Standard Treatment Guidelines

NIGERIA/2022

PUBLISHED BY THE FEDERAL MINISTRY OF HEALTH ABUJA, NIGERIA
IN COLLABORATION WITH WORLD HEALTH ORGANIZATION
AND CLINTON HEALTH ACCESS INITIATIVE

ISBN: 978-978-958-740-7

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Printed in Nigeria

FOREWORD

I am delighted to present the third edition of the Nigerian Standard Treatment Guidelines, 2022 as a tool in the healthcare delivery system to promote rational drug use, good prescription practice and also for antimicrobial stewardship to strengthen infection control among others.

The development and review of the Nigeria Standard Treatment Guideline (NSTG), National Drug Formulary and Essential Medicine List are under the mandate of the Review Committee statutorily established for Federal Ministry of Health through Decree 43 of 1989 (Now Act 252 LFN 2004).

The NSTG is a systematically developed statement designed to assist practitioners and patients in making decisions about appropriate healthcare in clinical practice. The document also identifies, summarizes and evaluates the highest quality of evidence and the most current data about prevention, diagnosis, therapy and prognosis, including dosage of medications, risk/benefit analysis and cost effectiveness. It has additional objectives such as standardized medical care to raise quality of care and reduce various risks to achieve the best balance between cost and cure.

It is expected that this third NSTG 2022 edition will be well utilized by Healthcare Providers at all levels of our Healthcare system, including the private sector, since it strictly followed due process and had wide consultations. I have no doubt the document will be utilized as a quick guide and as a reference in the management of patients and also serve as a training manual for medical students to improve our Health indices.

I commend the Committee, Experts and the Secretariat who worked hard to complete the 3rd edition of NSTG specially recognizing World Health Organization (WHO) and all Partners who supported the review.

Finally, I assure users of the Ministry's support in the circulation of this document to make NSTG relevant in the healthcare delivery system.

Dr. Osagie Ehanire MD, FWACS
Honourable Minister of health

PREFACE

This third edition of the Standard Treatment Guidelines (STG) provides the necessary information required for optimal health care delivery for the Nigerian populace in a wholistic manner while also taking into consideration some peculiarities in terms of personnel and resources available at various levels of the health care system. This is timely in view of the ever increasing knowledge about the management of already established and other emerging/re-emerging disease conditions.

The process of developing this document involved enormous committed efforts put together by experts in various therapeutic areas and various stakeholders following careful review of international best practices and ensuring that the specific guidelines are derived from evidence-based medicine. Notably, separate sections on Oncology and Intensive Care Unit (ICU) have been added to this edition in view of the increasing prevalence of clinical conditions requiring such specialized care in recent times. The accepted practices in the field of the special health projects such as HIV/AIDS, Malaria, TB/Leprosy programmes have also been adopted as the standard of care in these disease conditions.

It is hoped that practitioners will find these guidelines as a most useful reference document while however bearing in mind the need to individualize therapy depending on specific circumstances and periodic updates available for management of already existing clinical conditions and emerging diseases.

Special thanks and gratitude go to the Honourable Minister of Health, Dr. Osagie Ehanire for his encouragement and support towards the production of this document. Appreciation also goes to members of the National Drug Formulary/Essential Medicines List Review Committee, the body of experts in various therapeutic areas, the editorial board, programme managers, directors,

other relevant staff of the Federal Ministry of Health, Health Development partners for their support, input and provision of the needed logistics.

Thank you.

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February 2022

ACKNOWLEDGEMENTS

The third edition of the Nigeria Standard Treatment Guideline is a product of the support, recommendations and contributions of the following:

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LIST OF ABBREVIATIONS

ac	–	ante cibum (before food)
ACEI	–	Angiotensin Converting Enzyme Inhibitor
ACS	–	Acute coronary syndrome
ACTH	–	Adrenocorticotropic hormone
ADR	–	Adverse Drug Reaction
AFB	–	Acid – Fast Bacilli
ALA	–	Amoebic Liver Abscess
ALP	–	Alkaline Phosphatase
ALT	–	Alanine aminotransferase
ARB	–	Angiotensin II Receptor Blocker
ARDS	–	Acute Respiratory Distress Syndrome
AST	–	Aspartate aminotransferase
bd	–	bis die (twice daily)
BMI	–	Body Mass Index
BPPV	–	Benign Paroxysmal Positional Vertigo
BUN	–	Blood Urea Nitrogen
CA – 19 -9	–	Carbohydrate Antigen 19-9
CABG	–	Coronary Artery Bypass Surgery
CAPD	–	Continuous Ambulatory Peritoneal Dialysis
CBC	–	Complete Blood Count
CCB	–	Calcium Channel Blocker
CEA	–	Carcinoembryonic Antigen
CF	–	Complement Fixation Test
CHD	–	Congenita Heart Disease
CKD -MBD	–	Chronic Kidney Disease – Mineral and Bone Disorder
COAD	–	Chronic Obstructive Airway Disease
CREST	–	Calcinosis Raynaud's phenomenon Esophagus dysfunction Sclerodactyly Telangiectasias
CRP	–	C-reactive protein
CRPC	–	Castration Resistant Prostrate Cancer
CRT	–	Cardiac Resynchronization Therapy
CT	–	Computerized Tomography
CTG	–	Cardiotocography
DIC	–	Disseminated Intravascular Coagulopathy
DMARD	–	Disease-modifying antirheumatic drugs
DcSSc	–	Diffuse cutaneous systemic sclerosis
DST	–	dexamethasone suppression test

DVT	–	Deep Vein Thrombosis
E/U/Cr	–	Electrolyte, Urea, and Creatinine
ECG	–	Electrocardiography
ECT	–	Dexamethasone Suppression Test
ED	–	Erectile Dysfunction
ELISA	–	Enzyme-linked immunosorbent assay
ERCP	–	endoscopic retrograde cholangiopancreatography
ESA	–	erythropoietin -stimulating agents
ESR	–	erythrocyte sedimentation rate
ESWL	–	extra corporeal shock-wave lithotripsy
FANC	–	focused antenatal care
FBC	–	full-blood count
FEV	–	forced expiratory volume
FISH	–	flourescen in situ hybridization
FSH	–	follicle stimulating hormone
FVC	–	forced vital capacity
G6PD	–	glucose-6 phosphate dehydrogenase deficiency
GBS	–	Guillain-barre syndrome
GDM	–	gestational diabetes mellitus
GERD	–	Gastroesophageal Reflux Disease
GFR	–	glomerular filtration rate
GIC	–	glass ionomer cement
hCG	–	human chorionic gonadotrophin
HD	–	hemodialysis
HOCM	–	hypertrophic obstructive cardiomyopathy
HPLC	–	high performance liquid chromatography
HRCT	–	high-resolution computerized tomography
ICD	–	implantable cardioverter-defibrillator
ICS	–	inhaled corticosteroid
IFG	–	impaired fasting glucose
IGT	–	impaired glucose tolerance
INR	–	international normalized ratio
IOFB	–	Intra Ocular Foreign Body
IPSS	–	International prostrate symptom score
IVP	–	intravenous pyelogram
IVU	–	intravenous urogram
JVP	–	jugular venous pressure
KCCT	–	kaolin-cephalin clotting time
KUB	–	kidney ureter bladder

LABA	–	long-acting beta agonist
LCR	–	ligase chain reaction
LDL	–	low density lipoprotein
LFT	–	liver function test
LGV	–	lymphogranuloma venerum
LH	–	luteinizing hormone
LMWH	–	low molecular weight heparin
LVAD	–	left ventricular assist device
M/C/S	–	microscopy/culture/sensitivity
MAC	–	mycobacterium avium complex
MCH	–	mean corpuscular hemoglobin
MCHC	–	mean corpuscular hemoglobin concentration
MCV	–	mean corpuscular volume
MG	–	myaesthenia gravis
MIF	–	microimmuno-flurescence
MRCP	–	magnetic resonance cholangiopancreatopathy
MRSA	–	methicillin-resistant staphylococcus aureus
MVA	–	manual vacuum aspiration
NPO	–	nil per os
NSAIDs	–	non-steroidal anti-inflammatory agents
NSTEMI	–	Non-ST-Elevation Myocardial Infarction
od	–	omni die (every day)
OGLAs	–	oral glucose lowering agents
OGTT	–	oral glucose tolerance test
om	–	omni mane (every morning)
OTC	–	over the counter
pc	–	post cibum (after food)
PCP	–	pneumocystic carinii pneumonia
PCR	–	polymerase chain reaction
PCV	–	packed cell volume
PDA	–	patent ductus arteriosus
PEA	–	pulseless electrical activity
PEF	–	peak expiratory flow
PET-CT	–	positron emission tomography -computerized tomography
PID	–	pelvic inflammatory disease
PML	–	primary multifocal leucoencephalopathy
POEM	–	polyneuropathy, organomegaly, endocrinopathy, monoclonal gammopathy and skin changes
PPAR-γ	–	peroxisome proliferator-activated receptor gamma

prn	–	pro re nata (when require)
PRP	–	Platelet – Rich Plasma
PT	–	prothrombin time
PTTK	–	partial thromboplastin time with kaolin
qds	–	quarter die sumendum (to be taken four times daily)
qqh	–	quarter quaque hora (every four hours) stat immediately
RUCG	–	retrograde urethra-cystography
SABA	–	short-acting beta agonist
sCr	–	serum creatinine
SIRS	–	systemic inflammatory response syndrome
SSRI	–	selective serotonin reuptake inhibitors
STEMI	–	ST Elevation Myocardial Infarction
TCA	–	tricyclic antidepressant
TCD	–	Trans Cranial Doppler
tds	–	ter die sumendum (to be taken three times daily)
tid	–	ter in die (three times daily)
TMJ	–	temporomandibular joint
tPA	–	tissue plasminogen activator
TRH	–	thyrotropin -releasing hormone
TRIC	–	trachoma inclusion conjuctivitis
TSH	–	thyroid stimulating hormone
TDD	–	total digitalizing dose
UA	–	unstable Angina
UFC	–	urine free cortisol
VF	–	ventricular fibrillation
VSD	–	ventricular septal defect
VT	–	ventricular tachycardia
WHR	–	waist-hip ratio

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SECTION A

CHAPTER 1:

CARDIOVASCULAR SYSTEM DISORDERS

Acute Coronary Syndrome

Introduction

Spectrum of CAD comprising myocardial infarction with ST segment elevation (STEMI), or without ST segment elevation (NSTEMI) and unstable angina (UA) depending on clinical, ECG and enzyme changes. Guidelines for management of ACS are issued by ACC/AHA and ESC.

- STEMI: Angina, ST $\geq$ 1 mm (in $\geq$ 2 adjacent Limb leads) or $\geq$ 2 mm in $\geq$ 2 contiguous praecordial leads or new onset LBBB and elevated troponin
- NSTEMI: Angina ST depression $\geq$ 1 mm or T wave abnormalities; No ST segment elevation; Elevated troponin level
- Unstable angina: Rest angina, ST or T wave abnormalities; No ST segment elevation; No rise in troponin level

Clinical Features

- Focused history
- Chest pain similar in character to angina pectoris but greater in severity, longer in duration (> 30 mins), not relieved by nitrates, not specifically provoked by exercise or relieved by rest
- Autonomic disturbance: diaphoresis, vomiting, giddiness & anxiety
- History of risk factors, previous MI/intervention, stroke/asthma/bleeding tendencies
- Pulse: Tachycardia/bradycardia/arrhythmia
- BP: Normal/transient elevation/hypotension
- Pulmonary oedema

Differential Diagnoses

- Acute pulmonary embolism
- Acute pericarditis
- Acute aortic dissection
- Esophageal spasm
- Peptic ulcer disease

Complications

- Arrhythmia
- Pulmonary oedema
- Septal/chordae/myocardial wall rupture
- Stroke
- Ventricular aneurysm
- Pericarditis

Investigations

- 12 lead ECG within 10 mins of presentation with chest pain
- Serial ECG if there is diagnostic uncertainty or change in clinical status
- In inferior wall MI: do a right sided ECG (4VR) to exclude RV infarct (ST elevation > 1 mm)
- ECG diagnosis of STEMI in a setting of preceding LBBB is difficult, but the following are useful:
  - ST changes in the same direction
  - ST segment elevation > 7-8 mm
  - Coving of ST segment
  - Pathological Q wave in 2 consecutive leads and
  - Reciprocal changes
- Cardiac enzymes:
  - Cardiac troponin I & T are released within 4 hours of MI and remain elevated for up to 2 weeks
  - It is the most sensitive marker of myocardial damage. Useful in late presentation
  - MB-CK rises within 4-6 hours, peaks in a day and disappears by the second day
- Blood chemistry: Blood sugar, electrolytes (Na, K, Cl, Ca, Mg), urea, Cr, lipid levels, arterial blood gas
- C-Xray: Cardiomegaly & Pulmonary oedema
- Echocardiography
  - Regional wall motion abnormality
  - Pericardial effusion
  - Septal/chordae/ papillary muscle rupture
  - MR, LV function, RV function, PAP
- Coronary angiography: Delineate site (s) of lesion & number of vessels involved

Drug Treatment

General measures:

- Oxygen (100% 2 - 4 L/min) via nasal prongs if SaO2 < 90%
- Dual antiplatelet therapy:
  - Acetyl salicylic acid (aspirin) 300 mg stat; 75 mg daily + clopidrogrel 300 mg stat; 75 mg daily.
- Short acting nitrates (nitroglycerin):
  - Route: Sublingual (0.4 mg)
  - Buccal (1-5 mg 6 hourly)
  - Aerosol (400 μg per spray)
  - Long acting nitrates:
  - Oral isosorbide dinitrate 10 - 20 mg three times daily
  - IV route: IV nitroglycerin (5 - 10 g/min)

- Morphine: (2 - 4 mg) slow IV
- Lipid lowering drugs: Statins 10 - 40 mg daily
- ACEIs: Captopril (6.25 - 12.5 mg daily), lisinopril (2.5 - 10 mg daily depending on blood pressure status)
- ARBs:
  - Valsartan (80 mg daily), losartan (12.5 - 25 mg daily)
  - There is increased risk of hyperkalaemia, hypotension, and impaired renal function when angiotensin-II receptor antagonists are taken with ACE Inhibitors
- Beta blockers: Carvedilol (6.25 - 12.5 mg daily), metoprolol (25 - 50 mg daily)
- Calcium Channel Blockers (CCBs):
  - Rate limiting such as verapamil (40 - 80 mg three times daily) and diltiazem (30 - 60 mg three times daily)
  - Non rate limiting such as amlodipine (2.5 - 10 mg daily)
- Anxiolytics: Diazepam 5 mg daily
- Stool softener: Liquid paraffin 15 - 30 mL nocte
- Anticoagulant therapy
  - Heparin: Bolus of 60 units/kg body weight followed by 12 units/kg/hr
  - Heparin should not be given with streptokinase
  - LMWH: 1 mg/kg given twice daily
- Bed rest within the first 24 hours

Treatment of STEMI

- Reperfusion therapy (pharmacological)
- Indicated only in STEMI and in patients aged < 75 years
- Best benefit if given within 1-3 hours of AMI ("GOLDEN HOUR"). May be tried if patient reports within 6 - 12 hours, though benefit after 6 hours is uncertain
- Chances of successful reperfusion is about 50%
- Streptokinase (SK)
  - Activates fibrinolytic system
  - Antigenic, and dosage cannot be repeated until after at least 1 year
  - Dose 1.5 million units in 100 mL of normal saline given over 30 - 60 mins
- Recombinant tissue plasminogen activator (tPA)
  - Superior to, and more expensive than streptokinase
  - Not antigenic
  - Preferred to SK if there is hypotension
  - Higher risk of intracerebral haemorrhage

- Alteplase
  - 15 mg stat; then 0.75 mg/kg (max: 50 mg) over 30 mins; then 0.5 mg/kg (max: 35 mg) over 60 mins
- Medical intervention
  - Refer to centres for percutaneous coronary intervention where available and affordable: Balloon angioplasty, Stenting (Bare metal Thrombectomy)
- Surgical intervention:
  - Refer for coronary artery bypass graft (CABG) where available and affordable. Indicated in: Triple vessel disease, Proximal Left main coronary artery disease, Double vessel disease with proximal LAD lesion & Calcification.

Notable Adverse Drug Reactions, Contraindications and Caution

- Nitrates may cause headache and tolerance. Contraindicated in bradycardia and when SBP < 90 mmHg
- Beta blockers may precipitate bradycardia, heart failure, asthma and hypotension
- Thrombolytic agents may cause bleeding
- Heparin may induce thrombocytopenia
- Absolute contraindications to reperfusion therapy:
  - Active bleeding
  - Bleeding diathesis
  - Stroke within 3 months
  - Intracranial tumour
- Relative contraindications to reperfusion therapy
  - Severe hypertension (> 180/110 mmHg)
  - Recent trauma/CPR/c surgery
  - Active peptic ulcer
  - Oral anticoagulant therapy
  - Advanced liver diseases
  - Active cavitation PTB
  - Pregnancy and within 1 week post-partum

Prevention

- Life style modifications including regular exercise, optimum weight, high fibre and low saturated fat diet; cessation of cigarette smoking and moderate alcohol intake
- Treatment of hypertension, diabetes and hyperlipidaemia
- Others
  - Educate on benefits, outcome and complications of patient's condition and treatment modalities
  - Emphasize primary and secondary preventive measures as essential irrespective of treatment modality offered

Cardiac Arrhythmias

Introduction

Abnormalities of cardiac rhythm. Usually complicate acquired and congenital heart diseases

Classification

- Supraventricular such as atrial fibrillation which is the commonest cardiac arrhythmia in Nigeria
- Ventricular such as ventricular tachycardia

Clinical Features

- Mild arrhythmias might go unnoticed
- May present with:
- Palpitations
- Sudden collapse
- Dizziness
- Syncope
- Near-syncope
- Features of complications/underlying causes (s): cardiac failure, stroke, structural heart diseases, etc

Differential Diagnoses

- Anxiety

Complications

- Cardiac failure
- Stroke
- Peripheral embolic phenomena
- Sudden death

Investigations

- Electrocardiograph (resting, 24- hour Holter, 1 month Holter monitoring)
- Atrial fibrillation is characterized by absence of p waves, presence of fibrillary waves and varying RR interval
- Electrolytes including K and Mg; Urea and Creatinine
- Echocardiography
- Electrophysiology

Treatment Goals

- Abolish the arrhythmias
- Treat underlying cause
- Treat complications
- Prevent further arrhythmias

Non-drug Treatment

- Pacemaker insertion
- Ablation (electrophysiology)
- Cardioversion: acute arrhythmias

Drug Treatment
- Depends on the type of arrythmia
- Atrial fibrillation
- Rate Control:
  - Digoxin (0.125 - 0.375 mg daily) is the drug of choice in chronic atrial fibrillation
  - Beta blockers (atenolol 50 - 100 mg)
  - Calcium channel blocker (Verapamil 40 - 120 mg daily)
- Rhythm control: External cardioversion
- Prevention of atrial fibrillation: Amiodarone 100 - 400 mg daily
- Anticoagulation (warfarin 5 mg daily; maintain target INR 2-2.5)

Refer cases to a specialist for appropriate management

Supportive Measures
- Patient education
- Efficient systems to facilitate patient recovery

Notable Adverse Drug Reactions, Contraindications and Caution
- Anti-arrhythmias are pro-arrhythmics themselves
- Cardiac failure (all anti-arrhythmics)
- Blindness (amiodarone)

Prevention

Prevention and prompt management of predisposing conditions such as hypertension, rheumatic heart disease, diabetes mellitus, ischaemic heart disease, congenital heart diseases etc

Cardiomyopathies

Introduction

Refers to diseases of the heart muscle, characterized by inability of the heart to pump blood efficiently and to maintain normal electrical rythym. Heart muscle eventually become replaced with scar tissue. It could be acquired or inherited.

Causes:
- Genetic
  - Arrhythmogenic right ventricular cardiomyopathy
  - Hypertrophic cardiomyopathy
- Mixed (genetic and non-genetic)
  - Dilated cardiomyopathy
  - Restrictive cardiomyopathy
- Acquired
  - Myocarditis (inflammatory cardiomyopathy)

Clinical Features
- Asymptomatic
- Features of heart failure
- Sudden cardiac death (hypertrophic cardiomyopathy)

Differential Diagnoses

- Causes of heart failure

Complications

- Sudden cardiac death
- Thromboembolism
- Arrhythmias

Investigations

- Echocardiography
- Electrocardiography (ECG)
- Chest radiography
- B-type Natriuretic peptide

Non-drug Treatment

- Septal myectomy – open-heart surgery
  - implanted devices such as;
    Pacemaker –
    - This small device uses electrical pulses to prompt the heart to beat at a normal rate
    - Cardiac resynchronization therapy (CRT) device This device coordinates contractions between the heart's left and right ventricles
    - Left ventricular assist device (LVAD) This implantable device helps the heart pump blood to the body. An LVAD can be used for long-term therapy or as an interim treatment for those awaiting a heart transplant.
    - Implantable cardioverter defibrillator (ICD) An ICD helps to maintain a normal heartbeat by sending an electric shock to the heart if an arrhythmia, or irregular heartbeat, is detected
- Heart Transplant
- Alcohol septal ablation (nonsurgical procedure) – In this procedure, ethanol (a type of alcohol) is injected through a tube into the small artery that supplies blood to the area of heart muscle thickened by HCM. The alcohol causes these cells to die. The thickened tissue shrinks to a more normal size. The risks and complications of heart surgery increase with age. For this reason, ablation may be preferred to myectomy in older patients with other medical conditions.

Drug Treatment

- ACE inhibitors, angiotensin II receptor blockers, beta blockers and calcium channel blockers are drugs that lower blood pressure
- Anti-arrythmic drugs
- Diuretics
- Electrolyte replacement
- Anticoagulants
- Corticosteroids

Prevention

- You cannot prevent inherited types of cardiomyopathy. But you can take steps to lower your risk for conditions that may lead to (or complicate) cardiomyopathy, such coronary heart disease, high blood pressure and heart attack
- Cardiomyopathy can be precipitated by an underlying disease or condition. Treating that initial problem early enough may help prevent the complications presented by cardiomyopathy. For example, to control the underlying conditions of high blood pressure, high blood cholesterol and diabetes

Chronic Stable Angina (Angina Pectoris)

Clinical Features

Symptoms

Typically, retrosternal chest pain or heaviness worsened by exertion that radiates to the left upper arm, and radiating into the neck. Also tightness of the chest as if it is being tied

Angina equivalents include:

- Dyspnoea
- Palpitation
- Giddiness
- Fatigue
- Silent ischaemia may occur in the diabetics and the elderly

Signs

There may be no specific abnormal finding. Nicotine stain of the nails and cardiomegaly may be observed

Differential Diagnoses

- Pulmonary embolism
- Gastro-esophageal reflux disease (GERD)
- Pericarditis
- Aortic dissection
- Mitral valve prolapse syndrome
- Esophageal spasm
- Costochondritis

Investigations

- Resting ECG:
  - Normal in 50% of patients
  - ST depression
  - May show Q wave of previous MI
  - Exercise stress ECG: Positive test evidenced by ST depression ≥ 1 mm at the J point (planar or down sloping)
  - Arrhythmias or fall in BP
  - Sensitivity (68%); specificity (77%)

- Echocardiography:
  - May show segmental hypokinesia or dyskinesia, severe infarcts show global hypokinesia
- Laboratory evaluation:
  - FBG
  - Lipid profile
  - Electrolyte, Urea and Creatinine
  - Cardiac enzymes – Point of care or laboratory based (CK-MB, troponin, N-terminal B natriuretic peptide)
- Coronary angiography: Gold standard, invasive, expensive and done only when coronary artery bypass graft (CABG) or angioplasty is planned

Drug Treatment

- Anti-platelet therapy:
  - Acetyl salicylic acid: 75 mg orally daily

Or

  - Clopidogrel 75 mg orally daily
- Lipid lowering drugs:
  - HMG-CoA reductase inhibitors: Atovarstatin 10 - 20 mg orally daily
- Nitrates:

- Short acting nitroglycerin tablets 0.3-1 mg sublingually, repeated as required;
- 400 microgram spray/metered dose 1-2 doses under tongue

Or

- Intravenous infusion, 10 - 200 μg/minute, adjusted according to response; max. 400 μg/minute
- Long acting (Isosorbide dinitrate 30 - 120 mg three times daily, and up to 240 mg if required

Or

- Intravenous infusion, 2 - 10 mg/hr, higher doses up to 20 mg/hour may be required

- Beta blockers:

- Cardioselective (atenolol 50 - 100 mg daily; metoprolol 50 - 200 mg daily); Target pulse rate of 55 - 60 bpm. Taper over 3 - 10 days

- Calcium channel blockers

Dihydropyridine:

- Amlodipine 5 - 10 mg daily

Or:

- Nifedipine 20 - 60 mg daily

Or

Non-dihydropyridine:

- Verapamil 80 - 120 mg 8 hourly

- Angiotensin converting enzyme inhibitor:
- Captopril 6.25 - 12.5 mg daily; Other ACEIs may be used in patients with hypertension
- Angiotensin receptor blockers:
- Valsartan 80 - 160 mg daily

Non-drug Treatment

- Revascularization:
- Percutaneous coronary intervention
- Coronary artery bypass graft

Congenital Heart Disease

Introduction

A heart defect that occurs during the formation of the heart in utero could be fatal (i.e. causes intrauterine death, or death at anytime afterwards). An important cause of perinatal morbidity/mortality.

- Classified as cyanotic or acyanotic

Clinical Features

- Will depend on the type of the defect:
- Mild defects go unnoticed
- Stunted growth
- Cyanosis
- Failure to thrive
- Heart murmurs

Differential Diagnoses

- Rheumatic heart disease
- Endomyocardial fibrosis

Complications

- Embolic phenomena
- Cardiac failure

Investigations

- FBC and differentials
- Electrolyte, Urea and Creatinine
- Chest radiograph
- Electrocardiograhy
- Foetal echocardiography
- Angiography

Treatment Goals

- Relieve symptoms
- Treat the definitive defect(s)

Non-drug Treatment

Low salt diet

Drug Treatment

Treatment of cardiac failure if present with digoxin, diuretics and potassium supplements

Supportive Measures
Oxygen
Counselling
Prevention
- Pre-conception nutrition education
- Antenatal care
- Genetic counselling

Coronary Artery Disease
Introduction
A condition due to imbalance in oxygen demand and supply resulting predominantly from atherosclerotic disease of the coronary artery. Its incidence is on the rise in Nigeria as a result of epidemiologic transition from communicable to non-communicable diseases.
Traditional Risk Factors
- Diabetes mellitus
- Hypertension
- Cigarette smoking
- Obesity
- Dyslipidaemia
- Advanced aging
- Male gender
- Sedentary lifestyle
- Stressful lifestyle

Pathogenesis
- Atherosclerosis is the major underlying pathogenic factor (See Figure 1.1)
- Epicardial coronary artery stenosis:

- ≤ 60% occlusion is compensated for at rest
- 60%-90% occlusion causes ischaemia when there is increased oxygen demand
- 90% occlusion results in ischaemia even at rest

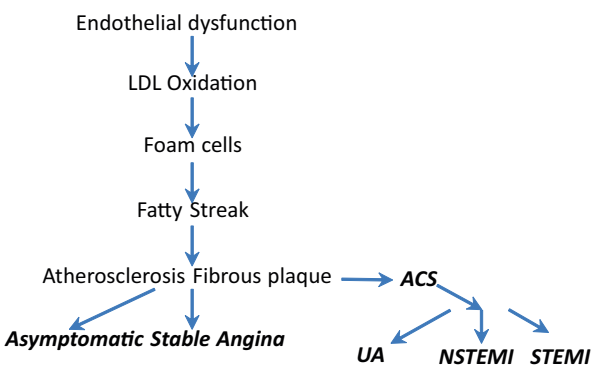

Figure 1.1: Pathogenesis of Coronary Artery Disease

Deep Venous Thrombosis

Introduction

Formation of blood clot(s) in the deep veins of the calf muscles or pelvis. It has the potential of being dislodged to the lungs, causing pulmonary embolism

Predisposing factors:

- Old age
- Obesity
- Hyper-coagulable states
- Long periods of immobilization e.g. cardiac failure, following surgery, long-distance travel, etc
- Varicose veins
- Pregnancy and puerperium
- Malignancies

Clinical Features

- Could be asymptomatic
- Pain and swelling of the leg (calf muscles)

Differential Diagnoses

- Cellulitis
- Infarctive crisis in sicklers
- Abscess (pyomyositis)

Complications

- Pulmonary embolism

Investigations

- FBC and differentials
- Prothrombin time
- KCCT
- Venous doppler of the leg/pelvic vessels
- Echocardiography
- Electrocardiography
- Venography (pelvic or calf veins)

Treatment Goals

- Lyse the clot
- Prevent clot from being dislodged
- Relieve inflammation

Non-drug Treatment

Avoid stasis, by encouraging ambulation and some degree of physical activity

Drug Treatment

- Achieve APTT of 1.5 to 2.5 of control:
- Heparin 5000 - 10,000 units by intravenous injection followed by subcutaneous injection of 15,000 units every 12 hours or intravenous infusion at 15 - 25 units/kg/hr, with close laboratory monitoring.
- Warfarin 1 - 5 mg orally daily for 6 - 12 weeks.
- Maintain Target INR at 2 – 2.5

Notable Adverse Drug Reactions, Contraindications and Caution
Bleeding from heparin, warfarin
Osteoporosis (heparin)
Prevention
Low molecular weight heparin 5000 units subcutaneously every 12 hours
Early mobilization

Heart Failure

Introduction
A clinical state (syndrome) in which the heart is unable to generate enough cardiac output to meet the metabolic demands of the body or does so at an increased filling pressure. The common causes in Nigeria include hypertension, dilated cardiomyopathy and rheumatic heart disease.
Cardiac failure may be acute or chronic

Clinical Features
- Major Diagnostic criteria:
  - Paroxysmal nocturnal dyspnoea
  - Orthopnoea
  - Raised jugular venous pressure
  - S_3
  - Pulmonary oedema
- Minor diagnostic criteria include:
  - Cough productive of frothy sputum
  - Leg swelling
  - Abdominal swelling
  - The prominence of particular symptoms will depend on which side is affected
  - Oedema
  - Tachycardia (about 100 beats per minute)
  - Displaced apex
  - Hepatomegaly, ascites

A diagnosis of heart failure requires 2 major or 1 major and 2 or more minor criteria

Differential Diagnoses
- Bronchial asthma
- Chronic obstructive airways disease (COAD)
- Chronic kidney disease
- Chronic liver disease

Complications
- Thrombo-embolic phenomena: stroke, pulmonary embolism
- Pre-renal azotaemia
- Arrhythmias

Investigations
- Chest radiograph
- Electrocardiography
- Echocardiography
- Electrolyte, Urea and Creatinine
- FBG
- Urine micro-analysis
- Full Blood Count with differentials

Treatment Goals
- Relieve symptoms
- Treat cause where feasible
- Treat precipitating factors
- Enhance quality of life
- Prevent complications
- Prolong life

Non-drug Treatment
- Bed rest
- Low salt diet
- Exercise (within limits of tolerance)
- Stop cigarette smoking
- Avoid excessive alcohol

Drug Treatment
- Diuretics
  - Furosemide: 40 - 160 mg intravenously or orally
  - Spironolactone: 25 daily
- Potassium supplements
  - Potassium chloride: 600 mg orally once, every 8 - 12 hours daily depending on the serum levels of potassium
  - Vasodilators
  - Angiotensin converting enzyme inhibitors (ACEIs): Captopril 6.25 - 25 mg every 12 hours preferably at bedtime

  Or
  - Lisinopril: 2.5 - 20 mg daily especially if there is hypertension
- Cardioselective blockers (moderate to severe cardiac failure)
  - Carvedilol: 3.125 - 25 mg daily. Initially 3.125 mg once to twice daily (with food); dose increased at intervals of at least 2 weeks to 6.25 mg twice daily, then to 12.5 mg twice daily, then to 25 mg twice daily; increase to highest dose tolerated, max. 25 mg twice daily in patients with severe heart failure or body weight less than 85 kg and 50 mg twice daily in patients over 85 kg

  Or
  - Metoprolol: 25 - 150 mg daily
- Venodilators
  - Nitrates: Glyceryl trinitrate (nitroglycerin): 0.3 - 1 mg sublingually and repeated as required

- Inotropes
  - Digoxin: 125 - 250 μg daily (the elderly may require 62.5 - 125 μg daily)
  - Dopamine : 2 - 5 μg/kg/minute by intravenous infusion
- Anticoagulants
  - Warfarin: monitor INR 2 - 2.5
  - Important in atrial fibrillation

Supportive Measures

- Pacemakers for arrythmias
- Ventricular assist devices

Notable Adverse Drug Reactions, Contraindications and Caution

- Digoxin: arrhythmias
- Potassium-sparing drugs: hyperkalaemia
- ACEIs: hypotension, hyperkalaemia
- Unless there is a compelling indication, do not combine potassium supplements with potassium-sparing drugs
- The dose and infusion rate for dopamine are critical
  - Low dose infusion rates will cause excessive hypotension
  - Higher infusion rates will elevate the blood pressure
- The use of β-blockers, atrial natriuretic peptide analogues and endothelin receptor antagonists should be reserved for specialist care

Prevention

- Adequate treatment of hypertension and diabetes mellitus
- Good sanitation and personal hygiene (to prevent rheumatic fever)

Hyperlipidaemia

Introduction

An increase in plasma lipid levels: Cholesterol, or its fractions, or triglyceridaemia. It can be primary (hereditary) or secondary with underlying diseases especially diabetes mellitus and hypertension.

A major risk factor for ischaemia heart disease

Clinical Features

Patients present with ischaemic heart disease or the underlying cause hyperlipidaemia

Signs include xanthomata, xanthelasmata, and corneal arcus

Differential Diagnoses

- Primary hyperlipidaemia
- Secondary hyperlipidaemia: diabetes mellitus,
- Nephrotic syndrome

Complications

- Ischaemic heart disease
- Peripheral vascular disease
- Stroke
- Hypertension

Investigations
- Lipid profile
- Urea, Electrolytes and Creatinine
- FBG
- Urine proteins
- Serum proteins (total and differential)

Treatment Goals
- Lower lipid levels
- Prevent or treat complications
- Treat underlying causes

Non-drug Treatment
- Stop smoking
- Reduce weight
- Exercise moderately and regularly
- Water soluble fibre: oat, bran

Drug Treatment
- Atorvastatin

Notable Adverse Drug Reactions, Contraindications and Caution
- Caution in patients with history of liver disease, high alcohol intake
- Hypothyroidism should be adequately managed before starting treatment with a statin
- Liver function tests mandatory before, and within 1 - month of starting treatment; thereafter at intervals of 6 months for 1 year
- Statins may cause reversible myositis, headache, diarrhoea, nausea, vomiting, constipation, flatulence, abdominal pain; insomnia

Prevention
- Dietary manipulation
- Early identification of individuals at risk

Hypertension

Introduction

A persistent elevation of the blood pressure above normal values (≥ 140/90 mmHg) taken 2-3 times on at least two different occasions. It is the commonest non-communicable disease in Nigeria

Clinical Features
- Largely asymptomatic until complications arise ("silent killer")
- Symptoms and signs of target organ diseases e.g. cardiac failure, stroke and chronic kidney disease

Complications
- Heart: Heart failure, ischaemic heart disease
- Brain: Stroke (ischaemic, hemorrhagic)
- Eye: Hypertensive retinopathy
- Kidney: Renal failure
- Peripheral artery disease

Investigations

- Urinalysis; urine microscopy
- Electrolyte, Urea and Creatinine
- Uric acid
- FBG
- Lipid profile
- Chest radiograph
- Electrocardiography
- Others as may be indicated:
- Echocardiography
- Abdominal ultrasound
- Renal angiography

Treatment Goals

- Educate patient about disease and need for treatment adherence
- Reduce blood pressure to acceptable levels
- Prevent complications (primary, secondary, tertiary)

Non-drug Treatment

- lifestyle modification
- Low salt diet: Not more than 1 level teaspoon of salt per day; No added salt; Avoid food preserved with salt
- Achieve/maintain ideal body weight (BMI 18.5 - 24.9 kg/m2)
- Stop smoking
- Reduce alcohol intake
- Regular exercise
- Reduce polyunsaturated fatty acid intake

Drug Treatment

Principles of drug Treatment

- Treatment should be individualized
- Most patients will require combination chemotherapy using drug from different classes
- Fixed dose combination is desirable when 2 or more drugs are required
- Drugs with at least 24 hours duration of action to ensure once daily dosing
- Diuretics should be included unless contraindicated
- ACEI and beta blockers are ineffective when used as monotherapy in blacks
- Treat coexisting cardiovascular risk factors
- All patients require lifestyle modifications
- Diuretics
    - Thiazides
    - Bendroflumethiazide: 2.5 - 10 mg orally daily

Or:

- Hydrochlorothiazide: 12.5- 50 mg orally daily

Or:

- Hydrochlorothiazide/amiloride: 25/2.5 mg daily

- Beta blockers
  - Atenolol: 25 - 100 mg orally daily
- Calcium channel blockers:
  - Nifedipine retard: 20 - 40 mg orally once or twice daily

  Or:
  - Amlodipine: 2.5 - 10 mg orally once daily
- Angiotensin converting enzyme inhibitors
  - Captopril: 6.25 - 50 mg orally once or every 8 - 12 hours

Or:

- Lisinopril: 2.5 - 20 mg orally once daily

- Angiotensin receptor blockers
  - Losartan: 50 - 100 mg orally daily
  - Valsartan: 80-160 mg daily
- Other vasodilators
  - Hydralazine: 25 - 100 mg orally once daily or every 12 hours

Or:

- Prazosin: 0.5 - 1 mg orally daily

- Centrally acting drugs
  - Alpha methyldopa: 250 - 500 mg orally twice, three or four times daily
- Treatment to be administered by experts
  - Involves the administration of antihypertensives by the parenteral route (usually intravenous hydralazine or sodium nitoprusside)

Supportive Measures

Patient/caregiver education

Notable Adverse Drug Reactions, Contraindications and Caution

- Angiotensin converting enzyme inhibitors, angiotensin receptor blockers: angioedema; dry cough with ACEIs
- Alpha methyldopa, thiazides and potentially other anti-hypertensive drugs may cause erectile dysfunction
- Alpha methyl dopa may cause postural hypotension
- SLE-like syndrome: hydralazine
- Do not use beta blockers in asthmatics and heart failure
- ACEI and ARB are teratogenic, contraindicated in pregnancy and to be used with caution in women in reproductive age group. Alpha methyl dopa, hydralazine, calcium channel blockers are safe in pregnancy Diuretics are relatively safe

Prevention

- Weight reduction
- Exercise moderately and regularly
- Public education
- Individual and Population based approaches

- Advocacy for the positive lifestyle change

Target blood pressure: BP< 140/90 mmHg for general population. BP < 130/80 mmHg for patients with diabetes or end stage renal disease

Infective Endocarditis

Introduction

A microbial infection of the endocardium and diseased heart valves (rheumatic heart disease, congenital heart disease, shunts and prosthetic valves).

May be acute or sub-acute. Some acute cases occur in normal valves in intravenous drug users, or may be part of systemic illness. Sub-acute form usually occurs on diseased valves

Causative organisms include: Streptococci, Staphylococci, Enterococci; Haemophilus, Actinobacillus, Cardiobacterium, Eikenella, and Kingella species ('Hacek' Organisms)

Clinical Features

- Acute:
  - High fever with rigors
  - Delirium
  - Shock
  - Development of new murmurs
  - Severe cardiac failure
  - Abscesses may form in many parts of the body (e.g. brain)
- Subacute:
  - Low-grade fever
  - Signs of carditis
  - Finger clubbing
  - Arthralgia
  - Splenomegaly
  - Osler's nodules
  - Janeway lesions
  - Roth spots

Differential Diagnoses

- Myocarditis
- Rheumatic heart disease

Complications

- Cardiac failure
- Destruction of heart valves
- Systemic embolism (could be infective)

Investigations

- FBC and differentials
- Urinalysis; urine microscopy
- Blood cultures X 3 (the yield is higher at the time of pyrexia)
- Chest radiography

- ECG
- Echocardiography

Treatment Goals

- Stop the infection
- Treat cardiac failure
- Prevent coagulation disorders

Non-drug Treatment

- Bed rest
- Low salt diet

Drug Treatment

Initiate therapy (culture results awaited) with:

- Benzylpenicillin: 7.2 g daily by slow intravenous injection or intravenous infusion in 6 divided doses for 4 -6 weeks. May be increased up to 14.4 g daily if necessary (e.g. in endocarditis)

Plus

- Gentamicin: 60 - 80 mg intravenously 12 hourly for 2 weeks

Following bacteriological confirmation, institute appropriate antimicrobial therapy

- Staphylococci:
  - Flucloxacillin: 250 mg - 2 g intravenously every 6 hours for 4 - 6 weeks
  - Vancomycin: 1 g intravenously 12 hourly; Gentamicin 60-80 mg intravenously 12 hourly for 2 weeks
- Enterococci:
  - Amoxicillin 2 g intravenously 4 hourly; intravenously Gentamicin 60-80 mg 12 hourly
- Candida
  - Systemic antifungals:
  - Amphotericin B: 0.8 - 1 mg/kg/day IV for at least 6 weeks

Plus

  - Flucytocine: 25 mg/kg/day in 6 hourly

Notable Adverse Drug Reactions, Contraindications and Caution

- Penicillin: rashes, anaphylaxis
- Gentamicin: nephropathy
- Monitor patients on gentamicin and vancomycin carefully

Prevention

Prophylactic antibiotics for patients at risk who are undergoing:

· Dental procedures under local or no anaesthesia

· For those who have NOT had endocarditis, and have NOT received more than a single dose of penicillin in the last one month:
  - Amoxicillin:
  - Adult: 3 g orally 1 hr before procedure
  - Child:
  - Under 5 years: 750 mg orally 1 hour before procedure
  - 5- 10 years: 1.5 g

- For penicillin-allergic patients or patients who have received more than a single dose of a penicillin in the previous one month:
  - Azithromycin
  - Adult: 500 mg orally one hour before procedure
  - Child:
  - Under 5 years: 200 mg orally
  - 5 - 10 years: 300 mg
- Patients who have had endocarditis:
  - Amoxicillin plus gentamicin intravenously as for procedures under general anaesthesia (see below)
- Dental procedures under general anaesthesia, and no special risk:
  - Amoxicillin
  - Adult: 1 g intravenously at induction of anaesthesia; mg orally 6 hours later
  - Child:
  - Under 5 years: a quarter of adult dose
  - 5 - 10 years: half adult dose

Or:

  - Adult: 3 g orally 4 hours before induction, then 3g as soon as possible after the procedure
  - Child:
  - Under 5 years: a quarter of adult dose
  - 5 - 10 years: half adult dose
- Special risk, e.g. previous infective endocarditis, or patients with prosthetic valves:
  - Amoxicillin plus gentamicin intravenously
  - Adult: 1 g amoxicillin plus 120 mg gentamicin at induction then oral amoxicillin 500 mg 6 hours after procedure
  - Child:
  - Under 5 years: a quarter of adult dose of plus 2 mg/kg gentamicin intravenously at induction
  - 5 - 10 years: half adult dose for amoxicillin; 2 mg/kg gentamicin
- Patients who are penicillin-allergic or have received more than a single dose of a penicillin in the last one month
  - Vancomycin
  - Adult: 1 g intravenously over at least 100 minutes
  - Child under 10 years: Vancomycin 20 mg/kg

Plus

  - Gentamicin
  - Adult: 120 mg intravenously - Given at induction or 15 minutes before procedure
  - Child under 10 years: Vancomycin 20 mg/kg

- Genito-urinary tract manipulation
- As for special risk patients undergoing dental procedures under general anaesthesia
- Obstetrics, gynaecological and gastrointestinal procedures
- As for genitourinary tract manipulation

Myocarditis

Introduction

Acute inflammatory process affecting the myocardium that may occur in association with endocarditis and pericarditis.

Possible causes:

- Infections: viral including HIV, bacterial, protozoa
- Toxins e.g. scorpion sting
- Poisons e.g. alcohol
- Drug allergy e.g. penicillin
- Deficiencies e.g. thiamine
- Physical agents e.g. radiation

Clinical Features

- Largely asymptomatic
- A few may present with palpitations; symptoms of cardiac failure
- Signs:
  - Arrhythmias
  - Tachycardia
  - Raised JVP
  - Cardiomegaly
  - S_3or S_4(with or without murmurs of regurgitation in the mitral/tricuspid areas)

Differential Diagnoses

- Other forms of cardiac failure, e.g. peripartum cardiomyopathy

Complications

- Cardiac failure
- Arrhythmias
- Thrombus formation

Investigations

- Electrocardiography
- Echocardiography
- FBC and differentials
- Electrolyte, Urea and Creatinine
- Cardiac enzymes
- Endomyocardial biopsy

Treatment Goals

- Eliminate/withdraw the offending agent(s)
- Treat the effect on the heart
- Treat complications

Non-drug Treatment
- Bed rest

Drug Treatment
- Treat underlying cause(s)
- Anti-arrhythmics (depends on the type of arrhythmias)
- Anticoagulant: warfarin
- Anti-cardiac failure: digoxin, diuretics, potassium supplements
- Steroids: prednisolone (not in all cases)
- Multivitamins
- Anti-oxidants: ascorbic acid (vitamin C), vitamin E

Notable Adverse Drug Reactions, Contraindications and Caution
- Antiarrhythmics may be pro-arrhythmic
- Anticoagulants: bleeding
- Steroids: fluid retention, dyspepsia
- Diuretics: dehydration, electrolyte imbalance

Prevention
- Prevent infection (viral, bacterial, etc)
- Prevent exposure to toxins
- Nutrition education

Pericarditis

Introduction

An inflammation of the pericardium, which may arise from viral, bacterial, fungal or protozoal infections

Other causes: metabolic, malignancy, connective tissue disease, radiation, trauma etc

May be acute or chronic

Clinical Features

Acute pericarditis:
- Chest pain
  - Retrosternal
  - Sharp
  - Radiating to the left shoulder
  - Made worse by breathing or coughing
  - Relieved by the upright position
- Low-grade fever
- Pericardial friction rub

Chronic pericarditis:
- Insidious onset
  - Dyspnoea on exertion
  - Leg and abdominal swelling

Differential Diagnoses
- Endomyocardial fibrosis
- Sarcoidosis
- Amyloidosis

Complications
- Pericardial tamponade
- Constrictive pericarditis

Investigations
- Electrocardiography
- FBC and differentials
- Chest radiograph
- Echocardiography

Treatment Goals
- Relieve distress from pain and tamponade
- Relieve constriction
- Treat the effect on the heart
- Treat complications
- Eradicate the organism (if cause is infection)

Non-drug Treatment
- Bed rest

Drug Treatment
- NSAIDs
  - Indomethacin 50 mg orally every 8 hours

Or:
  - Ibuprofen 400 - 800 mg orally every 12 hours

· Steroids
  - Predni

  solone 30 mg orally every 8 hours and tapered
- Anti-tuberculous drugs or other antimicrobial agents (if mycobacterium or other microbes are causative)

Supportive Measures
- Pericardiocentesis
- Pericardiectomy

Notable Adverse Drug
Reactions, Contraindications and Caution
NSAIDs/steroids: dyspepsia and upper GI bleeding

Prevention
- Avoid radiation
- Prevent infection

Peripheral Vascular Disease

Introduction
Chronic and progressive disease due to the atherosclerotic narrowing of the peripheral blood vessels. Commonly affects the peripheral arteries of the legs. Others peripheral vessels that may be affected are that of stomach, arms or head.

Clinical Features

- Hair loss on the feet and legs and brittle toenails
- Intermittent claudication
- Numbness in the legs.
- Sores or ulcers on the legs and feet that take a long time to heal
- Difficulty in finding a pulse in the leg or foot.
- Erectile dysfunction

Differential Diagnoses

- Deep venous thrombosis (DVT)
- Lumbar (intervertebral) disk disorders
- Mechanical back pain
- Septic thrombophlebitis
- Superficial thrombophlebitis

Complications

- Amputation
- Poor wound healing.
- Restricted mobility due to pain or discomfort.
- Severe pain in the affected extremity.
- Stroke

Investigations

- Ankle Brachial Index(ABI)
- A pulse volume record
- A vascular ultrasound

Treatment Goals

- To reduce cardiovascular risk
- To manage symptoms
- To prevent limb loss.

Non-drug Treatment

- Lifestyle modifications (cessation of smoking, exercise, healthy diet, care of feet)
- Management of conditions, such as diabetes and high blood pressure

Drug Treatment

- Antiplatelet:
  - Low-dose aspirin 81 to 325 mg/day
  - Clopidogrel 75 mg daily is an alternative
- Anticoagulant: heparin and warfarin are anticoagulant medications.
- Phosphodiesterase III inhibitor
  - Cilostazol: 100 mg twice daily

· Pentoxifylline: (To improves blood flow to the extremities)

· Antihypertensives may to prevent strokes and heart attacks

Notable Adverse Drug Reactions, Contraindications and Caution

- Headache, diarrhoea, and dizziness.

Surgical Treatment
- Revascularisation
- Angioplasty
- Artery by pass graft

Prevention
- Advice against smoking, high cholesterol and high blood pressure

Pulmonary Oedema

Introduction

Occurs when there is congestion of the lungs with fluid, usually in a scenario of left-sided cardiac failure. Results in stiffness of the lungs and flooding of the alveoli, with difficulty in breathing. May also follow inflammatory processes. May be acute or chronic

Clinical Features
- Difficulty in breathing, with a sensation of drowning
- Cough productive of frothy (sometimes pink) sputum
- Central cyanosis
- Sweating, agitation etc
- Other symptoms of left-sided cardiac failure
- Wide-spread crepitations
- Rhonchi (in severe cases)
- Other signs of left-sided cardiac failure

Differential Diagnoses
- Pulmonary embolism
- Pneumonia

Complications
- Hypoxaemia
- Coma

Investigations
- Chest radiograph
- Electrocardiography
- Echocardiography
- Blood gases
- Urea, Electrolytes and Creatinine
- D-Dimer

Treatment Goals
- Relieve oedema
- Relieve discomfort
- Treat underlying cause

Non-drug Treatment
- Propped up position
- Bed rest
- Sit on bed with legs hanging down

Drug Treatment
- Oxygen: 3 - 5L/min
- Morphine: 10 mg stat
- Loop diuretics:
  - Furosemide: 40 - 120 mg intravenously stat; maintenance with 40 - 500 mg daily in single or divided doses
- Venodilators:
  - Nitrates: Glyceryl trinitrate 0.3-1 mg by mouth or 10-200 microgram/min intravenously
- Vasodilators: Hydralazine 25 - 50 mg 12 hourly; ACEI (Captopril: 6.25-25 mg by mouth)
- Aminophylline 250 - 500 mg or 5 mg/Kg intravenously over 10 minutes

Supportive Measures
- Nursing care (e.g. nurse in cardiac position)

Notable Adverse Drug Reactions, Contraindications and Caution
- Diuretics: hypokalaemia
- ACEIs: First dose hypotension, dry cough, hyperkalaemia
- Nitrates: Hypotension
- Aminophylline: Arrhythmias

Prevention
- Treat cause(s) of cardiac failure or fluid overload (e.g. renal failure)
- Judicious administration of blood and intravenous fluids

Rheumatic Fever

Introduction

A result of abnormal reaction of antibodies developed against antigens of group A β- haemolytic streptococcus.

Infection is usually of the throat; occasionally the skin in a sensitized individual. Antigen-antibody complex damages the heart (endocardium, myocardium and pericardium).

Commonest streptococcal strains in Africa are C and G

Clinical Features

Duckett-Jones' diagnostic criteria
- Major:
  - Carditis
  - Sydenham's chorea
  - Erythema marginatum
  - Subcutaneous nodules
  - Arthritis (migratory polyarthritis)
- Minor:
  - Fever
  - Leucocytosis

- Arthralgia
- Raised ESR
- Raised ASO titre (> 200 IU)
- Prolonged PR interval

Supporting evidence of antecedent group A streptococcal infection: Positive throat culture or rapid streptococcal antigen

Diagnoses

· Two major criteria

Or

· One major plus 2 (or more) minor criteria

Differential Diagnoses

- Malaria
- Viral infection
- Pyrexia of undetermined origin
- Connective tissue disease

Complications

- Rheumatic heart disease
- Arrhythmias
- Cardiac failure

Investigations

- FBC and differentials
- ASO titre
- ESR
- Electrocardiograph
- Echocardiography
- Chest radiograph
- Throat swab for microscopy, culture and sensitivity

Treatment Goals

- Relieve symptoms
- Treat the bacterial throat infection
- Reduce or abolish inflammatory process
- Treat cardiac failure if present

Non-drug Treatment

- Bed rest

Drug Treatment

- Antibiotics
  - Penicillin V
  - Adult: 500 mg orally every 6 hours, increased up to 1g 6 hourly in severe infections
  - Child:
  - 1 month - 1 year: 62.5 mg orally every 6 hours increased in severe infection to ensure at least 12.5 mg/kg/dose
  - 1 - 6 years: 125 mg every 6 hours increased in severe infection to ensure at least 12.5 mg/kg/dose

- 6 - 12 years: 250 mg every 6 hours, increased in severe infection to ensure at least 12.5 mg/kg/dose
- 12 - 18 years: 500 mg every 6 hours, increased in severe infection up to 1 g/dose

Or

- Erythromycin
- Adult and child over 8 years: 250 - 500 mg orally every 6 hours or 500 mg - 1 g every 12 hours; up to 4 g daily in severe infections
- Child:
- Up to 2 years: 125 orally mg every 6 hours
- 2 - 8 years: 250 mg every 6 hours; doses doubled for severe infections

- Salicylates
  - Aspirin (acetylsalicylic acid)
  - Adult: 300 mg - 1 g orally every 4 hours after food; maximum dose in acute conditions 8 g daily
  - Child: not recommended for use
- Steroids (if salicylates are ineffective)
  - Prednisolone
  - Initially, up to 10 - 20 mg orally daily; up to 60 mg daily in severe disease (preferably taken in the morning after breakfast); dose can often be reduced within a few days, but may need to be continued for several weeks or months. Maintenance 2.5 -15 mg orally daily
- Prophylaxis against rheumatic fever
  - Benzathine penicillin 720 mg (1.2 million units) intramuscularly 3 - 4 weekly until the age of 25 years or for life

Notable Adverse Drug Reactions, Contraindications and Caution

- Penicillin: anaphylactic reaction
- Salicylates; steroids: peptic ulceration
- Cushingoid effects are increasingly likely with doses of prednisolone above 7.5 mg daily

Prevention

- Good sanitation
- School surveys - identify carriers of streptococcus and treat
- Secondary prevention and prophylaxis against endocarditis

Rheumatic Heart Disease

Introduction

A complication of rheumatic fever and common cause of cardiac failure in Nigeria. In Africans it manifests later compared to Caucasians. The mitral valve is most affected, followed by the aortic, then the tricuspid. The lesions can occur in various combinations of regurgitation and stenosis

Clinical Features

- Exertional dyspnoea
- Paroxysmal nocturnal dyspnoea

- Orthopnoea
- Leg and abdominal swelling
- Cough with production of frothy sputum
- Pedal and sacral oedema
- Small volume pulse, which may be irregular
- With or without tachycardia
- With or without hypotension
- Raised JVP
- Displaced apex
- Left ventricular hypertrophy
- Right ventricular hypertrophy
- Thrills
- Palpable P_2
- Soft S1; loud P_2
- S_3or S_4
- Systolic/diastolic murmursDifferential Diagnoses
- Constrictive pericarditis
- Endomyocardial fibrosis
- Dilated cardiomyopathy

Complications

- Arrhythmias e.g. atrial fibrillation, heart block
- Cardiac failure
- Embolic phenomena
- Endocarditis

Investigations

- Chest radiograph
- Electrocardiography
- Echocardiography
- Coronary angiography
- Electrolyte, Urea and Creatinine

Treatment Goals

- Relieve symptoms
- Prevent recurrence of rheumatic attack
- Repair and replace affected valves

Non-drug Treatment

- Bed rest
- Low salt diet

Drug Treatment

- Treat for heart failure if present
- Use anticoagulants if necessary
- Prophylaxis against endocarditis (see Infective Endocarditis)
    - Benzathine penicillin 720 mg (1.2 million units) intra muscularly monthly for life

- Other measures:
  - Valve replacement
  - Valve repair
  - Treat endocarditis

Notable Adverse Drug Reactions, Contraindications and Caution

- Penicillin may cause hypersensitivity reaction / anaphylaxis. Caution in patients with a history of penicillin allergy

Prevention

Personal hygiene and good sanitation to prevent recurrence of rheumatic fever

CHAPTER 2:

CENTRAL NERVOUS SYSTEM DISORDERS

Dizziness

Introduction

Simply means 'light-headedness' and results from impaired supply of blood, oxygen and glucose to the brain; may suggest some form of unsteadiness, or could precede a fainting spell.

Aetiology

- Side effects of medications notably anti-hypertensives and sedatives
- Anaemia
- Arrhythmias
- Fever
- Hypoglycaemia
- Transient ischaemic attack suggestive of brain stem lesions
- Alcoholism
- Excessive blood loss
- Prolonged standing
- Autonomic neuropathy (especially in diabetic patients)

Clinical Features

Light-headedness: Feeling faint especially on attempting to stand or after squatting, and Weakness. Dizziness may be accompanied by vertigo (giddiness) in some individuals and may culminate in loss of consciousness.

Differential Diagnoses

- Benign positional vertigo; Labyrinthine disorders; Hysteria; Premonitory symptoms of epilepsy;
- Migraine aura; Warning symptom of posterior circulation stroke (posterior inferior cerebellar artery)
- Cervical spondylosis with compression of vertebral artery and Brain tumour (acoustic neuroma)

Complications

- Falls with fractures
- Stroke
- If due to intracranial tumour: raised intracranial pressure with coning is a distinct possibility
- If due to other intracranial pathology, there may be cranial nerve palsies

Investigations

- Full Blood Count and differentials
- Electrocardiography
- Echocardiography
- Random blood glucose
- X-ray of the sinuses
- Neuro-imaging: CT scan, MRI and carotid Doppler ultrasound

Treatment Goals

- Eliminate symptoms
- Prevent recurrence

- Drug Treatment

Non-drug Treatment

- Stop all medicines suspected to be responsible
- Physiotherapy: pressure stockings

Drug Treatment

- For severe attacks
- Prochlorperazine
  - Adult: 20 mg initially then 10 mg after 2 hours
  - Child (> 10 kg): 0.25 mg/kg 2 to 3 times daily
  - Not recommended for children less than 10 kg
- Cinnarizine:
  - Adult: 25 mg three times daily or 75 mg at once
  - Child:
    - > 12 years: Same as adult dose
    - 5 - 12 years: 15 mg three times daily
- Aspirin tablets as an anti-platelet agent but recommended for children

Notable Adverse Drug Reactions, Contraindications and Caution

- Aspirin and other NSAIDs to be used with caution in patients with history of dyspepsia, asthma (especially aspirin)

Prevention

- Avoid precipitants which should be identified early for effective prevention

Headaches

Introduction

It is the commonest neurological disease in outpatient practice. Headache is defined as pain or discomfort in the head and the surrounding structures. Can be classified into primary (idiopathic) and secondary

Primary headache types

- Tension-type
- Migraine with or without aura
- Cluster headache
- Trigeminal neuralgia
- Headaches associated with coughing and sexual activity

Secondary causes

- Intracranial space-occupying lesions like brain tumours, subdural haematoma
- Vascular lesions
- Strokes
- Infections, notably HIV, herpes zoster
- Disorders of homeostasis affecting cerebral circulation
- Alcohol hangover and other substance use disorders
- Medication overuse
- Irritation of sensory cranial nerves (neuralgias)
- Inflammation or diseases of structures/organs in the head region (eyes, nose, sinuses, ears and cervical vertebrae) and post-epileptic state

Atypical headache
- Headache occurring in unusual circumstances like in sleep disorders (hypoxia)
- Brain stem malformations

Clinical Features
- Depends on the type/cause(s):

Primary Headaches

Migraine

Introduction

Headache results from changes in the calibre of certain blood vessels in the brain with accompanying physical, autonomic and emotional disturbance. It can be very incapacitating and affects productivity.

Each headache attack lasts for a few hours to a maximum of 3 days but can be aborted with appropriate intervention. More females affected than males, usually between the ages of 15 and 50 years

Clinical Features
- Migraine without aura (old name: common migraine)
  - Throbbing pain usually affecting one side of the head around the temples, associated nausea and vomiting with dislike of light and noise but without warning symptoms.
- Migraine with aura (old name: classical migraine)
  - Throbbing headache usually preceded by seeing flashes of light and disturbances in the field of vision (scotomas) with visual hallucinations
- Childhood periodic syndromes that may be associated with headache include: Abdominal pain and vomiting; alternating hemiplegia and benign positional vertigo
- Basilary artery migraine: Predominantly brain stem symptoms which include dysarthria; vertigo; tinnitus; decreased hearing; diplopia and ataxia
- Migraine headache may coexist with tension-type headache and there may be no pain (migraine equivalent) usually encountered in psychiatry
- Some individuals present with complications like stroke, ophthalmoplegia or status attacks: unrelieved, persistent headaches

Tension-type Headache
- The most common type and is characterised by heaviness in the head, crawling sensation, "peppery sensation" and tight-band sensation around the head. Other symptoms include: poor sleep and disturbed concentration

Cluster Headache
- Recurrent, frequent, brief attacks of disturbing pain in the head (mainly around the eyes and forehead); redness of the eyes; nasal stuffiness and occasional drooping of the eyelids

Persistent Daily Headache
- Daily attacks of pain on the head that mimic tension-type pain and could have pulsating quality

- Associated with chronic use of analgesic drugs (Medication Overuse Headache) which then sets up a vicious cycle and may point to underlying stress or emotional disturbance

Secondary headaches:

There is a defined underlying cause and the "red flags" include fever, early morning vomiting; neck stiffness; alteration in level of consciousness; seizures; cranial nerve deficits; limb weakness (hemiparesis, quadriparesis); papilloedema as evidence of raised intracranial pressure; evidence of disease in other organs and historical evidence of substance or alcohol abuse

Differential Diagnoses

- Epilepsy
- Hysteria (conversion disorder)
- Glaucoma
- Multiple sclerosis
- Refractive error
- Cervical spondylosis
- Brain tumour
- Haemorrhagic stroke

Complications

Depend on the cause and type

- Most headache attacks are benign with no sequelae apart from reduced economic productivity/wastage of medications
- The dreaded complication is coning from raised intracranial pressure
- Blindness may follow temporal arteritis and unrelieved raised pressure in idiopathic intracranial hypertension (pseudotumour cerebri)
- The risk of epilepsy is higher in those who suffer from migraine headache

Investigations

- Neuroimaging such as computerized tomographic (CT) scan, MRI for the exclusion of mass lesions and electroencephalography, skull X-ray
- Cerebrospinal fluid examination for pressure, cells and chemistry, erythrocyte sedimentation rate
- Angiography

Treatment Goals

- Eliminate pain
- Treat the precipitating factor
- Prevent recurrence

Non-drug Treatment

- Manage in a quiet (and dark) room, Psychotherapy and Physiotherapy/biofeedback

Drug Treatment

Acute attack (migraine headache)

- Aspirin (acetylsalicylic acid)
  - Adults 300 - 900 mg every 4 - 6 hours when necessary; maximum 4 g daily

Plus

- Metoclopramide or other non-steroidal anti-inflammatory agents
- *Child:* not recommended (risk of Reye's syndrome)

• Oral sumatriptan: Initial dose: 25 mg, 50 mg, or 100 mg orally, once. Dose may be repeated after at least two hours if migraine recurs (max. 300 mg in 24 hours)
• Ergotamine preparations (useful only during the aura phase)
  - Adult: 1-2 mg orally at first sign of attack; maximum 4 mg in 24 hours
  - Do not repeat at intervals of less than 4 days; maximum 8 mg in any one week
  - Not to be used more than twice in any one month
• Narcotic analgesics – pethidine, codeine

Prophylaxis should be considered for individuals who:

• Suffer at least 2 attacks a month, or those with an increasing frequency of headaches
• Suffer significant disability in spite of suitable treatment for acute attacks
• Cannot take suitable treatment for acute attacks
• Available options are:
  - Propranolol 40 mg orally every 8 - 12 hours
  - Tricyclic antidepressants, notably amitriptyline 10 mg orally at night, increased to a maintenance dose of 50-75 mg at night
  - Sodium valproate - initially 300 mg orally every 12 hours, increased if necessary, to 1.2 g daily in two divided doses

In refractory cases:

- Cyproheptadine (an antihistamine with serotonin-antagonist and calcium channel-blocking properties) 4 mg orally; a further 4 mg if necessary; maintenance 4 mg every 4 - 6 hours

Drug Treatment

Primary headaches

• Simple analgesics and non-steroidal anti-inflammatory agents
• Tricyclic antidepressants e.g., amitriptyline 10 - 25 mg daily at night
• Anxiolytics e.g., bromazepam 1.5 - 3 mg at night. Use lower doses for elderly patients
• Stop analgesic use in individuals with persistent daily headaches

Secondary headaches

• Medical or surgical management of identified causes
• Antibiotics for infections like meningitis, sinusitis; steroids for vasculitis

Notable Adverse Drug Reactions, Contraindications and Caution

• Aspirin and other NSAIDs: use with caution in patients with history of dyspepsia, and asthma
• Tricyclic antidepressants: use with caution in the elderly and in individuals with respiratory diseases, cardiac symptoms, muscle weakness, myasthenia gravis and organic brain damage. In those with history of drug or alcoholic dependence and personality disorder, there is increased risk of dependence, avoid prolonged use or abrupt withdrawal thereafter. Drowsiness may affect performance of skilled tasks (e.g., driving), effects of alcohol

enhanced anticholinergic effects e.g., urinary retention in the elderly.
- Ergotamine: use should not exceed 4 - 6 mg per attack
  - Caution in patients with vascular and renal disorders
  - Not recommended for children
- Opiates: risk of addiction
- B-blockers can slow down heart rate and reduce sensitivity to hypoglycaemia in diabetics

Prevention
- Reduce stress levels and avoid precipitants which must be identified for effective Prevention
- Prophylactic medications if attacks last more than 15 days a month, or are severely incapacitating (in the absence of other causes) and early detection and management of refractive errors, sinusitis, otorhinolaryngologic and dental problems.

Meningitis

Introduction

An infection of the meninges with the presence of pus and inflammatory cells in the cerebrospinal fluid.

A medical emergency, associated with considerable morbidity and mortality.

May be bacterial (Pneumococcus, Meningococcus, tubercle bacilli, Haemophilus influenzae), viral, fungal, protozoal, neoplastic or chemical.

Epidemics occur in the Savannah region and are usually caused by Neisseria meningitidis.

Clinical Features
- Neck stiffness and positive Kernig's sign
- High grade fever
- Headache
- Vomiting
- Photophobia with alteration in level of consciousness
- If due to Pneumococcal and H. influenzae infection, additional features are jaundice, pneumonia and heart failure
- Meningococcal infection presents additionally with joint pain, joint swelling, red eyes and skin rash
- Tuberculous infection presents with weight loss, cough with blood in sputum while those with underlying immunosuppression (HIV infection) may manifest severe weight loss, diarrhoea, mouth lesions and skin rash

Other Presentations
- Fever of unknown origin (chronic meningitis)
- Mass lesion with focal neurological deficits (tuberculoma)
- Stroke-like syndrome: resulting from vasculitis
- Uncontrolled seizures (status epilepticus)
- Acute psychosis (Organic Brain Syndrome) and dementia (chronic meningitis and pachymeningitis due to syphilis)

Differential Diagnoses
- Subarachnoid haemorrhage
- Cerebral malaria
- Septicaemia with meningism
- Tetanus
- Cerebral venous thrombosis

Complications
- Cranial nerve palsies notably blindness and deafness
- Subdural pus collection (empyema)
- Stroke (from vasculitis)
- Epilepsy
- Syndrome of Inappropriate Anti-Diuretic Hormone secretion (SIADH)

Investigations
- Lumbar puncture for CSF analysis
  - To demonstrate presence of inflammatory cells (after exclusion of raised intracranial pressure by fundoscopy or CT scan)
- Full Blood Count and differentials; Blood culture; Erythrocyte sedimentation rate
- Random blood glucose
- Electrolytes, Urea and Creatinine
- Chest radiograph; Mantoux test (if tuberculosis is suspected)
- HIV screening after voluntary counseling

Treatment Goals
- Eliminate the organism
- Reduce raised intracranial pressure
- Correct metabolic derangements
- Treat any complications.

Non-drug Treatment
- Tepid-sponging to reduce fever
- Attention to calories and fluid/electrolyte balance
- Physiotherapy (for passive muscle exercises)
- Nursing care (e.g., frequent turning and bladder care) to prevent decubitus ulcers and urinary tract infection

Drug Treatment
- Initial therapy will depend on the age of the patient and the causative agent, hence should be guided by microbiology results.

Bacterial infections
- acute conditions 8 g daily
  - Child: not recommended for use
- Diazepam (for seizures)
  - Adult: 10 - 20 mg at a rate of 0.5 ml per 30 seconds, repeated, if necessary, after 30-60 minutes; may be followed by intravenous infusion to a maximum of 3 mg/kg over 24 hours
  - Child: 300-400 μg/kg (maximum 20 mg) by slow intravenous injection into a large vein for protracted or frequent recurrent convulsions. (Note:

Not required in single, short-lived convulsions) Intravenous therapy should be continued until the fever has settled and continued for another 3 days. Thereafter, oral medications can be used for a minimum treatment period of 10 -14 days

- Vancomycin can be used for suspected Methicillin-resistant Staphylococcus aureus infection (MRSA)
- Intravenous penicillin G should be used with caution because of possible severe anaphylactic reaction that can lead to sudden death

Acute cerebral decompression

- Furosemide
  - Adult: 40 - 80 mg every 8 hours by slow intravenous injection (for a maximum of 6 doses)
  - Neonate: 0.5-1 mg/kg every 12 - 24 hours (every 24 hours in neonates born before 31 weeks gestation)
  - 1 month - 12 years: 0.5 - 1 mg/kg (maximum 4 mg/kg), repeated every 8 hours as necessary
  - 12 - 18 years: 20 - 40 mg, repeated every 8 hours as necessary; higher doses may be required in resistant cases

Or:

- Mannitol 20% solution
  - Adult: 50-200 g by intravenous infusion over 24 hours, preceded by a test dose of 200 mg/kg by slow intravenous injection
  - Neonate: 0.5-1 g/kg (2.5-5 mL/kg of 20% solution) repeated if necessary 1-2 times after 4-8 hours
  - 1 month - 18 years: 0.5 - 1.5 g/kg (2.5 - 7.5 ml/kg of 20% solution); repeat if necessary 1 - 2 times after 48 hours

Chemoprophylaxis

Treat contacts during meningococcal epidemics with either ciprofloxacin or rifampicin

- Rifampicin
  - Adult: 600 mg orally every 12 hours for 5 days
  - Child: 10 mg/kg orally every 12 hours for 5 days
  - Under 1 year: 5 mg/kg orally every 12 hours for 5 days
- Ciprofloxacin
  - Adult: 500 mg orally as a single dose
  - Child 5 - 12 years: 250 mg orally as a single dose

Notable Adverse Drug Reactions, Contraindications and Caution

- Diazepam: Must be administered slowly intravenously to avoid respiratory depression
- Mannitol extravasation causes inflammation and thrombophlebitis. Contraindicated in congestive cardiac failure and pulmonary oedema

Prevention

- Immunization of close contacts against communicable diseases
  - Meningococcus, Haemophilus, Streptococcus (especially for homozygous sickle cell anaemia)
- Chemoprophylaxis (rifampicin or ciprofloxacin)

Parkinsonism

Introduction

Synonyms: 'shaking palsy'; 'paralysis agitans'; 'akinetic-rigid syndrome'
A common neurodegenerative disease that results from deficiency of the neurotransmitter dopamine, in the striato-nigral pathway. The idiopathic variety is called Parkinson's disease while parkinsonism is used for secondary cases.

Aetiology

- Idiopathic: Parkinson's disease – more than 80% of the cases
- Medications: Antipsychotics (phenothiazines); Antihypertensives (alpha methyl dopa, reserpine)
- Infections: Encephalitis (von-Economo epidemic due to H. influenzae)
- Vascular diseases: Arteriosclerosis; Stroke involving the basal ganglia
- Neurotoxins: Carbon monoxide; Manganese; Cyanide; Heroin analogues e.g. MPTP (1-methyly 4-phenyl, 1,2,3,6, tetra hydropyridine)
- Head trauma as in boxing; tumuors and metabolic diseases (Wilson's disease)

Clinical Features

- Classical disease:
  - Rest tremors: coarse, distal tremors described as pill-rolling type; Rigidity; Slowness of movement; Loss of arm swinging when walking; Retropulsion, propulsion; Postural instability with frequent falls; Gait changes: shuffling gait with flexed posturing
- Parkinsonism Plus Syndromes:
  - Parkinsonism with Amyotrophic Lateral Sclerosis (ALS)
  - Parkinsonism with spinocerebellar degeneration
  - Multi-system atrophy - Parkinsonism with postural hypotension (Shy-Dragger Syndrome)
  - Progressive supranuclear palsy
  - Cortico-basal ganglionic degeneration
  - With brain stem and cerebellar degeneration (Olivo-ponto-cerebellar syndrome)
  - With Dementia – Dementia with Lewy Body characterized by fluctuating confusion, visual hallucination and phenothiazine sensitivity.

Differential Diagnoses

- Multi-infarct dementia
- Alzheimer's disease
- Normal pressure hydrocephalus
- Brain tumour
- Benign essential tremor
- Depression and Creutzfeldt-Jakob disease

Complications

- Recurrent falls with attendant complications e.g. fractures, subdural haematoma;
- Dementia
- Depression

Investigations
- Diagnosis is essentially clinical
- Neuro-imaging: CT scan/MRI for exclusion of possible differentials

Treatment Goals
- Replace dopamine
- Ensure mobility and avoidance of falls

Non-drug Treatment
- Physiotherapy for postural adjustment

Drug Treatment
- L-dopa/carbidopa (dose expressed as levodopa): 50 mg orally every 6 - 8 hours increased by 100 mg once or twice weekly depending on response
- Anti-cholinergic drugs:
  - Trihexyphenidyl (benzhexol) 1 mg orally daily, increased gradually (usually 5 - 15 mg in 3 - 4 divided doses up to a maximum of 20 mg)
- Dopamine receptor agonists:
  - Bromocriptine :
  - First week: 1 - 1.25 mg orally nocte
  - Second week: 2 - 2.25 mg nocte
  - Third week: 2.5 mg twice daily
  - Fourth week: 2.5 mg three times daily; increasing by 2.5 mg every 1 - 2 weeks according to response (usual range is 10 - 40 mg daily)
  - Ropinirole: 1 - 3 mg orally once daily (in resistant cases)

Supportive Measures
- Physiotherapy for postural adjustments
- Antidepressants such as amitriptyline for pain (which could be quite incapacitating) especially with dopamine-replacement drugs

Notable Adverse Drug Reactions, Contraindications and Caution
- Dopamine replacement drugs: dyskinesia, neuropathic pain
  - Advisable to start with small doses and gradually increase
  - There is need for dosage and timing adjustments when side effects manifest
  - Dopa-agonists: postural hypotension; may cause vomiting
  - Caution is advised to avoid falls
- Anticholinergic drugs: constipation; memory problems and double vision. Their use is contraindicated in the presence of glaucoma and prostatic enlargement

Prevention
- Avoid identified causative agents where feasible
- Timely and appropriate treatment to prevent/reduce complications

Seizures/Epilepsies

Introduction

A seizure results from abnormal excessive electrical discharge of brain cells. Epilepsy is a condition characterized by recurrent seizures unprovoked by any immediate identifiable cause

It may be idiopathic or could follow: cerebral infections, metabolic derangements (glucose, electrolytes, fluids), stroke, brain tumours, head trauma, birth injury/asphyxia, alcohol and substance abuse and neuro-degeneration in the elderly.

Clinical Features

- Classical attack with sudden loss of consciousness, jerking of limbs (tonic and/or clonic)
- Tongue biting; sphincteric dysfunction, frothing and postictal headaches
- Some may present with aura like abnormal sensation or perception, epigastric discomfort; hallucinations, automatisms (semi-purposive actions); Loss of postural tone (sudden falls without convulsions)
- Limb paralysis (Todd's paralysis) usually after attacks

Differential Diagnoses

- Migraine headache
- Syncope
- Narcolepsy
- Panic attacks
- Catatonia; Transient ischaemic attacks and conversion disorder (hysteria)

Complications

- Status epilepticus
- Cardiac arrhythmias
- Renal failure from myoglobinuria
- Anoxic brain damage and Sudden death

Investigations

- Electroencephalography
- Neuro-imaging (CT scan or MRI)
- Random blood glucose
- Urea, Electrolytes and Creatinine

Treatment Goals

- Stop convulsions/attacks
- Treat underlying cause if identified
- Improve quality of life.

Drug Treatment

Parenteral drugs are recommended for acute attacks/status epilepticus

- Diazepam by intravenous injection, 10 mg at a rate of 1 ml (5 mg) per minute, repeated once after 10 minutes, if necessary 200 - 300 μg/kg or 1 mg per year of age or Under 12 years, 300 - 400 μg/kg (max. 10 mg), repeated once after 10 minutes if necessary. Can be given per rectum in restless patients - 500 μg/kg (up to a maximum of 30 mg) in adults and children over 10 kg
- Phenytoin
  - Adult: initially 15 mg/kg by slow intravenous injection or infusion (with blood pressure and ECG monitoring) at a rate not more than 50 mg/minute; then 100 mg every 6-8 hours
  - Child (neonate): initial loading dose 20 mg/kg by slow intravenous

injection, then 2 - 4 mg/kg orally every 12 hours, adjusted according to response (usual maximum dose 7.5 mg/kg every 12 hours)

- Paraldehyde administered intramuscularly (see important precautions below)
- The following alternatives can also be considered where available: lorazepam, midazolam and magnesium sulphate
- Cerebral decompression with mannitol 20% infusion or furosemide if indicated (see meningitis)
- It may be necessary to infuse 50 ml of 50% glucose to supply brain cells with calories and add thiamine 100 mg in case of alcohol withdrawal seizures

Generalized epilepsies

- Phenobarbital
  - Adult: 60 - 180 mg orally daily
  - Child: 5 - 8 mg orally daily
- Phenytoin
  - Adult: 150 - 300 mg orally daily
  - Child: 15 to 20 mg/kg orally
- Sodium valproate
  - Adult: 600 mg daily in 2 divided doses
  - Child (1 month -12 years): initially 10 -15 mg/kg (max. 600 mg) daily in 1-2 divided doses, usual maintenance dose 25 - 30 mg/kg daily in 2 divided doses

Partial seizures

- Carbamazepine
  - Adult: 100 - 200 mg orally 1-2 times daily
  - Not recommended in pregnancy
  - Child:
    - 1 month - 12 years: initially 5 mg/kg orally at night or 2.5 mg/kg twice daily, increased as necessary by 2.5 - 5 mg/ kg every 3-7 days; usual maintenance 5 mg/kg every 8-12 hours
    - 12-18 years: initially 100 - 200 mg 1-2 times daily, increased slowly to usual maintenance of 400 - 600 mg every 8 - 12 hours

Absence attacks

- Ethosuximide
  - Adult: 500 mg daily initially in two divided doses; increase by 250 mg at intervals of 5 - 7 days to doses of 1 - 1.5 g daily in two divided doses (maximum dose 2 g daily)
  - Child:
    - Over 6 years: same as adult dose
    - 1 month to 6 years: initially 10 mg/kg (max 250 mg daily); in 2 divided doses increased every 5 – 7 days to usual dose of 20 - 40 mg/kg (max. 1 g daily in 2-3 divided doses)
- Sodium valproate
  - Adult: Initially 600 mg daily in 1-2 divided doses, increased gradually

(in steps of 150 - 300 mg) every 3 days; usual maintenance dose 1 - 2 g daily (20 - 30 mg /kg daily), max. 2.5 g daily

- Child:
  - 1 month - 12 years: initially 5 mg/kg orally at night or 2.5 mg/kg twice daily, increased as necessary by 2.5 - 5 mg/kg every 3 - 7 days; usual maintenance 5 mg/kg every 8-12 hours
  - 12 - 18 years: initially 100 - 200 mg 1-2 times daily, increased slowly to usual maintenance of 400 - 600 mg every 8 - 12 hours

Other drugs:

- Clonazepam for myoclonic seizures
- Primidone which is metabolized to phenobarbitone can be used in place of phenobarbitone

Newer medications which can be used either as add-on or monotherapy include:

- Levatiracetam starting with 250 mg twice daily in adults and increasing to a maximum of 1 g twice daily can be used for most seizure types. The dose is 10 - 20 mg/kg in children
- Lamotrigine can be started at a dose of 25 mg/day and then increased gradually to 200 mg/day based on efficacy

Non-drug Treatment

- Psychotherapy
- Health education to patients, relations and public
- Discourage harmful cultural practices e.g. burning, mutilation

Notable Adverse Drug Reactions, Contraindications and Caution

- Valproate is contraindicated in pregnant women because of risk of spina bifida
- Most of the other antiepileptic drugs should be used with caution in pregnancy because of possible damage to the foetus. Serial measurements of alpha-fetoprotein and ultrasound studies are necessary with close monitoring by an Obstetrician
- Phenytoin: gingival hypertrophy and hirsutism may limit use in girls and young children
- Phenobarbital: sedation and mental dullness and may affect school performance in children
- Most antiepileptics cause skin rashes, especially Stevens-Johnson syndrome; exfoliative dermatitis
- Do not use paraldehyde if it has a brownish colour or the odour of acetic acid
- All antiepileptics must be withdrawn slowly so as not to precipitate status epilepticus
- Introduce drugs singly because of possible interaction between drugs and the doses must be gradually increased to avoid toxicity and other side effects

Prevention
- Prompt treatment of fever in children to avoid febrile convulsions
- Prevention of head injuries mainly from automobile accidents
- Treat diseases of the brain early to avoid poor healing and death of brain cells
- Immunization of children against communicable diseases
- Address causative factors (see above)
- Avoid driving and swimming unattended, and operation of machinery

Stroke (Brain attack, cerebrovascular disease, apoplexy)
Introduction
It is a condition caused by disruption of blood supply to brain cells (either occlusion (infarction) or blood vessel rupture (haemorrhage). There should be pathological and/or radiological demonstration of the lesion and the disability may result in death. The duration of disability is no longer critical. Acute stroke is referred to as "Brain Attack" because the longer brain cells are deprived of blood, the bigger the size of the lesion and the more severe the damage or disability.

Clinical Features
- Classical stroke: Sudden motor weakness of one side of the body or could be bilateral, with/without speech, visual and sensory impairment
- Subarachnoid haemorrhage: sudden onset of severe headache, neck stiffness and positive Kernig's sign
- Stroke-in-evolution: gradual onset of deficit with progression
- Haematoma (mass lesion): sudden rise in intracranial pressure with loss of consciousness, respiratory changes, pupillary changes
- Sudden death
- Lacunar syndrome: manifesting as incomplete deficits: speech defects with clumsy hand involvement or pure motor and/or pure sensory deficits
- Dementia usually follows small, recurrent strokes in critical areas of the brain leading to cognitive impairment and functional dependence

Differential Diagnoses
- Brain tumour
- Subdural haematoma
- Cerebral abscess
- Meningitis/encephalitis
- Cerebral malaria
- Migraine headache
- Multiple sclerosis
- Metabolic derangements e.g. hypoglycaemia, hyperosmolar non-ketotic coma

Complications
- Short term: tentorial herniation with coning and death; cardiac arrhythmias, hyperglycaemia, aspiration pneumonitis with sepsis, urinary tract infections; deep vein thrombosis
- Long term: decubitus ulcers, depression, epilepsy, dementia, parkinsonism,

contractures, thalamic pain

Investigations

- Neuro-imaging with CT scan/MRI to determine stroke type and choice of management
- Lumbar puncture for CSF analysis in suspected subarachnoid haemorrhage
- Electrocardiography, echocardiography, carotid Doppler ultrasound study, cerebral angiography
- Full Blood Count with differentials, random blood glucose, urea, electrolytes and creatinine
- Chest radiograph, HIV screening

Treatment Goals

- Restore cerebral circulation
- Limit disability
- Treat identified risk/predisposing factors
- Reduce raised intracranial pressure
- Treat complications (if any)

Non-drug Treatment

- Attention to calories
- Fluid balance
- Physiotherapy for passive muscle exercises
- Nursing care (frequent turning and bladder care) to prevent decubitus ulcers and urinary tract infection
- Rehabilitation

Drug Treatment

- Cerebral decompression if there is evidence of raised intracranial pressure
  - 20% mannitol 250 mL repeated every 12 hours for 4-6 doses

and/or

  - Furosemide 40 mg every 8 hours by slow intravenous injection for 6 doses
- Thrombolysis with tissue plasminogen activator (altepase)
  - IF patient is brought to medical attention within 4 1/2 hours and CT scan does not show haemorrhage or big infarct, no previous bleeding, BP not severely elevated, no evidence of recent surgery and no head trauma
- Treat underlying conditions such as diabetes mellitus, hypertension, and thrombosis
  - Treat hyperglycaemia with intravenous soluble insulin
  - Treat seizures with Intravenous diazepam
  - Treat fever with antipyretics and antibiotics if infection is suspected
  - For subarachnoid haemorrhage: nimodipine is recommended for the prevention of vasospasm
  - Use of antacids to prevent and treat stress ulcers and anti-epileptic drugs to prevent seizures in the acute phase

Notable Adverse Drug Reactions, Contraindications and Caution

- Rebound cerebral oedema when mannitol is discontinued
- Thrombolytic agents cause bleeding
- Diazepam by the intravenous route must be administered slowly to avoid

respiratory depression and laryngeal spasm

Prevention

- Treat/control known risk factors: Hypertension, diabetes mellitus; cardiac diseases; hyperlipidaemia; obesity; smoking and excessive alcohol consumption
- Low dose aspirin (acetylsalicylic acid) is recommended as antiplatelet agent to prevent ischaemia in those at risk, if tolerated

Syncope (Fainting)

Introduction

Loss of consciousness and postural tone as a result of diminished cerebral blood flow. This can result from

Vaso-vagal attack or cardiac causes; prolonged standing; severe emotional disturbance; sight of blood (e.g. witnessed by medical student for the first time in theatre)

The more severe form is associated with various heart diseases:

Arrhythmias (especially complete heart block); Hypertrophic cardiomyopathy; 'Heart attack' (myocardial infarction); Atrial myxoma; Aortic stenosis; Dissecting aneurysm other causes; Pulmonary embolism; Vertebro-basilar insufficiency; Subclavian steal syndrome; Carotid sinus pressure and rarely Migraine headache

Clinical Features

- Sudden fall to the ground with loss of consciousness
- Cold extremities
- Bluish discolouration of extremities (cyanosis)
- Pulse irregularities (or pulselessness)
- Hypotension (or unrecordable blood pressure)
- Fainting induced by pressure on the neck
- Fainting induced by coughing, micturition

Differential Diagnoses

- Epilepsy
- Myocardial infarction
- Stroke
- Aortic dissection
- Conversion disorder

Complications

- Cerebral hypoxia/anoxia resulting in brain damage
- Stroke
- Sudden death

Investigations

- Electrocardiography
- Echocardiography
- Neuro-imaging: CT scan, MRI, carotid Doppler
- Random blood sugar

Treatment
Depends on the cause(s)
Treatment Goals
- Restore circulation and ensure brain perfusion by elevating the legs to increase venous return
- Identify cause and treat accordingly
- Prevent recurrence

Non-drug Treatment
- Physiotherapy: pressure stockings

Drug Treatment
- ***S***pecific treatment for cardiac arrhythmias: Please refer to cardiologist
- If hypotensive, give pressor agents

Notable Adverse Drug Reactions, Contraindications and Caution
- Aspirin and other NSAIDs: use with caution in patients with history of dyspepsia, and in asthmatics

Prevention
- Avoid prolonged standing
- Treat underlying cardiac disease
- Avoid dehydration or excessive fluid loss
- Ensure adequate calorie and avoid prolonged fasting
- Use medication as prescribed by physicians and avoid overdosage to compensate for missed doses

The Paralysed Patient
Introduction
An individual presenting with inability to use one, or all the limbs as a result of neurological disease. Paralysis of limbs on one side of the body has been covered under cerebrovascular disease (Stroke). This section will address paralysis of both lower limbs or all four limbs. The paralysis may be transient or last for a while and can affect any age group.

Aetiology
- Poliomyelitis
- Spinal cord diseases (myelopathies)
- Metabolic disease (periodic paralysis due to potassium changes in sensitive individuals),
- Vitamin B12 deficiency
- Immunological and autoimmune disorders – Guillain-Barre syndrome (GBS), Disorders of neuromuscular junction – Myasthenia gravis (MG)
- Infections – Cerebral venous thrombophlebitis, Lyme disease
- Neoplastic conditions with metastasis
- Trauma
- Brain stem pathologies
- Neurodegenerative diseases – Amyotrophic lateral sclerosis; Primary muscle disease – muscular dystrophy

Clinical Features
- Poliomyelitis – the most important cause of acute flaccid paralysis and a major cause of disability worldwide; Presents usually in childhood after a

febrile illness. There is muscle wasting and lower motor neuron signs. Post-polio syndrome is characterized by pain and worsening disability
- Brain stem lesions - quadriparesis with cranial nerve palsies, cerebellar signs (incoordination, tremors, ataxic gait, nystagmus) and bulbar signs (dysphagia, dysphonia, dysarthria), tongue wasting with fasciculations and absent gag reflex
- Myelopathies - quadriparesis or paraparesis and definite sensory level, gibbus (if extradural lesion) sphincteric dysfunction and impotence. There may be upper or lower motor neuron signs, the latter during the phase of neuronal shock
- Myasthenia gravis (MG) - fluctuating weakness that improves with rest or with the administration of anticholinesterase drugs in those previously diagnosed with the condition
- Motor neuron disease - a combination of upper and lower motor neuron signs commonly without sensory deficit
- Muscular dystrophy - motor weakness with abnormality in muscle bulk. There may be pseudohypertrophy, gait change, positive family history and no sensory deficit
- Guillain-Barre syndrome (GBS) - preceding febrile illness (urinary or respiratory tract infections or recent vaccination followed rapidly by ascending weakness, lumbar pain and sphincteric disturbance. May be associated with facial nerve paralysis, papilloedema and bulbar palsy

Differential Diagnoses
- Multi-infarct dementia
- Bilateral stroke
- Conversion disorder (hysteria)
- Multiple sclerosis

Complications
- Deep vein thrombosis
- Pulmonary embolism
- Decubitus ulcers
- Disuse atrophy
- Contractures
- Bulbar failure

Investigations
- Imaging: Plain X-ray of the skull and back; Magnetic resonance imaging (brain, spines); Chest X-ray
- Cerebrospinal fluid examination for protein, cells, cytology, oligoclonal bands
- Muscle biopsy
- Edrophonium test for myasthenia gravis; Protein Specific Antigen for prostatic cancer
- Electrolyte and urea for suspected periodic paralysis
- Electromyography and nerve conduction studies for suspected GBS, MG and periodic paralysis
- Other tests are pulse oximetry; erythrocyte sedimentation rate, full blood count and plasma glucose

Treatment Goals
- Restoration of motor power

- Mobility support
- Prevention of complications

Non-drug Treatment

- Physiotherapy
- Prevention of deep vein thrombosis
- Catheterization when there is either incontinence or retention
- Feeding support for those with swallowing disorders
- Use of calipers to aid movement and support extremities

Drug Treatment

- Acute phase: Pain – use of non-steroidal anti-inflammatory drugs and pregabalin for neuropathic pain
- GBS: Intravenous immunoglobulins where available or plasmapheresis; High dose steroid (Pulse therapy) with IV methylprednisolone 1 g daily for 5 days followed by oral prednisolone
- MG: Pyridostigmine/ neostigmine should be prescribed; Oral prednisolone may be added
- There may be need for ICU management of patients who develop bulbar palsy or severe respiratory depression (GBS, MG). This will be guided by oxygen desaturation.
- Management of complications like aspiration pneumonitis with antibiotics

Surgery

Surgical treatment when due to mass lesion (See Chapter on cancer for relevant management)

Notable Adverse Drug Reactions, Contraindications and Caution

- Steroids can cause dyspepsia and hyperglycaemia. They should be prescribed after infections have been excluded and with caution in diabetic patients

Prevention

- Immunization against poliomyelitis in childhood
- Screening for cancer and early management before metastatic spread
- Prevention of stroke (see section on Stroke and other causes listed above)
- Avoid known precipitants like heavy meals or exercise for periodic paralysis; infection or poor compliance for MG crisis

The Unconscious Patient

Introduction

A clinical state in which an individual is unresponsive to environmental stimuli. Such individuals may also have breathing and circulatory problems. The cause may be neurological, or may be due to other systemic diseases. An easy way of finding the cause is to think in terms of the vowels:

- Apoplexy (stroke)
- Epilepsy
- Infections e.g. meningoencephalitis
- Overdosing with drugs, alcohol intoxication, toxins
- Uraemia and other metabolic disorders
- Other causes include: head injury; brain tumours (with complications)

Clinical Features

- Varying levels of impaired consciousness:
  - Comatose: no response to stimulus, however painful
  - Semi-comatose: some response to pain
  - Stuporous: a state deeper than sleep; vigorous stimulation required to stimulate response
- Other features:
  - Cessation of respiration or abnormal ventilatory patterns: Cheyne-Stokes, ataxic, apneustic, gasping etc
  - Unresponsiveness or variable response to painful stimuli
- Features of the underlying cause(s)
  - Stroke: may present with hemiparesis, facial asymmetry, crossed-eye defects, speech defects etc.
  - Epilepsy: frothing or tongue biting; abrasions of the extremities; positive past history
  - Infections: may present with fever, neck stiffness
  - Drug overdosage/toxins: pin-point pupils; respiratory problems; suggestive history
  - Uraemia: characteristic fetor; skin rashes; oedema; severe dehydration
  - Head trauma: haematoma; subconjuctival haemorrhage
  - Bleeding from orifices (if coma is due to trauma or bleeding diathesis)
- Features of raised intracranial pressure:
  - Slow pulse (Cushing's reflex); rising blood pressure; papilloedema

Differential Diagnoses

- Stroke
- Post-epilepsy state
- Syncope
- Myocardial infarction
- Conversion disorder (hysteria)
- Substance abuse
- Locked-in state
- Minimal conscious state
- Persistent vegetative state
- Akinetic mutism and abulia

Complication

- Cerebral hypoxia/anoxia resulting in brain damage

Investigations

- Neuro-imaging: CT scan, MRI
- Random blood glucose
- Urea, Electrolytes and Creatinine
- Electroencephalography
- Cerebrospinal fluid analysis
- Drug levels/toxicology screen
- Full Blood Count
- Blood culture

Treatment Goals

- Clear airway and restore breathing

- Nurse in left lateral position and clear secretions by suction
- Maintain circulation
- Eliminate the cause
- Prevent complications (decubitus ulcers, atelectasis, contractures etc.)
- Correct metabolic derangements
- Admit in intensive care unit if facility available and connect to a ventilator with monitor

Non-drug Treatment

- Physiotherapy to prevent contractures/deep vein thrombosis, and for passive muscle exercises
- Nursing care (frequent turning and bladder care) to prevent decubitus ulcers and infections

Drug Treatment

- Infections: appropriate antibacterial agents
- Epilepsy: use effective parenteral anticonvulsant drugs; diazepam (see epilepsy)
- Renal failure: dialysis
- Appropriate treatment of other metabolic causes

Supportive Measures

- Subcutaneous Low Molecular Weight heparin (LMWH) to prevent deep vein thrombosis (see Pulmonary Embolism)

Notable Adverse Drug Reactions, Contraindications and Caution

- Diazepam, if required, should be administered slowly intravenously to avoid respiratory depression

Prevention

- Accessible, efficient and effective health care service delivery
- Early reporting/detection of ill health
- Adherence to medications and non-drug measures in managing disease states
- Public Health Education; Promote awareness on avoidance of risk factors

CHAPTER 3:

DENTAL AND ORAL DISORDERS

Acute Necrotizing Ulcerative Gingivitis

Introduction

A polymicrobial, endogenous infection

Aetiology

Fusiform and spirochaete bacteria

Epidemiology

- In developing countries, seen almost exclusively in children; Related to poverty and malnutrition (predisposing factors)
- In industrialized countries, most common in young adults with neglected mouths; Immunosuppressive factors, smoking and stress have been associated

Clinical Features

- Crater ulcers starting at the tips of the interdental papillae
- Ulcers spread along gingival margins
- Gingival soreness and bleeding
- Foul breath
- Metallic taste
- Increased salivation
- Cervical lymphadenopathy and fever in advanced cases

Differential Diagnoses

- Primary herpetic gingivo-stomatitis
- HIV-associated acute ulcerative gingivitis
- Gingival ulceration in acute leukaemia or aplastic anaemia

Investigations

- Smears from ulcers show predominantly spirochaetes and gram-negative fusiform bacteria

Treatment Goals

- Treat infection
- Restore oral health

Non-drug Treatment

- Oral hygiene (debridement) is essential

Drug Treatment

- Metronidazole
  - *Adult*: 200 mg orally 8 hourly for 3 days
  - *Child:*
    - 1-3 years: 50 mg orally every 8 hours for 3 days
    - 3-7 years: 100 mg every 12 hours for 3 days
    - 7-10 years: half adult dose

Supportive Measures

- Ascorbic acid
  - *Adult*: not less than 250 mg orally daily (in divided doses)

- *Child:*
  - 1 month - 4 years: 125 - 250 mg in 1-2 divided doses
  - 4-12 years: 250-500 mg daily in 1-2 divided doses
  - 12-18 years 500 mg - 1 g daily in 1-2 divided doses
- Ferrous sulphate
  - *Adult*: 200 mg orally three times daily taken before food
  - *Child 6-12 years:* half adult dose

Follow-up Treatment
- Rehabilitation of the mouth
- Once the acute phase has subsided, oral hygiene should be brought to as high a standard as possible to lessen the risk of recurrence
- Sequestrectomy

Notable Adverse Drug Reactions, Contraindications and Caution
- Metronidazole: nausea, vomiting, unpleasant taste; disulfiram-like reaction with alcohol

Acute Peri-apical Abscess

Introduction

A localized collection of pus in the peri-apical region of a tooth contained within the alveolar bone

Aetiology
- May develop either directly from acute periapical periodontitis or more usually from a chronic periapical granuloma or chronic pulpitis
- Generally, the result of a mixed bacterial infection
- Culture of the pus yields a wide range of different organisms
- Strict anaerobes (e.g. Prevotella, Porphyromonas) are usually predominant, but facultative anaerobes may be found

Clinical Features
- Painful swelling at the root of tooth
- Sinus (may be present)
- Tooth is tender to biting or percussion
- Tooth may be mobile

Differential Diagnoses
- Infected radicular cyst
- Periodontal abscess

Investigations
- Radiographs (periapical)

Treatment Goals
- Relieve symptoms
- Eliminate the infection

Non-drug Treatment
- Drain abscess using local anaesthesia by root canal extirpation if tooth is to be retained
- Otherwise extract the involved tooth
- Treat residual infection

Drug Treatment
- Amoxicillin

- *Adult*: 250 mg orally every 8 hours for 5 to 7 days
- *Child up to 10 years:* 125 mg every 8 hours for 5-7 days, doubled in severe infections

- Metronidazole
  - *Adult*: 200 mg orally every 8 hours for 3 - 7 days
  - *Child:*
    - 1 - 3 years: 50 mg orally 8 hourly for 3 - 7 days
    - 3-7 years: 100 mg 8 hourly
    - 7-10 years: 100 mg 8 hourly for 3-7 days

In dento-alveolar abscess that has not responded to penicillins or metronidazole

- Clindamycin
  - *Adult*: 150 - 300 mg every 6 hours; up to 450 mg every 6 hours in severe infections
  - *Child:*
    - 1 month – 18 years 3 - 6 mg/kg (max. 450 mg) every 6 hours
    - Neonate:
      - Under 14 days 3-6 mg/kg 3 times daily
      - 14-28 days 3-6 mg/kg (max. 450 mg) 4 times daily

By deep intramuscular injection or by intravenous infusion, 0.6-2.7 g daily (in 2-4 divided doses) life threatening infection, up to 4.8 g daily; single doses above 600 mg by intravenous infusion only; single doses by intravenous infusion not to exceed 1.2 g

Notable Adverse Drug Reactions, Contraindications and Caution

- Discontinue immediately if diarrhoea or colitis develops; monitor liver and renal function if treatment exceeds 10 days, and in neonates and infants; avoid rapid intravenous administration; avoid in acute porphyria

ACUTE PERIODONTAL DISEASES

Alveolar Osteitis (Dry Socket)

Introduction

The most frequent painful complication of extractions. Caused by destruction of the clot that normally fills the socket

Predisposing Factors

- Excessive extraction trauma
- Limited local blood supply
- Local anaesthesia
- Oral contraceptives
- Osteosclerotic disease
- Radiotherapy
- Female gender

Clinical Features

- Pain delayed for few days up to a week after extraction
- Deep seated, throbbing pain
- Mucosa around socket is red and tender

- No clot in socket - bare whitish alveolar bone exposed

Differential Diagnoses

- Osteomyelitis

Complication

- Osteomyelitis

Treatment Goals

- Alleviate pain and suffering of the patient
- Optimize condition for healing and epitheliasation of the extraction socket
- Keep open socket clean and protect exposed bone

Non-drug Treatment

- Irrigate with mild warm saline and antiseptic
- Fill with an obtundant dressing containing some non-irritant antiseptic
- Warm saline mouth rinse

Drug Treatment

- Local anaesthesia: lidocaine 2% (1 in 80,000)
- Co-amoxiclav: 250/125 mg orally every 8 hours for 5 days (dose doubled in severe infections)
- 10 mL of 2% chlorhexidine gluconate solution for mouth wash three times daily

Prevention

- Minimal trauma during extractions
- Immediately after extraction, squeeze socket edges firmly together and hold for a few minutes till clot has formed
- Antibiotics if patients have had irradiation, or have Paget's disease

Ankylosis

Introduction

Follows trauma, infection or other inflammatory condition. A disorder that leads to restriction of mouth opening from partial reduction to complete immobility of the jaw

Clinical Features

- An extremely disabling affliction that causes problems in mastication, digestion, speech, appearance, and oral hygiene
- In growing patients, deformities of the mandible
- and maxilla may occur together with malocclusion

Non-drug Treatment

- Temporomandibular joint (TMJ) ankylosis in children is challenging
- Surgical correction is technically difficult
- Incidence of recurrence after treatment is high
- 7-step protocol consists of: aggressive resection of the ankylotic segment, ipsilateral coronoidectomy, contralateral coronoidectomy, lining of the joint with temporalis fascia or cartilage, reconstruction of the ramus with a costochondral graft (CCG), rigid fixation of the graft, early mobilization and aggressive physiotherapy.

- Adults may be treated with one or several osteotomies or joint replacement

Cellulitis

Introduction

A rapidly spreading, poorly localized / diffuse erythematous inflammation of the soft tissues particularly associated with streptococcal infection to break down fibrin and ground substance, lyse cellular debris and enhanced spread of infection.

Pathogenesis

- Rapid spread is most likely related to release of large amounts of streptokinase and hyaluronidase which are produced by most strains of streptococci
- The fascial space infections may involve sublingual, submandibular and/or parapharyngeal spaces
- Ludwig's angina is bilateral brawny cellulitis of the sublingual, submandibular and submental spaces

Clinical Features

- Diffuse, tense, painful swelling of the involved soft tissues
- Malaise
- Elevated temperature
- Ludwig's angina
  - This is a surgical emergency!
  - It causes airway obstruction, which can quickly result in asphyxia
  - Suppuration and abscess formation may occur later if treatment is neglected or delayed

Complications

- Extension towards the eyes, and risk of cavernous sinus thrombosis: cellulitis affecting maxillary teeth; Respiratory difficulty: cellulitis affecting mandibular teeth

Investigations

- M/C/S (blood and swab)

Non-drug Treatment

- Decompression and drainage of the swelling to reduce pressure (oral drain may also be placed)
- Intravenous fluid resuscitation
- Nutritional support
- Secure the airway by tracheostomy if necessary

Drug Treatment

- Aggressive antibiotic treatment
  - Injection co-amoxiclav
  - *Adult*: 1000/2000 mg intravenously every 8 hours for 5 days
  - *Child:*
    - *Neonate and premature infants,* 25 mg/kg every 12 hours for 5 days
    - *Infants up to 3 months*, 25 mg/kg every 8 hours for 5 days
    - *3 months to 12 years*, 25 mg/kg every 8 hours for 5 days increased to 25 mg/kg every 6 hours in more severe infections

Plus

- Injection gentamicin:
- *Adult*: 3 - 5 mg/kg daily in divided doses every 8 hours for 5 days
- *Child:*
  - up to 2 weeks: 3 mg/kg every 12 hours for 5 days
  - 2 weeks - 12 years: 2 mg/kg every 8 hours for 5 days

Notable Adverse Drug Reactions, Contraindications and Caution

- Gentamicin may cause significant ototoxic and nephrotoxic effects

Prevention

- Early treatment of carious teeth

Dental Caries

Introduction

A progressive breakdown of teeth exposed to the carbohydrate and bacterial plaque

Classification

- Enamel caries
- Dentine caries
- Root surface caries

Aetiology

- Develops over time in the presence of certain interacting variables
- Carbohydrate diet
- Viridans streptococci bacteria
- Susceptible tooth surface

Pathogenesis

- Enamel caries progress in the following stages:
  - Incipient caries
  - Early (sub-microscopic) lesion
  - Phase of non-bacterial enamel crystal destruction
  - Cavity formation
  - Bacterial invasion of enamel

Clinical Features

- Cavity formation in affected tooth
- Starts as a white spot
- Pain on exposure of the cavity to thermal changes or food particles

Complications

- Pulpitis; If not treated can cause apical periodontitis and dento alveolar abscess

Investigations

- Periapical radiographs
- Bitewing radiographs
- Electric pulp testers
- Thermal test

Non-drug Treatment

- Depending on the stage of the lesion:

- Excision of lesion followed by:
- Amalgam filling, Glass Ionomer Cement (GIC) composite and Atraumatic Restorative Technique (ART) for enamel caries
- Amalgam filling, GIC for dentine caries
- Root Canal Therapy, pulp capping pulpotomy, pulpectomy for pulpal involvement

Drug Treatment

- Analgesics pre-operatively: paracetamol 1g 4-6 hourly orally to a maximum of 4 g daily

Prevention

- Oral health education
- Regular scaling and polishing
- Systemic and topical fluoride application
- Fissure sealants
- Routine dental check-ups

Developmental Defects

- Aplasia of the condyle is extremely rare and may be unilateral or bilateral
- Hypoplasia of the condyle may be congenital or acquired
- Cause of congenital hypoplasia is not known; either one or both condyles may be involved
- Acquired hypoplasia may be secondary to trauma, infection or radiation
- Hyperplasia of the mandibular condyle is rare and self-limiting. Cause is unknown. It is generally unilateral with resultant facial asymmetry, deviation of mandible to the opposite side and malocclusion

Gingival Abscess

Risk factors

Include diabetes, smoking, certain periodontal bacteria, aging, gender, genetic predisposition, systemic diseases and conditions (immunosuppression), stress, nutrition, pregnancy, HIV infection, substance abuse and medications

Clinical Features

- Inflammation of the gingiva and periodontium
- Loss of periodontal ligament attachment
- Red and slightly swollen gums with obvious pus accumulation
- Bleeding on slight provocation.

Treatment Goals

- Drainage to relieve the acute symptoms and mitigation of the aetiology
- Periodontal abscess-
- Establishing drainage by debriding the pocket and removing plaque, calculus, and other irritants and/or incising the abscess
- Other treatments may include irrigation of the pocket, limited occlusal adjustment, and administration of antimicrobials and management of patient comfort

- A surgical procedure for access for debridement may be considered. In some circumstances extraction of the tooth may be necessary
- A comprehensive periodontal evaluation should follow resolution of the acute condition

Non-drug Treatment

- Instruction, reinforcement, and evaluation of the patient's plaque control should be performed
- Supra- and subgingival scaling and root planning should be performed to remove microbial plaque and calculi

Drug Treatment

- Analgesics
  - Paracetamol
  - *Adult:* 1 g orally every 8 hours for 3-5 days
  - *Child:*
    - 1-5 years: 125-250 mg every 8 hours for 3-5 days,
    - 6-12 years: 250-500 mg every 8 hours for 3-5 days
- Antibiotics
  - Amoxicillin
  - *Adult:* 250 mg orally every 8 hours for 5 days
  - *Child:*
    - 1 month - 1 year 62.5 mg orally every 8 hours; dose doubled in severe infections
    - 1-5 years: 125 mg every 8 hours for 5 days
    - 5-12 years: 250 mg 8 hourly for 5 days
    - 12-18 years 500 mg 8 hourly for 5 days; all doses doubled in severe infections
  - Metronidazole
  - *Adult:* 200 mg orally every 8 hours for 5 days
  - *Child:*
    - 1-3 years 50 mg orally every 8 hours for 5 days
    - 3-7 years:100 mg every 12 hours for 5 days
    - 7-10 years: 100 mg every 8 hours for 5 days
- Antiseptic mouthwashes:
  - Chlorhexidine gluconate 2% three times daily for 1- 2 weeks
  - Hexetidine mouthwashes to alternate with warm saline mouthwashes

Juvenile Periodontitis

Introduction

An uncommon disease characterized by periodontal destruction, often in the absence of overt gingival inflammation

Epidemiology

- Prevalence 1:1000; male = female
- Onset at puberty or earlier

Clinical Features

- Affects the first permanent molar and incisors
- *Actinobacillus*, *Actinomycetes comitans* has been isolated from the affected sites

- Results in drifting and loss of the first permanent molar and incisors

Investigation

- Radiology may reveal marked bone loss interdentally, inter-radicularly and apically

Complications

- Tooth loss
- Malocclusion
- Temporomandibular Joint (TMJ) dysfunction syndrome

Non-drug Treatment

- Control of plaque bacteria by use of antiseptic solution
- Establishing a healthy gingival and periodontal attachment
- Oral hygiene instruction and motivation
- Regular scaling and polishing
- Root planning
- Splinting of mobile tooth
- Periodontal surgery
- Bone regenerative techniques e.g. using polytetrafluoroethylene (PTFE) membranes, Bio-Oss, Bio-membrane

Drug Treatment

- Metronidazole
  - *Adult:* 200 mg orally every 8 hours for 5 days
  - *Child:*
    - *1 - 3 years*:50 mg orally every 8 hours
    - *3 - 7 years*: 100 mg every 12 hours
    - *7 - 10 years*: 100 mg every 8 hours
    - *10 - 18 years*: 200 mg every 8 hours

Plus:

- Tetracycline
- *Adult:* 250 mg orally daily for up to 21 days
- *Child under 12 years:* metronidazole and amoxicillin (or erythromycin for those sensitive to penicillin)

Precaution

- Tetracyclines should not be given to children under 12 years

Neoplasia

Primary neoplasms arising from the structures of the TMJ are extremely rare. Benign tumours such as chondromas and osteomas are more frequent than sarcomas arising from bone or synovial tissues. Others are secondary carcinomas

Neoplasms of the salivary gland

Introduction

The next most common neoplasms of the mouth after squamous cell carcinomas [PSI]

Above 70% develop in the parotid gland and over three-quarters are benign.

Women are slightly more frequently affected

Classification

The modified WHO classification (1972) includes:

- *Epithelial tumours*
  - Adenomas:
  - Pleomorphic adenoma ('mixed tumour')
  - Monomorphic adenomas
  - Warthin's tumour, oxyphoitic adenoma
  - Carcinomas:
  - Mucoepidermoid carcinoma
  - Acinic cell carcinoma
  - Adenocarcinoma
  - Epidermoid carcinoma
  - Undifferentiated carcinoma
  - Malignant mixed tumour
- *Non-epithelial tumours*
  - Lymphomas
  - Sarcomas

Clinical Features

- Benign tumours are generally asymptomatic enlargements
- Malignant varieties are painful, irregular, ulcerative and metastatic

Investigations

- *Sialography*
  - Postero-anterior view of the skull
  - Oblique lateral view of the jaws

Treatment

- Benign and malignant lesions: surgical excision
- Malignant lesions: radiotherapy and chemotherapy in addition to excision
- Secondary bacterial infections: treat with antibiotics e.g. ciprofloxacin 500 mg orally every 12 hours for 5-7 days
- Adjust doses as appropriate for children

Oral Thrush (Candidiasis)

Introduction

A clinical infection of mucous membranes due to the fungus species Candida. *Candida albicans* is the most frequently isolated strain

Classification

- Acute oral candidosis
- Chronic oral candidosis
- Denture association candidosis/denture stomatitis

Pathogenesis/ Aetiology

- Immunosupression results in the *Candida albicans* (a normal oral commensal) becoming virulent
- It invades and proliferates in superficial epithelium
- Results in a thick plaque which is oedematous and not easily rubbed off

Clinical Features

- A creamy/whitish, soft and friable slough located on the soft tissues of the oral cavity: tongue, palate, cheek, pharynx
- May be asymptomatic, or painful, with difficulty in swallowing

Predisposing Factors

- Denture wearing
- Reduced salivation (e.g. drug induced)
- Antibiotic therapy (especially broad spectrum)
- Poorly controlled diabetes mellitus
- Steroid therapy (chronic)
- Salivary gland damage (e.g. post radiation)
- Malnutrition
- HIV infection and leukaemia
- Iron, vitamin B, folic acid deficiency and agranulocytosis

Investigations

- Smear of the affected region and Gram staining or PAS, with or without potassium hydroxide to demonstrate hyphae
- Swab sample for M/C/S
- Biopsy and histopathologic examination
- Identify predisposing factors (including immunosuppression)
- Define extent of involvement

Non-drug Treatment

- Manage any underlying predisposing factors
- Replace worn dentures
- Proper counselling of patients as to use of dentures
- Diet modification and improvement
- Chlorhexidine mouthwash three times daily for 1 - 2 weeks

Drug Treatment

- Topical anti-fungal medication
  - Nystatin suspension
  - *Adult:* 400,000 - 600,000 units/mL 4 times daily, after food (usually for7 days); Continue for 48 hours after lesions have resolved
  - *Child:* 1 month - 18 years, prophylaxis and treatment: 100,000 units 6 hourly after food for 7 days; Continue for 48 hours after lesions have healed
  - *Immunocompromised children:* 500,000 units 6 hourly for 7 days

Or:

  - Miconazole oral gel 2%
  - *Adult:* place 5 - 10 mL in the mouth after food and retain near lesions 4 times daily
  - *Child:*
    - *under 2 years:* 2.5 mL twice daily; 2 - 6 years: 5 mL twice daily
    - *6 - 12 years:* 5 mL four times daily;
    - *12 - 18 years:* 5-10 mL four times daily

Leave in the mouth after food and retain near lesions

- Some patients may require systemic antimicrobial medicines
  - Fluconazole

- *Adult:* 50 mg orally daily for 7 - 14 days
    - *Child:*
    - 3 - 6 mg/kg on the first day, then 3 mg/kg daily for 7 - 14 days
    - For neonates up to 2 weeks old: administer every 72 hours for 7 - 14 days
    - 2 - 4 weeks old: administer every 48 hours for 7-14 days

Osteoarthritis

Rare with increasing incidence after 50 years; joint crepitus denotes degenerative joint disease.

May be accompanied by pre-auricular pain, but not involving the masticatory muscles

Radiographs (panoramic, trans-pharyngeal, trans-cranial, oblique, lateral, open and closed) show degenerative joint disease

Pericoronitis

Introduction

An inflammatory condition of the operculum or gum flap around a partially erupted/impacted tooth. Common around the lower last molars or wisdom teeth

Classification

- Subacute
- Acute Chronic
- Acute-on-chronic

Aetiology

- Mixed microbial infection
- Food impaction and plaque accumulation under gum flap
- Trauma to gum flap from opposing tooth
- Ulcerative gingivitis
- Reduced resistance
- Anaerobes in plaque

Clinical Features

- Soreness and tenderness around partially-erupted tooth
- Pain
- Swelling
- Enlargement of regional lymph nodes
- Fever
- Abscess formation

Investigations

- Radiographs
- To establish the position of the affected tooth and its relationship to the second molar
- May show impacted third molar

Non-drug Treatment

- When mouth opening is possible: careful irrigation under the gum flap to clear debris, using warm saline mouthwash; To be done frequently until

stagnation area is removed
- Operculectomy
- Disimpaction of the third molar by surgical extraction
- Occlusal reduction of opposing tooth
- Extraction of opposing tooth to forestall supraeruption and sequelae

Drug Treatment
- Appropriate antibiotics
- Analgesics
- Supportive therapy

Complications
- Cellulitis
- Ludwig's angina
- Osteomyelitis
- Submasseteric abscess
- Temporomandibular joint ankylosis

Periodontitis

Introduction

An inflammatory condition of the periodontium: periodontal ligament, cementum, alveolar bone, gingivae

Classification
- Acute periodontitis
- Chronic periodontitis
- Juvenile periodontitis
- Other sub-classifications

Acute periodontitis
- Relatively uncommon, Of short duration; may be due to trauma, abscess or ulceration
- Characterized by pain - May be associated with bleeding, fever, swelling and redness of the mucosa, unpleasant taste in the mouth

Chronic periodontitis
- This is inflammation within the supporting tissues of the teeth with bone loss. The most frequently occurring form of periodontitis, Characterized by pocket formation and/or recession of the gingiva. Prevalent in adults, but can occur at any age.
- A sequelae to untreated gingivitis

Clinical Features
- May be asymptomatic initially, with a low grade inflammation of the periodontium and gingiva
- As it progresses, and following attachment, lost gums become red, slightly swollen and bleed on slight touch
- Associated teeth show different degrees of mobility

Risk Factors
- Diabetes mellitus
- Smoking

- Certain periodontal bacteria
- Aging
- Gender
- Genetic predisposition
- Immunosuppression
- Stress
- Nutrition
- Pregnancy
- HIV infection
- Substance abuse
- Medications
- Eliminate, alter, or control above risk factors which may contribute to chronic
- Consultation with the patient's physician may be indicated

Non-drug Treatment

- Instruction, reinforcement, and evaluation of the patient's plaque control should be performed
- Supra- and sub-gingival scaling and root planning to remove microbial plaque and calculi

Drug Treatment

- *Analgesics*
  - Paracetamol
  - *Adult:* 1 g orally every 8 hours for 3 - 5 days
  - *Child*:
    - *1 - 5 years*: 125 - 250 mg;
    - *6-12 years*: 250 - 500 mg orally every 8 hours
  - Antibiotics
  - Amoxicillin
  - *Adult*: 250 mg orally every 8 hours for 5 days
  - *Child*:
    - 1 month - 1 year: 62.5 mg orally every 8 hours for 5 days; dose doubled in severe infections
    - 1 - 5 years: 125 mg every 8 hours for 5 days
    - 5 - 12 years: 250 mg 8 hourly for 5 days
    - 12 - 18 years 500 mg 8 hourly for 5 days; all doses doubled in severe infections
  - Metronidazole
  - *Adult*: 200 mg orally every 8 hours for 5 days
  - *Child*:
    - *1 - 3 years:* 50 mg orally every 8 hours for 5 days;
    - *3 - 7 years:* 100 mg every 12 hours for 5 days;
    - *7 - 10 years:* 100 mg every 8 hours for 5 days
- Antiseptic mouthwashes
  - 2% Chlorhexidine gluconate (alcohol free) Rinse mouth with 10 mLs for about 1 minute twice daily for 1 - 2 weeks
  - Hexetidine mouthwashes to alternate with warm saline mouthwashes

Notable Adverse Drug Reactions, Contraindications and Caution
- Metronidazole: nausea, vomiting and metallic taste, disulfiram-like reactions if taken with alcohol
- Metronidazole is contraindicated in pregnancy
- Avoid alcohol during treatment with metronidazole, and for at least 48 hours after treatment

Prevention
- Oral health education
- Scaling and polishing every six months

Plaque-Induced Gingivitis

Introduction

An inflammatory response of the gingivae to plaque bacteria; the most common type is chronic marginal gingivitis

Clinical Features
- Chronic gingivitis is asymptomatic, low-grade inflammation of the gingivae
- Gums become red slightly swollen and bleed on slight touch

Non-drug Treatment
- Oral hygiene instructions
- Scaling and polishing
- Antiseptic mouthwashes e.g. chlorhexidine gluconate 2% three times daily for 1-2 weeks
- Hexetidine mouthwashes to alternate with warm saline mouthwashes

Drug Treatment
- Analgesics
  - Paracetamol
  - *Adult*: 1g orally every 8 hours for 3-5 days
  - *Child*:
    - 1-5 years: 125-250 mg
    - *6-12 years*: 250-500 mg orally every 8 hours
- Antibiotics
  - Amoxicillin
  - *Adult*: 250 mg orally every 8 hours for 5 days
  - *Child*:
    - *1 month - 1 year:* 62.5 mg orally every 8 hours for 5 days; dose doubled in severe infections
    - *1 - 5 years:* 125 mg every 8 hours for 5 days
    - *5 - 12 years:* 250 mg 8 hourly for 5 days
    - *12 - 18 years:* 500 mg 8 hourly for 5 days; all doses doubled in severe infections
  - Metronidazole
  - *Adult*: 200 mg orally every 8 hours for 5 days
  - *Child*:
    - *1 - 3 years:* 50 mg orally every 8 hours for 3 days;
    - *3 - 7 years:* 100 mg every 12 hours for 3 days;
    - *7-10 years:* 100 mg every 8 hours for 3 days

Notable Adverse Drug Reactions, Contraindications and Caution
- Metronidazole: nausea, vomiting and metallic taste
- Metronidazole is contraindicated in pregnancy
- Avoid alcohol during treatment with metronidazole, and for at least 48 hours after treatment

Prevention
- Oral health education
- Scaling and polishing every six months

Neoplasms of the oral cavity: refer to specialist care

Pulpitis

Introduction

Inflammation of the dental pulp. The single most important disease process affecting the dental pulp. Accounts for virtually all pulpal disease of any clinical significance

Clinical Features
- Pain which is difficult to localize
- May radiate to the adjacent jaw and occasionally to the face, ear or neck
- May be triggered by:
  - Cold or hot stimulants
  - A recumbent position
  - Occasionally by mastication when food particles get into a carious cavity

Important to determine whether pulpitis is reversible or irreversible
- Reversible pulpitis:
  - The pulp can recover with removal of stimulus
  - Pain lasts for only a few moments after removal of the initiating stimulus
- Irreversible pulpitis:
  - The pulp cannot recover even after removal of stimulus
  - Characterized by pain which lingers for at least one minute after removal of stimulus
  - May be spontaneous

Complications

The sequelae of untreated pulpitis (in the order in which they occur) are:
- Reversible pulpitis
- Irreversible pulpitis
- Pulpal necrosis
- Apical periodontitis
- Periapical abscess
- Cellulitis

Investigations

Of primary importance is the use of a pulp tester to test the vitality of the pulp
The following can be used:
- Electric pulp tester
- Cold or hot water bath

- Ethyl chloride spray
- Hot gutta percha sticks
- Ice sticks

Treatment Goals

- *E*xclude the pulp from the stimulus (or stimuli) in reversible pulpitis
- Remove the pulp in irreversible pulpitis

Non-drug Treatment

- Reversible:
  - Indirect pulp capping
  - Direct pulp capping
  - Conventional filling using amalgam, composite or GIC
  - Desensitization with strontium chloride
  - Root canal therapy
  - Extraction
- Irreversible:
  - Remove the pulp

Drug Treatment

- Paracetamol
- *Adult*: 500 mg - 1 g orally every 4 - 6 hours (to a maximum of 4 g) for 5-7 days
  - *Child (every 4-6 hours)*:
    - *13 and above*: same as adult dosing
    - *6 - 12 years:* 250-500 mg
    - *1 - 5 years:* 125-250 mg
    - *3 months - 1 year:* 62.5 mg

NSAIDs may be required in some patients

Notable Adverse Drug Reactions, Contraindications and Caution

- Aspirin and other NSAIDs
- Gastrointestinal haemorrhage, allergic reactions
- Do not prescribe for patients with peptic ulcer disease
- May exacerbate symptoms in asthmatics
- Aspirin is contraindicated in children less than 16 years as it may precipitate Reye's syndrome

Prevention

- Prevent dental caries (the most important cause of pulpitis)
- Seek prompt dental attention

Recurrent Aphthous Stomatitis (RAS)

Introduction

Recurrent Aphthous Stomatitis is the most common ulcerative disease affecting the oral mucosa. It occurs mostly in healthy individuals and has atypical clinical presentation in immunocompromised individuals. The aetiology of RAS is still unknown, but several local, systemic, immunologic, genetic, allergic, nutritional, and microbial factors, as well as immunosuppressive drugs, have been proposed as causative agents.

TABLE 3.1: Types of Recurrent Aphthous Stomatitis

Features	Minor	Major	Herpetiform
Gender predilection	M=F	M=F	M>F
Age of Onset (Yrs)	5-19	10-19	20-29
Number of Ulcers	1-5	1-10	10-100
Size of Ulcers (mm)	<10	>10	1-2 (Larger if coalesced)
Duration (days)	4-14	>30	<30
Recurrence rate (months)	1-4	<1	<1
Site predilection	Lips, Checks, Tongue Floor of Mouth	Lips, Checks, Tongue Palate, Pharynx	Lips, Checks, Tongue, Palate, Pharnyx, Floor of Mouth
Permanent scarring	Unusual	Common	

Treatment for Mild-to-Moderate Cases

- Triamcinolone acetonide in dental paste 0.1%; Disp. 5-g tube
- Sig. coat the lesion with a thin film after each meal and at bedtime.

Drug Treatment

- Dexamethasone oral solution or elixir 0.5 mg/5 ml; disp. 240 ml
- Sig. rinse with 1 teaspoon (5 ml) for 2 min, four times a day and expectorate. Do not eat or drink for 30 min after rinsing

Treatment for Severe Cases

- Fluocinonide 0.05% gel; Disp. 15-g tube
- Sig. Apply a thin layer to the ulcer after meals and at bedtime
- Discontinue use of topical steroids when lesions become asymptomatic. Other topical steroid preparations (cream, gel, rinse, ointment) are available.

In general, creams are not used intraorally because of very poor mucosal adherence. Many topical steroids come with a warning that they are for external use only. However, several of these agents have been used successfully for managing recurrent aphthous ulcerations.

Notable Adverse Drug Reactions, Contraindications and Caution

- Prolonged use of topical steroids (longer than 2 weeks of continuous use) may result in mucosal atrophy and secondary candidiasis and may increase the potential for systemic absorption. It may be necessary to prescribe antifungal therapy with steroids use in some patients

Rheumatoid Arthritis

Introduction

A disease of unknown aetiology; autoimmune mechanisms and immune complex formation have been implicated. Usually begins in early adult life and affects females more frequently.

Patients rarely complain of pain from temporomandibular joint (TMJ) but clinical examination shows TMJ involvement in 50% of cases. Limitation of mouth opening; softness, crepitus, referred pain, and tenderness on biting. Severe disability is unusual

Salivary Gland Diseases

Introduction

A wide spectrum of disorders

Diseases due to obstruction

- Salivary calculi
- Parotid papilla and duct strictures
- Salivary fistulae
- Mucoceles and cysts
- Ranula

Sialadenitis

Acute infection and inflammation of the salivary glands

Types*:*

- Parotitis (mumps – acute, non-suppurative)
  - The most common sialadenitis
  - Mainly affects children
  - Usually not related to sialolithiasis
- Suppurative parotitis
- Chronic sialadenitis
- Sub-mandibular sialadenitis
  - Less common in children
  - Abundant salivary flow with rich mucus component
  - Rapid excretion

Sublingual Sialadenitis

Introduction

This is a rare painful non-erythematous swelling of one or both parotid glands occurring 1-2 weeks following exposure to the aetiologic virus Mumps (acute non-suppurative)

Epidemiology

- Most common in children aged 6 - 8 years with epidemics occurring during winter and spring, before the onset of routine vaccination against measles, mumps and rubella

Clinical Features

- Preauricular swelling
- Preauricular pain
- Fever
- Chills
- Headache

Diagnoses

- Based on history and clinical findings
- Virological evaluations may be employed

Differential Diagnoses
- Bacterial infections
- Obstructive diseases

Complications
- Meningitis
- Pancreatitis
- Otitis
- Nephritis
- Orchitis
- Testicular atrophy
- Sterility

Drug Treatment
- Supportive care for fever, headache and malaise
- Antipyretics
- Analgesics
- Adequate rehydration

Temporomandibular Joint Disorders

Introduction

These disorders can be grouped under the following conditions:
- Temporomandibular Joint (TMJ) pain-dysfunction syndrome
- Osteoarthritis
- Rheumatoid arthritis
- Trauma
- Developmental defects
- Ankylosis
- Infection
- Neoplasia

TMJ Pain Dysfunction Syndrome
- The most common problem in or around the TMJ

Clinical Features
- Equal frequency between genders, but five times as many females seek treatment
- Patients are usually between 15 and 40 years
- Unilateral or bilateral dull pain within the TMJ and/or surrounding muscles, sometimes on waking or during eating or speech
- TMJ may lock in the open or closed positions, occasionally
- TMJ sounds such as clicking, crunching or grating are often described
- Associated headache is usually located in the temporal region
- Pain is cyclical and usually resolves, but may recur
- May be associated with psychological stress

Differential Diagnoses
- Migraine
- Psychologic depression

Treatment Goals
- Conservative and reversible treatment

Non-drug Treatment
- Most symptoms are self-limiting and do not require treatment
- Educate patient about the condition, emphasizing its frequency and self-limiting nature
- Soft diet
- Apply moist heat to painful muscles
- Physiotherapy

Drug Treatment
- Analgesics as appropriate
- Anxiolytics
- Diazepam 5 mg orally 1 hour before sleep, then 2.5 mg every 12 hours, for up to 10 days (maximum)

Supportive Measures
- Occlusal splints

Trauma

Clinical Features
- Condyle fracture or trauma arthritis
- Pain and trismus of traumatic arthritis resolve after one week
- Micro-trauma from parafunction may result in chronic symptoms
- Dislocation is usually a result of trauma and is rare; very rarely it occurs after yawning

Xerostomia (Dry Mouth)

Introduction

It can be caused by the following:
- Sjogren's syndrome
- Irradiation
- Dehydration
- Psychogenic
- Drugs

Sjogren's Syndrome
- Presents with dryness of the eyes and mouth (primary type)
- In the secondary type, dryness occurs in association with rheumatoid arthritis or other connective tissue disease

Non-drug Treatment
- Relief from oral dryness and accompanying discomfort can be achieved conservatively by the following:
  - Sipping water frequently all day long
  - Letting ice melt in the mouth
  - Restricting caffeine intake
  - Avoiding mouth rinses, drinks, and medications containing alcohol
  - Avoiding tobacco products
  - Humidifying the sleeping area
  - Coating the lips

Drug Treatment

- Saliva substitutes
  - Sodium carboxymethylcellulose 0.5% aqueous solution (OTC); Disp. 8 floz
  - Sig Use as a rinse as frequently as needed. Solution may be prepared by the pharmacist. Sipping on plain water or crushed ice is often used with some success in patients with dry mouth.
- Saliva stimulants
  - The use of sugar-free gum, candy, or mints is a conservative method to temporarily stimulate salivary flow in patients with medication-induced xerostomia or with salivary gland dysfunction. Patients should be cautioned against using products that contain sugar or have a low pH.

CHAPTER 4:

EAR, NOSE AND THROAT

Acute Otitis Media

Introduction

Acute inflammation of the middle ear due to pyogenic organisms.

Epidemiology

Common in infants and young children; more frequent during winter and rainy periods.

Aetiology

Organisms are usually Streptococcus pneumococcus and Staphylococcus aureus

Clinical Features

- Earache
- Fever
- Deafness
- Ear discharge
- Malaise (in babies, irritability)
- Redness of the eardrum
- Later, perforation and pulsating mucopurulent discharge

Differential Diagnoses

- Acute otitis externa
- Referred otalgia
- Otitis media with Effusion

Complications

- Acute mastoiditis
- Facial nerve paralysis
- Labyrinthitis
- Intracranial (meningitis, brain abscess, lateral sinus thrombosis)

Investigations

- Ear swab for MCS - swab taken properly without contamination
- FBC and Differentials

Treatment Goals

- Control infection
- Restore normal hearing

Non-drug Treatment

- Ear toileting and antiseptic dressings
- Myringotomy for persistent mucopurulent collection in middle ear with bulging eardrum

Drug Treatment

- Antibiotics

- Amoxicillin
  - Adult: 500 mg -1 g orally 8 hourly for 5 - 7 days
  - Child: 40 mg/kg orally 8 hourly
- Analgesics
- Paracetamol
  - Adult: 500 mg - 1 g orally 4 - 6 hourly (maximum of 4 g/d) for 5 - 7 days
  - Child
    - over 50 kg: same as adult dosing
    - 6 - 12 years: 250-500 mg 4-6 hourly
    - 1 - 5 years: 125 - 250 mg
    - 3 months - 1 year: 125 - 250 mg for 5 - 7 days
- Systemic decongestant
- Psuedoephedrine
  - Adult: 60 mg orally 4 – 6 hourly, (maximum 4 times a day)
  - Child:
    - 6-12 years: 30 mg (5 mL of syrup) 8 hourly;
    - 2-5 years:15 mg, (2.5 mL of syrup) 4-8 hourly
- Supportive Measures
  - Bed rest and adequate fluids

Notable Adverse Reactions, Contraindications and Caution

- Preparations of pseudoephedrine with antihistamines may cause drowsiness
- Avoid ear drops

Prevention

- General healthy and clean airy environment reduces incidence of upper respiratory infections (colds)

Adenoid Diseases

Introduction

A syndrome due to hyperplasia/hypertrophy of the adenoid tissue in the nasopharynx.

Epidemiology

Commoner in children aged 2 - 6 years.

Clinical Features

- Nasal obstruction and mouth-breathing
- Snoring at night
- Obstructive sleep apnoea
- Progressive deafness due to secretory otitis media
- Chronic infection of adenoid tissue may be present
- Symptom may subside spontaneously as adenoid regress and become atrophic with age

Differential Diagnoses

- Allergic rhinitis
- Sinusitis

- Otitis media

Complications

- Sinusitis
- Recurrent otitis media
- Pneumonitis

Investigations

- X-ray of nasopharynx
- X-ray of sinuses and chest
- Nasal endoscopy

Treatment Goals

- To improve nasopharyngeal airway and nasal breathing
- To treat concurrent infection

Non-drug Treatment

- Adenoidectomy in severe cases

Drug Treatment

- Decongestants
  - Psuedoephedrine syrup
  - 6-12 years: 30 mg (5 mL of syrup) orally 8 hourly;
  - 2-5 years: 15 mg (2.5 mL) 4-8 hourly

Or:

  - Ephedrine nasal drops (0.5%); Instill into nostrils twice daily and at night time
- Antibiotics
  - Amoxicillin syrup 125 - 250 mg orally 8 hourly for 5-7 days

Chronic Otitis Media

Introduction

A chronic inflammatory condition of the middle ear mucosa associated with recurrent ear discharge, often over a period of years.

Epidemiology

Occurs in two clinical varieties, with mixed bacteriology, usually gram-negative organisms (Proteus, Pseudomonas)

- The more common simple type with a central eardrum perforation
- The much less common, serious type often associated with the presence of cholesteatoma

Clinical Features

- Main complaints: recurrent ear discharge (mucoid in simple type; thick and foul-smelling in serious type) and increasing deafness
- Pain is uncommon
- Central eardrum perforation is of varying size may occur
- Cholesteatoma and marginal or attic perforation is seen in the serious type

Complications (Commoner in serious type)

- Intracranial suppuration (extradural abscess, meningitis, or brain abscess)

- Lateral sinus thrombosis
- Facial nerve paralysis
- Labyrinthitis

Investigations

- Ear swab for MCS
- Audiogram: conductive deafness
- X-ray of the mastoids: shows sclerosis,
- Hypopneumatization
- CT Scan of Petromastoid: Axial, coronal views
- MRI of the petromastoid

Treatment Goals

- To give the patient a safe and dry ear
- To preserve or restore hearing as much as possible

Non-drug Treatment

- Careful ear toileting and regular ear dressing with antiseptic pack
- Myringoplasty to protect middle ear and improve hearing in dry ears with persistent perforation.
- Mastoid operation when there is cholesteatoma unresponsive to Treatment.

Drug Treatment

- Antibiotic
  - Co-Amoxiclav
  - Adult: 500/125 mg orally q8hr for 14 days in acute exacerbations.
  - Child:
    - 6 - 12 years: 250 mg orally 12 hourly
    - under 6 years: 125 mg 12 hourly
    - Refer to specialist if no improvement following antibiotic treatment.
- Supportive Measures
  - Protect ears from water with Vaseline/cotton wool while bathing

Caution

- Do not use topical ototoxic antibiotics in the presence of perforation.

Epistaxis

Introduction

Epistaxis refers to bleeding from the nose of any cause. It is a clinical presentation rather than a disease entity.

Aetiology

- Commonly from ruptured vessels in the anterior nasal septum, but sometimes from the posterior nose especially in the elderly. Can arise from a wide variety of causes
  - Local (in the nose)
  - Trauma

- Inflammation of nose or sinuses
- Acute e.g. acute rhinitis/sinusitis
- Chronic e.g. tuberculosis, leprosy, neoplasms
- Manifestation of systemic diseases
- Bleeding diatheses
- Blood dyscrasias
- Hypertension

Clinical Features

- Intermittent bleeding from nose, often spontaneous, but may follow obvious trauma or injury; could vary from few drops of blood to torrential life-threatening bleeding.
- Most bleeding stops spontaneously.

Differential Diagnoses

- Local and systemic illneses may present with nasal bleeding

Complications

- Haemorrhagic shock
- Fatality

Investigations

- FBC, including platelet count
- Bleeding and clotting time; APTT
- Serum Electrolyte, Urea and Creatinine
- X-ray sinuses
- CT scan
- Nasal endoscopy

Treatment Goals

- To arrest bleeding
- Replace lost blood and treat shock
- Treat causes

Non-drug Treatment

- Pressure and compression of the nose between fingers to arrest bleeding
- Cotton wool pack soaked in epinephrine 1:1000 may be placed on bleeding area before compression to induce vasoconstriction
- Nasal packing with lubricated ribbon gauze
- Arrest of posterior bleed with rubber tampon or improvised Foley's catheter balloon
- Cauterization of bleeding point or dilated vessels in anterior nasal septum
  - Diathermy cautery (electrical) or chemical cautery with silver nitrate stick
  - Endoscopic identification and arrest of bleeding points by ligation or cautery

Drug Treatment

- Treat underlying causes
- Sedation if necessary

- Diazepam 5 mg orally twice daily for 1 - 2 days

- Antibiotics if infection is present
  - Amoxicillin
  - Adult: 500 mg orally 8 hourly for 5 - 7 days
  - Child: 250 - 500 mg orally 8 hourly for 5 - 7 days
  - Other drugs depending on identified causative factors

Supportive Measures

- Intravenous infusion, crystalloids and blood as necessary
- Bed rest

Prevention

- Avoid/treat predisposing conditions

Foreign Bodies in the Airways

Introduction

Children (most commonly) may aspirate pieces of play objects or food items accidentally into the airway. This may present as serious emergency with imminent asphyxia.

Clinical Features

- If object is arrested at laryngeal level, acute upper respiratory tract obstruction with difficulty in breathing and stridor may occur immediately or progressively.
- Initial dyspnoea and cough may subside if the object passes down, but symptoms may return later.
- Sharp objects (e.g. fish bone or pins) may be impacted on the vocal cord leading to oedema and progressive obstruction.
- In severe cases, stridor, severe cyanosis and imminent asphyxia requiring immediate intervention to prevent a fatal outcome may occur.
- Small objects such as seeds may transverse the larynx and become arrested in the trachea or bronchus. Vegetables such as peanuts may cause inflammatory reactions such as pneumonitis.
- Two-way stridor often occurs with tracheal foreign bodies
- In the lower airways objects may remain for long periods, with unexplained chest symptoms
- Differential Diagnoses
- Acute laryngitis
- Acute laryngeal oedema
- Bronchopneumonia
- Pulmonary tuberculosis

Complications

- Life-threatening asphyxia
- Lung collapse and atelectasis

Investigations

- Radiograph of neck and chest

Treatment Goals

- To maintain the airway and adequate respiratory function

- Remove the foreign object as expeditiously as possible

Non-drug Treatment

- Immediate removal under anaesthesia by direct laryngoscopy or bronchoscopy as appropriate.
- Tracheostomy where necessary to maintain airway

Drug Treatment

- Antibiotic prophylaxis if necessary (for 3 days)
- Amoxicillin
  - Child: 6-12 years: 250 mg orally 12 hourly
  - under 6 years: 125 mg orally 12 hourly
- Steroids
  - Hydrocortisone (for pneumonitis)
  - Child
    - 1 month - 1 year: initially 25 mg by intravenous or intramuscular injection q8hr;
    - 1 - 6 years: initially 50 mg q8hr;
    - 6 - 12 years: initially 100 mg q8hr;
    - 12 - 18 years: initially 100 - 500 mg q8hr,
    - adjusted in all age groups according to response

Supportive Measures

- Oxygen
- Steam inhalation/nebulizer

Prevention

- Vigilant supervision of young children

Foreign Bodies in the Ear

Introduction

A common presentation in ENT emergency practice; commoner in children than adults. Children may inadvertently insert various objects (beads, plastic toys, seeds etc) into their ears while playing. Live insects may also crawl into the ear in adults/children

Clinical Features

- May be asymptomatic
- Mild pain; sensation of blockage in older children
- Object usually seen with good light in the ear canal

Investigations

- Ear Endoscopy
- Xray of petromastoid
- CT Scan of petromastoid

Differential Diagnoses

- Impacted wax
- Otitis externa

Complications

- Otitis externa

- Perforation of tympanic membrane from attempts at removal

Treatment Goals

- Remove object expeditiously without damage to ear structures or causing undue pain to patient

Non-drug Treatment

- Removal by ear syringing
- Removal with appropriate hook, or alligator forceps
- Examination and removal under anaesthesia if difficult in the clinic

Prevention

- Vigilant supervision of young children

Foreign Bodies in the Nose and Rhinoliths

Introduction

Typically result in foul smelling unilateral nasal discharge. Some inorganic objects may (after long periods) become coated by hard calcific deposits and become known as rhinoliths. High index of suspicion is important. Once care giver insists on foreign body inhalation (symptomatic or asymptomatic), it must be fully investigated.

Clinical Features

- Often no indication or symptom
- May be noticed accidentally by parent
- Later, complaints of foul purulent unilateral nasal discharge of unknown origin

Differential Diagnoses

- Acute or chronic rhinitis/sinusitis
- Nasal growth/polyp

Complication

Secondary infection: rhinosinusitis

Investigation

- Nasal endoscopy
- Radiograph of nose: for metallic or radio-opaque objects
- CT Scan of the nose and paranasal sinuses when missile injuries are involved

Treatment Goals

- Remove object safely with little discomfort to patient

Non-drug Treatment

- Careful removal with appropriate hook or forceps
- Removal under anaesthesia as necessary

Prevention

- Vigilant supervision of young children

Foreign Body Impaction

Introduction

Accidental (rarely intentional) ingestion of foreign bodies which get impacted/stucked in the pharynx or upper oesophagus. Sharp objects may be

arrested in the oropharynx or cricopharyngeal sphincter.

Clinical Features

- Dysphagia
- Drooling of saliva
- Cough.

Complication

- Perforation of oesophagus, mediastinitis, aspiration pneumonitis

Investigation

- Radiograph of neck and chest

Treatment Goals

- To remove foreign body expeditiously

Non-drug Treatment

- Removal under local anaesthetic if object visualised in oropharynx
- Removal under general anaesthetic with oesophagoscopy if object is in hypopharynx or cervical oesophagus

Drug Treatment

- Antibiotic prophylaxis with amoxicillin if indicated.

Mastoiditis

Introduction

Develops as a complication of acute suppurative otitis media, mostly in children. Follows acute otitis media (untreated or inadequately treated), or due to particularly virulent organisms. Infection spreads from the tympanum posteriorly into the mastoid antrum and air cells. Colliquative necrosis of the air cells and suppuration in the mastoid bone follows. A subperiosteal abscess forms behind the ear in a child with a discharging ear.

Clinical Features

- Fever
- Pain behind the ear
- Mucopurulent ear discharge
- Progressive inflammatory swelling over the mastoid region
- Swelling is tender and fluctuant

Differential Diagnoses

- Suppurating post-aural lymphadenitis from otitis externa

Complications

- Spread of infection into cranial cavity with:
- Extradural abscess
- Meningitis
- Brain abscess
- Lateral sinus thrombophlebitis

Investigations

- Ear swab for microscopy, culture, culture and sensitivity
- Radiographs of the mastoid
- CT Scan of petromastoid

- MRI of the petromastoid

Treatment Goals

- Control and eradicate infection
- Prevent more serious Complications

Non-drug Treatment

- Cortical mastoidectomy to open the mastoid
- Exenterate the infected air cells and drain the mastoid

Drug Treatment

- Antibiotics: Large doses of parenteral antibiotics
  - Amoxicillin
  - Adult: 500 mg -1 g intravenously 6-8 hourly for 7 days
  - Child: 50 - 100 mg/kg intravenously 6 - 8 hourly in divided doses daily for 7 days
  - Ceftriaxone
  - Adult: 1 g 12 hourly intravenously for 7 days
  - Child:
    - 13 years and above: by intravenous infusion over 60 minutes
    - 1 month - 12 years (body weight under 50 kg) 50 mg/kg once daily, up to 80 mg/kg in severe infections
    - Neonates: 20 -50 mg/kg once daily, by deep intramuscular injection or by intravenous injection over 2 - 4 minutes, or by intravenous infusion
- Analgesics
  - Paracetamol
  - Adult: 500 mg -1 g orally 4 - 6 hourly (to a maximum of 4 g daily) for 5 - 7 days
  - Child
    - over 50 kg: same as adult dosing
    - 6 - 12 years: 250 - 500 mg;
    - 3 months - 5 years:125 - 250 mg taken orally 4 - 6 hourly for 5 - 7 days

Supportive Measures

- Bed rest: in-patient care
- Intravenous infusion as appropriate

Prevention

- Adequate and timely treatment of acute otitis media

Nasal Allergy

Introduction

Hypersensitivity of the nasal mucosa to various foreign substances, of the atopic type. Manifests as recurrent episodes of sneezing, rhinorrhoea and nasal obstruction whenever patient comes in contact with the offending allergen. Symptoms are attributed to the effect of histamine and other chemical

substances released from ruptured mast cells in the nasal mucosa.
Common allergens are pollens of various plants, flowers and trees; house-dust; hairs; some foods; fungi and cosmetics
A common condition and affects all age groups. May be familial, often associated with allergic asthma or dermatitis

Clinical Features

- Repeated episodes of sneezing
- Watery nasal discharge
- Nasal obstruction with itching and conjunctival irritation whenever patient is in contact with allergen
- Nasal mucosa may be congested or sometimes normal at the time of clinical examination
- Presentation may be seasonal as with pollen allergy, or perennial with allergy to house dust, etc
- Nasal polyps may develop

Differential Diagnoses

- Chronic rhinitis from other causes
- Vasomotor rhinitis
- Chronic sinusitis

Complications

- Chronic sinusitis
- Pharyngitis

Investigations

- Skin tests for allergens: intradermal or prick tests
- Smear of nasal secretions for eosinophilia
- Serological tests: radio-immunoassay for IgE antibodies
- Sinus X-ray
- CT Scan of nose and paranasal sinuses

Treatment Goals

- Control or suppress the allergic symptoms
- Prevent allergic reactions

Non-drug Treatment

- Elimination of allergens
- Hyposensitisation by vaccination

Drug Treatment

- Antihistamines
  - Sedating antihistamine
  - Chlorpheniramine
  - Adult: 4 mg orally 4 - 6 hourly; maximum 24 mg daily
  - Child:
    - not recommended in children under 1 year
    - 6 - 12 years 2 mg orally q4 - 6 hr; maximum 12 mg daily;
    - 2 - 5 years: 1 mg q4 - 6 hr; maximum 6 mg daily

Or:

- Promethazine
- Adult: 25 mg orally at night, increased to 25 mg twice daily if necessary or, 10 - 20 mg 8 - 12 hourly
- Child:
  - Not recommended in children under 2 years
  - 2 - 5years: 5-15 mg daily in 1-2 divided doses
  - 5 - 10years: 10-25 mg orally daily in 1-2 divided doses;
- Non-sedative antihistamines
- Loratidine
  - Adult and child over 12 years 10 mg once daily;
  - Child 2 - 12 years, body weight under 30 kg, 5mg/5ml once daily;
  - Body weight over 30 kg, 10 mg once daily

- Topical steroid
  - Beclomethasone nasal spray
  - Adult and child over 6 years: 100 μg (i.e. 2 sprays) into each nostril twice daily

Or

  - 50 μg into each nostril 8 hourly
  - Reduce dose to 50 μg into each nostril twice daily when symptoms are controlled
- Decongestant
  - Psuedoephedrine
  - Adult: 60 mg orally 4 - 6 hourly (up to 4 times daily)
  - Child: 6 - 12 years: 30 mg (5 mL of syrup) orally q8 hr;
  - 2 - 5 years: 2.5 mL

Notable Adverse Reactions, Contraindications and Caution

- Drowsiness with antihistamine drugs
- Avoid prolonged use of medications

Prevention

- Avoid known allergenic substances, inhalants, foods, etc

Otitis Externa

Introduction

Otitis externa is the inflammation of the external ear which may result from a variety of insults to the external ear. May be classified as localized or diffuse otitis externa; or acute or chronic otitis externa.

Aetiology:

May be:

- Infective: bacteria or fungi.
  - Localized otitis externa or furuncle (boil) is a Staphylococcal infection of a hair follicle in the canal.
  - Diffuse otitis externa may be bacterial or fungal or reactive.

- Bacterial infection often follows trauma from scratching the canal skin.
- Fungal otitis (otomycosis) commonly follows swimming in the tropics, usually infection by Aspergillus niger

- Reaction of the canal skin to chemical irritant(s)
- Part of a generalized dermatitis.

Clinical Features

- Pain and itching
- Ear discharge
- Sensation of blockage due to accumulated debris in canal
- Deafness is variable
- Canal is red and swollen, full of inflammatory debris
- In otomycosis whitish mass of debris with black spots

Differential Diagnoses

- Otitis media
- Acute mastoiditis

Complications

- Acute perichondritis

Investigations

- Ear swab, taken properly for microscopy, culture and sensitivity
- Ear endoscopy
- Urinalysis for glycosuria
- Blood glucose estimation in cases of recurrent furunculosis to exclude diabetes mellitus

Treatment Goals

- Control infection/inflammation
- Relieve discomfort

Non-drug Treatment

- Careful ear toilet to clear out debris
- Daily dressing with antiseptic gauze packed with Acriflavin in spirit
- Furunculosis: dressing with magnesium sulphate wick or steroid and antibiotic ointment dressing

Drug Treatment

- Antibiotics
  - Amoxicillin
  - Adult: 500 mg - 1 g orally every 8 hours for 5 - 7 days
  - Child: 40 mg/kg orally in every 8 hours for 5 - 7 days
  - Neomycin/hydrocortisone ear drops
  - Adult and child: 2 - 3 drops 3 - 4 times daily
- Analgesics
  - Paracetamol
  - Adult:500 mg -1 g orally every 4 - 6 hours (maximum of 4 g daily) for 5 - 7 days
  - Child over 50 kg: same as adult dosing
  - 6 - 12 years: 250 - 500 mg 4 - 6 hourly

- 3 months - 5 years: 125 – 250 mg taken orally every 4 - 6 hours

Supportive Measures

- Prevent water from entering ear for one month

Prevention

- Avoid trauma to ear canal (especially scratching)
- Keep ears dry

Peritonsillar Abscess (Quinsy)

Introduction

It is a common local complication of acute tonsillitis whereby a virulent streptococcal infection spread beyond the tonsillar capsule into the peritonsillar space, causing, first cellulitis, and later suppuration in the space. More common in adults with tonsillitis.

Clinical Features

- Follows an attack of acute tonsillitis
- Increasing pain, fever and dysphagia
- Trismus- spread of oedema and infection to pterygoid muscles
- Often referred pain to ipsilateral ear
- Difficulty in opening mouth for examination; mouth full of saliva
- Affected tonsil displaced downwards and medially, with swelling above and lateral to it, all inflamed and oedematous
- Uvula pushed to opposite side

Differential Diagnoses

- Parapharyngeal abscess
- Retropharyngeal abscess
- Tonsillar tumours

Complications

- Septicaemia
- Parapharyngeal suppuration/abscess

Investigations

- Throat swab
- Full Blood Count with differentials

Treatment Goals

- Rapid control of infection
- Relief of pain and discomfort

Non-drug Treatment

- Improves
- Incision and drainage, preferably under local anaesthetic when suppuration is definite

Drug Treatment

- Antibiotics
  - Amoxicillin
  - Adult: 500 mg -1 g intravenously every 6 hours for 7 days

- Child: 50 - 100 mg/kg orally every 8 hours

- Analgesics
  - Paracetamol
  - Adult: 500 mg - 1 g orally every 4 - 6 hours (maximum of 4 g daily) for 5 - 7 days
  - Child over 50 kg: same as adult dosing
  - 6 - 12 years: 250 - 500 mg;
  - 3 months - 5 years: 125 – 250 mg taken orally 4 - 6 hourly for 5 - 7 days

Or:

  - Aspirin (Acetylsalicylic acid)
  - Adult: 300 - 900 mg orally every 4 - 6 hours when necessary; maximum 4 g daily
  - Not recommended in children (risk of Reye's syndrome)

Supportive Measures

- Intravenous infusion
- Bed rest

Notable Adverse Reactions, Contraindications and Caution

- Aspirin may cause gastrointestinal irritation

Prevention

- Elective tonsillectomy is advised after an episode of quinsy to prevent further (more severe) attacks

Pharyngitis (Sore Throat)

Introduction

A common cause of persistent sore throat in young and most middle-aged adults, usually unaccompanied by other symptoms.

Often secondary to chronic nasal conditions with nasal obstruction e.g.

- Vasomotor rhinitis
- Nasal polyps
- Septal deviation

Obstruction causes mouth breathing with dryness of the throat

Other causes:

- Secondary inflammation from postnasal discharge of sinusitis
- Chronic exposure to irritants such as tobacco smoke and alcohol
- Secondary infection from carious teeth

Clinical Features

- Persistent sore throat with no systemic upset or dysphagia
- Sore throat is often worse in the mornings

Differential Diagnoses

- Chronic tonsillitis
- Pharyngeal or laryngeal tumour

Complications

- More often related to the primary sources of irritation or infection

Investigations

- Throat swab: microscopy, culture and sensitivity
- X-ray of paranasal sinuses
- CT Scan of Paranasal sinuses

Treatment Goals

- Control symptoms by identifying and treating primary causes

Non-drug Treatment

- Treat sinusitis
- Surgery for obstructive nasal conditions
- Treat dental caries

Drug Treatment

- Appropriate antibacterial agent if indicated

Supportive Measures

- Reduction or avoidance of exposure to known irritants-tobacco, alcohol, etc

Sinusitis

Introduction

Inflammation of the mucosal lining of the paranasal sinuses. May be acute or chronic and affect one or more of the sinuses. Most commonly the maxillary sinus or antrum (in very young children the ethmoidal sinuses)

Acute sinusitis is often sequel to acute rhinitis. Common organisms are Streptococcus, Pneumococcus, and Haemophilus Chronic sinusitis is more insidious

May be associated with chronic rhinitis and allergy but other factors such as air pollution, smoking, dental sepsis and poor general health may be contributory.

Bacteriology: is mixed: sometimes Gram negative and fungal organisms

Clinical Features

- Rhinorrhoea
- Nasal obstruction
- Fever with pain over affected sinus in acute cases
- Less dramatic symptoms in chronic sinusitis
- Intermittent nasal obstruction and discharge over a long period
- Little pain
- Mucopurulent postnasal discharge ("drip")

Differential Diagnoses

- Acute rhinitis (coryza)
- Allergic rhinitis
- Vasomotor rhinitis

Complications

- Orbital cellulitis (complicating ethmoidal sinusitis)
- Cavernous sinus thrombosis (sphenoidal sinusitis)
- Intracranial infection
  - Subdural abscess

- Meningitis
- Cerebral abscess
- Dural vein thrombophlebitis
- Osteomyelitis of frontal or maxillary bones
- Chronic pharyngotonsillitis
- Chronic laryngitis and bronchitis

Investigations

- Nasal swab for microscopy, culture and sensitivity
- X-ray of sinuses: four-view
- Antrum roof puncture/lavage: specimen for culture
- CT scan in complicated cases
- MRI

Treatment Goals

- Control and eradicate infection
- Restore adequate drainage of sinuses

Non-drug Treatment

- Antrum wash-out/lavage
- Trephining of frontal sinus
- Radical surgery for non-responsive cases
- Intranasal antrostomy
- Caldwell-Luc operation
- Fronto-ethmoidectomy
- Functional Endoscopic Sinus Surgery (FESS)

Drug Treatment

- Antibiotics
  - Amoxicillin
  - Adult: 500 mg - 1 g orally every 8 hours for 5 - 7 days
  - Child:40 mg/kg orally every 8 hours for 5 - 7 days

Or:

  - Amoxicillin/clavulanic acid
  - Adult: 500/125 mg orally every 12 hours
  - Child: 0.25 mL/kg of 125/31 mg suspension orally every 8 hours; dose doubled in severe infections
  - 1-6 years: 5 mL of 250/62 mg suspension every 8 hours; dose doubled in severe infections
  - 6 - 12 years: 5 mL of 250/62 mg suspension every 8 hours; dose doubled in severe infections
  - 12 - 18 years: one 250/125 mg strength tablet every 8 hours, daily increased in severe infection to one 500/125 strength tablet every 8 hours daily

Or:

  - Cotrimoxazole
  - Adult: 960 mg orally 12 hourly
  - Child 6 weeks to 5 months: 120 mg orally 12 hourly;

- 6 months - 5 years: 240 mg 12 hourly;
- 6 - 12 years: 480 mg every 12 hours
- Ceftriaxone
- Adult: 1 g intravenously or intramuscularly 12 hourly for 7 days for patients with severe or nosocomial disease
- Child:
- Neonates: 20 - 50 mg/kg by intravenous infusion over 60 minutes once daily, or by deep intramuscular injection, or by intravenous injection over 2 - 4 minutes, or by intravenous infusion
- 1 month - 12 years (body weight under 50 kg) 50 once daily, up to 80 mg/kg in severe infections

- Decongestant
  - Psuedoephedrine tablets
  - Adult: 60 mg orally twice daily until congestion clears
  - Child 2 - 6 years: 15 mg orally 3 - 4 times daily;
  - 6 - 12 years: 30 mg 3 - 4 times daily;
  - 12 - 18 years: 60 mg 3 - 4 times daily
- Analgesic
  - Paracetamol
  - Adult: 500 mg -1 g orally 4 - 6 hourly (maximum of 4 g daily) for 5 - 7 days
  - Child over 50 kg: same as adult dosing
  - 6 - 12 years: 250 - 500 mg;
  - 3 months - 5 years: 125 - mg taken orally every 4 - 6 hours for 5 - 7 days

Supportive Measures

- Steam inhalation with menthol
- Treat contributory nasal pathology as appropriate
- Allergy, nasal polyps, septal deviations, dental pathology, etc

Notable Adverse Reactions, Contraindications and Caution

- Amoxicillin
  - minor gastrointestinal disturbance
- Cotrimoxazole
  - Fixed drug eruption
  - Nausea and vomiting
  - Erythema multiforme
  - Steven-Johnson syndrome

Prevention

- Avoid airway irritants, smoking, and alcohol
- Avoid air pollution
- Maintain good general health and nutrition

Tonsillitis

Introduction

An inflammatory condition of the palatine tonsils, common in children. In half or more cases infection is by beta-haemolytic streptococcus, in others viral Typically an acute infection. Chronic tonsillitis presents usually as recurrent

acute infection
Essentially a disease of children but also occurs in young adults

Clinical Features

- Fever
- Sore throat
- Dysphagia
- Systemic upset and malaise
- Tonsils are swollen, inflamed and covered with purulent exudates
- Jugulo-digastric lymph nodes are enlarged and tender

Differential Diagnoses

- Infectious mononucleosis
- Vincent's angina
- Agranulocytosis

C***omplications***

- Quinsy: main common complication
- Parapharyngeal infection/abscess
- Rheumatic fever and nephritis following streptococcal tonsillitis

Investigations

- Throat swab for microscopy, culture and sensitivity
- Full Blood Count

Treatment Goals

- Control the infection
- Control pain
- Prevent further episodes

Non-drug Treatment

- Oral hydration
- Salt/warm water gurgle
- Tonsillectomy in chronic cases with frequent recurrent tonsillitis

Drug Treatment

- Antibiotics
  - Amoxicillin
  - Adult: 250 - 500 mg orally 8 hourly for 5 - 7 days
  - Child: 40 mg/kg orally every 8 hours for 5 - 7 days
  - The parenteral route may be required when there is vomiting or severe dysphagia

Or:

  - Cotrimoxazole
  - Adult: 960 mg orally 12 hourly for 5 - 7 days
  - Child 6 weeks to 5 months: 120 mg orally 12 hourly;
  - 6 months - 5 years: 240 mg 12 hourly;
  - 6 – 12 years: 480 mg every 12 hours
- Analgesic
  - Paracetamol
  - Adult: 500 mg -1 g orally 4 - 6 hourly (to a maximum of 4 g) for 5 - 7

days
- Child
  - over 50 kg: same as adult dosing
  - 6 - 12 years: 250 - 500 mg;
  - 3 months - 5 years:125-250 mg taken orally 4 - 6 hourly for 5 - 7 days

Supportive Measures

- Bed rest
- Intravenous infusion as necessary

Notable Adverse Drug Reactions, Contraindications and Caution

- Cotrimoxazole
  - Fixed drug eruption
  - Nausea and vomiting
  - Erythema multiforme
  - Steven-Johnson syndrome

Vertigo

Introduction

Vertigo is hallucination of movement (patient feels s/he is moving or the environment is moving) It is a symptom/feature of vestibular organ disfunction The commonest type is known as benign paroxysmal positiobal vertigo(BPPV), which results when the otoliths in the posterior semicircular canal is disorganized /reoriented in wrong position.

The trigger is usually sudden movement of the head.May also result from excessive wax, infections, tumours of inner ear (acoustic neuroma), head injuries and metabolic causes including cardiovascular disease.

Clinical Features

- Sensation of movement(e.g. spinning), exaggerated dizziness
- Nausea, sometimes vomiting, tinnitus(ringing in the ear) may be present.

Differential Diagnoses

- Meniere's disease
- Vestibulitis
- Acoustic neuroma

Complications

- Poor quality of life
- Suicidal tendencies

Investigations

- Audiologic tests - Pure Tone Audiogram (PTA), Tympanometry,
- Automated Brain Response Audiometry (where possible)
- CT scan in complicated cases
- MRI in suspected inner ear tumours
- Ear Endoscopy

Treatment Goals

- Identify cause and treat accordingly

Non-drug Treatment (mainstay of treatment)

- Canalithic Repositioning Manoeuvres e,g.

- Epley's manoeuvre
- Sermon manoeuvre

Drug Treatment (symptomatic relief)

- Labyrinthine sedatives
  - Beta histine 16 mg twice daily
  - Cinnarizine 15 - 30 mg twice daily
- Antiemetics
  - Promethazine
  - Adult: 25 mg orally at night, increased to 25 mg twice daily if necessary or, 10 - 20 mg 8 - 12 hourly
  - Child:
  - Not recommended to children under 2 years
  - 5 - 10 years: 10 - 25 mg orally daily in 1-2 divided doses;
  - 2 - 5 years: 5 - 15 mg daily in 1 - 2 divided doses

Wax in the Ear

Introduction

Wax (or cerumen) is a normal product of the human external ear. A dark brownish mixture of the secretions of the ceruminous and sebaceous glands in the outer third of the external auditory canal.

Small quantities are produced continuously and function to lubricate the canal Quantities produced and the consistencies vary May be excessive in some people, causing deafness, ear ache, secondary infection and even vertigo

Clinical Features

- Sensation of blockage and some degree of deafness are the most common complaints
- Sometimes, pain and irritation
- Ear discharge in some cases
- Quantity seen varies
- May be soft or hard
- May be impacted in the deep meatus

Differential Diagnoses

- Foreign bodies
- Otitis externa

Complications

- Superimposed infection: otitis externa
- Hearing impairment

Treatment Goals

- Evacuate the wax and clear the ear

Non-drug Treatment

- Removal with probe and cotton wool: for soft wax
- Ear syringing: for hard wax, often after preliminary softening with oily drops
- Occasionally, removal under anaesthesia if syringing is unsuccessful

Drug Treatment

- Ear drops to soften and loosen wax
- Warm olive oil

CHAPTER 5:

ENDOCRINE DISORDERS

Cushings Syndrome

Introduction

Cushing syndrome is a constellation of features associated with prolonged exposure to inappropriately high levels of plasma glucocorticoids.
The most common cause is from exogenous glucocorticoid use Endogenous causes of Cushing's syndrome are rare.

Classification/ Aetiology:

- ACTH- dependent
  - Cushing's disease
  - Ectopic ACTH Syndrome
  - Macronodular Adrenal Hyperplasia
- ACTH-independent causes:
  - Cortisol-secreting adrenal tumour or hyperplasia
  - Iatrogenic Cushing's Syndrome

Clinical Features

- Weight gain, moon facies, fat pads, truncal obesity;
- Facial plethora, red- purple striae ecchymoses, facial hair, hirsutism and male pattern balding in women, acne, Acanthosis nigricans, opportunistic fungal infections, poor wound healing.
- Ocular: Raised intraocular pressure, exophthalmos, Visual field defects-
- Muscle weakness especially proximal myopathy
- Menstrual irregularities- decreased libido, men- decreased libido and impotence in men
- Lethargy, depression, emotional liability, psychosis, diabetes mellitus, , loss of height, pathologic fractures, hypertension, discriminatory features - reddish purple striae, plethora, proximal muscle weakness, bruising with no obvious trauma, and unexplained osteoporosis.

Investigations

- Electrolyte, Urea and Creatinine, FBS and FBC
- Urine free cortisol (UFC; at least two measurements)
- Late-night salivary cortisol (two measurements)
- 1 mg overnight dexamethasone suppression test (DST)
- Longer low-dose DST (2 mg/day for 48 hours)

Specific investigations

- Morning plasma ACTH-
- High-Dose DST
- Inferior Petrosal Sinus Sampling and Selective Venous Catheterization
- Imaging: CT/MRI scanning of pituitary and adrenals; scintigraphy

Differential Diagnoses

- Constitutional obesity

- Other causes of weight gain
- Pseudo cushings
- Pregnancy
- Depression
- Bulimia
- Alcoholism

Treatment

- Exclude known causes of weight gain through history and examination
- Confirm diagnosis and differential diagnoses before initiating treatment
- Remove any underlying cause e.g. iatrogenic Cushing Syndrome.
- General principle is to reduce the level of plasma cortisol and treat any symptoms and Complications
- Surgical resection of the culprit tumour if patient qualifies.
- Start with medical treatment and then surgery or continue medical treatment as indicated.

Drug Treatment

- Mifepristone
- Adrenal steroid inhibitors
- Metyrapone
- Aminoglutethimide- commonly prescribed in combination with metyrapone.

Surgery

- Adrenalectomy or pituitary surgery

Radiotherapy

- For failed surgery and/or patients not fit for surgery

Complications of Cushing's syndrome and its treatment

- Diabetes mellitus
- Osteoprosis and fractures
- Hypopituitarism (compression of other corticotrophs)
- Steroid psychosis
- Hormone replacement
- Lifelong glucocorticoid replacement with pituitary destruction or bilateral adrenalectomy
- Lifelong mineralocorticoid replacement is also necessary in those patients who undergo bilateral adrenalectomy.

Prognosis

- Favourable for adenomas as surgery is curative.
- CS due to carcinoma and adrenal hyperplasia have worse prognosis

Diabetes Mellitus

Introduction

A common metabolic disorder associated with acute and long-term

Complications affecting the eyes, kidneys, feet, nerves, brain, heart and blood vessels. Its classification has been revised by the WHO and is based on aetiology:

- Type 1
- Type 2
- Secondary diabetes
- Gestational diabetes: appears for the first time in pregnancy

Type 1 diabetes

Patients present at a young age (usually teens or twenties); earlier presentation may also occur.

Presents with rapid onset of severe symptoms e.g. thirst, polyuria and weight loss.

Type 2 diabetes

- Commonest form of diabetes globally as well as locally.
- Most patients present with the classical symptoms.
- Some patients present asymptomatically and identified at screening.
- The patients usually do not seek medical attention early because of the insidious nature of the disease
- Many present at diagnosis with features of diabetic Complications.

Gestational diabetes (GDM)

- Glucose intolerance first diagnosed in pregnancy
- Must be distinguished from existing diabetes in women who become pregnant
- Associated with poor pregnancy outcomes if not promptly and appropriately managed.

Clinical Features

- No symptoms in many individuals
- Passage of large amounts of urine
- Thirst and excessive drinking of water
- Unexplained weight loss
- Blurred vision
- Recurrent boils
- Recurrent itching of the vulva
- Symptoms related to chronic Complications (e.g. 'pins and needles' sensation or numbness in the hands or feet, foot gangrene, poor vision)

Investigations

- Newly diagnosed patients
  - Fasting or random blood glucose
  - Urine ketones and protein
  - FBC and Electrolyte, Urea and Creatinine
  - Fasting blood lipid profile
  - Glycated haemoglobin (HbA1c)
  - ECG

- Subsequent monitoring
  - Blood glucose
  - Recorded results of regular self-monitoring of fasting and random tests at home by the patient using a glucose meter
  - Periodic fasting or random tests during clinic reviews
  - Glycated haemoglobin (HbA1c) at least three times a year.
  - Blood lipid tests annually, but more frequently if levels abnormal or on lipid lowering medication
  - Blood urea, electrolytes and creatinine annually, but more frequently if levels abnormal
  - Urine protein annually

Diagnosis

The diagnosis of diabetes must be confirmed biochemically prior to initiation of any therapy.

- Symptoms of hyperglycaemia and any of the following:
  - Random venous plasma glucose value of 11.1 mmol/L (≥ 200 mg/dl %), or
  – Fasting venous plasma glucose ≥ 7.0 mmol/L (≥126 mg /dl) confirms the diagnosis of diabetes.
  – In asymptomatic subjects however, a single abnormal blood glucose result is inadequate to make the diagnosis; in which case a second fasting blood glucose or random glucose values above would be required to make a diagnosis. Occasionally, a 75 g Oral Glucose Tolerance Test (OGTT) would be required to confirm the diagnosis.

Table 5.1: Values for the Diagnosis of Categories of Hyperglycaemia following OGTT.

Glucose Tolerance State	Venous plasma (mmol/L)	Venous plasma (mg/dL)
Diabetes mellitus		
Fasting 2 hour post-75 g glucose load	≥ 7 ≥ 11.1	≥ 126 ≥ 200
Impaired glucose tolerance Fasting 2 hour post-75 g glucose load	 < 7.0 and 7.8-11.0	 < 110 and 140-199
Impaired fasting glycaemia Fasting	 6.1 –6.9	 110 - 125

Treatment Goals

- Adequate management of hyperglycaemia
- Prevention of hypoglycaemia
- Management of co-morbidities
- Prevention and treatment of acute and chronic Complications by achieving

and maintaining the following:

- Fasting blood glucose between 4 - 6 mmol/L
- 2-hour post-meal blood glucose between 4 - 8 mmol/L
- Glycated haemoglobin 6.5 % or less
- Weight reduction in overweight and obese individuals
- Blood pressure less than 130/80 mmHg
- LDL-cholesterol less than 2.5 mmol/L

Non-drug Treatment

- Education

The provision of knowledge and skills to people with diabetes mellitus is aimed to:

- empower them to render self-care in their management
- Provide them with adequate knowledge of diabetes and its sequelae
- Create the right attitudes and provide resources to provide appropriate self care
- Principles of Diabetes Education Should be locally applicable, simple and effective
- All members of the diabetes care team should be trained to provide the education
- It must empower people with diabetes as well as their families
- The effectiveness of the program must be evaluated and modified as necessary

- Diet
  - Dietary modification (and increasing level of physical activity) are cornerstones in the management of newly diagnosed persons with Type 2 diabetes and should be maintained throughout the course of diabetes management.
  - An appropriate diet should be prescribed in the context of social, cultural and psychological influences on food choices
  - The diet should be individualized, based on traditional eating patterns, be palatable and affordable
  - Caloric restrictions should be moderate and yet provide a balanced nutrition
  - Eat at least three meals a day while avoiding binge eating.
  - A snack between meals can be healthy for certain groups of people
  - Animal fat, salt, and so-called “diabetic foods” should be avoided
  - Pure (simple sugars) in foods and drinks should be avoided this includes soft drinks, honey.
  - Eating plans should be high in carbohydrates and fibre, vegetables and fruits should be encouraged
  - Food quantities should be measured in volumes using available household items (e.g. cups), or be countable (e.g. number of fruits or slices of yam or bread)

Physical activity

One of the essentials in the management of Type 2 diabetes mellitus is regular physical activity because it:

- Improves metabolic control
- Increases insulin sensitivity
- Improves cardiovascular health
- Helps weight loss
- Gives a sense of well-being

Two main types of physical activity:

- Aerobic or endurance exercise e.g. walking, running
- Anaerobic or resistance exercise (e.g. lifting weights)

Both types of activity may be prescribed to persons with type 2 diabetes mellitus; the aerobic form is usually preferred

Drug Treatment

- Oral antidiabetic agents
  - There is no longer justification for trying life style modification alone in confirmed cases of type-2 diabetes.
  - All type-2 diabetic patients should be commenced on metformin therapy in addition to life style modification soon after confirmation of diagnosis; except where Contraindications for metformin use exist.
  - When individual glycaemic targets are not met within 3 months, a sulphonylurea or other antidiabetic agents should be added to the treatment regimen.
  - Thiazolidinediones are additional oral medications which may be used either alone or in combination with metformin or a sulphonylurea or in addition to both agents in type 2 diabetics.
  - The starting dose of medication for any long-term treatment for diabetes must initially be low, with increments over several days or weeks according to results of blood glucose or glycated haemoglobin.
  - Hypoglycaemia is a potential side-effect with insulin and all sulphonylureas.
  - Metformin and thiazolidinediones when used alone do not induce hypoglycaemia.
  - Avoid metformin and long-acting sulphonylureas such as glibenclamide in individuals with poor kidney and liver function .
  - Oral anti-diabetic medications should be avoided in Type 1 diabetes patients and should not be used during pregnancy and breast-feeding.
  - Sulphonylureas are best taken 15-30 minutes before meals.
  - Gliclazide is short-acting and preferred in the elderly and those with mild kidney disease. In general sulphonylureas should be avoided in all patients with liver disease and used with care in kidney disease. The preferred alternative in these circumstances is insulin.
  - Individuals with Type 2 diabetes not responding to maximum tolerable

doses of a sulphonylurea, metformin or a thiazolidinedione alone, could be given combined oral therapy with two or three oral anti-diabetic medications. However, two different products from the same group should never be used together.

- When oral combination therapy fails, insulin should be added to the treatment regimen or should replace the oral agents.
- Secondary failure of OGLAs is common (5 -10% of patients annually) although few reports are available locally

▪ Insulin

- Insulin is absolutely indicated in all Patients with Type 1 diabetes and in pregnant and breast-feeding women whether Type 1 or Type 2.
- Insulin is indicated in Type 2 patients with secondary failure of oral anti-diabetic medication (when oral anti-diabetic medications cease to be effective in controlling the blood glucose).
- Insulin therapy is required temporarily in Type 2 patients during severe stress e.g. severe infections, acute myocardial infarction, surgical operations, trauma, hyperosmolar state.

Table 5.2: Anti-diabetic Medications Currently in Use in Nigeria

Class	Example	Mechanism of action	Daily dose	Side effects
Biguanides	Metformin	Improves insulin sensitivity in the liver, muscle and adipocytes	500 - 2550 mg	Nausea, vomiting, abdominal pains
Sulphonylureas	Glibenclamide Glimepiride Gliclazide	Stimulates insulin release from the beta cells	2.5-15 mg 1 - 6 mg 40-320mg (doses above 160 mg given in 2 divided doses)	Hypoglycaemia Weight gain
Meglitinides	Repaglinide	Stimulates insulin release from the beta cells	0.5 - 4 mg before meals (max 16 mg/day)	hypoglycaemia
Thiazolidinediones	Pioglitazone	Stimulates PPAR-Ɣ	15 - 60 mg daily	Weight gain, Oedema, GIT upset
Alpha glucosidase inhibitors.	Voglibose	Delays absorption of glucose	0.2-0.3 mg thrice a day with meals.	Diarrhoea, flatulence, bloating, abdominal discomfort.
Dipeptidyl peptidase IV inhibitors	Vildagliptin Sitagliptin Linagliptin	Stimulate insulin release in a glucose-dependent manner	50 mg BD 100 mg daily 2.5 - 5 mg daily	GIT upset Abnormal liver function tests, Pancreatitis.
GLP-1 agonists.	Exenatide	Increase glucose-dependent insulin secretion from pancreatic beta cells, reduces glucagon secretion	5 - 10 µg twice a day Subcutaneously 60 minutes before morning and evening meals	GIT upset, pancreatitis Decreased apetite Weight loss.
Insulin	Various formulations	Increase glucose utilization by tissues.	Various doses	Hypoglycaemia Lipodystrophy

Insulin Therapy in Type 2 Diabetes

Insulin is increasingly being used in the management of type-2diabetes. Insulin therapy should usually begin with teaching the patient the correct technique for subcutaneous injections, the types of insulin and syringes, as self- injections are to be strongly encouraged.

Some of the indications for insulin therapy in type-2 diabetes include;

- In combination with OGLAs or as monotherapy in the management of Type 2 diabetes to achieve optimum targets
- Hyperglycaemic emergencies
- Peri-operatively, especially major or emergency surgeries
- Organ failure: renal, liver, heart etc
- Pregnancy
- Latent Autoimmune Diabetes of Adults (LADA)
- Sensitivity to OGLAs
- Regimen and dose of insulin therapy will vary from patient to patient
- Two forms of insulin therapy are often used in combination with OGLA therapy
- Intermediate/long acting insulin plus OGLA or pre-mixed insulin
- Referral to an endocrinologist should be considered if more than 30 units of insulin is required per day

Table 5.3: Time Course of Action of Insulin Preparations.igeria

Insulin Preparation	Onset of Action	Peak Action	Duration of Action	Injections per day
Very rapid acting (insulin analogues)	10 min	1 hour	3 hours	Immediately before meals
Short-acting	30 min	2 - 5 hours	5 - 8 hours	30 min before meals
Intermediate-acting (NPH or lente)	1 - 3 hours	6 - 12 hours	16 - 24 hours	Once or twice daily
Biphasic mixtures (30/70; premixed)	30 min	2 - 12 hours	16 - 24 hours	Once or twice daily
Insulin glargine	1.5 hour	6 - 20 hours	24-36 hours	Once daily.
Insulin detemir	1 hour	6 - 8 hours	20-24 hours	Once daily.

Diabetic Foot Problems

Introduction

People with diabetes are at increased risk of foot ulcers and amputations which are major causes of morbidity and disability. Both foot ulcers and amputations can be prevented by education, anticipation, early recognition and prompt management. The most common predisposing factors for ulcers and amputations are:

- Peripheral neuropathy with loss of sensation
- Poor foot hygiene
- Peripheral vascular disease
- Deformities and abnormal biomechanics
- Unsuitable or no footwear

Treatment

- Regular inspection and examination of the foot at risk
- Identify the at-risk foot
- Education of health workers, people living with diabetes and their families
- Appropriate footwear
- Early treatment of non-ulcerative and ulcerative foot problems

Diabetes in Pregnancy

Introduction

Gestational diabetes mellitus (GDM) is any degree of glucose intolerance first recognised in pregnancy

If inadequately managed, GDM is associated with increased risk of perinatal morbidity and mortality

Diagnosis and prompt institution of therapy reduce the risks of poor outcomes

- When to screen for GDM:
  - Between 24 and 28 weeks of gestation Who: Women with
  - High risk for GDM
  - BMI 25 kg/m 2
  - Previous history of GDM
  - Glycosuria
  - Previous large baby (> 4 kg)
  - Poor obstetric history
  - Family history of diabetes
  - Known IGT / IFG

Treatment

- Combined health care team- obstetrician, diabetologist, diabetes educator, and paediatrician/neonatologist.
- Initial therapy is dietary modification
- Spread carbohydrate over 3 small to moderate sized meals and 2 - 3 snacks/day
- Consider an evening snack to prevent starvation ketosis
- Energy intake should provide for desirable weight gain during pregnancy
- For obese women a 30 - 33% calorie restriction is advised
- Daily SBGM (urine glucose monitoring) is not useful in pregnancy
- Initiate insulin therapy if:
  - Fasting plasma glucose is > 5.8 mmol/L
  - 1 hour post-prandial glucose is > 8.6 mmol/L

- 2 hour post-prandial plasma glucose is >7.5 mmol/L
- Modify insulin regimen to achieve above targets
- Regular assessment of maternal wellbeing should include blood pressure and urine protein Regular surveillance for foetal well-being
- Delivery at 38 weeks gestation recommended
- Withdraw therapy for diabetes after birth
- Re-assess classification of maternal status at 6 weeks post partum

Acute metabolic Complications of diabetes mellitus(see emergency section)

Differential Diagnoses
- Stroke
- Seizures
- Trauma
- Drug overdose
- Ethanol intoxication

Prevention of diabetes

Obesity and physical inactivity are the major modifiable risk factors, and should be avoided/corrected

Onset of diabetes can be delayed in people at high risk by active lifestyle modification

Lifestyle modification should be the cornerstone of preventative strategies in the following categories of people:
- Age > 45 years
- Overweight and obesity (BMI > 25 kg/m2)
- Physical inactivity
- First degree relatives with diabetes
- Previous gestational diabetes
- Previously identified IGT or IFG
- Dyslipidaemia
- Hypertension

Obesity

Introduction

Overweight and obesity increase the risk for several diseases such as hypertension, ischaemic heart disease, and diabetes mellitus.Obesity results from an imbalance between energy intake and energy expenditure. However, more recent researches, have suggested that genetics, physiological and behavioural factors also play significant roles in the aetiology of obesity.

Clinical Features

Assessment.
- Body mass index (BMI) is a surrogate measure for global adiposity for ease of clinical use.
- Waist circumference: is a surrogate marker for truncal obesity.

BMI is calculated as follows

- BMI = weight in kg divided by the square of the height in metres expressed as kg/m2

Classification of Obesity

- Underweight: <18.5 kg/m2
- Normal weight: 18.5 - 24.9 kg/m2
- Overweight: 25 - 29.9 kg/m2
- Obesity (Class1): 30 - 34.9 kg/m2
- Obesity (Class 2): 35 - 39.9 kg/m2
- Morbid obesity (Class 3): > 40 kg/m2
- Super morbid obesity: > 50 kg/m2

Truncal obesity: waist circumference (WC) and/or waist/hip ratio (WHR).

- A healthy waist circumference for males is <94 cm and< 80cm for females.
- WC of >102 cm in males and >88 cm in females are associated with greatly increased risks.
- A healthy WHR is <0.9 in males and <0.85 in females.

Investigations

- Non-specific assessment:FBS, OGTT, serum lipid profile.
- Assessment of other complications as indicated.
- Specific assessment should be directed towards identifying underlying specific causes when suspected. These include conditions such as endocrinopathies (hypothyroidism, Cushing's syndrome, male hypogonadism, Insulinoma CNS disease that affects hypothalamic function, PCOS), genetic syndromes associated with obesity, mental disorders like bulimia nervosa and binge eating disorder, medications such as steroids, and atypical antipsychotics.

Table 5.4: Pathological Consequences of Obesity

System	Pathology
Gastrointestinal:	Gallstones, pancreatitis, abdominal hernia, Non-Alcoholic Fatty Liver Disease, GERD
Endocrinology/Metabolic:	Metabolic syndrome, insulin resistance, impaired glucose tolerance, type 2 DM, dyslipidaemia, polycystic ovarian syndrome.
Cardiovascular:	Hypertension, coronary artery disease, congestive heart failure, dysarrhythmia, pulmonary hypertension, stroke, venous stasis, deep venous thrombosis (DVT), pulmonary embolism, chronic kidney disease.
Respiratory:	Abnormal pulmonary function, obstructive sleep apnoea, obesity hypoventilation syndrome.
Musculoskeletal:	Osteoarthritis, gout, low back pain
Gynaecologic:	Menstrual irregularities, infertility
Genitourinary:	Urinary stress incontinence
Ophthalmologic:	Cataracts
Neurologic:	Idiopathic intracranial hypertension
Cancers:	Oesophagus, colon, gall bladder, cervix, breast, uterus, kidney, prostate
Postoperative events:	Atelectasis, pneumonia, DVT, pulmonary embolism

Treatment Goals

- Reduce energy intake and increase physical activity.
- Reduce body weight by 10% from the individual baseline weight over a period of six months.

This can be achieved through the following:

- Lifestyle modification (diet therapy and physical activity)
- Behavioural and psychological interventions
- Pharmacological intervention
- Bariatric surgery

Non-drug Treatment

Lifestyle modifications:

- Low caloric diets (with reduction of both carbohydrate and fats components) are to ensure deficit of 500 to 1000Kcal per day from the individual daily nutritional intake to ensure weight loss of 0.5 to 1 kg per week.

Physical activity:

- Moderate levels of exercise (brisk walking, swimming, cycling) for 30 to 45 minutes, five days per week is encouraged. Other forms of exercise must be based on physician prescription.

Behavioural and psychological interventions:

- Behavioural therapy should be aimed at motivating patients in adopting and practicing all recommended treatment strategies of obesity management.

Drug Treatment:

- Only employed when lifestyle modification and behavioural therapy has failed
- Useful and approved drugs include orlistat: 120 mg with each meal (not recommended in children)

Surgical intervention

- Bariatric surgery indicated when BMI >35 kg/m2 with co-morbidities or BMI ≥40 kg/m2 following failure of lifestyle and pharmacologic therapy.

Thyroid Disorders

Hypothyroidism (Myxoedema)

Introduction

A state of subnormal concentration of thyroid hormones in the circulation is called hypothyroidism. The extreme form of hypothyroidism is referred to as myxoedema.

Aetiology

May be primary or secondary

- Primary hypothyroidism more common
  - Probably an autoimmune disease; may occur as a sequel to Hashimoto's thyroiditis
  - Post therapeutic hypothyroidism (medical or surgical)

- Secondary hypothyroidism:
  - Occurs when there is failure of the hypothalamic-pituitary axis due to
  - Deficient secretion of TRH from the hypothalamus

Or:

  - Lack of secretion of TSH from the pituitary

Clinical Features

Usually quite subtle, with an insidious onset

- Adults:
  - Dull facial expression, slow speech and poor memory
  - Puffiness of the hands, feet and face
  - Lethargy and fatigue
  - Thinning, dryness and loss of hair
  - Hypothermia
  - Bradycardia,reduced systolic and increased diastolic blood pressure
  - Weight gain
  - Decreased reflexes
  - Constipation
  - Menstrual abnormalities
- Infants:
  - Mental and physical retardation
  - If not corrected, cretinism

Differential Diagnoses

- Endogenous depression
- Reactive depression

Complications

- Myxoedema coma in adults and cretinism in the young

Investigations

- Total serum T3 and T4 levels
- TSH stimulation test
- TRH test

Treatment Goals

- Establish cause
- Establish the severity of hypothyroidism
- Restore normal body functions
- Prevent Complications

Drug Treatment

Replacement therapy

- Levothyroxine sodium (thyroxine sodium)
  - Adult: initially 20 - 100 μg (50 μg for those over 50 years) orally, daily, preferably before breakfast. Adjusted in steps of 50 μg every 3 - 4 weeks until TSH normalises (usually 100 - 200 μg daily)
  - Child:
  - 1 month - 2 years: initially 15 μg/kg orally once daily, adjusted in steps

of 25 μg daily every 2 - 4 weeks until metabolism normalizes
- 2 - 12 years: initially 5 - 10 μg/kg once daily adjusted in steps of 25 μg daily every 2 - 4 weeks until metabolism normalizes
- 12 - 18 years: initially 50 - 100 μg once daily, adjusted in steps of 50 μg daily every 3 - 4 weeks until metabolism normalizes (usual dose 100 - 200 μg daily

Or:

- Liothyronine sodium (1-tri-iodothyronine sodium)
  - Adult initially 10 - 20 μg orally daily, gradually increased to 60 μg daily in 2 to 3 divided doses Small initial doses in the elderly
  - In hypothyroid coma: 5 - 20 μg by slow intravenous injection, repeated every 12 hours (up to every 4 hours if necessary)

Alternatively:

- 50 μg by slow intravenous injection initially then 25 μg every 8 hours, reducing to 25 μg daily
- Child 12 - 18 years: 10 - 20 μg orally daily, gradually increased to 60 μg daily in 2 - 3 divided doses

In hypothyroid coma

- 1 month - 12 years: 2 - 10 μg by slow intravenous injection every 8 hours (up to every 4 hours if necessary);
- Reduce to 1 - 5 μg in patients with cardiovascular disease
- 12 - 18 years: 5 - 20 μg, repeated every 12 hours (up to every 4 hours if necessary)
- Reduce to 10 - 20 μg in patients with cardiovascular disease

Supportive Measures

- Treat anaemia, constipation and other complications as appropriate
- Immediate mechanical ventilation in myxoedema coma

Notable Adverse Drug Reactions, Contraindications and Caution

- Thyroxine should not be used alone for long term replacement therapy
- Monitor serum levels of hormones to ensure that patients are not exposed to cardiac risks

Prevention

- Iodinated salt to prevent iodine deficiency

Thyrotoxicosis

Introduction

This refers to the clinical, physiological and biochemical manifestation of the effect of excess thyroid hormone on tissues. There is a female preponderance due to the role of autoimmunity in the aetiology.

Aetiology

- Graves' disease (commonest cause)

- Toxic nodule
- Toxic multi-nodular goitre
- Pituitary thyrotroph adenoma
- Trophoblastic tumours producing HCG with thyrotrophic activity
- Pituitary thyroid hormone resistance syndrome producing excess TSH and resultant excess T3 and T4
- Thyroid cancers (rarely)
- Thyroiditis (sub-acute or postpartum)
- Iodine induced by drugs such as amiodarone
- Radiographic contrast media
- Iodine prophylaxis programmes
- Extra-thyroidal sources of thyroid hormone excess
- Factitious hyperthyroidism
- Struma ovarii: TSH-induced

Clinical Features

- A goitre may or may not be present
- May be diffuse or nodular
- Heat intolerance
- Dermatological:
  - Increased sweating and pruritus,
  - Warm and moist skin,
  - Pretibial myxoedema
  - Pigmentation
  - vitiligo
  - Palmar erythema
  - Onycholysis
  - Hair loss
- Cardiorespiratory:
  - Palpitation
  - Dyspnoea on exertion
  - Angina
  - Cardiac failure
  - Increased pulse pressure
  - Tachycardia
  - Atrial fibrillation
- Gastrointestinal:
  - Weight loss despite increased appetite (hyperphagia)
  - Increased stool frequency
- Neuromuscular:
  - Tremors
  - Nervousness
  - Irritability
  - Emotional liability and psychosis

- Muscle weakness and proximal myopathy
- Hyperkinesia
- Hyperreflexia
- Insomnia

- Reproductive:
  - Loss of libido
  - impotence
  - Amenorrhoea/ oligomenorrhoea
  - Infertility and spontaneous abortions
- Ocular:
  - Lid lag/lid retraction
  - Grittiness, excessive lacrimation
  - Exophthalmos
  - diplopia
  - Papilloedema
- Others:
  - Increased thirst
  - Polyuria
  - Fatigue and apathy
  - Triad of Proptosis, Nail changes (onycholyis) and Skin changes) strongly suggest Graves' disease.

Differential Diagnoses

- Active tuberculosis – weight loss, cough if in heart failure
- Advanced retroviral disease –weight loss, hyperdefecation, skin changes
- Malnutrition-weight loss, proptosis
- Cancer cachexia- weight loss
- Malabsorption syndrome- weight loss
- Neuropsychiatric disorders- tremors, pressure of speech and talkativeness even frank psychosis.
- Poorly controlled Diabetes mellitus-weight loss, loss of libido, hyperphagia.

Complications

- Hyperthyroid crisis (thyroid storm)
- Tracheal compression.
- Cardiac failure
- Loss of visual acuity
- Infertility
- Periodic paralysis

I***nvestigations***

- Diagnostic
  - Thyroid Function Test with free T4 and T3 which are both expected to be high and TSH suppressed.
  - Thyroid antibodies-

- Thyroid Peroxidase Antibodies which is elevated in most cases of autoimmune thyroid disease,
- Thyroglobulin antibody elevated in most cases of thyroid diseases,
- TSH Receptor antibodies especially Thyroid Stimulating Immunoglobulin specifically in Grave's disease.
- Radio-labelled thyroid scan with iodine 123 especially if diagnosis is not certain

▪ Ancillary
- FBC and ESR
- Electrolyte, Urea and Creatinine
- Fasting blood sugar
- ECG and Echocardiography

Treatment Goals

▪ Achieve normal metabolic rate by attaining normal serum T3, T4 and TSH Levels
▪ Prevent Complications

Drug Treatment

▪ Antithyroid drugs
- Carbimazole
- Adult: starting dose 30 - 60 mg orally in divided doses daily
- Maintenance: 10 - 15 mg orally, daily
- Child:
  - Neonate, initially 250 μg/kg orally 8 hourly until euthyroid, then adjust as necessary
  - 1 month - 12 years: initially 250 μg/kg (maximum 10 mg 8 hourly) until euthyroid then adjust as necessary
  - 12 - 18 years: initially 10 mg every 8 hours until euthyroid then adjusted as necessary
  - Higher initial doses occasionally required, particularly in thyrotoxic crisis
  - Child and carers to inform doctor immediately if sore throat, mouth ulcers, bruising, fever, malaise or non-specific illness develops
- Propylthiouracil (preferred in pregnancy)
– Adult: starting dose 300 - 450 mg orally in divided doses daily
– Maintenance: 100 - 150 mg orally in 2 or 3 divided doses daily
– Child
  - Neonate, initially 2.5 - 5 mg/kg orally every 12 hours until euthyroid, then adjusted as necessary
  - 1 month - 1 year: initially 2.5 mg/kg 8 hourly until euthyroid;
  - 1 - 5 years: 20 mg/kg 8 hourly until euthyroid;
  - 5 - 12years: initially 50 mg 8 hourly until euthyroid;
  - 12 - 18 years: initially 100 mg 8 hourly until euthyroid
  - Higher doses occasionally required particularly in thyrotoxic crisis
  - Duration of treatment usually is 18 - 24 months

- Beta - adrenergic blocking drugs
  - Propranolol 80 - 160 mg orally, daily in divided doses
  - Symptoms and signs of hyperthyroidism due to adrenergic stimulation may respond to these agents
- Iodine is used in:
  - The emergency management of thyroid storm
  - Thyrotoxic patients undergoing emergency surgery
  - For the preoperative preparation of thyrotoxic patients selected for subtotal thyroidectomy
  - Aqueous iodide oral solution (Lugol's solution):
  - Iodine 5%, potassium iodide 10% in purified water; total iodine 130 mg/mL
  - Adult: 2 - 3 drops of saturated potassium iodide solution orally 3 to 4 times daily (300 - 600 mg/day)
  - Child:
    - Neonate: 0.1 - 0.3 mL orally every 8 hours; 1 month
    - 18 years: 0.1 - 0.3 mL every 8 hours in thyrotoxic crisis:
    - Child 1 month - 1 year: 0.2 - 0.3 mL 8 hourly; Dilute with milk or water
- Use of steroids in autoimmune cases of thyrotoxicosis.
- Radioactive sodium iodine
  - Used in patients who are past child bearing age
  - Dosage difficult to gauge; the response of the gland is unpredictable
  - Up to 25% of patients given enough radioactive iodine to achieve euthyroidism, may develop hypothyroidism within one year
  - High incidence of recurrence of hyperthyroidism if smaller doses are used

Surgery

Indications includes:

- Patients < 21 years who should not receive radio iodine
- Persons who cannot tolerate other agents because of hypersensitivity, or for other reasons
- Patients with very large goitres for aesthetic reasons, those with compressive symptoms or signs
- Some patients with toxic adenoma and multinodular goitres

Supportive Measures

- Appropriate care of any organ or system involved e.g. eye care, and treatment of heart failure.
- Thyroid storm would require judicious intravenous fluid use, corticosteroids and treatment of the precipitating cause

Notable Adverse Drug Reactions, Contraindications and Caution

Carbimazole and propylthiouracil

- May cause severe bone marrow suppression (including pancytopenia and agranulocytosis)
- They are contraindicated in breastfeeding mothers

CHAPTER 6:

EYE DISORDERS

Acute Anterior Uveitis

Introduction

Inflammation of the iris and ciliary body. Usually occurs without any associated systemic inflammation and may be recurrent.

Clinical Features

- Blurring of vision
- Photophobia
- Pain may feature due to ciliary spasms.
- Exudation into anterior chamber
- Flare and cells
- Keratic precipitates on the corneal endothelium
- Subsequent posterior synechiae
- Miosis due to spasm of sphincter pupillae

Differential Diagnoses

- Infective conjunctivitis
- Acute iritis
- Acute glaucoma

Complications

- Secondary glaucoma
- Secondary cataracts

Investigations

- Chest radiograph to exclude sarcoidosis and tuberculosis
- Spinal radiograph (especially lumbrosacral segment) to exclude ankylosing spondilytis
- Serology for rheumatoid factor, antinuclear antibody, etc

Treatment

- Corticosteroid drops for treatment of inflammation:
  - Betamethasone sodium phosphate 0.1% (1 - 2 hourly until inflammation is controlled, then reduce frequency)
  - Subconjunctival: injection of steroid if severe
- Atropine sulphate 0.5% or 1%; 1 drop up to 4 times daily

Notable Adverse Drug Reactions, Contraindications and Caution

- Avoid atropine drops if there is risk of acute glaucoma

Prevention

- No real preventive measures

Acute Keratitis

Introduction

Infection or inflammation of the cornea. It could be secondary to trauma, or associated with infective conjunctivitis or occur de novo.

Clinical Features
- Irritation, pain
- Red eye (conjunctival congestion)
- Eye discharge: watery; purulent (if bacterial)
- Photophobia
- Visual impairment, depending on the site and size of ulcer and if interstitial
- Hypopion, if associated with uveitis (no hypopion if viral)
- Ulceration of cornea, which stains with fluoresceine; no ulcer in interstitial keratitis

Aetiology
- Exogenous
  - Marginal ulcers secondary to bacterial conjunctivitis (S. aureus)
  - Central ulcers (Pneumococcus, Herpes simplex, fungi)
  - Keratomalacia (Vitamin A deficiency)
  - Exposure (7th cranial nerve palsy or dysthyroid eye disease)
- Endogenous
  - Interstitial keratitis of congenital syphilis
  - Interstitial keratitis of Herpes zoster

Differential Diagnoses
- Infective conjunctivitis
- Acute iritis
- Acute glaucoma

Complications
- Corneal perforation
- Corneal scarification

Investigations
- Corneal scraping for microscopy, culture and sensitivity

Drug Treatment
- Antibiotic drops (if bacterial)
  - Chloramphenicol eye drops 0.5%: Apply 1 drop at least every 2 hours, and then reduce the frequency as infection is controlled and continue for 48 hours after healing
- Atropine drops; 1 drop, twice daily
- Antivirals (if dendritic ulcer)
  - Acyclovir; Apply 1 cm ointment 5 times daily (continue for at least 3 days after complete healing)
  - Idoxuridine 5% in dimethylsulfoxide
  - Adult and child over 12 years: apply to lesions 4 times daily for 4 days, starting at first sign of attack
  - Child under 12 years: not recommended
- Topical steroids
  - Only for interstitial keratitis where there is no active ulcer

Non-drug Treatment

- Lateral tarsorrhaphy for exposure keratopathy

Notable Adverse Drug Reactions, Contraindications and Caution

- Never use topical steroids in the presence of an active microbial ulcer

Prevention

- Treat initial infection or trauma promptly to avoid progression to keratitis

Allergic Conjunctivitis

Introduction

Could occur on its own or in association with generalized atopy (asthma, eczema, seasonal (change spring) catarrh)

Clinical Features

- Itching of the eyes with grittiness
- May be associated with itchy ears and throat, or sinusitis
- Brownish discolouration of the conjunctiva
- Eyelid oedema
- Red eyes occasionally, with watering when acute
- Follicles on the bulbar conjunctiva especially at the limbus
- Papillae on the tarsal conjunctiva (seen on eversion of the eyelid)
- Phlycten in tuberculosis- appears as a yellow nodule with surrounding leash of engorged vessels

Aetiology

- Exogenous allergens
- Topical drugs: atropine, penicillin
  - Cosmetics
  - Pollen from plants and flowers (hay fever or spring catarrh)
  - House dust mite and animals
- Endogenous allergens
- Phlyctenular conjunctivitis caused by tuberculo-protein

Differential Diagnoses

- Trachoma
- Other forms of conjunctivitis

Complications

- Pannus formation
- Keratoconus
- Corneal plaques

Investigation

- Skin sensitivity test to detect allergen

Drug Treatment

- Anti-inflammatory preparations:
  - Antazoline sulphate 0.5%, xylometazoline hydrochloride0.05%:
  - Adult and child over 5 years: apply 2 - 3 times daily
  - Ketotifen eye drops: Child 3 - 18 years apply twice daily

Or

- Olopatadine eye drops:
- Adult and Child 3 - 18 years apply twice daily; max. duration of treatment 4 months

- Corticosteroids/NSAIDS – low dose, topical, if severe
- Diclofenac sodium 0.1% eye drops-
  - Adult and child: apply once daily

Phlyctenular conjunctivitis:

- Treat for tuberculosis using standard regimen

Notable Adverse Drug Reactions, Contraindications and Caution

- Avoid overuse/misuse of steroids. Use only in severe cases
- Xylometazoline is a sympathomimetic; use with caution in patients susceptible to angle closure glaucoma
- Systemic absorption of antazoline and xylometazoline may result in interactions with other drugs

Prevention

- Avoid allergen(s) as much as possible in cases where it/they have been identified

Cataract

Introduction

Cataract is the opacification or clouding of the crystalline lens. It is the commonest cause of blindness and low vision in the world.

Aetiology

- Congenital e.g. Rubella, toxoplasmosis
- Developmental
- Senile: occurs with ageing
- Secondary: trauma, diabetes mellitus, drug-induced, post uveitis etc.

Clinical Features

- Gradual, painless loss of vision
- In the early stages, feels like looking through frosted glass.
- White pupillary reflex
- If secondary, symptoms and signs of causative disease are also present.

Differential Diagnoses

- Corneal opacity
- Other causes of leucocoria: eg. retinoblastoma (in children); coloboma, severe ocular toxoplasmosis etc.

Complications

- In congenital cases, can lead to amblyopia in children (lazy eye) if not operated early
- Intumescent cataract with secondary glaucoma
- Phacolytic uveitis and glaucoma

Investigations
- Projection of light
- Pupillary light reflex
- Macular function test
- Ocular ultrasounds scan: especially in cases of trauma to exclude pathology of the posterior segment of the eye

Treatment Goals
- To remove and replace the cataractous lens with clear plastic lens inserted into the eye (except in infants)

Surgical Treatment
- An extracapsular cataract extraction with posterior chamber intraocular lens implant (ECCE + IOL) is the most appropriate for older children and adults
- Small incision cataract surgery and phacoemulsification are recent advances of the ECCE technique
- In new born babies and infants, a lensectomy and anterior vitrectomy is the preferred surgical procedure. Aphakic glasses or contact lenses are worn to correct the resulting refractive error
- Posterior capsular opacity following ECCE could be treated with surgical or Yag laser capsulotomy

Notable Adverse Drug Reactions, Contraindications and Caution
- Intraocular lens implants are not advisable for new born babies and infants

Prevention
- Aspirin and other aspirin like analgesics have been found to delay cataracts in patients with diabetes and rheumatoid arthritis
- Antioxidant vitamins - Vitamin C has been found to have a protective effect against nuclear and posterior subcapsular cataracts. Vitamin E has also been found to protect against nuclear and cortical cataract

Glaucoma

Introduction

The glaucomas are a group of diseases in which there is gradual loss of vision (actually visual field) due to a form of optic neuropathy. A raised intraocular pressure is a risk factor. It is a common cause of blindness worldwide and once a patient is blind from glaucoma, vision cannot be restored

Classification
- Congenital (Buphthalmous)
- Developmental
- Acquired – Primary - Acute - closed angle glaucoma
- Chronic – open angle glaucoma
- Closed angle glaucoma
- Secondary glaucomas e.g. traumatic, lens induced uveitis, drug induced etc

Clinical Features

- The commonest type of glaucoma, primary open angle glaucoma is generally symptomless except in the late stages when symptoms of visual loss present
- In Congenital glaucoma, there is enlarged eyeball(s) in the newborn, corneal oedema/opacity, photophobia and watering
- In Acute closed angle glaucoma, there is marked elevation of intraocular pressure with severe pain, reduction in vision, red eye, fixed mid-dilated pupil, shallow anterior chamber

Investigations

- Intraocular pressure measurement
- Central and peripheral visual field test.
- Fundoscopy to determine cup/disc ratio
- Gonioscopy to view the angle of the eye

Treatment Goals

- Stop further loss of retinal ganglion cells and nerve fibre layer by prompt treatment.

Drug Treatment

- Topical and Systemic drugs can be utilized in all forms of glaucoma but surgery may be the only treatment option in some glaucomas (drugs are used before surgery in these cases). These drugs include:
  - Beta-blockers e.g. timolol
  - Parasympathomimetics e.g. pilocarpine
  - Sympathomimetics e.g. adrenaline, dipivefrin
  - Carbonic anhydrase inhibitors e.g. acetazolamide, dorzolamide
  - Prostaglandin analogues e.g. latanoprost
  - Hyperosmotic agents e.g. mannitol, glycerol

Surgical Treatment

- Goniotomy (for congenital glaucoma)
- Trabeculectomy (for all forms of glaucoma)
- Trabeculotomy
- Laser trabeculoplasty
- Peripheral iridectomy or Yag laser iridotomy for acute closed angle glaucoma (to the affected eye as well as the normal fellow eye)
- Laser photo-ablation of the ciliary body

Differential Diagnoses

- Ocular hypertension
- Primary optic atrophy (pallor but no cupping of the disc)

Complications

- Central Retinal Vein Occlusion
- Rubeosis irides with resultant secondary glaucoma
- Total blindness

Notable Adverse Drug Reactions, Contraindications and Caution

- Timolol - can precipitate heart block, bradycardia and bronchospasms
- Pilocarpine - mioses, spasms of accommodation, retinal detachment
- Acetazolamide - paraesthesia, renal stone formation, Steven – Johnson syndrome, gastrointestinal disturbances, decreased libido, fatigue, weight loss.
- Latanoprost –foreign body sensation, mild conjunctival hyperaemia and increased pigmentation of iris

Contraindications

- Timoptol is contraindicated in Asthmatics and patients with heart block.
- Acetazolamide is contraindicated in patients with pre-existing systemic acidosis, patients with sicke cell disease and allergy to sulphonamides.
- Pilocarpine is contraindicated in eyes with previous retinal detachment, and pathological myopia.

Prevention

- Early detection and prompt treatment
- Screening for glaucoma should be incorporated into the health plan of any nation

Infective Conjunctivitis

Introduction

The commonest cause of a red eye is infective conjunctivitis.

Aetiology

- Bacteria
  - Staphylococcus aureus
  - Pneumococcus
  - Haemophillus influenza,
  - Gonococcus: Ophthalmia neonatorum; Older children or adults after use of infected urine to treat a red eye
- TRIC agent (Chlamydia)
- Adenovirus: Epidemic keratoconjunctivitis ('Apollo')

Clinical Features

- Red eye (generalized)
- Eye discharge: purulent or catarrhal, worse on waking from sleep
- Eye discomfort: grittiness
- Photophobia: mild
- Swollen eyelids in ophthalmia neonatorum

Differential Diagnoses

- Allergic conjunctivitis
- Acute keratitis
- Acute iritis/uveitis
- Acute glaucoma

Complications

- Corneal affectation, which could lead to perforation
- Endophthalmitis

Investigations

- Conjunctival swab for microscopy, culture and sensitivity

Non-drug Treatment

- Dark glasses for photophobia

Drug Treatment

- Antibiotic eyedrops or ointments
  - Chloramphenicol 0.5%: Apply one drop at least every 2 hours until infection is controlled then reduce frequency and continue for 48 hours after healing

Inclusion conjunctivitis:

- Sulphonamide drops or tetracycline drops or ointment

Epidemic keratoconjunctivitis:

- Antibiotic drops to prevent secondary bacterial infection (chloramphenicol 0.5% drops)
- Adult and child over 2 years: apply every 4 hours for no more than 5 days

Or:

- Ofloxacin 0.3% solution applied as stated above

Plus:

- systemic cephalosporin e.g. ceftriaxone
  - Adult: 1 g every 12 hours intravenously for 7 days
  - Child:
    - 12 years and above: by intravenous infusion over 60 minutes
    - Neonates: 20 - 50 mg/kg once daily, by deep intramuscular injection, intravenous injection over 2 – 4 minutes, or by intravenous infusion
    - 1 month - 12 years (body weight under 50 kg) 50 mg/kg once daily, up to 80 mg/kg in severe infections

Chlamydia

- Systemic erythromycin
  - Adults and children over 8 years: 250 - 500 mg orally every 6 hours (or 500 mg - 1 g every 12 hours)
  - 1 month - 2 years: 125 mg orally every 6 hours; dose doubled in severe infections
  - 2 - 8 years: 250 mg 6 hourly
  - 8 - 18 years: 250 - 500 mg 6 hourly; dose doubled in severe infections

Notable Adverse Drug Reactions, Contraindications and Caution

- Steroid drops are absolutely contraindicated

Prevention

- Wash hands thoroughly after any unhygienic procedure
- Avoid sharing towels used for cleaning face

Ophthalmia Neonatorum

Introduction

Infection in both eyes of a newborn baby in the first one month of life, without obstruction of the nasolacrimal ducts.

Aetiology

- Bacterial:
  - Especially Neisseria gonorrhoeae: starts within 3 days after birth
  - Chlamydia (usually starts 1 week after birth)
- Chemicals
- Others

Clinical Features

- Swollen eyelids: It may be impossible to see the baby's eye because of the swelling
- Red eyes: The conjunctivae are less inflamed in chlamydial infection
- Pus: Oozes out when the eyelids are opened
- Fever: May or may not be present

Differential Diagnoses

- Lid oedema following prolonged difficult labor

Complications

- Corneal perforation
- Endophthalmitis

Investigation

- Conjunctival swab for microscopy, culture and sensitivity

Non-drug Treatment

- Copious irrigation to wash pus from the eyes with cooled boiled water or sodium chloride 0.9% (normal saline)

Drug Treatment

- Topical antibiotics
  - Gentamicin 0.3% eye drops: Apply 1 drop at least every 2 hours, and then reduce frequency as infection is controlled

Or:

  - Ofloxacin 0.3% eye drops: Apply twice daily (not to be used for more than 10 days).

Or:

  - Tetracycline 1% eye ointment: Apply 3 times daily for one week or more, depending on the severity of the condition

Plus

  - Ciprofloxacin 10 mg/kg per dose intramuscularly 12 hourly for 2 days

Or:

  - Ceftriaxone:
  - Adults: 100 mg/kg by deep intramuscular injection or intravenous injection over 2 - 4 minutes every 24 hours or by intravenous infusion: 1 g daily, 2 - 4 g in severe infections
  - Child:
    - Neonate: infuse over 60 minutes, 20 - 50 mg/kg daily (maximum 50 mg/kg daily)

- Child under 50 kg: 20 - 50 mg/kg daily by deep intramuscular injection or by intravenous injection over 2 - 4 minutes, or by intravenous infusion; up to 80 mg/kg daily in severe infections

Notable Adverse Drug Reactions, Contraindications and Caution

- Do not use steroids eyedrops
- Penicillin drops are not effective in the treatment of opthalmia neonatorum

Prevention

- Apply tetracycline eye ointment or silver nitrate drops in both eyes of neonates immediately after delivery
- Proper antenatal care for early detection of infection in mothers

Scleritis/Episcleritis

Introduction

Inflammation of the sclera and episclera which is usually self-limiting but relapses may occur. It is also usually unilateral and associated with collagen disorders.

Clinical Features

- Dull, deep-seated pain in the eye
- Localized conjunctival congestion

Differential Diagnoses

- Pterygium
- Phlyctenular conjunctivitis
- Trauma to the eye

Complications

- Thinning of the sclera
- Anterior staphyloma
- Scleral perforation

Investigations

- Investigate for collagen diseases

Treatment

- Topical steroids or NSAIDs for the duration of symptoms
- Treat arthritis if active

Caution

- Avoid prolonged use of steroids

Prevention

- No real preventive measures available

Stye (Hordeolum)

Introduction

Stye could be external or internal. External stye is the infection of the lash follicle and its associated gland of Zeis or Moll while internal stye (chalazion) is the infection of the meibomian gland.

Clinical Features

- Painful lump growing on the eyelid

- Red swollen area on the eyelid (like a boil)
- Pain in the affected area of the eyelid
- Chalazion: firm, painless lump on the eyelid, usually upper lid

Differential Diagnoses

- Various eyelid cysts and tumours

Complications

- Pre-septal cellulitis
- Orbital cellulitis
- Cavernous sinus thrombosis

Investigations

- If recurrent, screen for diabetes

Non-drug Treatment

- Apply warm wet pads for 15 minutes 4 times daily until the stye drains
- Incision and curettage (if there is still a chalazion lump) as soon as the infection settles

Drug Treatment

- Antibiotic eye ointment to stop infection
  - Chloramphenicol ointment apply 4 times daily for 2 weeks
- Systemic antibiotics
  - Amoxicillin 250 - 500 mg orally every 8 hours for 5 - 7 days

Notable Adverse Drug Reactions, Contraindications and Caution

- Discourage the use of traditional eye medication

Prevention

- Clean eyelids regularly and thoroughly
- For recurrent styes, use baby shampoo to clean the eyelashes regularly

The Red Eye

Aetiology

- Infective conjunctivitis including ophthalmia neonatorum
- Allergic conjunctivitis
- Keratitis
- Scleritis/episcleritis
- Trauma to the eye
- See relevant sections

Trachoma

Introduction

Trachoma is an infection caused by an obligate intracellular bacterium, Chlamydia trachomatis. The organism is found in the conjunctival as well as corneal epithelium and is responsible for two different conditions:

- Trachoma (a severe disease)
- Inclusion conjunctivitis (milder)

Trachoma is commonly associated with poverty and unhygienic living conditions.

Clinical Features

- Acute phase:
  - Irritable red eye
  - Mucopurulent eye discharge
  - Eyelid oedema, pain, photophobia in severe cases
- Chronic phase:
  - Follicles on tarsal conjunctivae
  - Papillae
  - Superficial punctate keratitis
  - Pannus formation on superior cornea
  - End stage:
  - Eyelid scarring with trichiasis, entropion
  - Conjunctival scarring
  - Limbal scarring with Herbert's pits
  - Corneal scarring

Differential Diagnoses

- Other forms of infective conjunctivitis (especially viral)
- Allergic/vernal conjunctivitis
- Corneal scarring from other diseases

Complications

- Trichiasis
- Entropion
- Corneal scarring

Investigations

- Conjunctival scraping for microscopy
  - Immunofluorescence or ELISA test
  - Giemsa staining for trachoma inclusion bodies

Drug Treatment

- Topical:
  - Tetracycline ointment applied 4 times a day for 6 weeks
- Systemic:
  - Erythromycin, tetracycline (not recommended for young children) or the newer antibiotics e.g. azithromycin as appropriate
  - Azithromycin
  - Adult: 500 mg orally once daily for 3 days
  - Child:
    - under 6 months: 10 mg/kg (maximum 500 mg) orally once daily for 3 days
    - over 6 months (body weight 15 - 25 kg) 200 mg once daily for 3 days
    - body weight 26 - 35 kg: 300 mg once daily for 3 days
    - body weight 36 - 45 kg: 400 mg once daily for 3 days

Surgical Treatment

- Indicated for the treatment of trichiasis, entropion, corneal scarring
- Corneal graft, but entropion must be corrected first

Notable Adverse Drug Reactions, Contraindications and Caution

- Systemic tetracycline is contraindicated in young children

Prevention
- SAFE strategy: Surgery for trichiasis, Antibiotics for active disease, Face washing and Environmental changes
- Improve personal and public hygiene
- Treat the whole community with topical or systemic antibiotics
- Prompt surgery for trichiasis and entropion to prevent blindness from corneal scarring.

Xerophthalmia

Introduction

Xerophthalmia is a spectrum of eye diseases that leads to loss of corneal integrity and is often associated with Vitamin A deficiency. The disease ranges from night blindness to conjunctival xerosis, to Bitot's spots, to corneal xerosis and finally keratomalacia

Clinical Features
- Night blindness
- Dryness of the conjunctiva and cornea (xerosis)
- Tearing
- Bitot's spots
- Corneal degeneration (keratomalacia)

Differential Diagnoses
- Measles keratoconjunctivitis

Complications
- Corneal perforation
- Corneal scarring
- Blindness

Investigations
- Conjunctival impression cytology (where available)
- Serum Vitamin A levels

Non-drug Treatment
- Nutrition education

Drug Treatment
- Vitamin A capsules 200,000 units orally daily for two days, then one capsule after one week
- Topical antibiotics (ointment) and antivirals where applicable
- Padding the eye (for active corneal ulceration)

Notable Adverse Drug Reactions, Contraindications and Caution
- Avoid the use of harmful traditional eye medication

Prevention
- Distribution of massive dose capsules of vitamin A to affected communities
- Nutrition and health education
- Fortification of foods with vitamin A

CHAPTER 7:
GASTROINTESTINAL TRACT AND HEPATOBILLIARY DISORDERS

GASTROINTESTINAL TRACT DISORDERS

Amoebiasis

Introduction

A common parasitic infection of the gastrointestinal system caused by the protozoan *Entamoeba histolytica*
Acquired through faeco-oral transmission.

Clinical Features

- Mucoid/bloody diarrhoea
- Abdominal pain
- Fever/chills

Complications

- Amoebic Liver Abscess (ALA)
- Intracranial space-occupying lesion
- Rupture:Hepatobronchial amoebiasis, Lungs Abscess, Peritoneal Abscess
- Amoeboma
- Anal ulceration
- Amoebic cutis
- Chronic carrier

Investigations

- Fresh Stool Microscopy for cysts and trophozoites
- Serology

Chest radiograph

- Abdominal ultrasound scan

Treatment Goals

- Eradicate the protozoa
- Supportive care

Non-drug Treatment of ALA

- Ultrasound-Guided Aspiration, to prevent spontaneous rupture.

Drug Treatment

Amoebic dysentery

- Metronidazole
  - Adult: 800 mg 8 hourly for 5 days
  - Child: 30 mg/kg/day in 3 divided doses for 5 days

Or

- Tinidazole
  - Adult: 2 g daily orally for 3 days (with food)
  - Child: 50-60 mg/kg daily for 3 days

Or

- Secnidazole
  - Adult: 1.5 g – 2 g statim

Amoebic liver abscess (ALA)

- Metronidazole
  - Adult: 800 mg 8 hourly for 10 days
  - Child: 50 mg/kg/day in 3 divided doses for 7-10 days

Or

- Tinidazole
  - Adult: 2 g daily orally for 3 days (with food)
  - Child: 50-60 mg/kg daily for 5 days

Chronic Cyst carriers

- Diloxanide furoate
  - Adult: 500 mg every 8 hours for 10 days
  - Child:
    - over 25 kg: 20 mg/kg orally every 8 hours for 10 days
    - under 25 kg (I month – 12 years) 6.6 mg/kg every 8 hours for 8 - 10 days
    - 12 years - 18 years: 500 mg every 8 hours for 10 days

Notable Adverse Drug Reactions, Complications and Caution

- Metronidazole is contraindicated in the first trimester of pregnancy.
- Avoid alcohol with the use of metronidazole

Prevention

- Personal and communal hygiene
- Potable water, sanitary disposal of faeces
- Screen of food handlers

Bacillary Dysentery

Introduction

An important cause of diarrhoea, caused by pathogenic species of Shigella A-D (dysenteri, flexneri, boydii and sonnei).

Clinical Features

- Mucoid bloody diarrhoea.
- Abdominal pain
- Tenesmus
- Pyrexia

Complications

- Septicaemia/bacteraemia
- Severe rectal bleeding
- Intestinal perforation
- Reiter's syndrome

Investigations

- Stool microscopy, culture and sensitivity
- Full Blood Count

Treatment Goals

- Eradicate bacterial pathogens
- Supportive care

Drug Treatment

Appropriate systemic antibiotics are required with systemic infections.

- *Adults*
  - Ciprofloxacin 500 mg - 1 g orally 12 hourly for 5 days
  - Azithromycin 500 mg daily for 3 days for resistant strains
- *Children*
  - Cotrimoxazole:
    - 6 weeks – 6 months: 120 mg every 12 hours
    - 6 months – 6 years: 240 mg every 12 hours
    - 6 years – 12years: 480 mg every 12 hours
    - 12 years - 18 years: 960 mg every 12 hours

Notable Adverse Drug Reactions, Complications and Caution

- Ciprofloxacin causes tendinitis especially in children and so is contraindicated in pregnancy and in children <18 years

Prevention

- Personal and communal hygiene.
- Potable water, sanitary disposal of faeces.

Cholera

Introduction

An acute severe diarrhoeal illness of worldwide importance. It is caused by *Vibrio cholerae* bacilli (classical and El Tor species)

Clinical Features

- Diarrhoea (Rice water stool)
- Vomiting

Complications

- Hydropaenia/Hypovolaemic shock with multiple end organ failure leading to death
- Dyselectrolytetaemia
- Hypokalaemia

Investigations

- Stool microscopy, culture and sensitivity
- Urea, Electrolytes and Creatinine
- Complete Blood Count

Treatment Goals

- Hydration.
- Eradicate organism.
- Prevent spread.

Drug Treatment

- Intravenous Fluids.
  - Electrolyte replacement.
  - Oral Rehydration Therapy
- Antibiotic therapy:
  - Tetracycline:
    - Adult: 500 mg orally every 6 hours for 5 days

Or:

- Doxycycline:
  - Adult: 200 mg orally once daily for 5 days
  - Child: 12 - 18 years, 200 mg on first day, then 100 mg daily
  - Severe infections, 200 mg orally daily
- Erythromycin:
- Adult and child over 8 years: 250 - 500 mg orally every 6 hours for 5 days or 500 mg - 1 g every 12 hours
- Child:
  - Up to 2 years: 125 mg every 6 hours
  - 2 - 8 years: 250 mg every 6 hours
  - Doses doubled in severe infection

Or:

- Co-trimoxazole
- Adult: 960 mg orally every 12 hours for 5 days
- Child:
  - 6 weeks - 12 years: 24 mg/kg every 12 hours
  - 6 weeks - 6 months: 120 mg every 12 hours
  - 6 months - 6 years: 240 mg every 12 hours
  - 6 years - 12 years: 480 mg every 12 hours
  - 12 years - 18 years: 960 mg every 12 hours

Supportive Measures

Monitor fluid intake and output (vomitus, urine and stool)

Prevention

Personal and communal hygiene
Potable water, sanitary disposal of faeces
Cholera vaccine

Constipation

Introduction

A clinical condition characterized by infrequent bowel opening and/or passage of hard pellet-like stools.

Aetiology

- Inadequate fibre in diet (simple constipation)
- Side-effects of drugs e.g. antidepressants, narcotic analgesics, etc
- Colonic/Anorectal disorders e.g. fissures, haemorrhoids, cancer.
- Functional bowel disorders eg irritable bowel syndrome
- Metabolic diseases e.g. hypothyroidism, hypercalcaemia

Clinical Features

- Infrequent bowel openings
- Hard stools
- Flatulence.
- Abdominal discomfort.

Complications (when chronic)

- Faecal impaction.
- Rectal prolapse

- Anal fissures
- Haemorrhoids
- Rectal bleeding

Investigations

- Full blood counts
- Stool microscopy
- Serum electrolytes.
- Proctosigmoidoscopy/Colonoscopy.
- Barium enema
- Serum hormonal levels e.g. Thyroid hormones.
- Abdominal x-rays

Treatment Goals

- Identification of aetiology
- Restore normal bowel motions.
- Treatment largely depends on the aetiology.

Non-drug Treatment

- Avoid precipitants
- High-fibre diet.
- Adequate fluid intake.
- Surgery
- Hormonal therapy
- Avoidance of offending drugs

Drug Treatment

- Stimulant laxatives
  - Senna (7.5 mg tablet)
  - Adult: 2 - 4 tablets at night
  - Child:
    - 6 - 12 years: 1 - 2 tablets statim at night/or morning
    - 12 - 18 years: 2 - 4 tablets at night

Or:

- Bisacodyl tablets 10 mg orally at night

Or:

- Bisacodyl suppositories 10 mg at night

Acute Diarrhoea

Introduction

A very common clinical problem the world over. Defined as increase in daily frequency, fluidity or volume of stools. May be acute, chronic or intermittent. Aetiology may be infectious or non-infectiious.

Clinical Features

- Watery diarrhoea of varying volumes, sometimes with vomiting.
- Bloody mucoid stools
- Fever
- Abdominal pain
- Dehydration
- Fluid deficit.

Complications
- Hypovolaemic shock.
- Electrolyte imbalance.
- Septicaemia
- Intestinal perforation
- Gastro-intestinal bleeding
- Paralytic ileus

Investigations
- Stool microscopy, culture and sensitivity
- Full Blood Count
- Urea, Electrolytes and Creatinine

Treatment Goals
- *Reh*ydration.
- Correction of electrolyte anomalies
- Treat underlying cause (where possible)
- Treat Complications

Drug Treatment
- Rehydrate with:
  - Oral Rehydration Therapy (ORT): (low osmolarity) for mild to moderate dehydration 500 mL orally over 2 - 3 hours, 3 - 4 times daily
  - Intravenous sodium chloride 0.9%
  - 1 litre, 2 - 6 hourly for moderate to severe dehydration
  - Alternate with Darrow's solution depending on serum potassium
  - Children: Use of zinc supplementation
  - 6 months and above: 20 mg per day for 10 - 14 days
  - Under 6 months old: 10 mg per day
  - Specific anti-infective agents for infectious diarrhoeas e.g. metronidazole for amoebiasis, giardiasis

Supportive Measures
- Monitor fluid intake/output

Prevention
- Communal and Personal hygiene
- Potable water
- Sanitary disposal of human waste

Gastritis

Introduction

Inflammation of the gastric mucosa which may be acute or chronic. The most important risk factors for acute gastritis include drugs (NSAIDs) and alcohol. While *H. pylori* infection is the most important risk factor for chronic gastritis.

Clinical Features
- Upper abdominal burning pain or discomfort that mimics peptic ulcer disease (PUD). See PUD.

Complications
- Acute gastritis: Upper gastrointestinal (GI) haemorrhage
- Chronic gastritis: peptic ulcer disease; gastric cancer

Investigations
- Upper GI Endoscopy (macroscopic diagnosis).
- Histology of gastric biopsy for definitive diagnosis

Treatment Goals
- Eliminate pain.
- Address offending agent.
- Prevent progression to PUD or gastric cancer

Drug Treatment

Acute Gastritis
- Antacids
  - Magnesium trisilicate 1 - 2 tablets or suspension 10 mL orally three times daily or as required

Or:
- H receptor antagonist:
  - Ranitidine 150 mg orally once daily as required

Or:
- Proton pump inhibitors
  - Omeprazole 20 mg orally once daily as required

Type A gastritis
- Endoscopic surveillance every 2 - 3 years for early detection of cancer

Type B gastritis
- Eradication of H.pylori using triple therapy with
  - Clarithromycin 500 mg orally twice daily
  - Amoxicillin 1g orally every twice daily
  - Omeprazole 20 mg orally twice daily
  - All for 10 – 14 days

Prevention
- Avoid risk factors (NSAIDs, alcohol, etc)

Giardiasis

Introduction

A parasitic protozoal infection caused by *Giardia lamblia* or *Giardia intestinalis*. Worldwide in distribution but more common in developing countries. Spread is by the faeco-oral route.

Clinical Features
- Acute disease: watery diarrhoea with abdominal bloating
- Chronic disease: diarrhoea, steatorrhoea and weight loss from malabsorption syndrome- with lactose intolerance, xylose malabsorption and vitamin B deficiency

Complications
- Diseases related to Vitamin B deficiency

Investigations
- Stool microscopy
- Full blood count
- Duodenal aspirate for microscopy.

Treatment Goals
- Eradicate parasite
- Correct fluid and electrolyte deficits
- Replace malabsorbed nutrients

Drug Treatment
- Metronidazole
  - Adult: 2 g orally daily for 3 days or 400 mg 8 hourly for 5 days or 500 mg twelve hourly for 7 - 10 days
  - Child:
    - 1 - 3 years 500 mg orally daily
    - 3 - 7 years 600 - 800 mg daily
    - 7-10 years 1 g daily for 3 days
- Tinidazole
  - Adult: 40 mg/kg orally as a single dose; or 2 g stat, repeat after 1 week, once if necessary
  - Child: 50 to 75 mg/kg as a single dose; repeat after 1 week

Supportive
- Vitamin B supplementation.
- Correct fluid and electrolyte deficits

Prevention
- Good Communal and Personal hygiene
- Potable water.

Haemorrhoids

Introduction

Enlarged or varicose veins of the tissues at the anus or rectum. Engorgement of the vascular complex or thrombus often leads to the symptoms of disease. May be external or internal.

Clinical Features
- Internal haemorrhoids
  - Typically painless
  - May present with bright red rectal bleeding
  - Often become thrombosed and protrude into the anal canal.
- External haemorrhoids
  - When thrombosed, causes acute perineal pain with or without necrosis and bleeding on defeacation
  - Fibrosed external haemorrhoids present as anal tags

Complications
- Bleeding
- Necrosis
- Perineal sepsis
- Mucus discharge

Investigations
- Anoscopy.
- Full blood count

Treatment Goals
- Relieve pain.
- Ameliorate precipitants
- Extirpate haemorrhoids

Non-drug Treatment
- Increase fibre in diet
- Increase fluid intake
- Avoid foods that cause constipation
- Stool softeners
- Regular exercise

Drug Treatment
- Suppositories/ointments of preparations containing hydrocortisone acetate with or without lidocaine hydrochloride plus astringent(s)
- Dicynone may be useful.

Surgery
- Haemorrhoidectomy.
- Haemorrhoid tappling
- Band ligation
- Injection Sclerotherapy, photocoagulaton, cauterization, cryosurgery are other modalities of treatment.

Pancreatitis

Introduction

Inflammation of the pancreas could be acute or chronic

Cause
- Gallstones
- Alcohol
- Drugs
- Abdominal trauma
- Infections
- Duodenal ulcer penetration.
- Autoimmune
- Idiopathic

Clinical Features
- Acute pancreatitis:
- Epigastric pain which may radiate to the back.
- Nausea, vomiting, abdominal distension, severe abdominal tenderness with features of hypovolaemia in severe cases
- Cullen's sign
- Grey-Turner's sign

Investigations
- Serum amylase.
- Serum lipase.
- Alanine aminotransferase (ALT).
- Abdominal USS

- Plain Abdominal X-ray
- CT scan.
- ERCP, after recovery
- Magnetic Resonance Cholangiopancreatography (MRCP).

Complications

- Hypovolaemic shock
- Multiple organ failure syndrome
- Acute renal and respiratory failure
- Abscess
- Phlegmons
- Gastrointestinal bleeding
- Electrolyte imbalance (hypo & hypercalcaemia)
- Pancreatic pseudocysts

Treatment Goals

- Relieve pain
- Treatment and Prevention of Complications
- Address precipitant eg gallstones, drugs etc.

Drug Treatment

- Analgesics
- Paracetamol 500mg tds.
- Ibuprofen 400mg bd
- Codeine sulphate

Supportive Measures

- Bed rest
- Nil per oral (NPO).
- Hydration
- Fluid intake/output
- Nasogastric tube suctioning.
- Prevent, identify and treat Complications

Notable Adverse Drug Reactions, Complications and Caution

- Avoid narcotic analgesics

Peptic Ulcer Disease (PUD)

Introduction

Peptic ulcers (gastric, duodenal or lower oesophagus) are defects in the gastrointestinal mucosa that extend through the muscularis mucosa.

Aetiology/Predisposing factors

- *H pylori* infection
- Use of NSAIDs
- Smoking
- Alcohol

Clinical Features

- Recurrent epigastric pain
- Often radiating to the back
- Worse at night
- Improved by antacids

Complications
- Upper gastrointestinal bleeding
- Perforation
- Penetration
- Gastric outlet obstruction

Investigations
- Occult blood test. Stool microscopy
- Endoscopy
- Barium meal
- Direct/indirect detection of H. pylori

Treatment Goals
- Relieve pain
- Promote healing of ulcers
- Eradicate H. pylori
- Prevent/reduce recurrence

Drug Treatment
- H. pylori eradication

Triple therapy with:
- Clarithromycin 500 mg orally every 12 hours for 10 - 14 days

Plus:
- Amoxicillin 1g orally every 12 hours for 10-14 days

Plus:
- Omeprazole 20 mg orally every 12 hours for 10 - 14 days

- Omeprazole could be substituted with other proton pump inhibitors (PPI) e.g. rabeprazole, rantoprazole or esomeprazole.

If no improvement with the above regimen, patient should be referred to a Gastroenterologist for further evaluation and therapy.

Supportive therapy
- Regular meals
- Avoidance of provocative factors (NSAIDs, alcohol, spicy foods etc.)

Notable Adverse Drug Reactions, Complications and Caution
- Gastric irritation, diarrhoea from triple therapy

HEPATIC AND BILIARY DISORDERS
HEPATITIS

Introduction

Diffuse inflammation of the liver that can be caused by infective agents, drugs , alcohol, autoimmune and toxins

Clinical Features
- Acute hepatitis (lasting for less than 6 months):
- Mild-to-moderate jaundice
- Vague right upper quadrant discomfort

- FeverWith or without mild fever
- Hepatomegaly.
- Chronic hepatitis (Lasting more than 6 months):
- General malaise/Fatigue
- Re-occurence of jaundice.

Complications

- Liver failure
- Bleeding tendencies.
- Cirrhosis/Liver cancer

Investigations

- Liver Function Tests
- Serologic markers of Hepatitis A, B, C, D and E
- Viral load
- Abdominal ultrasonography
- Prothrombin time
- HIV Screening

Treatment Goals

- Provide supportive measures
- Prevent progression to chronic phase

Non-drug Treatment

- High carbohydrate and Normal protein diet
- Discontinuation of hepatotoxic medication
- Bed rest

Drug Treatment

Chronic Hepatitis B

- Treatment is required in patients with viral load exceeding 2000 IU/ml for HBeAg negative or 20000 IU/ml for HBeAg positive status.
  - Pegylated interferon alfa -2b: 180µg sc. weekly for 48 weeks
  - Oral Tenofovir 300 mg daily

Chronic Hepatitis C:

- Pegylated interferon alfa-2b: 180 microgram subcutaneously weekly for 48 weeks

Plus:

- Ribavirin:
  - 400 mg orally twice daily for adults with body weight less than 65 kg
  - 400 mg in the morning and 600 mg in the evening for adults weighing 65-85 kg;
  - 600 mg twice daily for adults weighing over 85 kg

Or

Peg IFN + Ribavirin + Sofosbuvir for 12 weeks. (For all genotypes)

Hepatitis D

Treatment of HBV is effective for HDV.

Notable Adverse Drug Reactions, Complications and Caution

- Interferon alpha 2b and Ribavirin reduce haematopoiesis

- Flu-like illness
- Leucopenia
- Psychiatric-like symptoms
- Development of early resistance if therapy exceeds one year

Jaundice

Introduction

Yellowshish green discoloration of the skin or sclera (at Serum bilirubin 2-4mg/dl). Jaundice is not a disease condition. It is either a symptom or a sign.

Aetiology

- Diseases of the liver and the biliary tract
- Conditions that cause excessive red cells haemolysis: infections, haemoglobinopathies

Investigations

- LFTsAbdominal ultrasound scanPT/PTTK
- CT/MRI/MRCP

Treatment Goals

- Treat underlying cause
- Prevent Complications

Drug Treatment

- Colestyramine: 3 - 6 g orally 6 hourly in severe obstructive jaundice
- Phenobarbital in neonatal jaundice: 5-8 mg/kg orally daily

Notable Adverse Drug Reactions, Complications and Caution

- Colestyramine: diarrhoea
- Phenobarbital: dose-dependent respiratory depression

Surgical Treatment

- Obstructive jaundice
- ERCP sphincterotomy with stone removal
- Stent insertion
- Pancreatic head/duodenal head realignment

Supportive Measures

- Reassurance and monitoring
- Phototherapy in neonatal jaundice

Liver Cirrhosis

Introduction

An advanced stage of chronic liver disease associated with histological evidence of hepatocyte degeneration, nodularity and fibrosis.

Causes

- HBV, HCV and Alcohol are the major causative agents.

Clinical Features

- Fatigue
- Fluid retention eg Ascites and peripheral oedemaPeripheral stigmata of chronic liver disease.

Investigations
- LFTs
- PT, PTTK,
- Liver biopsy
- Ultrasound examination of the liver
- Hepatitis B & C
- Upper GI endoscopy.

Treatment Goals
- Prevent further liver damage
- Prevent deterioration of liver function
- Symptomatic relief from anaemia, fatigue and oedema

Non-drug Treatment
- Encourage high fibre and low salt diet
- Correction of anaemia
- Reduce oedema and ascites

Drug Treatment
- Reduction of oedema and ascites
  - Diuretics:
    - Spironolactone tablets 25 - 100 mg orally 12 hourly
    - Furosemide 20 - 80 mg orally 12 hourly
    - Salt-poor albumin for intractable ascites
- Prevention of variceal bleeding:
  - Propranolol 40 - 80 mg orally daily
  - Isosorbide mononitrate 10 mg orally thrice daily

Prevention
- Immunization against hepatitis A and B,
- Abstinence from alcohol.

NUTRITIONAL DISORDERS
Kwashiorkor and Marasmus
Introduction

Adequate nutrition is the intake and utilization of energy-giving and body building foods and nutrients in the right proportions to maintain well-being, and productivity.

Malnutrition manifests as stunting, underweight, wasting (kwashiorkor and marasmus), obesity as well as deficiencies of micronutrients.

Epidemiology
- High prevalence in under-developed countries, especially sub-Saharan Africa

Clinical Features
- Kwashiorkor: Growth retardation, muscle wasting, anaemia, apathy, moon face, lack-luster skin easily plucked hair, pedal oedema, hypo-pigmented skin patches, exfoliation, diarrhoea
- Marasmus: Thin; protruding bones, hungry-looking 'old-looking face,' whimpering cry

Investigations
- Full Blood Count
- ESR
- Stool microscopy
- Urinalysis
- Serum proteins
- Chest radiograph
- Mantoux test

Non-drug Treatment
- Nutritional counselling
- Adequate nutrient intake: may require assistance and special preparations e.g. nasogastric feeding, Periodic growth monitoring

Drug Treatment
- May be indicated where there are specific infections/infestations

Micronutrient Deficiencies

Definition

Deficiencies of minerals (iron, iodine, zinc, calcium, phosphorus, magnesium, copper, potassium, sodium, chloride, fluoride etc); folic acid and vitamins

Aetiology
- Inadequate dietary intake
- Increased requirements
- Increased loss (e.g. worm infestation)

Epidemiology
- Global; high prevalence in under-developed countries, especially sub-Saharan Africa

Clinical Features
- Iron: anaemia
- Iodine: goitre
- Zinc, copper: manifestations of enzyme and insulin deficiencies
- Calcium: rickets, osteomalacia
- Phosphorus and fluoride: teeth and bone abnormalities
- Vitamins:
  - A: keratomalacia, corneal xerosis, night blindness
  - B_1(thiamine): beri-beri
  - B_2(riboflavin): scrotal and vulval dermatoses, angular stomatitis, scars, magenta tongue, cheilosis
  - B_3(niacin): scarlet and dry tongue, pellagra 6
  - C (Ascorbic acid): scurvy, petechiae and musculo-skeletal haemorrhages
  - D: rickets, epiphyseal enlargement, muscle wasting, bossing of skull bone, 'thoracic rosary', persistently open anterior fontanelle, genu valgum or varum

Investigations
- Blood, urine and stool tests. Other Investigations as appropriate

Treatment Goals
- Ensure adequate intake
- Prevent Complications

Treatment
- Administration of specific nutrients
- Food supplementation
- Treat underlying diseases

Prevention
- Nutritional counseling
- Adequate intake of locally available, nutritious foods
- Prophylactic therapies for malaria

Obesity

Introduction

A major component of the metabolic syndrome. Being overweight or obese significantly increases the risk of morbidity and mortality from Type 2 diabetes and its co-morbidities.

Measurements for evaluation:
- Body mass index (BMI): BMI = weight in kg divided by height in m, ^{2} expressed as kg/m^2
  - Classification of BMI
  - Underweight: <18.5 kg/m^2
  - Normal weight: 18.5 - 24.9 kg/m^2
  - Overweight: 25 - 29.9 kg/ m^2
  - Obesity (Class1): 30 - 34.9kg/m^2
  - Obesity (Class 2): 35 - 39.9 kg/m^2
  - Extreme obesity (Class 3): > 40 kg/m^2
- Waist circumference: determination of central fat distribution
  - The pattern of distribution of fat in the body (whether mostly peripheral or central) is assessed by the use of the waist/hip ratio (WHR): Waist/Hip ratio=Waist circumference (in cm) divided by Hip circumference (in cm)
  - Waist circumference: measured midway between the lower rib margin and the iliac crests
  - Hip circumference: the largest circumference of the hip
  - Waist circumference better depicts central or upper body obesity than waist/hip ratio
  - Upper limits: 102 cm and 88 cm in men and women, respectively

Investigations
- Rule out underlying causes: although these may not be common, specific therapy may be available. Clinical presentation may therefore require specific Investigations to exclude conditions such as hypothyroidism, hypercortisolism, male hypogonadism, insulinoma and CNS diseases that affect hypothalamic function

Complications

- Cardiovascular: Coronary artery disease
- Stroke
- Congestive heart failure
- Pulmonary:
- Obstructive sleep apnoea, 'Obesity hypoventilation syndrome'
- Endocrine: Insulin resistance and type 2 diabetes mellitus
- Hepatobiliary: Gall stones

Treatment Goals

- To educate patient and care givers
- Achieve an ideal body weight
- Prevent Complications

Treatment

- Assess dietary intake, level of physical activity, BMI (total body fat) and waist circumference (abdominal fat) on presentation and at regular monitoring
- Assess efficacy of weight loss measures
- Integrate weight control measures into the overall management of diabetes mellitus and co-morbidities if BMI is >25, and Waist circumference is more than 102 cm and 88 cm in men and women respectively
- Educate patients and other family members
- Set realistic Goals
- Use a multi-disciplinary approach to weight control
- Dietary changes and increased level of physical activity are the most economical means to lose weight
- Maintain records of Goals, instructions and weight progress charts
- Surgical intervention may be required in extreme cases

CHAPTER 8

GENITO-URINARY SYSTEM DISORDERS (NEPHROLOGY, UROLOGY AND VENEREOLOGY)

Acute Kidney Injury (AKI)

Introduction

Acute kidney injury is defined as a sudden clinical and/or laboratory manifestation of abnormal kidney function occurring within 48 hours or 7 days of kidney injury.

A reduction in urine output documented as less than 0.5 ml/kg/hour for more than 6 hours.

Absolute increase in serum creatinine of more than or equal to 0.3 mg/dl (26.5 µgmol/L) occurring within 48 hours of an insult to the kidneys.

A percentage increase in serum creatinine of more than or equal to 50% (1.5 fold from baseline) which is known or presumed to have occurred within 7 days.

Epidemiology

- Seen in about 5% of patients admitted to medical wards
- Up to 30% of intensive care admissions may manifest and develop AKI.
- AKI could be classified variably depending on the defining criteria.
- Hospital acquired AKI typically develops as a complication of another clinical condition
- Community acquired AKI typically evolve in these patients while in their homes.

Classification

Classified according to the:

- Medical specialty in which it evolves ie Surgical AKI if it complicates surgery, Obstetric or Gynaecologic AKI
- Volume of urine being excreted at the time the AKI is developing:
- Non-oliguric AKI when urine volume is more than 400 ml/day
- Oliguric AKI when urine volume is less than 400ml/day and anuric AKI when urine volume is less than 150 ml/day.
- Site of physiologic or anatomic derangements or toxic insult into pre-renal, intrinsic renal and post renal AKI:

Pre-renal AKI

- Systemic derangement leading to hypoperfusion of the kidneys leading to AKI e.g. diarrhoea and vomiting, haemorrhage, cardiac failure etc

Intrinsic renal AKI

- Direct nephrotoxic injury to renal tubules or there could be inflammation of interstitial, glomerular or vascular structures.

Post renal AKI

- Obstruction to the outflow of urine, which could be at different levels e.g. renal pelvis, ureter, urinary bladder or urethra.
- Examples of causes of post-renal AKI include:

- Nephrolithiasis
- Retroperitoneal fibrosis and tumours
- Bladder cancer
- Benign prostatic hypertrophy
- Prostate cancer or even urethritis

- Peculiar causes of AKI in Nigerians include:
  - Nephrotoxins (native herbs, drugs, $CuSO_4$ (green water)
  - Ethylene glycol poisoning etc)
  - Cholera
  - Malaria
  - Septicaemia (particularly typhoid)
  - Obstetric causes (ante partum haemorrhage, post-partum haemorrhage, septic abortion, eclampsia).

Table 8.1: Staging of Acute Kidney Injury

STAGE	CHANGE IN SERUM CREATININE (Scr)	% INCREASE IN SERUM CREATININE (Scr)	URINE VOLUME
1	Rise in Scr by >0.3 mg/dL (26.4 µmol/L)	Increase of >150 - 190 % (1.5 to 1.9-fold increase) from baseline	Urine output less than 0.5 ml/kg/hr for more than 6 hours
2		Rise in serum creatinine by >200-290 % (2 to 2.9-fold increase) from baseline	Urine output less than 0.5 ml/kg/hr for more than 12 hours.
3	Scr ≥4.0 mg/dL (≥353.6 µmol/L) OR Initiation of renal replacement therapy.	rise in serum creatinine to >300 % (≥ 3-fold) from baseline. OR eGFR <35 ml/min/1.73m^2 in those <18 years.	Urine output less than 0.3 ml/kg/hr for 24 hours or anuria for ≥12 hours.

Clinical Features

- Asymptomatic
- Reduction in urine output (oliguria),
- features of uraemia,
- fluid retention leading to oedema
- Uraemia present with different features in different systems:
  - Gastrointestinal system:
    - Nausea and vomiting,
    - Hiccups,
    - Diarrhoea,
    - Epigastric pain and rarely haematemesis.
  - Chest:
    - Central chest pain of pericarditis
    - Breathlessness
    - Pulmonary oedema.
  - Central nervous system:
    - Tremors
    - Derangement of sleep rhythm

- Drowsiness
- Seizures
- Stupor or coma
- Skin:
  - Dryness and pruritus
  - Haemopoietic system:
  - Anaemia (pallor)
  - Bleeding diathesis

Diagnostic criteria

As in the definition and table above.

Differential Diagnoses

- Acute exacerbation of chronic kidney disease.
- End-stage Renal Failure

Complications

- Pulmonary oedema
- Infections
- Electrolyte abnormalities:
- Hyperkalaemia in acute cases and
- Hypokalaemia and
- Hyponatraemia in polyuric phases.

Investigations

- Urine Examination (Volume / microscopy /Urinalysis / Electrolytes)
  - Allow quantification of total daily urine output, which could be used in staging. Microscopy would reveal the types of cells, casts, crystals or other substances in the urine.
  - Urinalysis may reveal proteinuria, haematuria, glycosuria or a suggestion of complicating urinary tract infection
  - urinary electrolytes may suggest the severity of tubular damage
- Serum chemistry (e.g. creatinine, urea, K):
  - Allow staging of the AKI according to severity and may suggest need for initiation of renal replacement therapy
  - Could also be used to monitor treatment outcomes or improvement.
- Haematology including serology:
  - Assess the Full Blood Counts, clotting profile.
  - Serological tests may be necessary in patients with suspected connective tissue diseases
- Imaging (e.g. USS, IVU, RUCG etc.):
  - Renal ultrasonography: Simplest non-invasive diagnostic tool for patients with AKI
  - Provides information on structural abnormalities
  - Suggest need for other imaging modalities particularly in patients with obstructive uropathy
- Renal biopsy
  - Mandatory in the following:
  - Any evidence of glomerular disease :

- nephrotic range proteinuria
- sub-nephrotic range proteinuria with haematuria
- RBC cast
- AKI not resolving in 6 weeks
- AKI in connective tissue disease
- AKI in renal allograft
- Determination of the prognosis and chance of recovery of renal function in dialysis dependent AKI.

Treatment Goals

- Maintenance of fluid homeostasis
- Control of biochemical abnormalities
- Maintenance of nutrition
- Treat the underlying cause
- Dialysis where indicated

Drug Treatment

- Maintenance of fluid homeostasis:
  - Entails strict regulation of fluid intake to insensible loss (500 - 1200 ml/day).
  - Replacement of fluids totaling volume of urine and other documented losses in the previous 24 hours.
  - Avoid potassium containing fluids
- Control of biochemical abnormalities:
  - Hyperkalaemia in these patients should be treated in one of 3 ways:
  - Forcing the potassium (K) into cells using
  - Glucose-Insulin Infusion or Glucose Infusion
  - Antagonising the effects of K on the heart using 10% Calcium gluconate
  - Dialysis or use of ion exchange resin like kayexelate
- Maintenance of nutrition: AKI patients are usually hyper-catabolic hence the following
  - High calorie low protein diet is recommended in acute or oliguric phase while
  - High calorie normal protein is recommended in recovery phase.
  - Parenteral hyperalimentation is seldom necessary in prolonged cases.
- Dialysis where indicated:
  - Manifestation of clinical and biochemical features of uraemia or development of electrolyte and acid-base Complications of AKI:
  - Encephalopathy,
  - Pulmonary oedema,
  - Persistent nausea and vomiting,
  - Pericarditis,
  - Refractory oedema,
  - Uncontrolled HT
  - Bleeding diathesis
  - Biochemical indications include:

- Hyperkalaemia > 6.5 mmol/l
- Serum bicarbonate < 12 mmol/l
- Urea > 25 mmol/l
- Creatinine > 600 μmol/l
- Manifestations of features of hyper-catabolism:
- K+ rate of rise > 1 mmol/day
- urea rate of rise > 10 mmol/day
- creatinine rate of rise >100 μmol/day.

Types of dialysis

- Daily haemodialysis,
- Extended daily dialysis,
- Slow low efficient dialysis,
- Acute peritoneal dialysis,
- Intermittent peritoneal dialysis,
- Haemofiltration or haemodiafiltration.

Prevention of AKI:

- Avoidance of nephrotoxins in all forms.
- Provision of pipe borne water.
- Prompt treatment of accident victims.
- Prompt treatment of infections.
- Good maternal, child and reproductive health care
- Adequate hydration during contrast Investigations

Chronic Kidney Disease (CKD)

Introduction:

CKD is defined as a structural and functional abnormality of the kidneys persisting for 3 months or more and manifesting as markers of kidney damage or reduction in glomerular filtration rate (GFR). Markers of kidney damage include persistent microalbuminuria or overt albuminuria or haematuria. Structural abnormalities include abnormalities on imaging or on histology. CKD is also defined as GFR less than 60ml/min or presence of markers of kidney disease for 3 months or more.

CKD is quite common in clinical practice as 12-26% of Nigerians have covert or overt CKD as revealed in community studies

Markers of kidney disease include*:*

- Persistent proteinuria - Dipstick positive proteinuria or microalbuminuria
- Persistent Haematuria - by dipstick and/or urine microscopy
- Abnormal renal imaging - by various techniques such as ultrasonography, Computerised Tomography Scan, intravenous urography or plain radiograph, renal scintigraphy.
- Abnormal renal histology

Table 8.2: Staging of Chronic Kidney Disease (CKD)

Stage	Description	GFR (ml/min/1.73m^2)
1.	Kidney damage with normal or increased GFR	≥90(with kidney damage)
2.	Kidney damage with mild decrease in GFR	60 – 89
3a.	Mild to Moderate decrease in GFR	45 – 59
3b.	Moderate to severe decrease in GFR	30 – 44
4.	Severe decrease in GFR	15 – 29
5.	Kidney failure	<15 (or dialysis)

Clinical Features

- Asymptomatic
- Younger patients may present with peri-orbital swelling early in the disease process
- Swelling which may then progressively worsen over time and lead to ascites and anasarca.
- Hypertension develops in majority of patients with co-existing Congestive cardiac failure or cerebrovascular disease.
- Reduction in urine output (oliguria)
- Features of uraemia: Gastrointestinal system - nausea, vomiting, hiccups, diarrhoea, epigastric pain and rarely haematemesis.
- Chest: central chest pain of pericarditis or breathlessness with development of pulmonary oedema.
- Central nervous system: Tremors, derangement of sleep rhythm, drowsiness, seizures and stupor or coma.
- Skin: Dryness and pruritus
- Haemopoietic system: Anaemia (pallor) and bleeding diathesis

Diagnostic criteria

See definition and table 8.1

Differential Diagnoses

- Severe acute kidney injury with cortical necrosis
- Poisoning with multiple organ involvement.
- Chronic Congestive cardiac failure (Cardio-renal syndrome)

Complications

- Anaemia
- CKD Mineral and Bone Disease
- Congestive cardiac failure
- Cerebrovascular disease
- Peripheral vascular disease
- Malnutrition

Investigations

- Urine Examination (Volume / microscopy /Urinalysis / Electrolytes); Serum chemistry (e.g. creatinine, urea, K):

- Allow estimation of GFR using various formulae and staging of the CKD
- For planning or initiation of renal replacement therapy
- To monitor treatment outcomes or improvement.

- Haematology including serology:
  - To assess the full blood count, clotting profile and monitor response to treatment with oral or parenteral iron and erythropoietin stimulating agents
  - Serological tests for HBV, HCV and HIV are necessary to be able to isolate infectious patients while applying general precautions in the management of all patients.
- Imaging (e.g. USS, IVU, RUCG etc.):
  - Renal ultrasonography remains the simplest non-invasive diagnostic tool for patients with CKD.
  - Provides information on size, shape, preservation of cortical thickness and cortico-medullary differentiation as well as echogenicity of the kidneys, which are usually deranged in patients with advanced CKD.
  - Other structural abnormalities like polycystic kidney disease or hydronephrosis may be discovered and may suggest need for other imaging modalities particularly in patients with obstructive uropathy.
- Renal biopsy
  - Renal biopsy is mandatory in patients that present with some conditions. These include
  - Any evidence of glomerular disease
  - Nephrotic range proteinuria
  - Sub-nephrotic range proteinuria with or without haematuria
  - RBC cast
  - Presence of persistent microscopic haematuria
  - Suspicion of connective tissue disease
  - Presence of familial type of nephrotic syndrome
  - Determine the prognosis and response to therapy.

Treatment Goals

- Counselling to discourage use of nephrotoxins in whatever form and ensure good compliance.
- Good Blood Pressure control.
- Reduction of proteinuria and ensuring maximum renoprotection
- Maintenance of fluid homeostasis
- Control of biochemical abnormalities
- Maintenance of nutrition
- Maintenance of haemoglobin between 11-12g/L
- Maintenance of normal calcium-phosphate homeostasis
- Treatment of any complicating infection
- Treat the underlying cause (more useful if discovered early)
- Dialysis where indicated

Treatment

- Stage the disease
  - Take appropriate measures depending on the stage:
  - Stage 1 – 2: Where the cause of CKD is known, treat underlying cause and institute measures to retard progression.
  - Stage 1-2: Where cause is unknown, refer to Nephrologist.
  - Stage 3-5: Refer to Nephrologist.
- Treatment of hypertension:

Combination of different groups of antihypertensive drugs is the rule but should include maximal doses of either ACEI or ARBs to achieve target BP.
Blood Pressure Targets:

- Proteinuria < 1 g/24 hours -------- 130/80 mmHg
- Proteinuria >1 g/24 hours -------- 120/75 mmHg
- CKD with diabetes -------- 120/75 mmHg
- In children -------- Less than 90th percentile for the age, sex and height.

- Anaemia is the commonest haematological complication of CKD and worsens with deterioration of renal function. *All CKD patients should be screened for anaemia at time of diagnosis and thereafter, at least every 3 months.*
  - Targets for anaemia treatment:
  - Predialysis: Hb - 11 – 12 g/dl, serum ferritin 100-500 ng/ml, TSAT ≥ 20%
  - Dialysis: Hb - 11 – 12 g/dl, serum ferritin 200 – 500 ng/ml, TSAT ≥ 20%
  - In all patients, avoid Hb level > 13 g/dl because of risk of haemoconcentration and its effect on morbidity and increased cardiovascular mortality.

Treatment of anaemia:

- In predialysis patients and patients receiving peritoneal dialysis or home haemodialysis, optimize iron balance before epoetin therapy using oral iron. If poor response (TSAT is < 20% and serum ferritin < 100 ng/ml for 4 weeks), switch to parenteral iron.
  - Dose of oral iron: Ferrous sulphate 200 mg or ferrous gluconate 600 mg three times daily (approx. 65mg elemental iron) or 2-6 mg /kg /day of elemental iron for paediatric patients
  - Dose of parenteral iron: Iron sucrose intravenously 200 mg weekly for 5 weeks (total of 1000 mg) or Iron dextran intravenously 250 mg weekly for 4 weeks. For patients in whom adherence may be difficult, total dose infusion should be considered as it has been found to be effective and safe
- For patients on in-center haemodialysis, start with parenteral iron at 100 mg in the last 30-60 minutes of the dialysis session to a total of 1000 mg. In cases of poor or inadequate dialysis, higher doses may be given to ensure achieving 1000 mg within 4 weeks.
  - *Test dose of iron dextran should be administered before the full dose.*

- *For patients that have received blood transfusions, check iron stores (serum ferritin) before giving supplemental iron because of risk of iron overload.*

- Erythropoiesis Stimulating Agents (ESAs)
  - These should be administered preferably after iron deficiency has been corrected and BP controlled.
  - Short-acting ESAs – erythropoetin alpha and erythropoetin beta.
  - Intermediate-acting ESAs – darbepoetin alfa
  - Long-acting ESAs – CERA

- Control of biochemical abnormalities
  - To maintain good calcium phosphate homeostasis:
  - Dietary phosphate intake should be limited in patients with hyperphosphataemia. Phosphate-binding agents are required in the treatment of hyperphosphataemia.
  - For choice of phosphate binder, it is reasonable to take into account the following:
    - Serum calcium
    - CKD stage,
    - Presence of other components of CKD-MBD
    - Concomitant therapies
    - Side-effect profile of the drug.
    - The dose of calcium-based phosphate binders should be restricted in the presence of arterial calcification and/or adynamic bone disease. In such instances the use of non-calcium based phosphate binders (e.g. Sevelamer HCl, lanthanum carbonate etc) could be used.
    - Hypocalcaemia, is treated with calcium salts and active vitamin D analogues. Calcium intake should however, be restricted in patients with hypercalcemia, soft tissue calcification, low PTH and in patients with adynamic bone disease.
    - Calcitriol or vitamin D analogs, or calcimimetics, or a combination of calcimimetics and calcitriol or vitamin D analogs may be used to lower PTH to two to nine times the upper normal limit for the assay in treated patients.
    - Parathyroidectomy is indicated when medical therapy fails.

- Dialysis
  - Maintenance Haemodialysis (HD) (Twice or Thrice weekly HD),
  - Continuous Ambulatory Peritoneal Dialysis (CAPD)
  - See indications for dialysis above under AKI

- Kidney Transplantation.

Nephrotic Syndrome

Introduction

A clinical complex characterized by the following:

- Proteinuria of 3.5 g per 24 hours
- Hypoalbuminaemia
- Generalized oedema
- Hyperlipidaemia;
- Lipiduria
- Hypercoagulability

Aetiology

- Idiopathic in a significant proportion of cases
- Inflammatory diseases of the glomeruli (glomerulopathies)
- Viral infections e.g. Hepatitis B, HIV
- Immunologic disorders e.g. SLE Allergies: insect bites, poisonous plants Intravenous drugs e.g. heroin Others:
- Diabetes mellitus
- Carcinomas
- Amyloid deposition

Histologic types

- Minimal change disease
- Focal segmental glomerulosclerosis
- Membranous glomerulopathy
- Mebrano- proliferative glomerulonephritis
- Mesangio-proliferative glomerulonephritis

Clinical Features

- Generalized body swelling
- Passage of frothy urine

Complications

- Peripheral arterial or venous thrombosis
- Acceleration of atherosclerosis
- Protein malnutrition
- Vitamin D deficiency
- Increased susceptibility to infections
- Iron-resistant microcytic hypochromic anaemia

Differential Diagnoses

- Congestive heart failure
- Decompensated chronic liver disease
- Protein losing enteropathy

Investigations

- Blood:
  - Serum proteins
  - Serum lipids Urine:
- Urinalysis
  - 24-hour urine collection for protein estimation

- Abdominal ultrasound scan
- Renal biopsy

Treatment Goals

- Reduce proteinuria
- Eradicate peripheral oedema

Drug Treatment

- Diuretics e.g. loop diuretics like furosemide
- Glucocorticoids (e.g. prednisolone)

If renal biopsy and histology reveal a steroid-responsive cause of the nephrotic syndrome

- Cytotoxic drugs (e.g. cyclophosphamide) in some steroid-resistant cases

Prevention

- Avoid nephrotoxins
- Treat bites and stings to prevent p haemolytic streptococcal infection

SEXUALLY TRANSMITTED INFECTIONS

Bacterial Vaginosis

Introduction

A clinical syndrome resulting from replacement of the normal hydrogen peroxide-producing Lactobacillus sp. in the vagina by high concentrations of anaerobic bacteria, such as Gardnerella vaginalis, Mycoplasma hominis and Mobiluncus curtisii. Predisposing factors are the use of antiseptic/antibiotic vaginal preparations or vaginal douching

Clinical Features

- Malodorous and increased white vaginal discharge: homogenous, low in viscosity, and uniformly coats vaginal walls (fishy-smelling discharge particularly noticeable after sexual intercourse)
- No pruritus or inflamed vulvae

Differential Diagnoses

- see Gonorrhoea

Complications

- Acute salpingitis
- Premature rupture of membranes
- Preterm delivery and low birth weight

Investigations

- Homogeneous milky discharge with pH > 4.5 (pH > 6.0 highly suggestive)
- Wet mount of the discharge – clue cells (normal vaginal epithelial cells studded with bacteria, giving the cells a granular appearance)
- Whi fftest - addition of several drops of 10% KOH to a sample of vaginal discharge (Fishy odour is indicative of a positive test)

Treatment Goals

- Eliminate the organisms

Drug Treatment

- Recommended regimen:

- Metronidazole 400 mg orally, every12 hours for 7 days

- Alternative regimen:
  - Metronidazole 2 g orally, as a single dose

Or:

- Metronidazole 0.75% gel 5 g intravaginally, twice for 7 days

Notable Adverse Drug Reactions, Contraindications and Caution

- Metronidazole: see Trichomoniasis
- Advise to return if symptoms persist as re-treatment may be needed

Recommended regimen for pregnant women

- Metronidazole 200 orally, every 8 hours for 7 days, after the first trimester Or 2g orally as a single dose

Notable Adverse Drug Reactions, Contraindications and Caution

Metronidazole:

- Causes a disulfiram-like reaction with alcohol
- Avoid high doses in pregnancy and breast feeding
- May cause nausea, vomiting, unpleasant taste, furred tongue, and gastro-intestinal disturbances
- Generally, not recommended for use in the first trimester of pregnancy

Prevention

- Reduce or eliminate predisposing factors (antiseptic/antibiotic vaginal preparations or vaginal douching)
- Treat symptomatic pregnant women
- Screen pregnant women with a history of previous pre-term delivery to detect asymptomatic infections
- Retreat pregnant women with recurrence of symptoms
- Counselling, Compliance, Condom use and Contact treatment

Chancroid (Ulcus Molle, Soft Chancre)

Introduction

An infectious disease caused by Haemophilus ducreyi, a small gram-negative bacillus. Common in the tropics, especially in Africa, the Far East, and the Caribbean. Persons may present with chancroid outside endemic regions; sporadic outbreaks of infection occur in Europe and North America

Clinical Features

- Incubation period is about 3 - 7 days
- Begins as a small, tender papule, changing into a pustule which rapidly progresses to a painful ulcer with a bright red areola
- Neither the edge nor base of the ulcer is indurated (unlike syphilis)
- The ulcer feels soft, hence the name 'soft sore' (ulcus molle)
- With superimposed bacterial infection, it often feels indurated
- The ulcers may be multiple due to auto-inoculation
- Sites of predilection in men are the prepuce, frenulum, glans or shaft of the penis
- In women the labia, fourchette, vestibule, clitoris, cervix, or perineum are favoured sites

- Lesions may cause dyspareunia, pain on voiding or defaecation and vaginal discharge
- Women may be asymptomatic carriers
- About 7 - 14 days after the appearance of the ulcer, a bubo appears
- A mass of glands matted together, often adherent to the overlying skin
- The glands above the inguinal ligament are usually affected, and often there is a unilateral enlargement
- Central softening is often found and if untreated the bubo may rupture and discharge through a fistula
- The combination of a painful genital ulcer and suppurative inguinal adenopathy is almost pathognomonic of chancroid
- Patient may present with bubo, the initial ulcer having healed
- Atypical lesions have been reported in HIV-infected individuals
- More extensive, or multiple lesions sometimes accompanied by systemic manifestations such as fever and chills

Complications

- Progressive ulceration and amputation of the phallus, particularly in HIV patients

Differential Diagnoses

- Other causes of genital ulcers: Syphilis; Herpes; Granuloma inguinale; Lymphogranuloma venereum; Fixed drug eruption; Erythema multiforme; Behcet's disease; Trauma; Tuberculous ulcer and Cancers

Investigations

- Microscopy, culture and sensitivity of discharge from ulcer
- Serological tests e.g. complement fixation (CF); microimmuno-fluorescence (MIF) test; PCR

Treatment Goals

- Same as for Gonorrhoea

Drug Treatment

- Recommended regimen is ciprofloxacin 500 mg orally every 12 hours for 3 days

Or:

- Erythromycin 500 mg orally every 6 hours for 7 days

Or:

- Azithromycin 1 g orally as a single dose alternative regimen:
- Ceftriaxone, 250 mg by intramuscular injection, as a single dose

Adjuvant therapy

- Keep ulcerative lesions clean
- Aspirate fluctuant lymph nodes through the surrounding healthy skin, preferably from a superior approach to prevent persistent dripping and sinus formation
- Incision and drainage, or excision of nodes may delay healing and is not recommended

Follow-up

- All patients should be followed up until there is clear evidence of

improvement or cure

- In patients infected with HIV, treatment may appear to be less effective, but this may be a result of co-infection with genital herpes or syphilis
- Chancroid and HIV infection are closely associated and therapeutic failure is likely to be seen with increasing frequency
- Patients should therefore be followed up weekly until there is clear evidence of improvement

Notable Adverse Drug Reactions, Contraindications and Caution

- Ciprofloxacin and ceftriaxone (see gonorrhoea)
- Erythromycin and azithromycin (see chlamydia)

Prevention

- Counselling, Compliance, Condom use and Contact treatment

Chlamydial Infection (other than Lymphogranuloma venereum)

Introduction

The Chlamydiae occupy a special place between bacteria and viruses. They are a large group of obligate intracellular organisms

Chlamydia trachomatis has a number of serovars and causes many different human infections:

- Eye: trachoma; inclusion conjunctivitis
- Genital tract: lymphogranuloma venereum, non-gonococcal urethritis, cervicitis, salpingitis
- Respiratory tract: pneumonia

C. trachomatis immunotypes D - K are isolated in about 50% of cases of non-gonococcal urethritis and cervicitis by appropriate techniques

Clinical Features

- Asymptomatic, but when an incubation period can be determined, it is usually about 10 - 20 days
- Co-infection with gonococci and chlamydiae is common
- Non-gonococcal urethritis in males, and in females cervicitis, salpingitis, or pelvic inflammatory disease
- Urethral or cervical discharge tends to be less painful, less purulent, and watery in chlamydial compared with gonococcal infection
- Cervix may show contact bleeding in addition to the discharge
- A patient with urethritis or cervicitis and absence of gram-negative diplococci on Gram stain and of *N. gonorrhoeae* on culture is assumed to have chlamydial infection

Complications

- Epididymo-orchitis and sterility in males
- Pelvic inflammatory disease (PID) and infertility in females
- Adverse pregnancy outcomes
- Conjunctivitis and pneumonia in the newborn

Differential Diagnoses

- See Gonorrhoea

Investigations

- Microscopy, culture and sensitivity (of discharge)
- Direct immunofluorescence assay
- Enzyme-linked immunoassay
- DNA probe test
- Ligase chain reaction (LCR)

Treatment Goals

- Same as for gonococcal infection

Drug Treatment

- Recommended regimen: Doxycycline 100 mg orally, every 12 hours for 7 days

Or:

- Azithromycin 1 g orally, in a single dose

Chlamydial infection during pregnancy

- Recommended regimen:
  - Erythromycin 500 mg orally every 6 hours for 7 days

Or:

  - Amoxycillin 500 mg orally every 8 hours for 7 days

Neonatal chlamydial conjunctivitis

- Typically has an incubation period of 10 - 14 days compared to 2 - 3 days for gonococcal opthalmia
- Recommended regimen is erythromycin syrup 50 mg/kg per day orally, every 6 hours for 14 days

Or

- Trimethoprim 40 mg with sulfamethoxazole 200 mg orally, every 12 hours for 14 days

Note

- There is no evidence that additional therapy with a topical agent provides further benefit
- If inclusion conjunctivitis recurs after therapy has been completed, erythromycin treatment should be reinstituted for 2 weeks
- It is important to treat the mother and her sexual partner

Notable Adverse Drug Reactions, Contraindications and Caution

- Doxycycline and tetracycline
  - Caution in patients with hepatic impairment, systemic lupus erythematosus and myasthenia gravis
  - Antacids, aluminium, calcium, iron, magnesium and zinc salts, and

milk decrease the absorption of tetracyclines
  - Deposition of tetracyclines in growing bones and teeth (by binding to calcium) causes staining and occasionally dental hypoplasia
  - Should not be given to children under 12 years, or to pregnant or breast-feeding women
  - With the exception of doxycycline, tetracyclines may exacerbate renal failure and should not be given to patients with kidney disease
  - May cause nausea, vomiting and diarrhoea; hypersensitivity reactions. Headache and visual disturbances may indicate benign intracranial hypertension
  - Candida superinfection with prolonged therapy
- Azithromycin and Erythromycin
  - Erythromycin estolate is contraindicated during pregnancy because of drug-related hepatotoxicity; only erythromycin base or erythromycin ethylsuccinate should be used
  - Erythromycin should not be taken on an empty stomach
  - Caution in persons with arrhythmias
  - Infants should be followed up for symptoms and signs of infantile hypertrophic pyloric stenosis (has been reported in infants less than 6 weeks exposed to this drug)
- Ofloxacin See ciprofloxacin- Gonorrhoea Amoxicillin
  - Caution where there is a history of allergy
  - Erythematous rashes common in glandular fever, cytomegalovirus infection, acute or chronic lymphocytic leukaemia with pityriasis rosea, and allopurinol use

Prevention

- Counselling, Compliance, Condom use and Contact treatment

Gonorrhoea

Introduction

Caused by Neisseria gonorrhoeae, a gram-negative aerobic diplococcus. It prefers the columnar epithelium of the urethra, the cervical canal, the rectum and the conjunctivae.

The keratinizing epithelium of the adult vagina is quite resistant to N. gonorrhoeae, but that of the pre-pubertal girls, pregnant women and the elderly is more easily colonized. Occasionally N. gonorrhoeae reaches the blood stream causing sepsis

Gonorrhoea in males

Clinical Features

- Presents as foul-smelling urethral discharge of pus with dysuria 2 - 6 days after exposure
- Some patients have a scanty discharge that cannot be distinguished from

non-gonococcal urethritis

- Often asymptomatic during the day but there may be a drop of discharge in the morning
- Urethral orifice is usually inflamed; there may be balanitis because of the irritation from the discharge and secondary infection
- About half of infected males are asymptomatic
- Ascending infection is common and may lead to inflammation of the epididymis (epididymitis)
- Epididymitis usually manifests by acute onset of unilateral testicular pain and swelling, often with tenderness of the epididymis and vas deferens
  - Occasionally there is erythema and oedema of the overlying skin
  - The adjacent testis is often also inflamed (orchitis), giving rise to epididymo-orchitis

Complications

- Local Complications (now uncommon):
- Littre abscess involving periurethral glands
- Paraurethral abscesses
- Proximal urethral involvement with frequency and terminal haematuria
- Cowper's gland abscess involving the bulbourethral glands, producing a swelling behind the base of the scrotum that can produce a proximal or Cowper's stricture
- Prostatitis
- Proctitis
- Urethral stricture leading to hydroureters and hydronephrosis
- Chronic epididymo-orchitis leading to sterility
- Contaminated fingers or other fomites can also lead to infection of the eyes-gonococcal conjunctivitis
- Haematogenous spread leading to meningitis, arthritis etc

Differential Diagnoses

- Urethral discharge: Spermatorrhoea/prostatorrhoea (sexual arousal)
  - *Trichomonas vaginalis and Candida albicans*canalso give rise to urethral discharge and balanitis Ascending infections:
  - Escherichia coli, a common cause in the insertive male homosexuals
  - Other organisms may be transmitted non-sexually following genitourinary infections, surgery and instrumentation (including catheterization)
- Scrotal swelling (epididymo-orchitis): In older men, where there may have been no risk of STIs, other general infections may be responsible, ***e.g.*** Escherichia coli, Klebsiella spp. or Pseudomonas aeruginosa
- Tuberculous epididymo-orchitis, secondary to lesions elsewhere, especially in the lungs or bones
- Brucellosis, caused by Brucella melitensis or Brucella abortus
- Orchitis is usually clinically more evident than an epididymitis
- In pre-pubertal children the usual aetiology is coliform, pseudomonas infection or mumps virus
- Non-infectious causes of scrotal swelling: Trauma (haematocoele),

testicular torsion, tumour, hydrocoele of the tunica vaginalis, cyst of epididymis, varicocoele, inguinoscrotal hernia

Investigations

- Urethral swab for microscopy and culture and sensitivity

Gonorrhoea in women

Clinical Features

- Inflammation of the cervix and cervical canal (cervicitis) is the commonest presentation in women
- Urethritis: the urethra becomes the most common site in women who have had hysterectomy
- The most frequent complaint is discharge, often accompanied with burning on urination
- Over 50% of infected women are asymptomatic
- Oropharyngeal gonorrhoea from orogenital sex (fellatio) may present as sore throat

Complications

- ***Local:***
  - Infections of Skene's periurethral glands and Bartholin's labial glands; a Bartholin's gland abscess may cause pain on sitting or walking
  - Vulvitis
  - Ascending infection to the endometrium, fallopian tubes, ovaries and peritoneum (pelvic inflammatory disease)
  - Ectopic pregnancy
  - Infertility
  - Perihepatic abscess (Fitz-Hugh-Curtis syndrome)
  - Risk of disseminated gonococcal infection during pregnancy and menstruation
- Risk to the newborn infant:
  - Premature rupture of membranes
  - Premature labour
  - Chorioamnionitis
  - Septic abortion
  - Ophthalmia neonatorum
  - Oropharyngeal gonorrhoea

Differential Diagnoses

Other causes of vaginal discharge

- Accentuation of physiological discharge
  - Premenstrually
  - At the time of ovulation
  - In pregnancy
  - Use of contraceptive pills or an intrauterine device
- ***Infective causes:***
  - Candidiasis
  - Trichomoniasis

- Bacterial vaginosis
- Chlamydia
- Cervical herpes genitalis
- Cervical warts
- Syphilitic chancre
- Toxic shock syndrome *(Staphylococcus aureus)*
- B-haemolytic streptococcal infection, *Mycoplasma* infection

- ***Non-infective causes:***
- Cervical ectropion
- Cervical polyp(s)
- Neoplasia e.g. cancer of the cervix
- Retained products (tampon, post-abortion, post-natal)
- Trauma
- Semen (post-coital)
- Contact irritants and sensitizers e.g. from douches or feminine hygiene sprays
- Bullous diseases of the mucous membranes

Investigations

- Endocervical swab (through a vaginal speculum) for microscopy, culture and sensitivity

Gonorrhoea in children

Clinical Features

- Sexual abuse is a common cause of gonorrhoea in young girls
- Usually symptomatic in young girls
- Pruritus and dysuria are common complaints
- Discharge may cause irritant dermatitis of the upper thighs

Differential Diagnoses

- Other causes of vaginal discharge in young girls:
- A vaginal foreign body such as a small toy, bead, or even a piece of food
- Other infections caused by T. vaginalis, and C. albicans
- Intestinal bacteria or pin worms due to inadequate cleaning after defeacation

Ophthalmia neonatorum

- Gonococcal conjunctivitis in the neonate can be acquired perinatally
- Purulent conjunctivitis; the lids swell; eyes are red and tender
- If not treated promptly, the cornea may be eroded and perforated, leading to secondary glaucoma, conophthalmus and blindness
- About 30% of babies infected will also have oropharyngeal gonorrhoea

Differential Diagnoses

- The silver nitrate prophylaxis can produce a chemical conjunctivitis, usually appearing 6 -8 hours after treatment and resolving over 24 hours
- The most common cause of neonatal conjunctivitis in most countries is C. trachomatis, E. coli, Staphylococci, Streptococci and Pseudomonas sp. can also cause conjunctivitis in the neonate.

Treatment Goals

- Eliminate the organism in the patient and sexual partner(s)
- Prevent re-infection
- Prevent Complications
- Counsel and screen for possible co-infection with HIV so that appropriate management can be instituted

Drug Treatment

- Recommended regimen:
  - Ciprofloxacin 500 mg orally, as a single dose

Or:

  - Ceftriaxone 500 mg by intramuscular injection, as a single dose

Neonatal gonococcal conjunctivitis

- Recommended regimen:
  - Ceftriaxone 50 mg/kg by intramuscular injection, as a single dose, to a maximum of 125 mg

mg/kg

Note

- Single-dose ceftriaxone and kanamycin are of proven efficacy
- The addition of tetracycline eye ointment to these regimens is of no documented benefit

Adjunctive Treatment for Gonococcal Ophthalmia

- Systemic therapy, as well as local irrigation with saline or other appropriate solution
- Irrigation is particularly important when the recommended therapeutic regimens are not available
- Careful hand washing by personnel caring for infected patients is essential

Follow-up

- Review patients after 48 hours

Notable Adverse Drug Reactions, Contraindications and Caution

- Ciprofloxacin
  - Avoid in pregnancy and breast feeding; children below 12 years
  - Reduce dose in renal impairment
- Ceftriaxone
  - Caution in persons with known sensitivity to beta-lactam antibiotics
  - May cause diarrhoea (and rarely antibiotic-associated colitis); nausea, vomiting and abdominal discomfort

Prevention

- Counselling, Compliance, Condom use and Contact treatment
- Ocular prophylaxis provides poor protection against C. trachomatis conjunctivitis

Prevention of ophthalmia neonatorum

- Clean the eyes carefully immediately after birth
- The application of 1% silver nitrate solution or 1% tetracycline ointment to the eyes of all infants at the time of delivery is strongly recommended as a prophylactic measure
- Infants born to mothers with gonococcal infection should receive additional

antibiotic treatment (as those with clinical neonatal conjunctivitis)

Granuloma Inguinale (Donovanosis Granuloma venereum)

Introduction

A mildly contagious disease caused by Klebsiella granulomatis. Currently rare in several parts of Africa; Endemic in Southeast Asia, Southern India, the Caribbean and South America

Clinical Features

- A chronic mildly contagious disease with a potentially progressive and destructive character
- Incubation period ranges from 10 - 40 days
- The early lesion is a papule or nodule which soon becomes ulcerated and has an offensive discharge
- The floor of the ulcer may be covered with a dirty grey material; its walls may be overhanging, or a papillomatous fungating mass may arise from the growth of vegetations
- Progressive indolent, serpiginous ulceration of the groins, pubis, genitals and anus may form.
- Pain on walking may be excruciating
- Persisting sinuses and hypertrophic depigmented scars are fairly characteristic
- Regional lymph nodes are not enlarged but with cicatrisation, the lymph channels may be blocked causing pseudoelephantiasis of the genitalia. Both the fibrotic scarring and elephantiasis-like lesion could cause obstructed labour
- Subcutaneous extension and abscesses may occur and form a pseudo-bubo in the inguinal region
- Healing is unlikely without treatment; the locally destructive lesion may eventually involve the groin, pubis and anus
- A squamous cell carcinoma may arise from chronic lesions.

Differential Diagnoses

- Syphilis
- Chancroid
- Lymphogranuloma venereum
- Lupus vulgaris
- Deep mycosis
- Amoebic ulcer
- Pyoderma gangrenosum
- Squamous cell and basal cell carcinoma

Complications

- Obstructed labour
- Squamous cell carcinoma

Investigations

- Direct microscopy

Treatment Goals

- Same as for gonococcal infection

Drug Treatment

- Recommended regimen
  - Azithromycin 1 g orally on first day, then 500 mg orally, once a day

Or:

  - Doxycycline 100 mg orally every 12 hours
  - Therapy should be continued until the lesions have completely epithelialized

Alternative regimen:

– Erythromycin 500 mg orally every 6 hours

Or:

– Tetracycline 500 mg orally every 6 hours

Or:

– Trimethoprim 80 mg/sulfamethoxazole 400 mg, 2 tablets orally, 12 hourly

All treatment should be for a minimum of 14 days

Note

– The addition of a parenteral aminoglycoside such as gentamicin should be carefully considered for treating HIV-infected patients

Follow-up

– Patients should be followed up clinically until signs and symptoms have resolved

Notable Adverse Drug Reactions, Contraindications and Caution

- Sulfamethoxazole/trimethoprim
  - Contraindicated in persons with hypersensitivity to sulfonamides or trimethoprim; porphyria
  - Caution required in renal impairment (avoid if severe); hepatic impairment (avoid if severe); maintain adequate fluid intake (to avoid crystalluria)
  - May cause nausea, vomiting, diarrhoea, headache, hypersensitivity reactions, including fixed drug eruption, pruritus, photo-sensitivity reactions, exfoliative dermatitis, and erythema nodosum

Others

. See Chlamydia

Prevention

- Counselling, Compliance, Condom use and Contact treatment

Lymphogranuloma Venereum

(Climatic bubo; lymphogranuloma inguinale; lymphopathia venereal; Durand-Nicolas-Favre Disease)

Introduction

A chronic disease caused by Chlamydia trachomatis (serotypes L1, L2, L3), an obligate intracellular microorganism. Most common in Asia, Africa, and South America. In Europe and North America, it is most prevalent among homosexuals, immigrants from endemic areas and people returning from endemic areas, such as soldiers, seamen, and vacationers

Clinical Features

- A chronic granulomatous, locally destructive disease that is characterized by progressive, indolent, serpiginous ulceration of the groins, pubes, genitals and anus
- May be classified into primary, secondary, and late stages
- Primary stage
  - After an incubation period of 7 - 15 days, a papule or small non-indurated painless ulcer appears –
  - Usually goes unnoticed
  - Extra-genital lesions (rectal, oral) have also been described
  - Women probably act as asymptomatic carriers
  - Patients are very rarely seen at the primary stage
- Secondary stage
  - About 3 - 6 weeks post-contact a uni-or bilateral massive inguinal lymphadenopathy (bubo) appears
  - The glands elongate along the Poupart's ligament to become sausage shaped
  - Buboes progress to involve the glands above and below the ligament, so that the depression formed by the ligament which separates these two groups of glands gives the "sign of the groove"
  - Pain in the gland is usual, and as the glands are matted together, the overlying skin develops an erythematous or violaceous hue. The glands eventually become fluctuant, break down and discharge
  - Inguinal lymphadenopathy occurs in only 20 - 30% of women with LGV
  - There is primary involvement of the rectum, vagina, cervix, or posterior urethra, which drain to the deep iliac or peri-rectal nodes
  - This may produce symptoms of lower abdominal or back pain
  - Systemic symptoms usually present with:
    - Fever
    - Malaise
    - Arthritis
    - Loss of weight
    - Skin manifestations (erythema nodosum, papulo-pustular lesions and photodermatosis)
    - Raised ESR
- Late stage
  - Spontaneous remission is common, though some patients enter the late stage
  - Characterized by disfiguring and destructive sequelae
  - Impairment of the lymphatic drainage from fibrotic scarring leads to distant oedema and gross elephantiasis of the genitalia
  - There could be associated anorectal and vaginal strictures

Complications

- Systemic spread of C. trachomatis in the secondary stage resulting in

arthritis, pneumonia, hepatitis or rarely perihepatitis

- Other rare systemic Complications include pulmonary infection, cardiac involvement, aseptic meningitis, and ocular inflammatory disease
- The late stage may be complicated by the genito-anorectal syndrome
- Reported more in homosexual men, and women who engage in receptive anal intercourse
- Patients may also complain of fever, pain, and tenesmus
- Obstructed labour from elephantiasis of the vulva

Differential Diagnoses

- Buboes:
  - Chancroid; Infections of the lower limbs; Hodgkins disease and other lymphomas; Plague
- Tularemia Late stage:
  - Tuberculosis; Deep mycosis of the genitalia; Squamous cell or basal cell carcinoma

Investigations

- Culture and cell typing of the isolate from an aspirate of involved lymph node
- Serological tests e.g. CFT and MIF; PCR

Treatment Goals

- Same as for gonorrhoea

Drug Treatment

Recommended regimen:

- Doxycycline 100 mg orally every 12 hours for 14 days

Or:

- Erythromycin 500 mg orally every 6 hours for 14 days

Alternative regimen:

- Tetracycline 500 mg orally every 6 hours for 14 days

Adjuvant measures

- Aspirate fluctuant lymph nodes through healthy skin Incision and drainage or excision of nodes may delay healing and is not recommended
- Some patients with advanced disease may require treatment for longer than 14 days, and sequelae such as strictures and/or fistulae may require surgery

Notable Adverse Drug Reactions, Contraindications and Caution

- See Chlamydia

Prevention

- Counselling, Compliance, Condom use and Contact treatment

Syphilis

Introduction

Infection caused by the spirochaete Treponema pallidum which occurs worldwide

Can be classified as:

- Congenital (transmitted from mother to child *in utero)*
- Acquired (through sex or blood transfusion): Early or Late
  - Early syphilis: primary, secondary and early latent stages
  - Primary syphilis is characterized by an ulcer or chancre at the site of infection or inoculation
  - Secondary syphilis includes a skin rash, condyloma lata, mucocutaneous lesions and generalized lymphadenopathy
  - Late syphilis: late latent syphilis, gummatous, neurological and cardiovascular syphilis

This section is only on primary syphilis

Clinical Features

- After an incubation period of 2 - 4 weeks (full range 90 days) the first lesion of syphilis may appear at the site of exposure, most commonly, the genitals
- Chancres may also be located on the lips or tongue; ano-rectal chancres frequently seen in male homosexuals - Begins as a small, dusky-red macule which soon develops into a papule
- The surface of the papule erodes to form an ulcer which is typically round and painless with a clean surface and exudes a scanty yellow serous discharge teeming with spirochaetes
- Lesion is indurated and feels firm or hard on palpation; surrounding skin is oedematous
- Regional inguinal (or generalized) lymphadenopathy follows
- The glands are painless, moderately enlarged (not buboes), discrete and never suppurate
- Atypical lesions: Bacterial superinfection, trauma or co-infection with chancroid.
- Even without treatment, the primary lesion(s) gradually heals up and will disappear after approximately 3 - 8 weeks, sometimes leaving a thin atrophic scar which is easily overlooked

Differential Diagnoses

- Other causes of genital ulcers:
- Chancroid Herpes
- Lymphogranuloma venereum
- Granuloma inguinale
- Trauma
- Fixed drug eruption
- Behcet's disease
- Erythema multiforme
- Tuberculous ulcer
- Amoebic ulcer
- Cancer

Complications

- Phimosis and paraphimosis
- Late syphilis: gummatous, neurological and cardiovascular syphilis

Investigations

- Dark field examination
- Direct fluorescent antibody tests of lesion exudates or tissue
- VDRL and RPR

Treatment Goals

- Eliminate the organism in the patient and sexual partner(s)
- Prevent re-infection
- Prevent complications
- Counsel and screen for possible co-infection with HIV so that appropriate management can be instituted

Drug Treatment

Recommended regimen

. Benzathine benzyl penicillin- 4 G (2.4 MU by intramuscular injection, at a single session); because of the volume involved, this dose is usually given as two injections at separate sites

Alternative regimen for penicillin-allergic (non-pregnant) patients

. Doxycycline100 mg orally, every 12 hours for 14 days

Or:

. Tetracycline 500 mg orally, every 6 hours for 14 days

Alternative regimen for penicillin-allergic pregnant patients

. Erythromycin 500 mg orally, every 6 hours for 14 days

Notable Adverse Drug Reactions, Contraindications and Caution

- Benzylpenicillin (Penicillin G)
- Caution in patients with history of allergy; atopic patients; in severe renal impairment, neurotoxicity; high doses may cause convulsions
- Contraindicated in penicillin hypersensitivity
- May cause hypersensitivity reactions including! urticaria, fever, joint pains, rashes, angioedema, anaphylaxis, serum sickness-like reaction, rarely interstitial nephritis, haemolytic anaemia, leucopaenia, thrombocytopaenia and coagulation disorders
- Other antibiotics
- See Chlamydia

Prevention

- Counselling, Compliance, Condom use and Contact treatment
- All infants born to seropositive mothers should be treated with a single intramuscular dose of benzathine penicillin 50,000 units/kg, whether or not the mothers were treated during pregnancy (with or without penicillin)
- Prevention of congenital syphilis is feasible
- Programmes should implement effective screening strategies for syphilis in pregnant women
- Screening for syphilis should be conducted at the first prenatal visit
- Some programmes have found it beneficial to repeat the tests at 28 weeks of

pregnancy and at delivery in populations with a high incidence of congenital syphilis

Trichomoniasis

Introduction

Caused by the flagellated protozoan, Trichomonas vaginalis. An extremely common infection, almost always transmitted via sexual contact. Women are far more frequently affected and more likely to have symptoms. Men are more likely to be asymptomatic and serve as carriers

Clinical Features

- Vaginal discharge: a white-yellow frothy discharge is characteristic
- Burning sensation
- Dysuria
- Dyspareunia
- The labia are often swollen
- The cervix may have punctuated haemorrhages producing a strawberry-like surface when viewed with a colposcope
- Some men may have dysuria or a minimal urethral discharge and balanoposthitis
- Co-infection with *N. gonorrhoeae*is common

Differential Diagnoses

- Other causes of vaginal discharge or urethral discharge: see Gonorrhoea

Complications

- Acute salpingitis
- Adverse pregnancy outcomes, particularly premature rupture of membranes, pre-term delivery and low birth weight

Investigations

- Microscopy and culture of vaginal discharge

Treatment Goals

- Eliminate the organism in the patient and sexual partner(s)
- Prevent re-infection
- Prevent Complications
- Counsel and screen for possible co-infection with HIV so that appropriate management can be instituted

Drug Treatment

Recommended regimen:

- Metronidazole 2g orally in a single dose

Or:

- Tinidazole 2g orally in a single dose

Alternative regimen:

- Metronidazole 400 mg or orally every 12 hours for 7 days

Or:

- Tinidazole 500 mg orally every 12 hours for 5 days

Note

- Other 5-nitroimidazoles are also effective, both in single and in multiple dose regimens
- Asymptomatic women with trichomoniasis should be treated with the same

regimen as symptomatic women
- Recommended regimens for male urethral infections: same as for women
- Patients not cured with the repeated course of metronidazole may be treated with a regimen consisting of metronidazole 2 g orally daily, together with 500 mg applied intravaginally each night for 3 - 7 days
- Vaginal preparations of metronidazole are available in many parts of the world, but are only recommended for the treatment of refractory infections, not for the primary therapy of trichomoniasis

Recommended regimen for neonatal infections
- Metronidazole 5 mg/kg orally, every 8 hours for 5 days
- Infants with asymptomatic trichomoniasis, or urogenital colonization persisting past the fourth month of life should be treated with metronidazole

Notable Adverse Drug Reactions, Contraindications and Caution

Metronidazole
- ***Causes a disulfiram-like reaction with alcohol***
- Avoid high doses in pregnancy and breast feeding
- May cause nausea, vomiting, unpleasant taste, furred tongue, and gastro-intestinal disturbances
- Generally, not recommended for use in the first trimester of pregnancy

Prevention
- Counselling, Compliance, Condom use and Contact treatment

Vulvo-Vaginal Candidiasis

Introduction

Inflammation of the vagina and vulva, usually evolving from vaginal discharge and secondary external irritation

Candida albicans is the commonest cause of candidal vulvo-vaginitis; Candida glabrata has also been identified

Candidal vaginitis is most common in:
- Pregnancy
- Patients with diabetes mellitus
- Those on long-term antibiotic therapy or oral contraceptives
- Conditions associated with immune suppression
- Corticosteroid use
- Usually not acquired through sexual intercourse

Because of the close proximity between the anus and female genitalia, re-infections may occur from the gastrointestinal tract

Clinical Features
- Up to 20% of women with the infection may be asymptomatic
- If symptoms occur, they usually consist of vulval itching, soreness and a non-offensive vaginal discharge which may be curdy
- Clinical examination:
- Vulval erythema (redness) or excoriations from scratching
- Vulval oedema
- Erosions and crusting on the adjacent intertriginous skin

- Although treatment of sexual partners is not recommended, it may be considered for women who have recurrent infections
- A minority of male partners may have balanitis, which is characterized by erythema of the glans penis or inflammation of the glans penis and foreskin (balanoposthitis)

Differential Diagnoses

- Other causes of vaginal discharge: see Gonorrhoea in women

Complications

- Emotional problems because of the recurrent nature of the infection, and dyspareunia
- Very serious emotional problems in a non-sexually active person wrongly "accused" by parents, spouse or health care providers

Investigations

- Positive KOH examination
- Culture of vaginal discharges

Treatment Goals

- Cure the infection
- Prevent recurrence

Drug Treatment

Recommended regimen

- Clotrimazole 1% vaginal creamInsert 5 g at night as a single dose; may be repeated once if necessary

Or:

- Miconazole 2% intravaginal creamInsert 5 g applicator once daily for 10 - 14 days or twice daily for 7 days

Or:

- Clotrimazole 500 mg intravaginally, as a single dose

Or:

- Fluconazole 150 mg orally, as a single dose

Recommended topical regimen for balanoposthitis

- Clotrimazole 1% cream apply twice daily for 7 days

Or:

- Miconazole 2% cream twice daily for 7 days

Notable Adverse Drug Reactions, Contraindications and Caution

- Fluconazole:
- Caution in patients with renal impairment
- Avoid in pregnancy and breastfeeding
- Monitor liver function
- Discontinue if signs or symptoms of hepatic disease develop (risk of hepatic necrosis)
- May cause nausea, abdominal discomfort, diarrhoea, flatulence, headache, skin rash and Steven-Johnson syndrome
- Discontinue treatment or monitor closely if infection is invasive or systemic)

Prevention

- Reduce or eliminate predisposing factors
- After defecation cleaning should be done backwards to prevent faecal contamination of the vulva and vagina

Urology

Benign Prostatic Hyperplasia

Introduction

Benign Prostatic Hyperplasia is anon-cancerous enlargement of the prostate causing clinical symptoms. Its increase in size impacts on the urethra and partially or completely obstructs urine outflow.

A common cause of lower urinary tract obstruction among elderly males and pathological enlargement occurs usually after the age of 40.

Symptoms are due to mechanical obstruction (static cause) or spasm of the smooth muscles in the prostate and around the bladder neck.

Clinical Features

Lower Urinary Tract Symptoms (LUTS);

- Filling/Storage Symptoms
  - Daytime frequency
  - Urgency
  - Urgency incontinence
  - Nocturia
- Voiding/Emptying Symptoms
  - Poor stream
  - Excessive straining
  - Hesitancy
  - Intermittency
  - Terminal dribbling
  - Acute retention of urine
- Post-micturition Symptoms
  - Feeling of incomplete emptying of the bladder
  - Post-micturition dribbling of urine
- Other Symptoms
  - Haematuria
  - Swelling of the lower abdomen

Signs

- Mass in the lower abdomen
- Digital Rectal Examination (DRE): Anatomic enlargement of the prostate, firm, smooth-surfaced, with median groove and lateral sulci present.
- Signs of progressive renal failure in severe longstanding obstruction

Investigations

- FBC and ESR
- Urinalysis, urine microscopy, culture and sensitivity
- Serum electrolytes, urea, and creatinine
- Prostate Specific Antigen (PSA)

- Transrectal ultrasound (TRUS)
- Abdominal ultrasound
- X-rays – Chest, Abdomen (KUB)
- Uroflowmetry
- Uterocystoscopy

Differential Diagnoses

- Prostate Cancer
- Bladder Cancer
- Bladder neck stenosis/ contracture
- Bladder neck dysnerrgia
- Urinary Tract Infection
- Urethral stricture
- External sphincter dyssynergia
- Bladder calculus
- Prostatitis
- Neurological Diseases
- Bladder wall diseases, especially chronic schistosomiasis and tuberculosis of the bladder.

Complications

- Urinary retention
- Recurrent Urinary Tract Infection
- Bladder calculus
- chronic renal insufficiency & Acute renal failure
- Haematuria
- Obstructive uropathy

Treatment Goals

- To relieve obstruction and treat complication

Non-drug Treatment

- In severe symptoms (IPSS≥19) and associated Complications

Surgical Operation

- Open prostatectomy
- Transurethral resection of the prostate
- Transurethral incision of the bladder neck
- Transurethral Vaporization of the Prostate
- Transurethral laser surgery

Non-medical minimally invasive alternatives

- Urethral catheterization (Size 16 or 14 FG)
- Prostatic urethral stents
- Balloon dilatation of the prostatic urethra
- Transurethral or transrectal hypothermia
- Transurethral thermotherapy
- Interstitial therapies

Drug Treatment

- In mild to moderate symptoms (IPSS <19)
  - α-1 adrenergic blockers: Alfuzosin 10 mg nocte (preferable in

reproductive age)
- 5α - reductase inhibitors: Finasteride 5 mg daily

Notable Adverse Drug Reactions, Contraindications and Caution

- α -1 adrenergic blockers: retrograde ejaculation, dizziness, hypotension and syncopal attacks. So should be taken at bedtime
- 5α - reductase inhibitors: loss of libido, erectile dysfunction, gynaecomastia

Carcinoma of the Prostate

Introduction

The most commonly diagnosed malignancy affecting men above middle age. Exact cause not known

Risk factors

- Increasing age
- Presence of testicles
- Heredity – Cancer of the prostate in first degree relatives, inheritance of faulty genes e.g. cancer of the breast in mother
- Ethnicity – commoner and more aggressive in the black race
- Environment –Industrial workers (rubber, textile, fertilizer)
- Obesity

Clinical Features

Lower urinary tract symptoms (LUTS)

- Daytime frequency
- Poor stream
- Excessive straining
- Nocturia
- Terminal dribbling

Features of advanced disease

- Low back pain
- Paraplegia/Paraparesis
- Pedal oedema
- Weight loss
- Pathological fractures
- Azotaemia
- Digital Rectal Examination (DRE): Enlarged, assymetrical, hard, nodular prostate with obliteration of the median groove and lateral sulci

Differential Diagnoses

- Benign Prostatic Hyperplasia
- Chronic Prostatitis
- Bladder cancer
- Prostatic calculi
- Urethral Stricture

Complications

- Urinary retention
- Recurrent Urinary tract infection
- Obstructive uropathy

- Progressive renal failure
- Paraplegia/Paraparesis
- Pathological fractures
- Lymphoedema

Investigation

- FBC and ESR
- Serum , electrolytes, urea and creatinine
- Transrectal ultrasound
- Abdominal ultrasound
- Prostate biopsy
- X-ray- Lumbosacral spine, chest
- MRI/CT scan
- Radionuclide bone scan

Treatment Goals

- Cure for early disease
- Palliation and improvement of quality of life for advanced disease
- Treatment should be in a specialist centre.

Non-drug Treatment:

- Active surveillance (Watchful waiting)
- Radical Prostatectomy
- Radical radiotherapy
- Bilateral orchiectomy
- Cryoablation therapy
- Laser therapy

Drug Treatment:

- Used usually in advanced diseases
- Lutenising hormone releasing hormone (LHRH) agonist:
  - Goserelin 3.6 mg subcutaneously every month or 10.8 mg 3 monthly
  - Leuprolide 3.75 mg - 7.5 mg subcutaneously monthly or 11.5 mg - 22 mg 3 monthly
- Lutenising hormone releasing hormone (LHRH) antagonist:
  - Degarelix 280 mg subcutaneously stat, then 80 mg monthly
- Antiandrogens: used with LHRH agonist, antagonist, or orchidectomy (monotherapy is not advised)
  - Bicalutamide 50 mg daily orally
  - Flutamide 250 mg three times daily orally

For castration resistant prostate cancer (CRPC): This must be treated in tertiary centres with appropriate facility and personnel

- Ketoconazole 400 mg orally three times daily with prednisolone 20 mg mane, 10 mg evening
- Dietylstilbestrol 3 mg daily
- Docetaxel 75 mg daily to be used with Prednisolone

For bone metastasis:

- Zoledronic acid 400 mg over 1 hour once per month
- Radiotherapy – Radium - 223

Notable Adverse Drug Reactions, Contraindications and Caution

- Antiandrogens
  - Loss of libido
    - Gynaecomastia
    - Erectile dysfunction
    - Fluid retention
    - Hypertension
    - Thromboembolic disease
    - Gynaecomastia
    - Ketoconazole
    - Liver toxicity-monitor liver function

Other drugs for CRPC fraught with ADRs including blood dyscrasias, and reduced quality of life

Erectile Dysfunction

Introduction

Erectile dysfunction (ED) is the persistent inability to achieve and maintain an erection sufficient for satisfactory sexual intercourse. It results from disorder in any of the factors involved in the complex processes that lead to erection which involves the brain, hormones, blood vessels, emotions, and muscles.

It can occur at any age, but is uncommon in boys, common in the elderly.By the age of 45 years, most men have experienced ED at some time. Generally, 40% of men experience some degree of ED at 40 years, and 70% at 70 years. Complete ED occurs in approximately 5% of men at 40 years and 15% at 70 years.

Types of ED

- Organic – Physical
- Psychogenic- Emotion and mental health
- Mixed – occasionally

Risk factors/Causes

- Advanced age
- Diabetes mellitus
- Cardiovascular diseases e.g. hypertension, coronary heart disease
- High cholesterol (dyslipidaemia)
- Tobacco intake: smoking, snuffing
- Recreational drug use: Indian hemp, cocaine etc
- Depression and other psychiatric illnesses
- Drugs: alpha methyl dopa, Beta blockers & Hydrochlorothiazide

Clinical Features

- Difficulty getting erection
- Difficulty keeping an erection
- Reduced sexual drive
- History suggestive of possible causes- e.g. drugs, systemic diseases
- Focused history to confirm it is ED and not any other sexual dysfunctions (see Differential Diagnoses)
- Focused physical examination to identify significant abnormalities, e.g.

gynaecomastia, penile deformity or plaques, impaired sensations etc

Differential Diagnoses

- Ejaculatory Dysfunctions (premature ejaculation, delayed ejaculation, anejaculation, anorgasmia)
- Long refractory period
- Decreased libido
- Peyronie's Disease

Complications

- Psychological disturbance –stress and anxiety
- Unsatisfactory sex life
- Embarrassment and low esteem
- Relationship problems
- Infertility

Investigations

- *General*
  - FBC and ESR
  - Urinalysis
  - Blood glucose screening
  - Blood lipid profile (Fasting)
  - Hormone assay – Total and free testosterone, prolactin, FSH, LH
- ***Specific***
  - Nocturnal penile tumescence testing (Rigidscan)
  - Colour Duplex Ultrasound – for suspected vascular cause.
  - Cavernosogram – suspected venous leak

Treatment Goals

- Achieve and sustain erection

Non-drug Treatment (non-active treatment):

- Life-style and home remedies
  - Quitting smoking,
  - Losing excess weight
  - Exercising regularly
  - Reducing or stopping alcohol and hard drugs
  - Couples or marriage counselling, if relation problem

Adjusting medications: Important part of ED treatment

- alpha methyl dopa, Beta blockers & Hydrochlorothiazide cause ED
- Ca channel blockers & ACEIs have no effect

Drug Treatment

First line active treatment

- Oral phosphodiesterase-5 inhibitors (PDES-5): Sildenafil 25-100 mg daily
- Adequate medical evaluation must be done before PDES-5 (or any OTC drug for ED) is given.

Male Infertility

Introduction

Failure to achieve conception after one year of regular, unprotected sexual intercourse in a couple trying to achieve pregnancy.

Male factor is responsible for about 50% of infertile unions

Clinical Features

- Vital points in the history: Duration of infertility
- Ability to have erection, penetration and ejaculation Family history of infertility
- History of systemic disease e.g. diabetes mellitus, hypertension, chronic liver disease and tuberculosis
- History of sexually transmitted infections and urinary tract infections
- History of genital trauma
- History of surgery: herniorraphy, orchidopexy, urethral surgeries, etc
- Signs
  - Gynaecomastia
  - Penis: epispadias, hypospadias, penile deformities
  - Scrotum: absence of testis, small sized testis, varicocoeles, hard and irregular epididymis

Investigations

- Semen analysis x 3
- Hormone profile (LH, FSH, testosterone, and prolactin)
- Scrotal ultrasound
- Trans-rectal ultrasound
- Testicular biopsy
- Vasography

Treatment Goals

- To improve semen quality and restore reproductive capability

Non-drug Treatment

Surgical options:

- Varicocoelectomy
- Vasovasotomy
- Epididymo-vasotomy
- Transurethral resection of obstructed ejaculatory duct
- Assisted reproductive techniques:
- Intra-uterine insemination
- In vitro fertilization
- Gamete intra-fallopian tube transfer
- Intra-cytoplasmic sperm injection

Posterior Urethral Valves

Introduction

Congenital mucosal folds situated in the prostatic/membranous urethra, causing urine outflow obstruction.Occurs in males - The most common mechanical cause of renal deterioration in children

Clinical Features

- Obstructive urinary symptoms
- Urinary retention
- Failure to thrive
- Distended bladder with palpable kidneys

Differential Diagnoses

- Anterior urethral valves
- Congenital bladder neck hypertrophy
- Congenital urethral stricture
- Meatal stenosis
- Posterior urethral polyp

Complications

- Recurrent urinary tract infections
- Septicaemia
- Bladder dysfunction
- Bladder stones
- Hydroureter/hydronephrosis
- Progressive renal impairment
- Failure to thrive

Investigations

- Urinalysis
- Urine microscopy, culture and sensitivity
- FBC
- Serum Urea, Electrolytes and Creatinine
- Abdominal ultrasound
- Micturating cysto-urethrogram
- Urethrocystoscopy

Treatment Goals

- Relieve obstruction
- Treat any Complications

Non-drug Treatment

- Valve resection with endoscopes
- Valve avulsion with valvotomes

Supportive Measures

- Correct dehydration and electrolyte imbalance
- Treat infection with appropriate antibiotics
- Urinary diversion: vesicostomy

Priapism

Introduction

Persistent penile erection that continues beyond, or is not related to sexual stimulation

Predisposing factors

- Thromboembolic disorders e.g. sickle cell disease, leukaemia
- Spinal injuries

- Perineal and genital trauma
- Drugs e.g. chlorpromazine, prazosin and prostaglandins

Clinical Features

- Persistent painful erection lasting several hours
- Penis is rigid and tender but the glans penis and corpus spongiosum are soft

Complication

- Erectile dysfunction

Investigations

- FBC
- Haemoglobin electrophoresis
- Colour Doppler/duplex ultrasound

Treatment Goals

- Increase venous drainage from the corpora cavernosa
- Decrease arterial inflow in high flow priapism
- Treat the primary cause(s)

Non-drug Treatment

- Shunting procedures
  - Caverno-glandular shunt
  - Caverno-spongiosum shunt intensity
  - Caverno-saphenous shunt
- Spinal or epidural anaesthesia

Drug Treatment

- Intracavernosal injection of alpha adrenergic agonist:
  - Phenylephrine testicle 250 - 500 µg

Or:

- Ephedrine 50 - 100 mg

Supportive Measures

- Adequate hydration
- Pain relief

Prevention

- Avoid causative drugs

Prostatitis

Introduction

An inflammation of the prostate or pain in the prostate, similar to that caused by an inflammation.

Classified into:

- Acute bacterial prostatitis
- Chronic bacterial prostatitis
- Chronic non-bacterial prostatitis
- Prostatodynia

Risk factors:

- Ductile reflux
- Urinary tract infection

- Indwelling urethral catheterization
- Penetrating anal sex
- Sexually transmitted infections

Classification

- Acute bacterial prostatitis
  - Results from direct spread of ascending urethral infection or reflux of infected urine into the prostatic ducts. E. coli is the main causative organism. Others are Klebsiella, Pseudomonas, Streptococcus faecalis and Staph aureus
- Chronic bacterial prostatitis
  - Caused by E. coli, Klebsiella, Mycoplasma and Chlamydia
- Non-bacterial prostatitis
  - An inflammation of indeterminate cause

Clinical Features

Acute prostatitis

- Systemic features:
  - Fever
  - Chills
  - Malaise
  - Nausea
- Local features:
  - Dysuria
  - Frequency
  - Haematuria
  - Urethral discharge

Rectal examination:

- Hot boggy, swollen and very tender prostat

Chronic prostatitis

- Voiding symptoms: dysuria, frequency, urgency, haematuria
- Poor stream
- Urethral discharge
- Low back pain
- Perineal pain
- Haemospermia
- Painful ejaculation
- Rectal examination: enlarged, tender, firm prostate

Differential Diagnoses

- Benign prostatic hypertrophy
- Cystitis
- Urethral stricture
- Prostate cancer

Complications

- Prostatic abscess
- Prostatic calculi
- Infertility
- Septicaemia

Investigations

- FBC and ESR
- Urinalysis
- Urine microscopy, culture and sensitivity
- Prostatic massage: microscopy, culture and sensitivity (chronic prostatitis only)
- Trans-rectal ultrasound
- Biopsy: culture and histology
- Urethrocystoscopy (chronic prostatitis only)

Treatment Goals

- To eradicate causative organisms
- Control pain

Non-drug Treatment

- Prostatic massage (chronic prostatitis only)
- Physiotherapy
- Sitz baths

Drug Treatment

- Antibiotics (based on local sensitivity)
  - Ciprofloxacin 500 mg orally every 12 hours for 28 days

  Or:
  - Cotrimoxazole 960 mg orally every 12 hours for 28 days
- Anti-inflammatory drugs
  - Non-steroidal e.g. diclofenac, ibuprofen etc
  - Steroids e.g. prednisolone, dexamethasone
- Alpha blockers e.g. prazosin,
- Hormonal therapy e.g. finasteride

SCROTAL MASSES

The Empty scrotum

Introduction

A clinical situation in which the testis is absent from the scrotum. May be bilateral or unilateral

Aetiology

- Undescended testis
- Ectopic testis
- Retractile testis
- Absent (vanishing) testis
  - Atrophic testis
  - Surgical removal (for treatment of other conditions)

Clinical Features

- Absence of one or both testes from the scrotum
- Pain from trauma to the testis
- Infertility (in adulthood)
- Atrophic testis
- Inguinal hernia may be present on the affected side

Complications

- Torsion of the spermatic cord
- Trauma to the testis
- Malignancy
- Infertility

Investigations

- Urinary 17-ketosteroids, gonadotropins
- Serum testosterone
- Ultrasonography
- Computed tomography
- Laparoscopy
- Magnetic Resonance Imaging

Treatment

- Hormone therapy:
  - Human chorionic gonadotropin 1,500 units/week intramuscularly, for a total of 9 injections
  - Applicable only to special cases
- Surgical treatment: In those with undescended testes bring testis down and fix it in the scrotum

Torsion of the Testis

Introduction

Twisting of the spermatic cord with compromise of the blood supply to the testis. An uncommon affliction that is most commonly seen in adolescent males. A few cases occur in infancy

Clinical Features

- *Testicular pain* of sudden onset, severe and radiates to the lower abdomen
- Nausea and vomiting
- Swollen, high lying testis with reddening of the scrotal skin
- Tenderness: Pain can be increased by lifting weights or objects
- Absence of the cremasteric reflex
- Abnormal lie of the testis on the opposite side

Differential Diagnoses

- Acute epididymo-orchitis
- Mumps orchitis
- Trauma to the testis
- Strangulated inguinal hernia
- Idiopathic scrotal oedema
- Testicular tumour

Complications

- Testicular atrophy
- Sympathetic orchidopathy
- Abnormal sperm count
- Infertility

Investigations

- Colour Doppler sonography: an absence of arterial flow is typical
- Radionuclide scan using Tc-99m pertechnetate: the twisted testis is avascular

Treatment Goals

- Detorsion
- Fixation of the testis to prevent recurrence

Surgery

- ***Fixation on the affected side and prophylactic fixation on the opposite side***

Urethral Stricture

Introduction

An abnormal narrowing or loss of distensibility of any part of the urethra, as a result of fibrosis.One of the commonest causes of urine retention in tropical Africa. Very rare in females and may result from trauma or inflammation; may be iatrogenic or congenital.

- Traumatic causes:
  - Penetrating or blunt injury to the urethra
  - From pelvic fractures or falling astride an object
- Infective causes:
  - Gonococcal urethritis or non-gonococcal urethritis from chlamydia, tuberculosis or schistosomiasis
- Iatrogenic causes:
  - Urethral instrumentations e.g. catheterization and urethroscopy
- May be congenital
  - May be complete or partial, single or multiple
  - Can affect any part of the urethra, anterior or posterior

Clinical Features

- Dysuria
- Frequency
- Urgency
- Poor stream
- Straining
- Hesitancy
- Dribbling
- Examination of the external genitalia may reveal:
- Urethral indurations
- Periurethral or perineal abscess
- Urinary fistula

Differential Diagnoses

- Benign prostatic hypertrophy
- Prostate cancer
- Bladder calculi
- Bladder neck stenosis

Complications

- Urinary tract infections
- Urethral/bladder calculi

- Urinary retention
- Fournier's gangrene
- Perineal urinary fistulae
- Progressive renal failure

Investigations

- Urinalysis
- Urine microscopy, culture and sensitivity
- Urethroscopy
- Urethrogram
- Uroflowmetry
- Abdominal ultrasound
- Serum Urea, Electrolytes and Creatinine
- Full Blood Count

Treatment Goals

- To restore urethral patency

Non-drug Treatment

- Serial dilatation/bouginage
- Endoscopic direct visual urethrotomy
- Urethroplasty: excision and end-to-end anastomosis
- Substitution urethroplasty

Prevention

- Ensure Prevention of sexually transmitted infections
- Prompt and appropriate treatment of sexually transmitted infections
- Care and attention to asepsis during instrumentation procedures involving the urethra

Urinary Schistosomiasis

Introduction

A common parasitic infection of the urinary tract caused by a body fluke, Schistosoma haematobium.

Acquired while bathing/wading in infected water. Endemic in many parts of Africa and gets to the urinary tract through the blood vessels after penetrating the skin

Clinical Features

- Soon after penetration of the skin:
- Pricking sensation and itching (cercarial dermatitis)
- Four weeks later:
- Intermittent fever, malaise, urticaria and cough
- 6 - 24 months later:
  - Intermittent, painless terminal haematuria (may be total)
  - Symptoms of bladder irritability: dysuria, frequency, urgency, strangury

Differential Diagnoses

- Tuberculous cystitis
- Abacterial cystitis
- Bladder carcinoma

Complications

- Bladder fibrosis and contracture
- Ureteral stricture
- Urethral stricture
- Bladder calculi
- Bladder cancer

Investigations

- Urine examination for schistosomal ova
- Cystoscopy: tubercles, sandy patches, nodules, ulcers
- Plain abdominal radiograph (KUB)
- Intravenous urogram
- Serological tests
- Full Blood Count

Treatment Goals

- To eradicate the fluke and ova
- Prevent complications#

Drug Treatment

- Praziquantel:
  - Adult: Single oral dose of 50 mg/kg
  - Child over 4 years: 20 mg/kg orally, repeated after 4 – 6 hours
  - In S. japonicum infection, 20 mg/kg 3 times daily for one day after initial dose

Notable Adverse Drug Reactions, Contraindications and Caution

- Nausea, epigastric pain, pruritus, headache, dizziness

Prevention

- Provision of and access to pipe-borne water
- Improvement in socio-economic conditions
- Mass chemotherapy in endemic areas
- Eradicating the intermediate hosts (water snails)

Urinary Tract Calculi

Introduction

Occurrence of stone(s) in the kidney, ureter, bladder or urethra. Incidence in Nigeria is 7 - 34 per 100,000. Stones are different with respect to their composition (oxalate stones, phosphate stones, uric acid stones and cystine stones)

- Factors promoting stone formation:
  - Obstruction to urine outflow
  - Infection in the urinary tract
  - Crystallization on foreign bodies
  - Dehydration
  - Change in pH
  - In-born errors of metabolism

Clinical Features

- Renal and ureteric stones:
- Sudden onset loin pain radiating to the groin
- Haematuria
- Nausea and vomiting
- Stones in the bladder:
- Frequency
- Urgency
- Difficulty in passing urine
- Stones in the urethra
- Urinary retention

Differential Diagnoses

- Acute pyelonephritis
- Renal tumour
- Acute appendicitis
- Other causes of urinary obstruction e.g. enlarged prostate, urethral strictures

Complications

- Recurrent and intractable urinary tract infection
- Secondary hydronephrosis
- Progressive renal failure
- Periurethral abscess/urethral fistula

Investigations

- Urinalysis
- Urine culture
- Serum calcium, phosphate and albumin
- Intravenous urography (IVU)
- Ultrasonography
- Computerized tomography (non-contrast enhanced)

Treatment Goals

- Relieve symptoms
- Remove stones
- Prevent recurrence

Non-drug Treatment

- Increased fluid intake
- Endoscopic Short Wave Lithotripsy (ESWL)
- Endoscopic removal of stones
- Open surgical removal

Drug Treatment

- Analgesics
- Antibiotics to treat infections
- Drugs used to prevent recurrence:
  - Thiazide diuretics
  - Hydrochorothiazide 5 mg orally daily

Or:

  - Potassium citrate 60 mEq orally daily

Or:

- Allopurinol 100 mg orally daily

Renal Cell Carcinoma

Introduction

Renal cell carcinoma is the 4 most common genitourinary tumour. The incidence is 0.3/100,000 population with a slight male preponderance and affect younger age group in Nigeria compared to the Caucasian in the 6 decade of life.

Clinical Features

- Loin pain
- Total painless haematuria
- Swelling
- Weight loss

Differential Diagnoses

- Xanthogranulomatous pyelonephritis
- Oncocytoma
- Renal angiomyolipoma

Investigation

- FBC,
- Electrolyte, Urea and Creatinine
- Liver function test,
- Clotting profiles,
- Urine M/C/S
- Abdominal ultrasound
- Abdominal CT scan – useful to establish stage of disease.
- Magnetic resonance imaging (MRI)
- Intravenous pyelography (IVP)

Treatment:

- Active surveillance or watchful waiting – indicated in small incidental renal masses.
- Surgery – depends on size and number of tumours. Either as partial nephrectomy (also referred to as nephron sparing surgery) or radical nephrectomy. Surgery should be offered to early, small localized renal tumour.
- Targeted drugs inhibit growth factors that promote growth and spread of tumours. These include sorafenib, sunitinib, nivolumab, axitinib and temsirolimus. This is the treatment of choice for metastatic renal cancer
- After a period of 3 months, salvage radical nephrectomy may be considered
- Chemotherapy and radiotherapy - not successful in treating renal cell carcinoma

Prognosis

Good for early localized tumour 81% 5 - year survival rate. Reduces with tumour spread to distant metastases and inferior vena cava (8% 5 - year survival)

CHAPTER 9:

HAEMATOPOIETIC SYSTEM DISORDERS

Anaemias

Introduction

Anaemia is a reduction in the haemoglobin concentration in the peripheral blood below the normal range expected for the age and sex of an individual. The determination of haemoglobin concentration should always take the state of hydration and altitude of residence of the individual into consideration.

Anaemia can be classified on the basis of red cell morphology and aetiology/pathogenesis:

Morphological Classification

- Macrocytic Megaloblastic:(Folic acid deficiency, Vitamin B12 deficiency, Inherited disorders of DNA synthesis etc).
- Hypochromic-microcytic: (Iron deficiency anaemia, sideroblastic anaemia etc)
- Normochromic-normocytic: (Recent blood loss, Haemolytic anaemias, Hypoplastic bone marrow)
- Chronic Anaemic disorders (Renal disease, Liver disease etc)

Classification based on aetiology and pathogenesis

Blood Loss:

- Acute or Chronic (leads to iron deficiency) Increased red cell destruction (haemolytic anaemias)
- Corpuscular defects (intracorpuscular or intrinsic abnormality)
- Disorders of the membrane e.g. elliptocytosis, spherocytosis
- Disorders of metabolism e.g. Glucose-6-Phosphate dehydrogenase deficiency, Haemoglobinopathy e.g. sickle cell disease
- Immunological (Rhesus-incompatibility, mismatched transfusion etc)
- Infections e.g. malaria, Clostridium welchii, drugs and toxins
- Others e.g. burns, decreased red cell production
- Nutritional (due to deficiencies of substances essential for erythropoiesis eg Iron, Folate, Vitamin B12, Various deficiencies e.g. protein, ascorbic acid etc)

Bone marrow failure:

- Primary (idiopathic eg Aplastic anaemia, Pure red cell aplasia)
- Secondary (Drugs eg phenylbutazone, cytotoxic agents, Chemicals, Irradiation etc)
- Anaemias associated with systemic disorders: Infection, Liver disease, Renal disease
- Connective tissue disease, Cancer (including leukaemia), Marrow infiltration etc

Clinical Features

Depends on the degree of anaemia, severity of the causative disorder and age of the patient

The clinical effects of anaemia are due to anaemia itself and the disorder(s) causing it.

- Common:
  - Tiredness, lassitude, weakness, dyspnoea on exertion, palpitations, pallor
- Less common:
  - Angina of effort, faintness, giddiness, headache, ringing in the ears, high output state congestive cardiac failure.

Differential Diagnoses

- Cardiac failure
- Respiratory failure

Complications

- Cardiac failure

Investigations

- Haematologic
  - Haematocrit, haemoglobin concentration, red cell indices, reticulocyte count, total leukocyte and differential counts, platelet count
  - Erythrocyte sedimentation rate, Blood film examination for morphology of cells, thick and thin films for malaria parasites
  - Urine analysis: Colour, pH, clarity, and specific gravity, microscopic examination of fresh urine specimen, protein, glucose, occult blood
  - Stool: Colour, consistency, examination for ova and parasites, occult blood
  - Plasma: Blood Urea Nitrogen (BUN), Total protein and albumin bilirubin, creatinine (if BUN is abnormal)
- Others:
  - Coombs test for the presence of antibodies to red cells
  - Ham's test (acidified serum test)
  - Bone marrow aspiration and trephine biopsy
  - Haemoglobin electrophoresis
  - Sickling test (metabisulphite and solubility)
  - Family studies

Treatment Goals

- Restore haemoglobin concentration to normal levels
- Prevent/treat Complications

Non-drug Treatment

- Bed rest in severe cases: initially necessary, especially when cardiovascular symptoms are prominent
- Treat cardiac failure by standard measures
- Balanced diet with adequate protein and vitamins
- Correct dietary deficiencies (e.g. iron, folic acid)
- Blood transfusion: a very important measure in the treatment of anaemia, but should not be used as a substitute for investigation, or specific treatment of the cause
- Arrest blood loss

- Treat any underlying systemic disorder
- Remove any toxic chemical agent or drug
- Correct anatomical gastro-intestinal abnormalities

Drug Treatment

- Haematinics e.g. iron, vitamin B_{12}, folic acid
- The specific haematinic indicated should be given alone
- Response to adequate treatment is important in confirming diagnosis

Iron deficiency:

- Oral iron therapy:
  - Ferrous sulphate 200 mg (containing 65 mg of iron) tablet 2-3 times daily
  - In children, 4-6mg/kg of elemental iron
  - Treat for 3-6 months to correct deficits in haemoglobin
- Parenteral therapy:
  - Not necessary unless there is intolerance to oral iron
  - Not commonly used in children
  - Indications for parenteral iron:
  - Anaemia diagnosed in late pregnancy.
  - Correction of anaemia just before an operative procedure
  - Haemorrhage expected to continue unabated
  - Iron preparations:
  - Iron dextran given as "total dose" infusion
  - By deep intramuscular injection into the gluteal muscle or by slow intravenous injection or by intravenous infusion, calculated according to body weight and iron deficit dose in mL (of 50 mg/mL preparations) = [Patient's wt. in kg X (14 Hb in g/dL)]-10

Notable Adverse Drug Reactions, Contraindications and Caution

- Oral iron preparations:
  - Nausea, epigastric pain, diarrhoea, constipation, skin eruptions
  - Reduce dosage and frequency of administration to reduce these effects
- Parenteral iron:
  - Local reactions: phlebitis and lymphadenopathy
  - Systemic reactions: may be early or late- headache, fever, vomiting; general aches and pains, backache, chest pain, dyspnoea, syncope; death from anaphylaxis
  - Test doses are no longer recommended, but caution is needed with every dose of intravenous iron. Patients should be monitored for signs of hypersensitivity during, and for at least 30 minutes after every administration
  - Total-dose infusion should be avoided in patients with history of allergy
  - Not recommended for children under 14 years
  - Avoid in first trimester and use in the second and third trimesters only when the benefit outweighs the potential risks for both mother and foetus
  - Anaphylaxis and other Hypersensitivity can occur with parenteral iron

and facilities for cardiopulmonary resuscitation must be available; Discontinue oral iron prior to administration of iron dextran injection
- Oral iron should not be given until 5 days after last injection

Megaloblastic anaemia

Response to therapy is satisfactory if administered dose is limited to the minimal daily requirement

- Treatment with vitamin B_{12} (cobalamin) to replace body stores
  - Six 1000 µg intramuscular injections of hydroxocobalamin given at 3 - 7 day intervals
- Maintenance therapy: patients will need to take vitamin B_{12} for life
  - 1000 µg hydroxocobalamin intramuscularly once every 1-3 months
  - In children, give loading dose of IM Vitamin B_{12} 1000 µg; followed by monthly maintenance of 100 µg
  - In folate deficiency, 5-10 mg folic acid daily for at least 4 weeks

Notable Adverse Drug Reactions, Contraindications and Caution

- Toxic reactions are very rare and are usually not due to cobalamin itself
- Pharmacologic doses of folic acid produce haematological response in vitamin B_{12} deficient patients, but worsen the neurological complications
- Large doses of vitamin B_{12} also give haematological response in folate-deficient patients

Prevention

- Balanced diet
- Prompt treatment of all illnesses

Blood Transfusion

Introduction

Blood transfusion is the administration of blood for therapy. It is potentially hazardous: blood should be given only if the dangers of not transfusing outweigh those of transfusion.

Indication(s) must be clearly established. Transfusion of whole blood or red cell concentrates is important in the treatment of acute blood loss and of anaemia.

Types of blood transfusion

Autologous blood transfusion: Transfusion of the patient's own blood to him/her

Safest blood for patients

The three main types are:

- Pre-deposit autologous transfusion
- Immediate pre-operative phlebotomy with haemodilution
- Intra-operative blood salvage

Types of blood components

- Red cell concentrate
- Platelet concentrate (A. platelet rich plasma (PRP) B. Single donor platelet)

Exchange transfusion:

To remove deleterious material from the blood, for example, in Sickle cell

disease, severe jaundice resulting from haemolytic disease of the newborn
Alternatives to red cell transfusion:

- Perfluoro chemicals such as Fluosol-DA
- Polymerised haemoglobin solutions with good intravascular recovery

Indications for blood transfusion

- Symptomatic anaemias: Recurrent haemorrhage, haemolysis, bone marrow failures, pure red cell aplasia, severe anaemia of chronic disorders, haematological malignancies (e.g. leukaemia, lymphoma), chemotherapy complicated by anaemia
- Prevention or treatment of shock:
- Clinical situations in which there is need to restore and/or maintain circulatory volume e.g. trauma, haemorrhage
- To maintain the circulation (as in extracorporeal or cardiac by-pass shunts)
- Whole blood preparations: Should be limited to correction or prevention of hypovolaemia in patients with severe acute blood loss
- Fresh Blood: Justified by the recognition that there is a relatively rapid loss of platelets, leucocytes and some coagulation factors with liquid storage.
- There is also progressive increase in the levels of undesirable products such as potassium, ammonia, and hydrogen ions

Erythrocyte preparations

Four types are in common use:

- Packed red blood cells
- Washed red blood cells
- Leucocyte-reduced red blood cells
- Frozen red blood cells

Washed red blood cells: Obtained from liquid-stored blood by saline washing using a continuous-flow cell separator or from frozen erythrocytes extensively washed to remove the cytoprotective agents
Leucocyte-reduced red blood cells: Best prepared bypassing whole blood or packed cells through specifically designed filters
Three main reasons for the use of leucocyte-reduced red blood cells:

- To prevent non-haemolytic febrile reactions to white cell and platelet antibodies in recipients exposed to previous transfusions or pregnancies
- To prevent sensitization of patients with aplastic anaemia who may be candidates for bone marrow transplantation
- To minimize risk of transmission of viruses such as HIV or cytomegalovirus

Transfusion therapy

- Informed consent should be obtained from patients except in life-threatening emergencies
- The risks and benefits of the proposed transfusion therapy should be discussed with the patient and documented in the patient's medical records
- Blood for emergencies:

There may be no time available to type, select and cross-match compatible blood which is a rare occurrence, except for

- Trauma
- Unexpected intra-operative haemorrhage
- Massive gastro-intestinal bleeding
- Ruptured aneurysm

Uncross-matched or partially cross-matched blood is administered; routine cross-match should be carried out retrospectively to identify any incompatibility

Complications of blood transfusion

- Immunological:
  - Sensitization to red cell antigens
  - Haemolytic transfusion reactions
  - Immediate
  - Delayed
  - Reactions due to white cell and platelet antibodies
  - Febrile transfusion reactions
  - Post-transfusion purpura
  - Reactions due to white cell and plasma protein antibodies
  - Urticaria
  - Anaphylaxis
- Non-immunological:
  - Transmission of disease, Reactions due to bacteria and bacterial pyrogens, Circulatory overload, Thrombophlebitis, Air embolism, Transfusion haemosiderosis, Complications of massive transfusion

Tests of Compatibility

A minimum of three major procedures must be carried out:

- Determine the recipient's ABO and Rhesus groups
- Select compatible donor blood
- Cross-match donor cells against recipient's serum
- Donor blood should be screened for infective agents: HIV, hepatitis B, and C viruses

Other Investigations

- Haemoglobin concentration, haematocrit
- Red cell indices: MCH, MCV, MCHC
- Total leucocyte and differential counts
- Reticulocyte count
- Erythrocyte sedimentation rate
- Platelet count

Treatment Goals

- To raise haemoglobin concentration and other blood parameters to normal levels
- To prevent blood transfusion complications

Non-drug Treatment

- Transfusion of red blood cells, platelet concentrates or platelet rich plasma as required
- Provision of fresh frozen plasma or other blood products as necessary

Drug Treatment
- Furosemide 40 mg on administration of one unit of blood
- In children, IV furosemide 1-2mg/kg
- In the event of transfusion reactions, stop the transfusion immediately and administer the following:
- Promethazine 25 mg intramuscularly or intravenously
- Epinephrine 0.5 mL of 1:1000 solutions to be administered subcutaneously
- Hydrocortisone sodium succinate 100 mg injection intravenously

Supportive Measures
- Appropriate nutrition
- Adequate hydration

Notable Adverse Drug Reactions, Contraindications and Caution
- Furosemide: dehydration and hypersensitivity
- Promethazine: drowsiness, hypersensitivity

Prevention
- Avoid/prevent accidents
- Prompt treatment of illnesses that could be complicated by anaemia
- Regular medical check-ups

Haemostasis and Bleeding Disorders – refer for specialist care

Leukaemia

Introduction

A heterogeneous group of diseases characterized by infiltration of the blood, bone marrow and other tissues by neoplastic cells of the haematopoietic system

Two main types
- Myeloid leukaemia
- Lymphoid leukaemia

Each is further divided into acute and chronic
- Acute leukaemias are defined pathologically as blast cell leukaemias or malignancies of immature haematopoietic cells. The bone marrow shows > 30% blast cells

Two main groups of acute leukaemias
  - Acute myeloid leukaemia (AML)
  - Acute lymphoblastic leukaemia (ALL)
- Childhood leukaemias: patients aged <15 years
- Adult leukaemias: patients aged >15 years

Leukaemias in adults aged > 60 years: an important group because their responses to current treatment protocols both for ALL and AML are inferior. These patients are not usually considered for more radical treatment approaches such as autologous or allogeneic bone marrow transplantation
80% of adult cases: AML

Epidemiology/predisposing conditions

Acute lymphoblastic leukaemia (ALL) and Acute myeloid leukaemia (AML)
More common in industrialized than rural areas.

- Environmental agents implicated in the induction of certain types of leukaemia:
  - Ionising radiation: X-rays and other ionizing rays
- Chemical carcinogens
  - Benzene and other petroleum derivatives
  - Alkylating agents
- Host susceptibility e.g. genetic disorders: Bloom's syndrome
  - Fanconi's anaemia (AML)
  - Ataxia telangiectasia (ALL)
  - Down's syndrome
- Blast transformation in pre-existing myeloproliferative disorders:
  - Aplastic anaemia (ALL)
- Oncogenic viruses:
  - HTLV-1 (Human T-cell Lymphotropic virus 1): implicated in adult T cell leukaemia /lymphoma

Clinical Features

- General symptoms of anaemia: Bleeding, Infections, Anorexia, Weight loss
- Lymphadenopathy (not common in AML except in the monocytic variant)
- Skin: Macules, papules, vesicles, pyoderma gangrenosum, neutrophilic dermatitis, leukaemic cutis, granulocytic sarcoma

Differential Diagnoses

- Septicaemia
- Miliary tuberculosis
- Malignant histiocytosis

Complications

Worsening ill- health

Investigations

- Full blood count with ESR, reticulocyte count, Coombs test
- Bone marrow examination
- Biochemical tests: serum electrolytes, urea, creatinine, uric acid, liver function tests
- Prothrombin time, partial thromboplasmin human leucocyte antigen typing
- HIV I and II
- Cytochemical tests:
  - Peroxidase
  - Sudan Black B-Non-specific esterase reaction e.g. alpha napthyl acetate esterase
  - Bone marrow cultures
  - Cytogenetic studies
  - Electron microscopy
- Cell markers e.g. using a panel of antibodies combined with flow cytometric analysis or the alkaline phosphase-anti alkaline phosphate (APAAP) technique to classify the blast cells into lymphoid or myeloid lineages
- Abdominal ultrasound/CT scans

- Immunological classification
- Terminal deoxynucleotidyl transferase demonstration in nuclei of B and T lymphocytes

Treatment Goals

- Induce remission to achieve complete remission
- Consolidate the remission
- Maintain disease-free state

Non-drug Treatment

- Appropriate nutrition
- Adequate hydration (at least 3 litres/24 hours)
- Erythrocyte transfusion as required
- Platelet concentrate transfusion as required
- Maintain electrolyte balance

Drug Treatment

Acute lymphoblastic leukaemia

- Allopurinol 300 mg daily orally DVP Regime
- Daunorubicin 30 mg/m^2 intravenously on days 8, 15, 22 and 29
- Vincristine 1.4mg/m^2 to a maximum of 2 mg intravenously on days 8, 15, 22 and 29
- Prednisolone 60 mg orally once daily from day 1 - 28
- L-asparaginase 1000 IU/rm intravenously on days 12, 15, 18, 21, 24, 27, 30 and 33

Or:

- COAP Regime
  - Cyclophosphamide 650 mg/m^2 intravenously on days 1 and 8; 14 and 22
  - Vincristine (Oncovin) 1.4mg/m^2 intravenously to a maximum of 2mg: days 1 and 8; 14 and 22
  - Cytosine Arabinoside 50 mg/m^2 subcutaneously 12 hourly for 12 days or bolus intravenous injection 100 mg/m^2 daily for 7 days
  - Prednisolone 40 mg/m^2 oral for 14 days

Drugs are given every 28 days for 3 courses

- Nervous system prophylaxis
  - Methotrexate 12.5 mg/m^3 intrathecally twice weekly to a maximum of 15 mg i.e. 5 doses over 3 weeks.
- Nervous system treatment
- IT Methotrexate 12.mg/m^2 plus IT Cytosine Arabinoside 50mg/m^2 plus IT Hydrocortisone 100mg

Or:

- APO Regime
  - Adriamycin 30mg/m^2 intravenous infusion on days 1 – 3
  - Prednisolone 40mg/m^2/day orally on days 1 – 28
  - Oncovin 1.5mg/m^2 intravenous infusion on days 1 and 8; 15 and 22
- Consolidation:
  - To be given on day 29

- COAP regime to be given once provided WBC count is = 1x10s/L and platelet count is = 100 x10VL

• Maintenance :
  - 6-Mercaptopurine 75 mg/m^2 orally daily
  - Methotrexate 20 mg/m^2 orally weekly

• For 3 years if remission is maintained, otherwise reassessment
  - Pulse therapy (Intensification). To be given every 3 months with
  - Vincristine 1.4 mg/m^2 a maximum of 2 mg weekly on days1 and 8

Acute myeloblastic leukaemia

Either TAD or COAP as shown below:

TAD:

• Cytarabine 100 mg/m^2 (continuous infusion) on days 12 and 2, and 100 mg/m every 12 hours by intravenous infusion over 30 minutes on days 3 - 8
• Thioguanine 100 mg/m^2 every 12 hours orally on days 3-9
• Daunorubicin 60 mg/m^2 by intravenous infusion over one hour on days 3 - 5

Or:

• COAP:
  - Cyclophosphamide 650 mg/m^2 intravenously on days 1 and 8
  - Vincristine 1.4 mg/m^2 intravenously to a maximum of 2 mg on days 1 and 8
  - Cytarabine 50 mg/m^2 subcutaneously every 12 hours for 7 days
  - Prednisolone 40 mg/m^2 orally for 14 days
  - Nervous system prophylaxis is not required
  - Assess for remission after 3 courses
  - Maintenance
  - COAP every 6 weeks for 2 years
  - Intrathecal treatment as for ALL if there is CNS disease of the monocytic type

Chronic Myeloid Leukaemia (CML)

Also Chronic Myelogenous Leukaemia; Chronic Granulocytic Leukaemia (CGL)

A clonal disease that results from acquired genetic change in a pluripotential haematopoietic stem cell

Altered stem cell proliferation generates a population of differentiated cells, and a greatly expanded total myeloid mass

Classification

• Majority of patients have relatively homogenous disease characterized by:
  - Splenomegaly
  - Leucocytosis
  - Presence of Philadelphia (Ph) chromosome in all leukaemia cells
• Minority of patients has less typical disease (atypical CML)

These variants lack Ph chromosome.

  - Chronic myelomonocytic leukaemia
  - Chronic neutrophilic leukaemia
  - Juvenile chronic myeloid leukaemia

Epidemiology, aetiology and natural history

- Rare below the age of 20 years but occurs in all age groups
- Increased risk of developing CML with exposure to high doses of irradiation
- A biphasic or triphasic disease, usually diagnosed in the initial "chronic" or stable phase, Distinguishing features between phases of CGL
- Chronic phase
  - Untreated patient: <12% blast cells in blood or marrow
  - Treated patient: Normal or near-normal blood count without immature granulocytes in peripheral blood
- Accelerated phase
  - Rising leucocyte count despite treatment
  - Rapid leucocyte doubling time
  - Immature granulocytes in blood
  - Blast cells >5% but <30°/o in marrow
  - Anaemia (Hb <10 g/dL) not attributable to treatment
  - Thrombocytosis (>1000 x 109/L)
  - Acquisition of specific new cytogenetic abnormalities
  - Increasing marrow fibrosis
  - Blastic transformation
  - More than 30% blasts

Or:

- Blasts plus promyelocytes in blood or bone marrow

Clinical Features

- Asymptomatic Abdominal swelling/pain, Lethargy
- Shortness of breath on exertion
- Weight loss
- Unexplained haemorrhage at various sites e.g. gums, intestinal/urinary tracts
- Increased sweating
- Visual disturbances
- Gout
- Priapism
- Splenomegaly
- Anaemia and Haemorrhage
- Fever
- Lymphadenopathy (rare in chronic phase)

Complications

- Blastic transformation
- Death

Investigations

- As above for acute leukaemia

Plus:

- Determination of Philadelphia chromosome
- Lactic dehydrogenase
- Serum calcium

Treatment Goals
- Induce remission to achieve complete remission
- Maintain disease-free state
- Achieve absence of Philadelphia chromosome

Non-drug Treatment
- Appropriate nutrition
- Adequate hydration
- Electrolyte balance

Drug Treatment
- Hydroxycarbamide (hydroxyurea)
  - Adult: 20-30 mg/kg orally daily or 80 mg/kg every third day
  - Child: Not recommended
- Interferon alpha
  - Adult: 9 million units subcutaneously or intravenously thrice weekly for 6 - 12 months

Or:
  - Imatinib mesylate
  - 400 mg orally daily
  - To be used strictly under specialist supervision

Notable Adverse Drug Reactions, Contraindications and Caution
- The above drugs (except the steroids) all cause profound myelosuppression
- Profound nausea, vomiting, diarrhoea and abdominal discomfort
- Secondary malignancies
- Steroids: Cushing's syndrome, hypertension, diabetes mellitus, immunosuppression, infections
- Vincristine: neurotoxicity
- Cylophosphamide: alopecia, haemorrhagic cystitis
- Daunorubicin: myelosuppression, alopecia, cardiotoxicity
- All are contraindicated in patients with history of hypersensitivity reactions to the respective medicines

Prevention
- Avoid exposure to ionizing radiation
- Early detection and treatment

Chronic Lymphocytic Leukaemia

Neoplastic proliferations of mature lymphocytes. The diseases involve the blood bone marrow and other tissues. Characterized by accumulation of small mature-looking CD5+ B lymphocytes in the blood, marrow and lymphoid tissues. B-cell disorders are more common

B-cell CLL is more common in males than females
- Accounts for 60% of cases
- Rarely diagnosed below the age of 40 years

Clinical Features
- Asymptomatic (30% of cases)
- Symptoms of anaemia
- Lymph node enlargement (painless)

- Rare: pyrexia, sweating or weight loss
- Severe chest infection/pneumonia
- Splenomegaly (50% of cases)
- Hepatomegaly (not frequent)

Differential Diagnoses

- Low grade non-Hodgkin's lymphomas with frequent blood and bone marrow involvement (leukaemia / lymphoma syndromes)
- Tuberculosis
- Viral infections
- Toxoplasmosis

Complications

- Richter transformation
- Progression of disease

Investigations

- Cell morphology:
- Size
- Nuclear: cytoplasmic (N: C) ratio
- Regularity or irregularity of the nuclear outline
- Characteristics of the cytoplasm (presence and length or absence of azurophil granules)
- Degree of nuclear chromatin condensation and its pattern
- Prominence, frequency and localization of the nucleolus

Investigations

As for anaemia and other leukaemias

Treatment Goals

- Induce remission to achieve complete remission
- Maintain disease-free state

Non-drug Treatment

- Appropriate nutrition
- Adequate hydration
- Maintenance of electrolyte balance
- Bone marrow transplant
- Red cell and platelet concentrate transfusion as required

Drug Treatment

Chronic Lymphocytic Leukaemia

- Allopurinol 100 mg orally every 8 hours
- Chlorambucil 5 mg/ml orally on days 1 to 3
- Prednisolone 75 mg orally on day 1; 50 mg orally on day 2 and 25 mg orally on day 3
- Repeat every 2 weeks

Or:

- Fludarabine 25 - 30 mg intravenously over 30 minutes on days 1-5
- Repeat every 4 weeks

Or:

Combination chemotherapy

- Cyclophosphamide 400 mg/m^2
- Vincristine 1.4 mg/m^2
- Prednisolone 100 mg orally days 1 - 5 Repeat every 3 weeks

Or:

- Fludarabine 30 mg/m^{2}intravenously over 30 minutes on days 1 - 3
- Cyclophosphamide 250 - 300 mg/m^2 intravenously over 30 minutes on days 1 - 3
- Repeat every 4 weeks

Supportive Measures

- Appropriate nutrition
- Adequate hydration

Notable Adverse Drug Reactions, Contraindications and Caution

Same as for other leukaemias

Prevention

- Avoid chemicals on body (e.g. benzene)
- Avoid ionizing radiation (X rays)
- Early detection and treatment

Lymphomas

Introduction

Solid neoplasms that originate in lymph nodes or other lymphatic tissues of the body. A heterogeneous group of disorders. Can arise at virtually any site and more often occurs in regions with large concentrations of lymphoid tissues, e.g. lymph nodes, tonsils, spleen and bone marrow.

Two main groups:

- Hodgkin's disease
- Non-Hodgkin's lymphomas

Hodgkin's disease:

Characterized by Reed-Sternberg cells (large binucleate cells with vesicular nuclei and prominent eosinophilic nucleoli)

- Reed-Sternberg cells are occasionally found in other clinical conditions e.g. hyperplastic or inflammatory lesions of lymph nodes

Non-Hodgkin's lymphomas: a heterogeneous collection of lymph proliferative malignancies

- Vary widely according to histological subtype, stage and bulk of disease

Investigations

Mandatory

- FBC and ESR
- Coombs test
- Bone marrow aspiration and needle biopsy, Serum Urea, Electrolytes, Serum Uric acid
- Liver Function Tests: transaminases-ALT, AST, ALP; bilirubin; serum proteins
- HIV screening
- Immunoglobulins
- Chest Radiograph

Optional
- Examination of post-nasal space
- Serum copper level
- Neutrophil alkaline phosphatase
- Tomograms of lung or mediastinum
- Skeletal X-ray
- Abdominal ultrasound scan
- Intravenous pyelography
- CT scans of chest and abdomen
- Supplementary node biopsy

Treatment Goals
- Induce remission
- Restore patient to disease-free state
- Maintain state of well-being

Non-drug Treatment
- Appropriate nutrition
- Adequate hydration
- Red cell and platelet concentrate transfusions as required

Drug Treatment
- Malaria prophylaxis: proguanil 200 mg orally daily
- Antibiotics as indicated
- Allopurinol 300 mg orally daily (when uric acid is elevated)

Non-Hodgkin's lymphomas

CHOP or COP

CHOP (3 weekly):
- Cyclophosphamide 750 mg/m2 intravenously on day 1
- Doxorubicin 50 mg/m^2 intravenously on day1, 2
- Vincristine 1.4 mg/m^2 (maximum of 2 mg) intravenously on day 1
- Prednisolone 100 mg orally on days 1 - 5 CHOP (4 weekly):
- Cyclophosphamide 750 mg/m^2 intravenously on days 1 and 8
- Doxorubicin 25 mg/m^2 intravenously on days 1 and 8
- Vincristine 1.4 mg/m^2 (maximum 2 mg) on days 1 and 8
- Prednisolone 100 mg orally on days 1 - 8

COP (3 weekly) x 6 – 8 courses
- Cyclophosphamide 600mg/m^{2}Day 1 & 3 (in 200ml D/S over 30mins)
- Vincristine (Oncovin) 1.4mg/m^{2}Day 1
- Prednisolone 40mg/m^2 Days 1-5

Hodgkin's lymphoma

MOPP
- Mechlorethamine 6 mg/m^2 intravenously on days 1 and 8
- Vincristine 1.4 mg/m^2 (maximum 2 mg) intravenously on days 1 and 8
- Procarbazine 100 mg/m^2 orally on days 1 and 4
- Prednisolone 40 mg orally on days 1 - 14

ChlVPP
- Chlorambucil 6 mg/m^2 orally on days 1 and 14

- Vinblastine 6 mg/m^2(maximum 10 mg) intravenously on days 1 and 18
- Procarbazine 100 mg/m^2 orally on days 1 and 14
- Prednisolone 40 mg orally on days 1 - 14

ABVD 28 days cycle x 6 – 8 cycles

- Adriamycin 25mg/m^2 Days 1 & 15 (in 200ml D/S over 30 mins)
- Bleomycin 10 i.u./m^2 Days 1 & 15
- Vinblastine 6mg/m^2 Days 1 & 15
- Darcarbazine 375mg/m^2 Days 1 & 15
- COVP 28 days cycle x 6 – 8 cycles
- Cyclophosphamide 650mg/m^2 Days 1 & 8 (in 200ml 5% D/S over 30mins)
- Vincristine (Oncovin) 1.4mg/m^2 Day 8
- Vinblastine 6mg/m^2 Day 1
- Prednisolone 40mg/day Days 1 – 14

Supportive Measures

- Appropriate nutrition
- Adequate hydration

Notable Adverse Drug Reactions, Contraindications and Caution

- All the drugs are contraindicated in patients with hypersensitivity reactions to the respective medicines
- Profound nausea, vomiting, diarrhoea and abdominal discomfort
- Secondary malignancies

Myelosuppression (except the steroids)

- Steroids (prednisolone) may cause Cushing's syndrome, hypertension, diabetes mellitus, suppression of immunity, infections
- Vincristine: neurotoxic
- Cyclophosphamide: alopecia and haemorrhagic cystitis
- Doxorubicin: cardiotoxic

Prevention

- Avoid unnecessary exposure to irradiation and chemicals

Tumour Lysis Syndrome

Introduction

Tumour Lysis Syndrome (TLS) is a syndrome characterized by hyperkalaemia, hyperuricaemia, hyperphosphataemia and hypocalcaemia.

One of the metabolic oncologic emergencies

Usually occurs within few hours to days of commencement of chemotherapy for several malignancies leading to massive release of potassium, uric acid and phosphate into the circulation.

It may also occur without treatment and prior to initiation of chemotherapy especially following neoplastic cell lysis in lymphomas and leukaemias.

Clinical Features

- May vary but usually seen are nausea, vomiting, weakness and lethargy
- Precipitation of uric acid crystals in the joint may lead to gout
- In the kidney may lead to acute kidney injury manifesting with oedema, oliguria, fluid overload

- Hypocalcaemia may manifest with tetany, paraesthesia, muscle cramps, numbness and seizure
- Hyperkalaemia may result in cardiac arrhythmia, cardiac arrest and sudden death

Investigations

- Full Blood Count,
- Serum electrolyte, urea and creatinine + Ca, PO_4, Serum Uric acid, Urine Uric acid (normal urinary excretory rate is 300-600 mg/day), LFT, ECG, Abdominal X-ray (for gouty nephropathy)

Treatment

- Hyperkalaemia:
- Discontinue all potassium-containing fluids
- Administer sodium polystyrene resin
- In severe hyperkalaemia- Sodium bicarbonate, Ca gluconate, insulin + dextrose
- Hyperphosphataemia
- Hydrate with normal saline bolus + mannitol
- Oral Aluminium hydroxide to bind phosphate
- Hypocalcaemia
- If symptomatic, give calcium gluconate

Prevention:

- ***Commenced prior to initiation of chemotherapy:***
- Hyperhydration of patient at least 24 hours prior to commencement of chemotherapy using non-potassium containing IVF at 2-3L/m^2/day
- Sodium bicarbonate for the alkalinization of urine
- Allopurinol administration
- Rasburicase- in high risk patients, this is used in place of allopurinol

Sickle Cell Disease

Introduction

A group of conditions with pathological processes resulting from the presence of Haemoglobin S. Usually inherited from the parents who have themselves inherited Haemoglobin S

The principal genotypes include:

- Homozygous sickle cell disease (SS)
- Sickle cell-haemoglobin C disease (SC)
- Sickle cell-B thalassaemia (SB thal)
- Sickle cell-B+ thalassaemia Type I (SB+thal. Type I)
- Sickle cell-B+ thalassaemia. Type II. (SB+thal Type II)
- Sickle cell-B+ thalassaemia. Type III. (SB+thal. Type III)

Sickle cell trait

Inheritance of one normal gene controlling formation of B Haemoglobin (HbA), and a sickle gene (HbS)

Total haemoglobin A is more than haemoglobin S Normal haemoglobin F

Sickle cell disease

Inheritance of two abnormal allelemorphic genes controlling formation of B chains of haemoglobin, at least one of which is the sickle gene. Polymerization of the sickle haemoglobin may lead to vaso-occlusion

Pathophysiology

- Red cells have reduced deformability and easily adhere to vascular endothelium, increasing the potential for decreased blood flow and vascular obstruction. Abnormalities in coagulation, leucocytes, vascular endothelium, and damage to the membranes of red cells contribute to sickling. Haemolytic anaemia and vasculopathy are the result of the various pathophysiologic processes
- Organ damage is on-going and is often silent until far advanced
- The course of the disease is punctuated by episodes of pain

Clinical Features

- Vary widely from one patient to another:
- Persistent anaemia/pallor, growth retardation (variable); Jaundice (variable); Bone pains (recurrent)
- Prominent facial bones due to increased bone marrow activity
- Leaner body build and less weight (on average)
- Some fingers are shortened as a result of infarction (destruction due to blockage of blood supply)
- Hand-foot syndrome (painful and swollen hands and feet) in childhood
- Life span on average shorter than normal
- Sexual development is delayed in both sexes: menarche occurs at a mean age of 15.5 years (range 12 - 20 years) compared to non-sicklers (mean 13.2 years)
- Impotence can occur from prolonged priapism
- High foetal loss in pregnancy

Sickle cell crises

- Patient has acute symptoms/signs attributable directly to sickle cell disease
- Two main types:
- Pain (vaso-occlusive) crisis
- Anaemia crisis

Vaso-occlusive crises

- Painful, tender, swollen bones
- Acute hepatopathy
- Acute chest syndrome
- Priapism
- Painless haematuria
- Cerebrovascular disease (accident) - in descending order of prevalence
  - Thrombotic stroke
  - Seizures
  - Haemorrhage
  - Retinopathy (commonest in SC patients)

Anaemic crises

- Acute splenic (or hepatic) sequestration
- Hyper-haemolytic (e.g. precipitated by malaria)

- Megaloblastic (folic acid deficiency)
- Hypoplastic (due to infection or renal failure)
- Aplastic (e.g. due to epidemic parvo virus B19)

Differential Diagnoses

- Connective tissue disorders e.g. rheumatoid arthritis
- Liver disease
- Other causes of failure to thrive

Complications

- Kidneys:
  - Hyposthenuria (reduced ability to concentrate urine/conserve body fluids)
  - Haematuria
  - Albuminuria
  - Reduced kidney function
- Leg ulcers:
  - Occur around the ankles
  - Heal slowly and tend to recur
- Bones and Joints
  - Osteomyelitis
  - Avascular necrosis

These may cause:

  - Hip pain
  - Limping gait
  - Kyphoscoliosis when necrosis affects spinal vertebral bones
- Infections:
  - Salmonella osteomyelitis
  - Pneumococcal pneumonia
  - Pneumococcal meningitis (rare in adolescents and adults)
  - Tonsillitis and pharyngitis
- Brain and nerves:
  - Strokes, seizures (not common in adults)
  - Meningitis (not common in adults)
  - Cerebral haemorrhage
  - Mental neuropathy (rare)
- Cardiovascular/respiratory:
  - Heart failure
  - Pulmonary hypertension
  - Acute chest syndrome

Investigations

- FBC and ESR; Red cell indices (MCH, MCHC, MCV), Reticulocyte count
- Sickling tests: solubility test; metabisulphite test
- Haemoglobin electrophoresis
- Using cellulose acetate paper at pH 8.4 (alkaline) or citrate agar gel at pH 5.6 (acidic)

- Serum Electrolytes, Urea and Creatinine
- Liver function tests (transaminases, bilirubin, serum albumin, alkaline phosphatase and prothrombin time)
- Others as may be indicated:
- Urinalysis; microscopy, culture and sensitivity:
- Sputum: Acid Fast Bacilli, Microscopy, culture and sensitivity
- Stool: Ova and parasites, Occult blood
- Ultra sound scan:
  - Abdominal ultrasound scan
  - Transcranial Doppler ultrasonography
- Chest radiograph

Treatment Goals

- Maintain (or restore) a steady state of health
- Prevent and treat Complications
- Provide accurate diagnosis, relevant health education and genetic counselling to patients,
- relatives and heterozygotes
- Improve quality of life
- Provide a positive self-image in affected persons

Treatment Strategies

- Counselling and health education
- Encouraging membership of support groups
- Providing infection prophylaxis (antimalarial; anti-pneumococcal, hepatitis B virus vaccines)
- Providing folate supplementation
- Avoiding pain-inducing conditions
- Providing prompt treatment of symptoms
- Advising on contraception
- Supervising pregnancy/Labour
- Providing regular health checks
- Limiting family size

Non-drug Treatment

- Balanced diet
- Adequate fluid intake (at least 3 litres/24 hours)
- Avoidance of pain-inducing conditions
  - Strenous physical exertion or stress
  - Dehydration
  - Sudden exposure to extremes of temperature
  - Infections e.g. malaria
  - Emotional stress

Adjunct treatment

- Blood transfusion (especially red cell transfusion)
- Pneumococcal vaccine

Drug Treatment

Steady state (when patient is well with no complaints):

- Proguanil
  - Adult: 200 mg orally daily
  - Child:
  - under 1 year 25 mg daily
  - 1 - 4 years 50 mg
  - 5-8 years 100 mg
  - 9 - 14 years 150 mg orally daily

Plus:

- Folic acid 5 mg orally daily

Plus

- Multivitamin 1 every 8 hours
- Omega-3 1 every 12 hours

Pain crises

Mild pain

- Paracetamol
  - Adult: 1 g every 4 - 6 hours to a maximum of 4 g daily
  - Child
  - 1-5 years 120-250 mg
  - 6-12 years 250-500 mg
  - 12 -18 years 500 mg every 4 - 6 hours
  - (maximum 4 doses in 24 hours)

Or:

- Aspirin (acetylsalicylic acid) 600 mg orally every 8 hours daily
  - Not recommended for children under 16 years

Or:

- Ibuprofen
  - Adult: 200 mg every 8 hours daily (or other non-steroidal anti-inflammatory drugs)
  - Child: 10 mg/kg/dose every 8 hours

Moderate-to-severe painful crises

Parenteral therapy:

- Diclofenac sodium
  - Adult: 75 mg or 100 mg intramuscularly (as necessary)
  - Not recommended for children
- Pentazocine
  - Adult:
  - Child: Pentazocine 0.5-1mg/kg every 6-8 hours

Oral therapy:

- Paracetamol
  - Child: 1 -5 years 20 mg/kg every 6 hours (maximum 90 mg/kg daily in divided doses) for 48 hours or longer if necessary and if adverse effects are ruled out

Then:

- 15 mg/kg every 6 hours (maintenance)
- 6 - 12 years: 20 mg/kg (maximum 1 g) 6 hourly (maximum 90 mg/kg

daily in divided doses, not to exceed 4 g for 48 hours or longer if necessary and if adverse effects are ruled out

Then:

- 15 mg/kg every 6 hours (maximum 4 g daily)
- 12 - 18 years: 500 mg - 1g every 4 - 6 hours (maximum 4 doses in 24 hours)

• Diclofenac potassium 50 mg every 12 hours

Or:

• Diclofenac sodium 100 mg once daily

Or:

• Dihydrocodeine 1-2 mg/kg every 8 hours

Or:

Morphine 15 mg every 8 - 12 hours daily

Antimalarials

Artemisinin-based combination therapy (see section on malaria)

Supportive Measures

• Counselling and health education
• Membership of support group
• Regular health checks

Definitive treatment:

Stem cell transplantation and Gene therapy.

Notable Adverse Drug Reactions, Contraindications and Caution

• Paracetamol should be used with caution in patients with hepatic impairment
• Opioid analgesics cause varying degrees of respiratory depression and hypotension. They should be avoided when intracranial pressure is suspected to be raised

Prevention

• Advice on the risks involved in marriages between carriers and between sicklers
• Anti-pneumococcal vaccine (once every 5 years)

Multiple Myeloma

Introduction

A malignant proliferation of plasma cells derived from a single clone. The terms multiple myeloma and myeloma may be used interchangeably.

The tumour, its product, and the host response to it result in a number of organ dysfunctions and symptoms of bone pain or fracture, renal failure, susceptibility to infection, anaemia, hypercalcemia, and occasionally clotting abnormalities, neurologic symptoms, and vascular manifestations of hyper-viscosity.

Clinical Features

• Classified as asymptomatic or symptomatic, depending on the absence or presence of myeloma related organ or tissue dysfunction, including hypercalcemia, renal insufficiency, anaemia, and bone disease

- Bone pain is the most common symptom in myeloma, affecting about 70% of patients
- Usually involves the back and ribs
- The pain of myeloma is precipitated by movement (Unlike the pain of metastatic carcinoma, which often is worse at night)
- Persistent localized pain in a patient with myeloma usually signifies a pathologic fracture
- The bone lesions of myeloma are caused by the proliferation of tumour cells and the activation of the osteoclasts that destroy the bone
- The next most common clinical problem in patients with myeloma is susceptibility to bacterial infections
- Anaemia occurs in about 80% of myeloma patients:
  - Usually normocytic and normochromic
  - Related both to the replacement of normal marrow by expanding tumour cells and to the inhibition of haematopoiesis by factors made by the tumour
- Bony lesions develop in almost 80% of patients with newly diagnosed disease; in one study, 58% of patient reported bone pain
- Renal impairment occurs in 20 – 40% of patients with newly diagnosed disease, mainly as a result of direct tubular damage from excess protein load, dehydration, hypercalcemia and the use of nephrotoxic medications
- The risk of infection is increased with active disease but decreases with response to therapy

Investigations

Diagnosis is based on the presence of at least 10% clonal bone marrow plasma cells and monoclonal protein in serum or urine

In patients with true non-secretory myeloma, the diagnosis is based on 30% monoclonal bone marrow plasma cells or a biopsy proven plasmacytoma

The recommended tests for diagnosis of myeloma include:

- Routine laboratory testing:
  - FBC
  - Chemical analysis
  – Serum and urine protein electrophoresis with immunofixation, and qualification of monoclonal protein
  – Bone marrow examination (trephine biopsy plus aspirate of cytogenetic analysis or fluorescence In situ hybridization [FISH])
  - Conventional radiography of the spine, skull, chest, pelvic, humeri, and femoral remains the standard to identify myeloma related bone lesions
  - Magnetic resonance imaging (MRI) is recommended to evaluate symptoms in patients with normal results in conventional radiography and in all patients with radiographs suggesting the presence or solitary plasmacytoma of the bone
  - Computed tomography and MRI are the procedures of choice to asses suspected cord compression and should be performed on an urgent basis

Treatment Goals

- Reduce total mass of tumour
- Maintain this by continuation therapy

Induction therapy (3-4 weeks)

- Chemotherapy of cancer is complex and should be confined to specialists in oncology and in line with National Guidelines on Cancer Chemotherapy
- Due to the complexity of dosage regimens in the treatment of malignant diseases, dose statements have been omitted from majority of the entries in this guideline
- Single agent combination
  - Melphalan/prednisolone
- Combination chemotherapy
  - VMCP (vincristine, melphalan, cyclophosphamide, prednisolone)
  - VAD regimen (Vincristine, adriamycin, high dose dexamethasone)
  - VAMP-use of methyl prednisolone in place of dexamethasone
  - Alpha interferon (3mu)
- Novel Therapies
  - Thalidomide (FOLLOW THE GUIDELINES STRICTLY) and dexamethasone
  - Adverse effects: sedation, constipation, fatigue, Peripheral Neuropathy, DVT
  - Treatment
  - Transplantation
  - Allogenous and autologous stem cell
- Radiotherapy

Notable Adverse Drug Reactions, Contraindications and Caution

- Cytotoxic medicines have both anticancer activity and the potential to damage normal tissue; most are teratogenic
- All cytotoxic medicines cause side effects and a balance has to be struck between likely benefit and acceptable toxicity
- Trained personnel should reconstitute cytotoxics in designated pharmacy areas
- Pregnant sta ffshould avoid exposure to cytotoxics
- Prescriptions should not be repeated except on the instructions of a specialist

CHAPTER 10:

INFECTIOUS DISEASES/INFESTATIONS

Fevers: Management Approach

Introduction

'Fever' is elevation of body temperature that exceeds the normal daily variation and occurs in conjunction with an increase in hypothalamic set point. Fever occurs in response to infection, inflammation, and trauma.

Diagnosis

Fever is diagnosed clinically when:

- Rectal temperature is greater than 38°C Or
- Early morning oral temperature of >37.2◦C (>99◦F) or
- A temperature of >37.7◦C (>100◦F) at any time during the day; Axillary temperature ≥37.5◦C (99.5◦F)
- Important points in the history are:
  - Periodicity, grade, and duration of fever, Associated night sweats
  - Associated systemic symptoms
  - Use of antipyretics
  - History of possible causes- infections, diseases associated with inflammation and trauma.

Physical examination:

- Measure body temperature using a thermometer. (Axillary temperature is easier to measure but is the least accurate)
- Other vital signs
- Skin, lymph nodes, eyes, nail beds, CNS, chest, abdomen, cardiovascular, musculo-skeletal and nervous systems
- The penis, prostate, scrotum, and testes (for men)
- Pelvic examination (for women)

Investigations

The investigations will depend on the clinical diagnosis and differential diagnosis. On occasions, patients may need to be extensively investigated.

- General:
  - FBC and differential WBC
  - Urinalysis, with examination of the urinary sediment
  - Examination of any abnormal fluid collection
  - Microbiology: to identify possible infectious cause:
  - Rapid diagnostic tests for infectious antigen or antibody
  - Blood smear for malaria parasites.
  - Serology- detection of pathogen antigen or antibody
  - Nucleic acid-based techniques for detection of pathogens (e.g., polymerase chain reaction)
  - Microscopy, culture, and sensitivity of specimens from body fluids, and

mucosal surfaces as indicated.
- Chemistry:
  - Urine examination
  - Serum urea, electrolytes, and creatinine
  - Blood glucose
  - Liver function tests
  - Cerebrospinal fluid examination
- Radiology:
  - Chest radiograph

Other Investigations as may be indicated in the clinical circumstances.

Complications

- Heat stroke in adults
- Febrile convulsions in children
- Complications associated with underlying cause(s) of fever.
- Arrythmias in those with cardiac disease.

Treatment Goals

- Reduce the body temperature
- Treat underlying causes

Non-drug Treatment

- External cooling: Tepid sponging, modification of clothing and environmental cooling measures
- Prevent dehydration: Liberal oral sips of water (if clinical state is not a contraindication)

Drug Treatment

- Antipyretics could mask the detection of fever and sometimes confound the clinical evaluation of infectious diseases. Fever often resolves with treatment of underlying cause.
- Identification and treatment of underlying causes of fever is paramount before using antipyretics, except for children at risk of febrile convulsions and in high-grade fevers (axillary temperature ≥39.4°C (103 F).
- The options for drug treatment of fever include:
  - Paracetamol
  - Adult: 500 mg - 1 g orally every 4 - 6 hours; maximum 4 g daily
  - Child:
    - 3 months - 1 year: 60 - 125 mg
    - 1 - 5 years: 120 - 250 mg
    - 6 - 12 years: 250 - 500 mg repeated every 4 – 6 hours if necessary, to a maximum of 4 doses in 24 hours
    - Infants under 3 months should not be given paracetamol unless advised by a doctor
    - Aspirin: (acetylsalicylic acid)
    - Adult: 300 - 900 mg orally (with or without food) every 4 - 6 hours if necessary; maximum 4g daily
    - Child: under 16 years, aspirin is not recommended because of the risk of Reye's syndrome
- Treat the identified (or suspected) cause of fever.

Notable Adverse Drug Reactions, Contraindications and Caution

Paracetamol:

- Liver damage (and less frequently, renal damage) following over dosage.

Aspirin:

- Gastrointestinal discomfort, nausea
- GI ulceration
- Tinnitus (rarely deafness)
- Use with caution in the following clinical conditions:
  - Asthma
  - Allergic disease
  - Impaired renal or hepatic function
  - Pregnancy
  - Breastfeeding
  - Elderly
  - Dehydration

Food Poisoning

Introduction

A spectrum of disorders arising from:

Ingestion of food and water contaminated by micro-organisms, and/or their toxins, or by chemicals from non-infectious sources.

Clinical forms:

- Staphylococcal food poisoning:
  - Food is contaminated by Staphylococcus aureus (S. aureus) when prepared unhygienically by individuals who are carriers
  - Subsequent growth of S. aureus in the food and enterotoxin production occurs if the food is not cooked at temperatures sufficient to kill the bacteria, or is not refrigerated
- Food-borne botulism
- Non-typhoidal Salmonellosis
- Shigellosis
- E. coli food poisoning
- Campylobacter food poisoning
- Listeria monocytogenes food poisoning
- Yersinia enterocolitica food poisoning
- Norwalk (Norovirus) virus food poisoning
- Hepatitis A virus food poisoning
- Giardiasis
- Helminthic parasitic food poisoning
- Others: Bacillus cereus, Vibrio cholera,

Clinical Features

Variable depending on cause and severity:

- Abdominal pains
- Nausea and Vomiting

- Diarrhoea
- Fever
- Dehydration
- Fatigue
- Other systemic symptoms
- Staphylococcal food poisoning: symptoms begin 30 minutes – 6 hours after exposure to microbial toxins.
  - Nausea
  - Abdominal cramps
  - Vomiting
  - Diarrhoea
- Clostridium perfringens: symptoms begin 6 – 24 hours after exposure.
  - Diarrhoea
  - Abdominal cramps.
- Food-borne Clostridium botulism
  - Incubation period is 18 - 36 hours, but depending on toxin dose, can extend from a few hours to several days.
  - Symmetric descending paralysis
  - Diplopia
  - Dysarthria/dysphagia
  - Nausea, vomiting and abdominal pain may precede or follow the onset of paralysis.
- Non-typhoidal Salmonellosis: symptoms begin 6 hours to 6 days after exposure.
  - Diarrhoea
  - Nausea
  - Vomiting
  - Abdominal cramps
  - Fever
  - Headache
  - Myalgia
- Shigellosis: symptoms begin 24hours to 48 hours after exposure
  - Fever
  - Self-limiting watery diarrhoea
  - Bloody diarrhoea
  - Dysentery
  - Frequent passage, 10 - 30 times/day of small volume stools containing blood, mucus, and pus
  - Abdominal cramps
  - Tenesmus
- Campylobacter food poisoning: symptoms begin 2 to 5 days after exposure.
  - Diarrhoea (frequently bloody)
  - Abdominal pain
  - Fever, headache, nausea, and/or vomiting.
  - The symptoms typically last 3 to 6 days.

- E. coli food poisoning: symptoms begin 3 to 5 days after exposure.
  - Watery diarrhoea (often bloody) accompanied by abdominal cramps.
  - Vomiting.
  - Around 5–10% of people diagnosed with E. coli food poisoning develop a life-threatening complication.
- L. monocytogenes food poisoning: Symptoms begin 1 – 4 weeks after exposure.
  - Non-invasive listeriosis – fever and diarrhoea
  - Invasive listeriosis-pregnancy losses and meningoencephalitis in immunosuppressed person
- Norwalk virus food poisoning: Symptoms begin 12 – 48 hours after exposure:
  - Abrupt onset of nausea and abdominal cramps followed by vomiting and/or diarrhoea
- Hepatitis A virus food poisoning:
  - May cause large outbreaks of diarrhoea and vomiting from contaminated food, water, milk and shellfish. Intra-family and intra-institutional spread common

Diagnosis

- Essentially clinical
- Laboratory confirmation of the specific microbe(s) involved.

Differential Diagnoses

- Other causes of acute onset diarrhoea, nausea,
- abdominal cramps and vomiting with or without systemic manifestations.

Complications

Variable depending on cause and severity.:

- Fluid and electrolyte derangements, Dehydration
- Rectal prolapse.
- Protein-losing enteropathy, Malnutrition
- Haemolytic-uraemic syndrome
- Toxic megacolon, perforation
- Bacteraemia, Cholecystitis, Pancreatitis, Cystitis, Meningitis, Endocarditis, Arthritis, Peritonitis, Cellulitis or Septic abortion

Treatment Goals

- Restore fluid and electrolyte balance
- Neutralize toxin
- Eradicate the microbe

Non-drug Treatment

- Gastric lavage in food-borne botulism

Drug Treatment

- Appropriate fluid and electrolyte replacement
- Botulism Antitoxin Heptavalent (A, B, C, D, E, F, G) - (Equine)should be administered as soon as possible after specimens are obtained for laboratory analysis for food-borne botulism.
- Emetics in food-borne botulism

- Administer appropriate medicines
- Shigellosis
  - Oral Rehydration Therapy

Plus:

  - Amoxicillin:
  - Adult: 50 - 100 mg/kg/day orally every 8 hours; up to 2 g/day
  - Child up to 10 years: 125 mg every 8 hours, doubled in severe infections.

Or:

  - Trimethoprim/sulfamethoxazole (co-trimoxazole)
  - Adult: 960 mg orally every 12 hours for 5 days
  - Child :
    - Few weeks to 5 months: 120 mg orally
    - 6 months - 5 years: 240 mg
    - 6 - 12 years: 480 mg given every 12 hours for 5 days

Or:

  - Ceftriaxone:
  - Adult: 1 g intravenously slowly for 5 days
  - Child: 50 mg/kg/day intravenously for 5 days

- Campylobacter food poisoning
  - Fluid and electrolyte replacement

Plus:

  - Erythromycin
  - Adult: 250 mg orally every 6 hours for 5 - 7 days
  - Child: 30-50 mg/kg orally every 6 hours for 5 - 7 days
  - Infections involving macrolide resistance could be treated with amoxicillin-clavulanate.

- E. coli food poisoning
  - Antibiotics are not recommended for patients with suspected shiga-toxin producing E. coli (STEC) infections, also referred to as enterohemorrhagic E. coli (EHEC). Administering antibiotics to patients with STEC infections might increase their risk of developing haemolytic uraemic syndrome (characterized by low platelet, anaemia and kidney failure)

. L. monocytogenes food poisoning
  - Ampicillin 50 mg/kg/day in divided doses

Plus:

  - Gentamicin 3 - 5- mg/kg daily

. Treat specific Complications as appropriate e.g.
  - Antibiotic-unresponsive toxic megacolon: colectomy
  - Haemolytic-uraemic syndrome: dialysis
  - Malnutrition from protein-losing enteropathy: nutritional support; optimal nutritional management

Prevention

- Environmental and personal hygiene
  - Hand washing with soap and water.
  - Decontamination of water supplies by chlorination.
  - Use of sanitary latrines or toilets
  - Identify and treat chronic carriers among food handlers.
- Hygienic preparation and storage of food and water
- Ensure that food is cooked at temperatures sufficient to kill bacteria.
- Refrigerate food whenever possible.
- Encourage exclusive breastfeeding.
- Encourage measures to reduce the burden of malnutrition (with its attendant predisposition to severe infections)
- Administer a pentavalent vaccine (A, B, C, D, and E) for persons at high risk of botulism.
- Report new cases to public health authorities

Helminthiasis

Introduction

Helminths are parasitic worm infestations that cause variable symptoms in humans.

Helminths are broadly classified as Nematodes (round worms), Cestodes (Tapeworms) and Trematodes (Flukes).

Nematodes (round worms) :

- Ascaris (typical round worm)
- Ancylostoma (hookworm)
- Enterobius (pinworm)
- Trichuris (whipworm)
- Strongyloides stercoralis

Cestodes (flat worms/tapeworms)

- T. solium and T. saginata
- Echinococcosis

Trematodes (flukes)

- Schistosoma haematobium and S. mansoni
- Fasciola
- Round worm infestations are associated with rural living and poor hygiene.
  - Most are soil-transmitted .
  - Prevalent among school children and young adults
  - Acquired through soil and faeco-oral contamination.
- Flat worms and tape worms are acquired by eating under-cooked contaminated meat or fish.
- Bladder worms (S. haematobium) are acquired by wading through streams and ponds contaminated with the vector snails.

Clinical Features

Depends on the infecting helminth:

- Ascariasis

- May be asymptomatic.
- Lung phase
- Migration of parasite larvae through the lungs can lead to:
- Irritating, non-productive cough
- Burning substernal discomfort, aggravated by coughing or deep inspiration.
- Dyspnoea
- Blood-tinged sputum
- Intestinal phase:
- Usually no symptoms, but high worm burden may cause:
- Abdominal Pain
- Features of small bowel obstruction.
- Features of perforation, Intussusception, Volvulus
- Biliary tree occlusion: biliary colic, cholecystitis, cholangitis, pancreatitis, intrahepatic abscess
- Effects of migration of an adult worm up the oesophagus:
- Coughing
- Oral expulsion of the worm

- Hookworm
  - Most are asymptomatic.
  - Maculo-papular dermatitis
  - Mild transient pneumonitis
  - Epigastric pain, often with post-prandial accentuation
  - Diarrhoea
  - Weakness
  - Shortness of breath
  - Skin depigmentation
  - Anaemia and protein deficiency
- Enterobiasis
  - Perianal pruritus, worse at night owing to the nocturnal migration of the female worms.
  - Skin excoriation and bacterial superinfection
  - Abdominal pain
  - Weight loss
  - Vulvo-vaginitis
  - Pelvic/perineal granulomas
- Trichuriasis
  - Light infections are asymptomatic.
  - Heavy infections may cause:
  - Abdominal pain and anorexia
  - Bloody or mucoid diarrhoea
  - Rectal prolapse.
  - Growth retardation
- Strongyloidiasis

Distinguished from other round worms by its ability to replicate in the human host.
Can thus persist for decades without further exposure of the host to exogenous infective larvae

- Acute strongyloides
- Initial sign is localized pruritus and erythematous rash at site of skin penetration.
- Tracheal irritation
- Dry cough
- Mid-epigastric abdominal pain
- Nausea
- Diarrhoea
- Gastrointestinal bleeding
- Repeated autoinfection leads to recurrent serpiginous maculopapular or urticarial rash along the buttocks, perineum, and thighs- “larva currens”.
- Chronic strongyloides
- Generally asymptomatic
- Recurrent urticaria: buttocks and wrists
- Mild chronic colitis
- Weight loss
- Small bowel obstruction
- Nephrotic syndrome
- Cardiac arrythmia
- Recurrent asthma
- Arthritis
- Malabsorption

▪ Hyperinfection syndrome and disseminated strongyloidiasis.

- Associated with subclinical infection and use of corticosterioids
- Depressed immunity leads to widespread larvae migration.
- Hyperinfection syndrome associated with GIT and lung symptoms.
- In disseminated strongyloidiasis larva invades multiple organs
- Mortality is high for both conditions.

▪ Trichinellosis

- In the first week after infection (gut invasion):
- Diarrhoea
- Abdominal Pain
- Constipation
- Nausea
- Vomiting
- In the second week after infection (muscle invasion):
- Fever
- Periorbital and facial oedema
- Haemorrhages (subconjunctival, retinal and nail bed)
- Maculopapular rash

- Headache
- Cough
- Dyspnoea
- Dysphagia
- Tachyarrhythmias
- Heart failure
- Encephalitis
- Pneumonitis

- Schistosomiasis
  - See Urology

Investigations

- Stool examination for ova and parasites
- Urine examination: microscopy
- Haematology: eosinophilia and anaemia may be present
- Serology and CT scan may be required in some instances.

Drug Treatment

Hookworm

- Mebendazole: Adult and child: 100 mg orally every 12 hours for 3 days; iron supplementation may be given if anaemia is present.
- Albendaozole: Adult and child: 400 mg orally once

Ascaris

- Mebendazole: Adult and child: 100 mg orally every 12 hours for 3 days
- Albendaozole: Adult and child: 400 mg orally once
- Ivermectin: 150-200 µg/kg orally once

Trichuris

- Mebendazole: Adult and child: 100 mg orally every 12 hours for 3 days
- Albendaozole: Adult and child: 400 mg orally for 3 days
- Ivermectin: 200 µg/kg/day orally for 3 days

Enterobius

- Pyrantel pamoate: Adult and child: 10 mg/kg orally once; repeat dose 2 weeks later; several treatments may be necessary

Trematodes

- Praziquantel :
  - Adult 40 mg/kg given orally at once provides up to 80% cure rates
  - Child over 4 years: 20 mg/kg followed after 4 - 6 hours by a further dose of 20 mg/kg.
  - Praziquantel is effective in all human cases caused by schistosomes.

Cestodes

- Praziquantel
  - Adult: 40 mg/kg given orally at once

Or:

  - 20 mg/kg followed by another 20 mg/kg after 4 - 6 hours
  - Child over 4 years: 20 mg/kg followed 4 - 6 hours by a further dose of 20 mg/kg (20 mg/kg 3 times daily for one day for S. japonicum infections)

Notable Adverse Drug Reactions, Contraindications and caution

- Avoid mebendazole in pregnant women.
- Adverse effects of praziquantel include abdominal pain, headache, dizziness, and skin rashes.

Prevention

- Good personal and food hygiene
- Access to safe and potable water
- Regular deworming
- Adequate cooking of food and meats

Human Immunodeficiency Virus (HIV) Infection

Introduction

Human Immunodeficiency Virus (HIV) is a retrovirus, which infects primarily CD4 T cells (T helper cells)
and leads to progressive destruction of the immune system with a consequent myriad of opportunistic infections and the development of certain malignancies.
Acquired Immuno Deficiency Syndrome (AIDS) is defined as the presence of an AIDS-defining illness (see table 1) with a positive antibody test for HIV.

HIV transmission

Sexual transmission through vaginal and anal sex is the commonest route globally and in Nigeria, accounting for about 80%.
Other routes of transmission

- Transfusion of infected blood and blood products, use of contaminated instruments, sharing needles, tattooing and occupational exposures.
- Mother-to-child transmission of HIV: from an infected mother to her baby during pregnancy, at delivery and, after birth through breast-feeding

Clinical Course

Acute (Primary):

This occurs 1-4 weeks after infection during which infected people experience transient flu-like symptoms, which may include:

- Mild fever
- Muscle aches and pains
- Fatigue
- Enlargement of lymph nodes
- Sore throat
- Fever
- Skin rash

This stage is difficult to diagnose by standard laboratory assays.

- Seroconversion: Usually occurs within 4 weeks. Patients develop antibody response, which is detectable by a positive HIV Ab test.
- Asymptomatic Infection: The individual feels well despite on-going viral replication. Usually last a variable amount of time and is marked by a gradual decline in CD4 cell counts.

Early Symptomatic Infection:

- Generalized lymphadenopathy.
- Weight loss
- Night sweats
- Pruritic skin rash
- Unexplained fever
- Chronic diarrhoea
- Oral candidiasis
- Oral hairy leukoplakia
- Herpes zoster
- Pneumococcal infections
- Pulmonary Tuberculosis

Late Disease/AIDS defining Illness:

This period is marked by the appearance of opportunistic infections and neoplasms.

Opportunistic infections:

- Pulmonary/extra-pulmonary tuberculosis and Disseminated TB.
- Pneumocystis jiroveci (carinii) pneumonia.
- Cryptococcal meningitis
- Recurrent bacterial pneumonia
- Candida oesophagitis
- CNS toxoplasmosis
- Kaposi sarcoma
- Non-Hodgkin's lymphoma
- Disseminated/extra-pulmonary coccidiomycosis, cryptococcosis or histoplasmosis.
- Chronic (> 1month) intestinal cryptosporidiosis or isosporiasis
- Disseminated extra-pulmonary mycobacteria (non-tuberculous)
- Progressive multifocal leukoencephalopathy (PML)
- Recurrent salmonella septicaemia
- HIV wasting syndrome

Staging of HIV/AIDS

WHO Staging System for HIV Infection and Disease in Adults and Adolescents

- Clinical Stage I:
  - Asymptomatic
  - Generalised lymphadenopathy
  - Performance scale 1: asymptomatic, normal activity
- Clinical Stage II:
  - Weight loss < 10% of body weight
  - Minor muco-cutaneous manifestations (seborrhoeic dermatitis, prurigo, fungal nail infections, recurrent oral ulcerations, angular cheilitis)
  - Herpes zoster within the last five years
  - Recurrent upper respiratory tract infections (i.e. bacterial sinusitis)
  - And/or performance scale 2: symptomatic, normal activity

- Clinical Stage III:
  - Weight loss > 10% of body weight Unexplained chronic diarrhoea, > 1-month Unexplained prolonged fever (intermittent or constant)
  - >1month Oral candidiasis (thrush), Oral hairy leucoplakia, Pulmonary tuberculosis, within the past year Severe bacterial infections (i.e. pneumonia, pyomyositis)
  - And/or performance scale 3: bedridden < 50% of the day during last month
- Clinical Stage IV:
  - HIV wasting syndrome.
  - Pneumocystis carinii pneumonia
  - Toxoplasmosis of the brain
  - Cryptosporidiosis with diarrhoea > 1 month
  - Cryptococcosis, extra-pulmonary Cytomegalovirus disease of an organ other than liver, spleen, or lymph node (e.g., retinitis)
  - Herpes simplex virus infection, mucocutaneous (>1 month) or visceral
  - Progressive multifocal leucoencephalopathy
  - Any disseminated endemic mycosis
  - Candidiasis of oesophagus, trachea, bronchi
  - Atypical mycobacteriosis, disseminated or lungs.
  - Non-typhoid salmonella septicaemia
  - Extra-pulmonary tuberculosis
  - Lymphoma
  - Kaposi sarcoma 2
  - HIV encephalopathy
  - And/or performance scale 4: bedridden > 50% of the day during last month
  - 1: Weight loss of > 10% plus either unexplained chronic diarrhoea > 1 month, or chronic weakness and unexplained prolonged fever > 1 month.
  - 2: Clinical findings of disabling cognitive and/or motor dysfunction interfering with activities of daily living, progression over weeks or months in absence of concurrent illness or condition other than HIV infection that could explain the finding.

Differential Diagnoses:

- Tuberculosis
- Malignancies
- Diabetes mellitus
- Other wasting syndromes

Complications:

See table 10.1

Table 10.1: Complications of HIV disease at different CD4 cells cut-offs.

CD4 count (cells/ mms)	Infectious Complications	Non-infectious Complications
> 500	Acute HIV, candidal vaginitis	Persistent generalized lymphadenopathy (PGL), Guillain Barre syndrome, myopathy, aseptic meningitis
200 – 500	Pneumococcal and other bacterial pneumonias, pulmonary TB, Herpes zoster, oropharyngeal candidiasis, oral hairy leukoplakia, Kaposi sarcoma	Cervical cancer, anaemia, lymphomas
< 200	Miliary/extra-pulmonary TB, pneumocystis carinii pneumonia (PCP), disseminated histoplasmosis and coccidiomycosis, progressive multifocal leukoencephalopathy (PML)	Wasting, peripheral neuropathy, progressive polyradiculopathy, HIV-associated dementia, cardiomyopathy
< 100	Disseminated herpes simplex, toxoplasmosis, crytococcosis, cryptosporidium, chronicmicrosporidiosis, and oesophageal candidiasis	
< 50	Disseminated cytomegalovirus (CMV), disseminated Mycobacterium avium complex (MAC)	Central nervous system lymphomas

Investigations

- Full Blood Count and differentials
- VDRL (or RPR)
- Tuberculin test (PPD)
- Gene Xpert
- Sputum smears for TB
- Renal function tests: Electrolytes, Urea and Creatinine
- Urinalysis
- Blood glucose
- Liver function tests
- Lipid studies (fasting triglycerides, LDL, HDL)
- HBV, HCV serology
- Cervical (PAP) smears
- CD4 T cell counts.
- Chest X-ray
- HIV RNA level (viral load)
- HIV DNA (paediatric diagnosis <18 months of age)
- Genotype and phenotype assays for resistance testing
- Pregnancy assessment, family planning and counselling services, wh
  required

Treatment Goals

- Clinical: prevent disease progression
- Immunological: restore immunity
- Virological: control or suppress viral replication
- Public health: reduce infectivity.

Criteria for initiating ART based on Nigerian ART guidelines

- The current national guidelines recommend initiation of ART in all persons

testing positive for HIV including children, adolescents, adults, pregnant and breastfeeding women, regardless of clinical and immunological stages of the disease.

Drug Treatment

- Recommended first-line ART regimens for adults, adolescents, pregnant and breastfeeding women, and children[1].

Table 10.2: Recommended first-line ARV regimen for ART naive adults and adolescents.

Population	Preferredfirst-line regimen	Alternativefirst-line
Adults	TDF + 3TC + DTG	TDF+3TC (or FTC) + EFV AZT+3TC+EFV TDF+3TC (or FTC) +EFV (400mg) AZT+3TC+NVP TDF+3TC (or FTC) +NVP ABC+3TC+DTG
Adolescents (10 - 19 years)	TDF + 3TC + DTG*	TDF+3TC (or FTC) +EFV TDF+3TC (or FTC) +EFV (400mg) AZT+3TC+NVP or EFV ABC+3TC (or FTC) +DTG ABC+3TC (or FTC) +EFV (400mg) TDF+3TC (or FTC) +NVP ABC+3TC (of FTC) +NVP
Children(3 - 10 years)	ABC+ +3TC+DTG, ABC+3TC+EFV** or TDF+3TC+DTG(for children weighing >30kg)	ABC+3TC+NVP AZT+3TC+NVP TDF+3TC (or FTC) +EFV TDF+3TC (or FTC) +NVP
Children(<3 years)	ABC + 3TC + LPV/ror AZT + 3TC + LPV/r	ABC+ 3TC + NVP AZT + 3TC + NVP ABC + 3TC + RAL AZT + 3TC + RAL
Pregnant and breastfeeding women	TDF + 3TC (or FTC) + EFV or TDF + 3TC + DTG#	AZT + 3TC + EFV (or NVP) TDF + 3TC (or FTC) + NVP

3TC: lamivudine; ABC: abacavir; AZT: zidovudine; DTG: dolutegravir; EFV: efavirenz; LPV/r: lopinavir/ritonavir; NRTI: nucleoside reverse-transcriptase inhibitor; NVP: nevirapine; TDF: tenofovir disoproxil fumarate; RAL: raltegravir.

ABC + 3TC + EFV- may be considered in cases of impaired renal function and osteoporosis (TDF induced or post- menopausal).

Initiation of DTG in pregnancy in ARV naïve pregnant women should be started after the first trimester. Effective contraception should be offered to adult women and adolescent girls of childbearing age or potential. DTG can be prescribed for adult women and adolescent girls of childbearing age or potential who wish to become pregnant or who are not otherwise using or accessing consistent and effective contraception if they have been fully informed of the potential increase in the risk of neural tube defects (at conception and until the end of the first trimester.
*For adolescents with weight > 30 kg, DTG in fixed dose TLD can be used.
**EFV is only indicated for use in children >3 years of age and >10 kg.
+ In case of ABC hypersensitivity reactions, do not ever re-use in-patient.

Dosing schedule for DTG by weight band for children up to 6yrs weighing <30 kg.

- 15 - 19 kg (20 mg once daily)
- 20 - 29 kg (25 mg once daily)

Table 10.3: Recommendations for ART in HIV + children with active TB

Considerations	Time of initiation of ART[a]	Preferred ART regimen
Active TB diagnosed, not yet on HAART	Start anti-TB treatment[c] Start ART within 2 weeks after commencing anti-TB treatment	Children<3 years and PMTCT exposure to NNRTI Use Triple NRTI (AZT + 3TC + ABC) Children < 3 years and no PMTCT exposure to NNRTI Initiate NVP-based regimen and increase NVP dose to 200 mg/m^2 per day, OR Triple NRTI (AZT + 3TC + ABC) Children>3 years: Standard 1st line AZT + 3TC + EFV[e] is preferred. Consider 1st line alternatives if preferred regimen not applicable.
Active TB diagnosed, already on HAART	If <3 years and on NVP-based regimen	Continue regimen but increase NVP to maximum dose (200 mg/m^2/day)
	If >3 years and on NVP-based regimen	Substitute: Replace NVP with EFV
	If on LPV/r-based regimen	Increase dose of Ritonavir to make 1:1 ratio with LPV

[a] Administration of CPT is important in children with TB/HIV co-infection.
** Regimen assumed to contain Rifampin*
[c] Careful clinical monitoring with lab support, is recommended where NVP is used with rifampicin. This combination should only be used if there are no other options.
[e] EFV is not currently recommended for children <3 years of age.

Monitoring Response to ART and diagnosis of Treatment Failure

Clinical and laboratory monitoring of patient on ART is critical to achieving the treatment goals. Through this, treatment response and possible toxicity of ARVs are monitored and patients that are eligible for drug switch are easily detected.

Table 10.4: Recommended and desirable laboratory tests during monitoring of ART

Laboratory Tests after the initial baseline Investigations and during follow-up on ART

Phase of HIV management	Recommended	Desirable (if feasible)
Receiving ART	CD4 cell count (every 6 months) HIV viral load (at 6 months after initiating ART and every 12 months thereafter)	Urine dipstick for glycosuria and serum creatinine for TDF[d]
Treatment failure	CD4 cell count HIV viral load	HBV (HBsAg) serology[f] (before switching ART regimen if this testing was not done or if the result was negative at baseline)

Table 10.5: WHO definitions of clinical, immunological and virological failure for the decision to switch ART regimens

Failure	*Definition*	*Comments*
Clinical Failure	Adults and adolescents New or recurrent clinical event indicating severe immunodeficiency (WHO clinical stage 4 condition) after 6 months of effective treatment. Children New or recurrent clinical event indicating advanced or severe immunodeficiency (WHO clinical stage 3 and 4 clinical condition with exception of TB) after 6 months of effective treatment	The condition must be differentiated from Immune Reconstitution Inflammatory Syndrome occurring after initiating ART For adults, certain WHO clinical stage 3 conditions (pulmonary TB and severe bacterial infections) may also indicate treatment failure

Failure	*Definition*	*Comments*
Immunological failure	**Adults and adolescents** **CD4 count falls to the baseline (or below)** **Or Persistent CD4 levels below 100 cells/ mm^3** **50% decline from on-therapy CD4 cell peak level**	**Without concomitantor recent infection to cause a transientdecline in the CD4 cell count** **A systematic review found that currentWHO clinical and immunological criteriahave low sensitivity and positive predictivevalue for identifying individuals with virological failure. The predictivevalue /would be expected to be even lowerwith earlierART initiation and treatment failureat higher CD4 cell counts.**
	Children Younger than 5 years **Persistent CD4 levels below 200 cells/mm^3 or <10%** **Older than 5 years** **Persistent CD4 levels below 100 cells/mm^3**	
Virological Failure	**Plasma viral load above 1000 copies/ ml based on two consecutive viral load measurementsafter3 months, with adherence support**	**The optimalthreshold for defining virological failure and the need for switching ART regimen has not been determined.An individual must be takingART for at least 6 months before it can be determinedthat a regimenhas failed.** **Assessment of viral load using DBS and point-of-care technologies should use a higherthreshold*** **Blips are a transient increase in viral load between 50 and 1,000 copies/ml and can occur duringperiods of inter-currentinfections.**

Notable Adverse Drug Reactions, Caution, and Contraindications

Dolutegravir (DTG)

- CNS symptoms: insomnia, fatigue, headache, depression, abnormal dreams, dizziness, suicidal ideation, suicidal tendencies- CNS symptoms associated with older age, co-administration with ABC and higher plasma drug level.
- GI symptoms- Increased serum lipase, diarrhoea, abdominal distress and pain, flatulence, nausea and vomiting.
- Hepatic- Increased serum AST, hyperbilirubinaemia, hepatitis
- Hypersensitivity reactions
- Limit daily dose of metformin to 1000 mg when used with DTG & monitor glycemic control.
- Avoid co-administration of DTG with carbamazepine, nevirapine, phenytoin, phenobarbitone, rifampicin, dofetilide

Nevirapine (NVP)

- Life-threatening skin rash (Stevens-Johnson syndrome); occurs in < 5% of patients, usually within 8 weeks of treatment.
- DRESS syndrome **(D**rug **R**ash, **E**osinophilia, and **S**ystemic **S**ymptoms): manifests as fever, athralgia, etc
- Hepatitis and jaundice reported

Efavirenz (EFV)

- Morbilliform rash may appear; usually not life-threatening.
- CNS side effects in about 50% of patients (usually self-limiting)
  - Hallucinations
  - Insomnia
  - Abnormal dreams
  - Somnolence
  - Amnesia
  - Abnormal thinking
  - Confusion
  - Euphoria

For these reasons, EFV is contraindicated in patients who already have psychiatric manifestations.

- Foetal abnormalities observed in animal models; efavirenz should not be used in pregnant women or women who might become pregnant while on therapy

Zidovudine (ZDV)

- Bone marrow suppression resulting in:
- Anaemia with macrocytosis
- Thrombocytopaenia
- Leucocytopaenia
- Gastro-intestinal intolerance is fairly common: hypersalivation, nausea, abdominal discomfort.

Stavudine (d4T)

- Peripheral neuropathy presenting with painful sensations in the lower limbs more than the upper limbs
- Lactic acidosis with hepatic steatosis
- Stop treatment or switch to a drug less toxic to mitochondria (worse when d4T is used in combination with ddI)
- Peripheral fat atrophy
- Ascending motor weakness resembling Guillain-Barre syndrome.

Lamivudine (3TC)

- No major side effect but class side effects may occur.

Didanosine (ddI)

- Dose-related pancreatitis; worse when combined with hydroxycarbamide (hydroxyurea)
- Peripheral neuropathy; worse if combined with d4T.
- Lactic acidosis (a class adverse effect)

Tenofovir (TDF)

- Infrequent; not more than what is observed in placebos in controlled trials.
- Renal insufficiency and bone demineralization

Abacavir (ABC)

- Life-threatening hypersensitivity in 3 - 9% of patients
- Lactic acidosis with or without hepatic steatosis

Indinavir (IDV)
- Class-specific events
- Nephrolithiasis with or without haematuria in 10 - 28% of patients; (fluid intake should be increased)
- Alopecia

Nelfinavir (NFV)
- Diarrhoea: 10 - 30% of patients; (should be managed with agents such as loperamide)
- Fat accumulation
- Hyperlipidaemia

Lopinavir/ritonavir (LPV/r)
Well tolerated except for occasional class adverse reactions:
- Gastrointestinal
- Hepatic transaminitis especially in patients with hepatitis B or C
- Hyperlipidaemia
- Fat accumulation

Saquinavir (SQV)
GIT intolerance in 5 - 30% leading to:
- Nausea
- Abdominal pain
- Diarrhoea

Amprenavir (AMP)
- Class adverse effects
- GIT intolerance; oral paraesthesia in 28% of patients

Oral solution contains propylene glycol which may precipitate:
- Seizures
- Stupor
- Tachycardia
- Hyperosmolality
- Lactic acidosis
- Renal failure
- Haemolysis

Oral solution is contraindicated in children below 4 years; should be changed to capsules as soon as possible.

Ritonavir (RTV)
- Class side effects
- Perversion of taste
- Circumoral and peripheral paraesthesia
- Hepatotoxicity
- Aesthenia

Atazanavir (ATV)
- Unconjugated hyperbilirubinaemia
- Gastrointestinal effects
- No effect on lipids

Note

Refer to standard texts for possible drug-drug interactions in all cases

Prevention

Prevention of Mother-To-Child Transmission (PMTCT)

- ART should be initiated in all HIV pregnant and breast-feeding women regardless of WHO clinical stage and at any CD4+ cell count and continued for life. This is also regardless of gestational age.

Drug of choice

- Preferred first-line regimen: TDF+3TC + EFV.
- Alternative first-line Regimens
- AZT + 3TC + EFV*(Recommended alternative to TDF for pregnant and breastfeeding women)*
- AZT + 3TC + NVP*(For pregnant women who cannot tolerate EFV)*
- TDF + 3TC + NVP*(For pregnant women who cannot tolerate AZT and EFV)*

Prophylaxis for HIV exposed infants

- All infants born to HIV mothers are exposed and should receive post-exposure prophylaxis.
- Infants delivered to HIV positive mothers who are stable on ART should receive Nevirapine prophylaxis.
- Infants born to mothers with HIV who are at high risk of acquiring HIV should receive dual prophylaxis with AZT (twice daily) and NVP (once daily) for the first 6 weeks of life, whether they are breastfed or formula fed.
- Breastfed infants who are at high risk of acquiring HIV should continue infant prophylaxis for an additional 6 weeks (total of 12 weeks of infant prophylaxis) using AZT (twice daily) and NVP (once daily).
- Cotrimoxazole prophylaxis is recommended for HIV-exposed infants from 6 weeks of age and should be continued until HIV infection has been excluded by an age-appropriate HIV test 12 weeks after complete cessation of breastfeeding.

Table 10:6 NVP Dosing for Infants HIV Prophylaxis

Infant age	Daily dosing
Birth to 6 weeks: Birth weight <2,500 g Birth weight ≥ 2,500 g	 10 mg (1 ml) once daily 15 mg (1.5 ml) once daily
>6 weeks to 6 months*	20 mg (2 ml) once daily
>6 months to 9 months*	30 mg (3 ml) once daily
>9 months to 12 months*	40 mg (4 ml) once daily

**Dosing beyond 6 weeks of age should be considered in special situations.*

** For the duration of therapy, refer to the Integrated National Guideline on HIV Prevention, Treatment and Care of Nigeria

Post-exposure prophylaxis

- Evaluate the risk of exposure and potential eligibility of post-exposure prophylaxis.
- Offer prophylaxis as soon as possible, within 1 hour and at the latest within 72 hours of the exposure.

Recommended drug regimen for post-exposure prophylaxis

- It is recommended that a three-drug ARV regimen should be used for PEP. TDF + 3TC (or FTC) is recommended as the preferred backbone regimen for HIV PEP for adults and adolescents.
- DTG or EFV are recommended as the preferred third drug for HIV PEP for adults and adolescents. However, where available, LPV/r, RAL, or DRV/r, can be considered as alternative options.
- If the source person is known to be on a second-line regimen or has failed first-line regimen, the preferred prophylaxis regimen should be "a second-line regimen". If the source person on the second-line regimen has a detectable viral load, the prophylaxis should be a third line regimen.
- Children above 30kg should receive TDF/3TC/DTG or EFV.
- In children <10 years or less than 30kg, AZT + 3TC is recommended as the preferred backbone regimen for HIV PEP.
- Alternative backbone regimen for this age category will include ABC + 3TC or TDF + 3TC (or FTC). DTG is recommended as the preferred third drug for HIV PEP for children < 10 years.
- An age-appropriate alternative regimen can be identified from LPV/r, ATV/r, RAL, DRV/r.
- Regimen must be continued for at least 28 days or until the result of the HIV status of the source person is known to be negative.
- Nevirapine should never be used for PEP as the risk of fatal hepatotoxicity outweighs the risk of HIV infection.

Sexual Assault

- *This should be initiated as soon as possible (and up to 72 hours post-assault) to optimize the potential benefit.*

Pre-Exposure Prophylaxis (PrEP)

- PrEP is the preemptive use of antiretroviral (ARV) drugs to reduce the probability of HIV negative individuals acquiring HIV infection especially persons who engage in high-risk activity.
- PrEP should be offered only to the category of individuals listed below:
  - Serodiscordant couples
  - Commercial sex workers
  - Injecting drug users
  - Individuals who engage in anal sex on a prolonged and regular basis
- Before initiating PrEP
  - Confirm HIV negative status.
  - Screen and treat for chronic hepatitis B infection.
  - Client should have normal renal function.
- Recommend drugs for PrEP.

- Preferred daily oral dose regimen is TDF+ FTC (Truvada) given as one tablet daily
- Alternate regimen is a daily dose of TDF.
- These drugs are to be taken indefinitely until the individual no longer qualifies as high risk for HIV.

Behavioural interventions

- Mechanisms with established merit:

A: Abstinence
B: Be faithful (mutual fidelity to infected partner)
C: Consistent and correct use of male and female condoms
D: Delay onset of sexual activity
E: Examine yourself
F: Find out your status

- Screening and treatment of sexually transmitted infections
- Encourage Partner Disclosure and Voluntary
- Confidential Couple Counselling (VCCCT)
- Promote the rights and protection of children and infusion women.

Malaria

Introduction

An infectious protozoan disease transmitted by the female Anopheles mosquito.
A major public and private health problem and indeed a cause and consequence of national underdevelopment.
Five species of the parasite cause the disease in humans: *Plasmodium falciparum, P. malariae, P. vivax, P. ovale* and *P. knowlesi* . P. *falciparum* accounts for 98% of all cases of malaria in Nigeria and is responsible for the severe form of the disease. Principal mode of spread; bites from infected female Anopheles mosquito. Peak feeding times are usually dusk and dawn, but also throughout the night.
Other uncommon modes are:

- Blood transfusion
- Mother-to-child transmission

Classification based on clinical course of P.falciparum.

- Asymptomatic parasitaemia
- Acute uncomplicated malaria
- Severe malaria

Asymptomatic parasitaemia

- Affects older children and adults living in high malaria endemicity.
- Have acquired natural immunity to clinical disease.
- Have malaria parasites in the peripheral blood but no symptoms.

Acute Uncomplicated malaria:

Present with Clinical Features, usually non-specific:

- Fever
- Chills

- Headache Malaise
- Aches and body pain
- Weakness
- Tiredness
- Pallor
- Anorexia
- Vomiting
- Bitterness in the mouth
- Excessive sweating
- Pallor
- Hepatosplenomegaly
- Jaundice

***Severe (Complicated) malaria*:**

Is a medical emergency requiring prompt attention

Indication for severity could be clinical or laboratory:

- Clinical:
  - Prostration
  - Impaired consciousness or unrousable coma
  - Failure to feed
  - Respiratory distress
  - Multiple convulsions - more than 2 episodes in 24 hours
  - Circulatory collapse (Algid malaria)
  - Pulmonary oedema (radiological)
  - Abnormal bleeding/DIC
  - Jaundice
- Laboratory:
  - Severe anaemia
  - Hypoglycemia (blood glucose < 2.2 mmol/L)
  - Acidosis (HCO_3^- < 15 mmol/L)
  - Haemoglobinuria (black water fever)
  - Renal impairment (creatinine > 265 μmol/L)
  - Hyperlactataemia (> 5 mmol/L)
  - Hyperparasitaemia (> 5% or 250,000/ μL)

Indicators of a poor prognosis in severe malaria

- Clinical:
  - Marked agitation
  - Hyperventilation (respiratory distress)
  - Hypothermia (<36.5^{0}C)
  - Deep coma
  - Repeated convulsions
  - Bleeding
  - Anuria
  - Haemodynamic shock
- Laboratory:
  - Hyperparasitemia (> 100,000 /μgL; about 2% of cells infected)

- Blood film showing >20% of parasite to be 'late stage'
- Blood film showing > 5% of neutrophils with visible pigments
- Hypoglycemia (<2.2 mmol/L)
- Hyperlactatemia (> 5 mmol/L)
- Acidosis (arterial PH > 7.3, serum HCO> 15 mmol/L)
- Elevated serum creatinine (> 265 µmol/L)
- Elevated total bilirubin (> 50 µmol/L)
- Leukocytosis (>12,000 /µL)
- Severe anaemia (PCV >15%)
- Coagulopathy
- Decreased platelet count (< 50,000 /µL)
- Prolonged prothrombin time
- Decreased fibrinogen

Other early Complications include:

- Pneumonia
- Septicaemia
- Preterm contractions/preterm labour
- Abortions
- Low birth weight
- Intrauterine deaths
- Congenital malaria

Late Complications:

- Hyperreactive malaria splenomegaly
- Quartan malaria nephropathy
- Possibly, Burkitt's lymphoma

Cerebral malaria

- A severe form of malaria.
- Malaria with coma persisting for > 30 min after a seizure is considered to be cerebral malaria.
- Occurs usually in children and in non-immune adults.
- Manifests with diffuse and symmetric encephalopathy; focal neurologic signs are unusual.
- Requires prompt and effective therapy to avoid fatality.

Diagnosis of malaria

- Clinical diagnosis alone is presumptive, gives room for over-diagnosis.
- Confirmatory diagnosis is based on the detection of parasites in the blood.
- Parasitological confirmation is recommended in all suspected cases of malaria.
- Light microscopy remains the gold standard.
- Microscopic diagnosis should not delay appropriate treatment if there is a clinical suspicion of severe malaria.
- Rapid Diagnostic Test is used in Primary Health Care levels

Differential Diagnoses

- Typhoid fever
- Meningitis

- Encephalitis
- Septicaemia
- Other causes of fever

Investigations

- Blood smear for malaria parasites
- Packed cell volume; haemoglobin concentration
- White cell count with differentials
- Blood sugar
- Urinalysis
- Electrolytes and Urea; Creatinine Stool microscopy for ova; occult blood Chest radiograph
- Cerebrospinal fluid biochemistry; microscopy, culture, and sensitivity

Treatment Goals

- Eradicate parasitaemia
- Prevent progression to severe malaria.
- Attend to the immediate threats of life.
- Prevent transmission of gametocytes.
- Provide personal protection against malaria.
- Provide chemoprophylaxis in susceptible groups.

Drug Treatment

- All patients suspected of malaria should have prompt parasitological confirmation by microscopy or RDTs before treatment.
- Uncomplicated malaria
  - Artemisinin-based Combination Therapy (ACTs) are the current recommended treatments for uncomplicated malaria globally.
  - ACTs are the recommended treatment of uncomplicated malaria in all trimesters of pregnancy.
  - Artemether-Lumefantrine (AL) is the medicine of choice while Artesunate-Amodiaquine (AA), Dihydroartemisinin Piperaquine and Artesunate-Pyronaridine are alternatives.

Table 10:7 Dosage Regimen for AL

Weight	No of tablets/dose (20/120) mg tab	No of tablets/dose (40/240) mg tab	No of tablets/dose (80/480) mg tab
5 -- <15 kg	1 tab twice daily x 3 days	NA	NA
15 -- <25 kg	2 tabs twice daily x 3 days	1 tab twice daily x 3 days	NA
25 -- <35 kg	3 tabs twice daily x 3 days	NA	NA
> 35 kg	4 tabs twice daily x 3 days	2 tabs twice daily x 3 days	1 tab twice daily x 3 days

Table 10.8: Dosage Regimen for AA:

Weight/Age	Tablet strength	Dosage Regimen
4.5 kg-- < 9 kg (2 months - 11 months)	25 mg/67.5 mg	1 tablet once daily x 3 days
9 kg - <18 kg (1 year - 5 years)	50 mg/135 mg	1 tablet once daily x 3 days
18 kg - < 36 kg (6 years - 13 years)	100 mg /270 mg	1 tablet once daily x 3 days
36 kg and above 14 years and above	100 mg /270 mg	2 tablets once daily x 3 days

Treat infants less than 5 kg with ACTs under supervision by the health care provider.

Other ACTs available for the treatment of uncomplicated malaria:

- Artesunate-Mefloquine
- Dihydroartemisinin- Piperaquine
- Artemisinin- Piperaquine

Pre-referral treatment of severe malaria

- To mitigate poor outcome, pre-referral treatment should be offered in cases of severe disease.
- As soon as a presumptive diagnosis of severe malaria is made, recommended pre-referral treatment options include any of these; rectal Artesunate, Artesunate IM, Artemether IM or Quinine IM, in the order of preference.
- Dosing regimen
  - IM Artesunate: 3 mg/kg (children <6 years or < 20 kg); 2.4 mg/kg (older children and adults)
  - Rectal Artesunate: 10 mg/kg body-weight single dose.
  - IM Artemether: 3.2 mg/kg
  - IM Quinine: 10 mg/kg

Severe malaria

- Parenteral Artesunate is the drug of choice, and treatment should be started without delay.
- If not available other effective parenteral antimalarial should be commenced.
- Adults and Children > 20 kg:
  - Artesunate 2.4 mg/kg (BW) IV or IM given on admission (time 0), then 12 hours and 24 hours, then once a day. There is no upper limit to the total dose of artesunate.
- Children ≤ 20 kg:

- Artesunate 3 mg/kg (BW) IV or IM given on admission (time 0), then 12 hours and 24 hours, then once a day.
- Parenteral artemether or quinine is an alternative if parenteral artesunate is not available.

- Artemether 3.2 mg/kg (BW) IM given on admission then 1.6 mg/kg (BW) per day; or
- Quinine 20 mg salt/kg (BW) on admission (IV infusion or divided IM injections), then 10 mg/kg (BW) every 8 hours; infusion rate should not exceed 5 mg/kg (BW) per hr.

Note: Give parenteral antimalarials in the treatment of severe malaria for a minimum of 24 hours once started (irrespective of the patient's ability to tolerate oral medications earlier) and thereafter complete treatment by giving a complete course of the recommended ACT.

Follow-on Treatment

- After the initial 24 hours parenteral treatment, and once the patient can tolerate oral therapy, complete treatment with a full course of ACT (Arthemeter + Lumefantrine, OR Artesunate + Amodiaquine, OR Dihydroartemisinin + Piperaquine OR Pyronaridine + Artesunate) for 3-days irrespective of the number of days for which patient was on parenteral artesunate prior to the commencement of oral administration.

In all cases, patient's progress should be monitored, and management changed as deemed necessary.

Supportive Measures

- Paracetamol (oral/rectal) for symptomatic relief
- If temperature is >38.5°C, wipe with wet towel, and fan to lower the temperature.
- Pulmonary oedema
  - Nurse in cardiac position
  - Give oxygen.
  - Furosemide 2 - 4 mg/kg intravenously
  - Exclude anaemia as the cause of pulmonary oedema
- Renal failure
  - Give fluids if patient is dehydrated: 20 ml/kg of chloride injection 0.9%, and challenge with furosemide 1 - 2 mg/kg
  - Catheterize to monitor urinary output.
  - If no urine within the next 24 hours, refer to Nephrologist for possible renal replacement therapy
- Profuse bleeding
  - Transfuse with screened fresh whole blood.
  - Give pre-referral treatment and refer urgently.
- If meningitis is suspected, and cannot be excluded immediately by lumbar puncture, give appropriate antibiotics.
- Other severe diseases should be treated accordingly.

Treatments not recommended

- High dose Corticosteroids and other anti-inflammatory agents

- Agents used for cerebral oedema e.g. Urea.
- Adrenaline
- Heparin

Notable Adverse Drug Reactions, Contraindications and Caution

- Mefloquine should be avoided if the patient had cerebral malaria because of the increased risk of seizure, encephalopathy and psychosis.

Prevention

- Personal protection
  - Reduce the frequency of mosquito bites by avoiding exposure to mosquitoes at their peak feeding times.
  - Use insect repellants.
  - Put on suitable clothing.
  - Use insecticide-impregnated bed nets (ITN)
- Chemoprohylaxis: Indicated for:
  - Children born to non-immune mothers in endemic areas
  - Pregnant women (see section on antenatal care)
  - Travellers to endemic areas
  - *People with sickle cell anaemia should have regular chemoprophylaxis* (see Sickle Cell Diseases)

Recommended antimalarial prophylaxis in Nigeria:

- The recommended chemoprophylaxis for non-immune visitors should be available in the visitor's country of origin. Mefloquine, and Atovaquone-Proguanil are recommended for use in Nigeria.

Mefloquine:

- 5 mg base/kg weekly, giving an adult dose of 250 mg base weekly.
- If tablets are available, an appropriate fraction can be given to child aged 8 - 13 years
- Contraindicated in children <8 years and in pregnant women
- Commence 2 - 3 weeks prior to arrival, weekly in country and thereafter for 2-3 weeks after departure.

Atovaquone-Proguanil

- Fixed dose combination administered daily.
- Commence 1-2 days prior to arrival, then continue throughout stay, and for 7 days after departure.

Table 10.9: Atovaquone-Proguanil Dosage Regimen

Weight(kg)	Total daily dose	Dosage Regimen
11-20 kg	62.5 mg/25 mg	1 Paediatric tablets daily
21-30 kg	12.5 mg/50 mg	2 Paediatric tablets daily as a single dose
31-40 kg	187.5 mg/75 mg	3 Paediatric tablets daily as a single dose
>40 kg	250 mg/100 mg	1 Tablet (adult strength) as a single dose

- Chemoprophylaxis is not recommended for individuals living with areas of intense transmission.

Rabies

Introduction

An acute progressive encephalitis zoonotic disease caused by a bullet-shaped rhabdovirus called rabies virus.
The virus is a single-stranded enveloped RNA virus and has the potential to infect all mammals.

Transmitted by infected secretions, usually saliva.
Infected dogs are responsible for 99% of human rabies infection.
Wildlife -foxes, wolves, jackals, bats, racoons, skunks, or mongoose account for a small proportion of transmission in non-endemic countries.

Infection occurs from scratch and bites or when infected secretions are in direct contact with exposed skin or mucous membranes.

Occasionally contact with a virus-containing aerosol or the ingestion or transplant of infected tissues may initiate the disease process.

Clinical Features

*A*fter an incubation period of 1 to 3 months (sometimes from 1 week to 1 year), infected patients develop:

- Symptoms around site of bite/scratch
  - Pain
  - Parasthesiae
- A non-specific prodrome of 1 - 4 days consisting of
  - Fever
  - Headache
  - Malaise
  - Myalgia
  - Anorexia
  - Nausea
  - Vomiting
  - Sore throat
  - Cough
  - Paraesthesia
- An acute encephalitic stage (presenting as forms of furious or paralytic rabies)
  - Furious rabies
  - Signs of hyperactivity-agitation, combativeness, restlessness
  - Excitable behaviour
  - Hallucinations and pyschosis
  - Confusion

- Muscle spasms
- Meningismus
- Seizures
- Hydrophobia (fear of water)
- Sometimes aerophobia (fear of drafts or of fresh air).
- Death occurs after a few days due to cardio-respiratory arrest.
- Paralytic
- Muscles gradually become paralyzed, starting at the site of the bite or scratch.
- A coma slowly develops, and eventually death occurs.
- Brainstem dysfunction
- Diplopia
- Facial paralysis
- Optic neuritis
- Difficulty with deglutition
- Priapism
- Spontaneous ejaculation
- Coma

Rabies, once symptomatic is usually fatal.

Differential Diagnoses

- Guillain-Barre syndrome
- Other causes of viral encephalitis
- Poliomyelitis
- Allergic encephalomyelitis

Diagnosis

- By diagnostic techniques detecting whole viruses, viral antigens, or nucleic acids in infected tissues (brain, skin, or saliva) intra-vitam and postmortem.
- Fluorescent antibody testing on brain tissue is the gold standard for rabies diagnosis

Investigations

- Full Blood Count and differentials
- Urea and Electrolytes
- Culture of secretions
- Cerebro Spinal Fluid (CSF) analysis
- Serology
- Pulmonary Chain Reaction (PCR)
- Direct rapid immunohistochemistry tests
- Enzyme-linked immunosorbent assays

Treatment Goals

- Disinfect wound; avoid early suturing.
- Provide passive immunization with anti-rabies antiserum
- Provide active immunization with the vaccine.

Non-drug Treatment

- Wound care
  - The wound or site of exposure should be:

- Cleansed under running water.
- Washed for several minutes with soapy water.
- Disinfected and dressed simply.
- *It should not be sutured immediately.*

Drug Treatment/Vaccination

- Purified cell culture and embryonated egg-based rabies vaccines (CCEEVs) is recommended.
- CCEEVs can be administered by intradermal (ID) or IM injection.
- Post-exposure prophylaxis (PEP) and Pre-exposure (PrEP) regimens require a series of vaccine injections according to the manufacturers recommended schedules.
- Most vaccine manufacturers currently recommend:
  - for PrEP a 1-site IM 3-dose regimen and
  - for PEP a 1-site IM 5-dose regimen on days 0, 3, 7, 14 and 28 or
  - 4-dose Zagreb regimen (2-site IM on day 0 and 1-site IM on days 7 and 21).

Schedules

- Unimmunized persons or those whose prophylaxis is probably incomplete.
  - Rabies (purified cell culture) vaccine:
  - Adult: 1 ml by deep subcutaneous or intramuscular injection in the deltoid region on days 0, 3, 7, 14 and 28

Plus:

  - Rabies immunoglobulin (RIG) given on day 0
  - Maximum dose calculation for RIG is 40 IU/kg body weight for equine derived RIG (eRIG), and 20 IU/kg body weight for human derived RIG (hRIG).
  - *Child: same* as for adult.
- For fully immunized persons:
  - Rabies (purified cell culture) vaccine
  - *Adult:* 1 ml by deep subcutaneous or intramuscular injection in the deltoid region on days 1 and 3
  - *Child: same* as for adult

<u>Post-exposure prophylaxis (PEP)</u>

- Should be initiated as soon as possible after exposure.
- The decision to initiate PEP should be based on contact categories below:

Table 10.10: Decision to initiate PEP

Categories of contact with suspect rabid animal	Description	PEP
Category I	Touching or feeding animals, animal licks on intact skin (no exposure)	Washing of exposed skin surfaces, no PEP
Category II	Nibbling of uncovered skin, minor scratches, or abrasions without bleeding (exposure)	Wound washing and immediate vaccination
Category III	Single or multiple transdermal bites or scratches, contamination of mucous membrane or broken skin with saliva from animal licks, exposures due to direct contact with bats (severe exposure)	Wound washing, immediate vaccination, and administration of rabies immunoglobulin

- Pregnancy not a contraindication to rabies vaccine

Supportive Measures

- Allay anxiety: reassure.
- Other measures as appropriate for clinical situation

Prevention

Pre-exposure prophylaxis

Should be offered to persons at high risk of exposure and/or contact with rabies virus:

- Veterinarians
- Cave explorers
- Laboratory workers who handle the rabies virus
- Animal handlers
- Workers in quarantine stations
- Field workers who are likely to be bitten by infected wild animals
- Certain port officials Bat handlers
- Persons living in (or traveling to) areas where rabies is enzootic and/or where there is limited access to prompt medical care.
- Those caring for patients caring for patients with rabies (Although there is no proven evidence of human transmission)
- If there is substantial risk of exposure, and rapid access to post-exposure prophylaxis is limited, give pre-exposure prophylaxis Rabies vaccine

- PrEP schedule
  - 2-site ID vaccine administered on days 0 and 7

Or

  - 1-site IM vaccine administration on days 0 and 7. (1 ml by deep subcutaneous or intramuscular injection in the deltoid region)
  - Booster doses every 2 - 3 years for those at continued risk.

Tetanus

Introduction

A neurologic disorder characterized by increased muscle tone and spasm that is caused by tetanospasmin, a powerful protein toxin elaborated by *Clostridium tetani.* C. tetani is ubiquitous, and therefore affects all ages and sexes, especially in low socioeconomic settings.

The bacteria are found in the soil, inanimate environment, animal faeces and occasionally in human faeces. Portals of entry:

- Umbilical stump
- Female genital mutilation (FGM)
- Male circumcision
- Abortion sites
- Penetrative wounds (e.g., nail puncture or intramuscular injection)
- Head injury; scalp wounds
- Traditional scarification (e.g. for tribal identity)
- Trado-medical incisions
- Post-operative surgical sites
- Chronic otitis media

Clinical Features

- Generalized tetanus.
  - Lock jaw (trismus)
  - Dysphagia
  - Stiffness or pain in the neck, shoulder, and back muscles
  - Risus sardonicus (from facial muscle involvement)
  - Rigid abdomen and sti ffproximal limb muscles
  - Intermittent reflex spasms in response to stimuli (eg, noise, touch)
  - Opisthotonos (ie, flexion and adduction of the arms, clenching of the fists, and extension of the lower extremities).
  - Consciousness and sensorium are intact.
- Neonatal tetanus (tetanus neonatorum)
  - Poor feeding
  - Irritability
  - Rigidity
  - Spasms
  - Poor prognosis
- Localized tetanus
  - Increased tone: spasms are restricted to the muscles near the wound.
  - Prognosis is good

- Cephalic tetanus
  - Follows head injury or ear infection.
  - Trismus
  - Dysfunction of one or more cranial nerves, often the 7th nerve
  - May become generalised
  - Mortality is high.

Diagnosis

- Entirely clinical

Differential Diagnoses

- Alveolar abscess
- Strychnine poisoning
- Dystonic drug reactions
- Hypocalcaemic tetani
- Meningitis/encephalitis
- Acute abdomen

Complications

- Autonomic dysfunction
  - Labile or sustained hypertension
  - Tachycardia
  - Dysarrhythmias
  - Hyperpyrexia
  - Profuse sweating
  - Peripheral vasoconstriction
  - Cardiac arrest
  - Aspiration pneumonia
  - Fractures
  - Muscle rupture
  - Deep vein thrombophlebitis
  - Pulmonary emboli
  - Decubitus ulcers
  - Rhabdomyolysis

Investigations

- Wound swab for microscopy, culture, and sensitivity
- Cerebrospinal fluid for biochemistry; microscopy, culture, and sensitivity most
- Full Blood Count; ESR
- Urinalysis; urine microscopy, culture, and sensitivity
- Blood glucose
- Electrocardiography
- Serum Electrolytes, Urea and Creatinine
- Electromyography

Treatment Goals

- Eliminate the source of toxin
- Neutralize unbound toxin.
- Prevent muscle spasms.

- Monitor the patient's condition and provide support (especially respiratory support) until recovery.

Non-drug Treatment

- Admit patient to a dark and quiet room or intensive care unit where available.
- Protect airway.
- Explore wounds.
- Cleanse and thoroughly debride the wound.
- Provide intubation or tracheostomy for hypoventilation.
- Physiotherapy
- Monitor bowel, bladder and renal function.
- Prevent decubitus ulcers.

Drug Treatment

- Antibiotics
  - Metronidazole
  - *Adult: 500* mg intravenously, every 6 hours for 10 days
  - *Child*
    - neonate, initially 15 mg/kg by intravenous infusion then 7.5 mg/kg twice daily
    - 1 month - 12 years: 7.5 mg/kg (maximum 400 mg) every 8 hours
    - 12 - 18 years: 400 mg every 8 hours

Or:

  - Benzylpenicillin (Penicillin G)
  - *Adult:* 0.6 - 2.4 g daily by slow intravenous injection or infusion in 2 - 4 divided doses; higher doses in severe infections
  - *Child:*
    - 1 month - 18 years, 100 mg/kg in 4 divided doses, every 6 hours; dose doubled in severe infections (maximum 2.4 g, every 4 hours)
    - 1 - 4 weeks: 75 mg/kg daily in 3 divided doses, every 86 hours; dose doubled in severe infection.
    - Preterm neonate and neonate under 7 days: 25 mg/kg, every 12 hours; dose doubled in severe infection.
    - NB: Metronidazole is preferable as penicillin is a known antagonist of gamma-aminobutyric acid (GABA), as is tetanus toxin.
- Antitoxin
  - Human tetanus immune globulin (TIG)
  - *Adult:* TIG 500 units by IM injection or intravenously (IV)—depending on the available preparation
  - Administer antitoxin before manipulating the wound
  - In addition, give 0.5 mL of tetanus toxoid by IM injection at a separate site.
  - Tetanus disease does not induce immunity; patients without a history of primary TT vaccination should receive a second dose 1–2 months after the first dose and a third dose 6–12 months later.
- Control of muscle spasm

- Diazepam
- *Adult:* 20 mg intravenously slowly stat and titrate up to 250 mg/day in infusion
- *Child:* 1 month - 18 years: 100 - 300 µg/kg repeated every 1 - 4 hours by slow intravenous injection; could also be administered by intravenous infusion or by nasoduodenal tube as follows: 3 - 10 mg/kg over 24 hours, adjusted according to response.

Or

- Phenobarbital (dilute injection, 1 in 10 with water for injection)
- *Adult:* 10 mg/kg intravenously at a rate of not more than 100 mg/minute, up to maximum total dose of 1 g
- *Child:* 5 - 10 mg/kg at a rate not more than 30 mg/minute

- Treat autonomic dysfunction with vasopressors, chronotropic agents if necessary
- Hydration: To control insensitive and other fluid losses
- Enteral or parenteral nutrition as determined by clinical situation
- Treat intercurrent infections.

Treatment of tetanus-prone wounds

- TIG by intramuscular injection, Adult and Child: 250 units,
- Increased to 500 units if wound older than 12 hours or there is risk of heavy contamination or if patient weighs more than 90 kg.
- Second dose of 250 units given after 3–4 weeks if patient is immunosuppressed or if active immunization with tetanus vaccine contraindicated.

Notable Adverse Drug Reactions, Contraindications and Caution

- Diazepam is adsorbed from plastics of infusion bags and giving sets; causes drowsiness and light headedness; hypotension.
- Benzyl penicillin: hypersensitivity reactions
- Metronidazole: taste disturbances
- Phenobarbital: caution in renal and hepatic impairment
- May cause paradoxical excitement, restlessness, and confusion in the elderly; hyperkinesia in children.

Prevention

- Active immunization of all partially or un-immunized adults, those recovering from tetanus, all pregnant women, infants and un-immunized (missed) children.
- Health education
- Improvement in socio-economic status

Trypanosomiasis (Sleeping sickness)

Introduction

African trypanosomiasis is an acute or chronic disease caused by *Trypanosoma brucei* namely *T. brucei* rhodesiense (East Africa) or *T. brucei* gambiense (West Africa)

The disease is transmitted to humans by the bites of infected tsetse fly (Glossina genus) .

Clinical Features

- Early stage:
  - A nodule or chancre following a bite.
  - Fever
  - Headache
  - Dizziness
  - Weakness
  - Joint pains
  - Significant posterior cervical (Winterbottom sign) and supraclavicular lymphadenopathy
  - Splenomegaly
- CNS stage:
  - Occurs six months to several years later.
  - Characterized by behavioural changes with hallucinations, delusions, and disturbances of sleep with drowsiness during the day and terminating with stupor.

Investigations

- Peripheral blood film for the detection of trypanosomes
- Rapid Card Agglutination Trypanosomiasis Test (CATT) for antibody detection

Diagnosis

- Presumptive
- Based on the clinical suspicion and history of exposure to the tsetse fly
- A finding of the trypanosome in peripheral blood, lymph node aspirate or CSF is confirmatory.

Differential Diagnoses

- Malaria fever
- Meningitis
- Viral infections involving the CNS

DrugTreatment

- Early stage
  - Suramin (treatment of T.b. rhodesiense)
  - *Adult and child:* 5 mg/kg on day 1, 10 mg/kg on day 3, and 20 mg/kg on days 5, 11, 17, 23 and 30

Or

  - Pentamidine (treatment of T. b. gambiense)

Dose: 4 mg/kg/day IM or IV (diluted in saline in 2-hour infusions) x 7 days

- Late stage
  - Melarsoprol (treatment of both gambiense and rhodesiense infections)
  - *Adult:* 2.0 - 3.6 mg/kg intravenously in 3 divided doses for 3 days, followed 1 week later with 3.6 mg/kg intravenously in 3 divided doses for 3 days 10 - 21 days later: 3.6 mg/kg intravenously in 3 divided doses for 3 days.

Or

- Nifurtimox-eflornithine combination therapy (NECT)- (treatment of T. b. gambiense)
- Nifurtimox 15 mg/kg per day orally in three doses x 10 days, and eflornithine 400 mg/kg/day IV in two 2-hour infusions (each dose diluted in 250 mL of water for injection) x 7 days.
- Eflornithine in children weighing <10 kg: dilute in 50 mL of water for injection. Children weighing 10 - 25 kg: dilute in 100 mL of water for injection.

Caution/Follow up

- Urine should be examined for casts and protein before and after treatment with suramin.
- Lumbar puncture follow-up for at least 1 year after treatment with melasoprol is required.
- There is no test of cure for African trypanosomiasis.
- After treatment, patients should be closely followed for 24 months and monitored for relapse.
- Recurrence of symptoms will require examination of body fluids, including CSF, to detect the presence of trypanosomes.

Prevention

- Surveillance and treatment
- Chemoprophylaxis
- Vector control by selective clearing of vegetation and use of insecticides.

Typhoid Fever (Enteric Fever)

Introduction

A multisystemic illness caused primarily by *Salmonella enterica* serotype typhi and, to a lesser extent, *S. enterica s*erotypes paratyphi A, B, and C.
It is usually spread through contaminated food or water.
Once *Salmonella typhi* bacteria are eaten or drunk, they multiply and spread into the bloodstream.
Risk is higher in populations that lack access to safe water and adequate sanitation.
Humans are the only reservoir fo salmonella.
Incidence of chronic carriage is higher among women and persons with biliary abnormalities: gall stones, carcinoma of the gall bladder; also higher in persons with gastrointestinal malignancies.

Clinical Features

- Incubation period ranges from 3 - 21 days
- High grade fever (38.8^{0}C to 40.5^{0}C)
- A prodrome of non-specific symptoms:
  - Chills
  - Headache
  - Anorexia

- Cough
- Weakness
- Sore throat
- Dizziness
- Muscle pains
- Gastro-intestinal:
- Diarrhoea or constipation
- Abdominal pain
- Rash (rose spots)
- Hepato-splenomegaly
- Epistaxis
- Relative bradycardia

Complications

- Neuropsychiatric symptoms
- Intestinal perforation
- Gastro-intestinal haemorrhage
- Pancreatitis
- Hepatitis
- Splenic abscesses
- Meningitis
- Nephritis
- Pneumonia
- Osteomyelitis
- Chronic carrier state

Investigations

- *A positive culture is the 'gold standard' for the diagnosis of typhoid fever.*
- Specimens for culture may be obtained from the blood, stool, urine, bone marrow; gastric and intestinal secretions.
- *There are no diagnostic tests other than positive cultures.*

Non-specific

- Full Blood Count
- Leucopenia, neutropenia, leucocytosis can develop early, especially in children; late if complicated by intestinal perforation or secondary infection
- Liver function tests: values may be elevated.
- Electrocardiography:
  - ST and T wave abnormalities may be present.
- Serological tests
- Widal test gives high rates of false positives and negatives

Treatment Goals

- Eliminate *S. typhi* and *S. paratyphi*
- Prevent Complications.
- Prevent chronic carrier status.

Drug Treatment

- *Antibiotics*

- at least 2 - 4 minutes; 2 - 4 g daily in severe infection; may also be given by intravenous infusion
- *Child:*
  - neonate, 20 - 50 mg/kg daily by intravenous injection over 60 minutes
  - infant and child under 50 kg: 20 - 50 mg/kg daily; up to 80 mg/kg in severe infection;
  - over 50 kg: adult dose
  - *Doses of 50 mg/kg and above should be given by intravenous infusion only*
  - *Intramuscular doses over 1 g should be divided between more than one site; single intravenous doses above 1 g should be given by intravenous infusion only*

Or:

- Ciprofloxacin:
- *Adult:* 500 - 750 mg orally every 12 hours

Or

- 200 - 400 mg every 12 hours by intravenous infection over 30 - 60 minutes
- *Child and adolescent:* not recommended.

- Parenteral fluid administration
- Treat Complications.

Notable Adverse Drug Reactions, Contraindications and Caution

- Ciprofloxacin:
  - Diarrhoea, nausea, vomiting, abdominal discomfort, headache (which are themselves features of the disease)
  - Should be given with caution in pregnancy and during breastfeeding.
  - Not recommended for children or adolescents

Non-drug Treatment

- Nursing care
- Enteral or parenteral nutrition

Prevention

- Eliminate Salmonella by effective treatment of cases, improved sewage management, improved water treatment and improved food hygiene (production, transit, storage, and utilization)
- Typhoid immunization is recommended for those at risk.
- Not a substitute for scrupulous personal and environmental hygiene
- Identify, and treat chronic carriers with amoxicillin or ciprofloxacin daily for 4 - 6 weeks.
- In patients with urolithiasis and schistosomiasis appropriate treatment should be instituted
- Correct anatomic abnormalities associated with the disease surgically.
- Cholecystectomy may be required in some cases

Coronavirus Disease (COVID-19)

Introduction

Covid -19 is a viral illness caused by the severe acute respiratory syndrome coronavirus 2 (SARS-COV-2).

One of seven coronaviruses known to cause disease in humans. Declared a pandemic by WHO in 2019.

Other common diseases due to coronaviruses include: severe acute respiratory syndrome (SARS) and middle east respiratory syndrome (MERS)

Transmission

- From both symptomatic and asymptomatic people
- By close contact through respiratory droplets or by direct contact with infected persons, or by contact with contaminated objects and surfaces, or
- By aerosols, i.e., in enclosed spaces indoors, crowded and inadequately ventilated spaces, or
- During aerosol-generating procedures

Clinical Features

- Fever
- Cough
- Fatigue
- Anorexia
- Shortness of breath
- Myalgia
- Other non-specific symptoms-
- Sore throat, nasal congestion, headache, diarrhoea, nausea and vomiting.
- Loss of smell (anosmia) or loss of taste (ageusia) preceding the onset of respiratory symptoms.
- Children might not report fever or cough as frequently as adults.
- Clinical severity
  - Mild disease
  - Symptomatic patients meeting the case definition for COVID-19 without evidence of viral pneumonia or hypoxia.
  - Moderate disease
  - Adolescent or adult with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing) but no signs of severe pneumonia, including SpO2 ≥ 90% on room air.
  - Child with clinical signs of non-severe pneumonia (cough or difficulty breathing + fast breathing and/or chest indrawing) and no signs of severe pneumonia.
  - Fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40
- Severe disease
  - Adolescent or adult with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing) plus one of the following: respiratory rate > 30 breaths/min; severe respiratory distress; or SpO2 < 90% on room air.

- Child with clinical signs of pneumonia (cough or difficulty in breathing) + at least one of the following:
- Central cyanosis or Sp O2 < 90%; severe respiratory distress (e.g. fast breathing, grunting, very severe chest in-drawing); general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions (87).
- Fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40
- Critical disease
- Any one of the following
- Acute respiratory distress syndrome (ARDS)
- Sepsis
- Septic shock
- Acute thromobosis i.e., pulmonary embolism, acute coronary syndrome, acute stroke
- Multisystem inflammatory syndrome temporally associated with COVID-19 in children and adults.

Risk factors associated with severe disease.

- Age more than 60 years (increasing with age).
- Underlying noncommunicable diseases (NCDs):
  - Diabetes, hypertension, cardiac disease, chronic lung disease, cerebrovascular disease, dementia, mental disorders, chronic kidney disease, immunosuppression, obesity, and cancer.
- In pregnancy,
  - Increasing maternal age, high BMI, non-white ethnicity, chronic conditions, and pregnancy specific conditions such as gestational diabetes and pre-eclampsia.
  - Smoking.

Diagnosis

- Gold standard is viral nucleic acid (RNA) detection by polymerase chain reaction.
- Viral antigen detection
- Detection of antibodies to the virus (not routinely recommended for diagnosis)

Investigations

- FBC & Differentials
- Chest X-ray
- Chest CT scan
- Renal function tests
- Blood gas analysis
- C-reative protein, Lactate dehydrogenase, D-dimer and ferritin levels
- Clotting profile
- Immunological markers
- Sputum analysis for respiratory pathogens

- Blood culture
- Liver function tests

Complications

- Thromboembolism-Stroke, deep venous thrombosis, pulmonary embolism, or acute coronary syndrome
- Acute liver injury
- Acute kidney injury
- Acute cardiac injury
- Disseminated intravascular coagulation (DIC)
- Sepsis and septic shock
- Acute respiratory failure
- Secondary infection
- Multiorgan failure

Non-drug Treatment

- Implement infection prevention and control measures.
- Decide on home-based care or hospital care depending on severity and other factors.
- Provide supportive care- alleviate symptoms, as necessary.
- Manage co-morbidities such as hypertension and diabetes, etc.
- For hospitalized patient:
  - Provide supplemental oxygen in cases of hypoxaemia targeting SpO2 ≥ 94%
  - In patients with ARDS or respiratory failure consider non-invasive or invasive mechanical ventilation
  - Identify other co-infections and treat according to local guidelines.

Drug Treatment

- Consider corticosteroids (i.e., dexamethasone, hydrocortisone, or prednisone) for the treatment of patients with severe and critical COVID-19; duration of treatment of 7-10 days.
- Dexamethasone 6 mg daily (oral or IV)
- Hydrocortisone 160 mg (i.e. 50 mg every 8 hours or 100 mg every 12 hours),
- Prednisolone 40 mg daily
- Methylprednisolone 32 mg (8 mg every 6 hours)
- Consider thromoboprophylaxis for hospitalized severe and critical COVID-19
  - Preferable: Low molecular weight heparin (enoxaparin) SC 40 mg every 24 hours.
- Manage Complications according to local guidelines.

Prevention

- Non-pharmacological interventions
- Vaccination

CHAPTER 11:

ONCOLOGY

Cancer Therapy

Introduction

Cancer is abnormal and rapid cell growth with the potential to invade near or distant organs. It is the 2nd leading cause of death globally. Common adult cancers occur in the lung, breast, colon and rectum, liver, cervix, prostate and the ovaries. Some childhood cancers are leukaemias, lymphomas, Wilm's tumour, neuroblastoma, rhabdomyosarcoma and retinoblastoma. This section focuses mainly on adult tumours.

Risk factors

Genetics, family history, occupational exposures (radiation exposure and hydrocarbons) tobacco, obesity, alcohol, certain infections

Classification

- ***Based on tissue of origin***
  - ***Carcinomas are derived from epithelial cells***
  - Sarcomas are derived from mesenchymal cells (bone, cartilage, muscle, fat, nerve, etc.)
  - Lymphomas / Leukaemias are derived from blood forming cells
  - Blastomas are derived from embryonic cells
  - Germ cell tumours are derived from pluripotent cells

Clinical Features

- Local: as lumps or ulcers
- Regional: lymph nodes, satellite nodules, skin involvement, infiltration of surrounding tissues or structures
- Systemic: evidence of wider metastasis or dissemination; non-specific paraneoplastic syndromes, etc.
- Emergency: local or metastatic Complications

Any unusual feelings of ill-health, unexpected bleedings, unexplained weight loss, should trigger a suspicion of cancer.

Investigation

Tissue diagnosisis the hallmark of diagnosis, and it must be confirmed prior to initiation of treatment.

- Cytology : From body fluid or discharge or cell scrapings/shavings; fine needle aspiration biopsy/cytology (FNAB/C) of solid tumours
- Histopathology: Core tissue obtained from specialized needles (e.g. Tru cut needle for solid tumours, Vim Silverman needle, Menghini needle), incisional/wedge biopsy, excision biopsy.

NOTE: *Tissue specimens obtained from patients should be subjected to pathological assessment. Surgical specimen from any patient should not be* ***DISCARDED*** *without histopathological assessment.*

- Immunohistochemistry: Specialized studies to further characterize cancers

e.g. breast cancer.
- Others: FBC, Electrolyte, Urea and Creatinine, LFT, Plain x-ray, USS, Endoscopy, Radionuclide bone scan, CT scan, MRI, Tumour markers like CEA, CA 19-9

Treatment

Undertaken by a multi-disciplinary team. This team includes surgical oncologists, medical oncologists, radiation oncologists, radiologists, pathologists, nurse oncologists, psycho-oncologists, genetic counselors, etc.
Others:

Specific treatment modalities

Local/Loco-regional

- Surgery
  - Simple excision: complete tumour excision; risk of local recurrence is high, therefore NOT advised
  - Wide excision: complete tumour excision with minimum of 2cm tumour-free margin in all planes around the tumour
  - Radical excision: complete tumour excision with loco-regional control of lymph nodes
  - Resection of metastasis (metastatectomy) e.g. localized liver, lung and brain metastases

Oncologic emergencies

- Relief of obstruction, perforation, bleeding, fistula, etc
- Palliative operations: e.g. tumour debulking (neo-adjuvant chemotherapy allows more definitive resection), bypass surgeries like use of stents, gastro-enterostomies, etc.
- Reconstruction and rehabilitation
- Radiotherapy
- Neo-adjuvant (tumour debulking prior to surgery)
- Adjuvant (post-surgery)
- Localized metastasis
- Palliation
- Pain control
- Bleeding control

Systemic:

- Chemotherapy
  - For locally advanced or metastatic tumours
  - Tissue diagnosis must be established prior to use of chemotherapy
  - Neo-adjuvant or adjuvant use
  - Appropriate use of combination therapy
  - Calculate tolerable doses based on body surface area.
  - Supportive therapy include anti-emetics, anxiolytics, intravenous fluid hydration, etc.
  - Functional status and quality of life should be weighed against the benefit of chemotherapy
  - Objective tumour response should be measured using Response

Evaluation Criteria In Solid Tumours (RECIST): complete response, partial response, stable disease, progressive disease. Assess tumour response after every two cycles of chemotherapy.

- Endocrine/Hormonal therapy
  - Anti-oestrogens (e.g. tamoxifen) in breast cancer; oestrogens in prostate cancer
  - Neo-adjuvant, adjuvant, others
- Biologic response modifiers
- Interferons, cytokines, growth factors, immune based interventions, monoclonal antibodies

Treatment of complications of cancer

- Complications can arise from cancer or its treatment. It is still pertinent to refer cancer patients for specialist care as much as it is feasible.
- Pain:Analgesic ladder, antidepressants, anxiolytics, bisphosphonates (for bone metastasis and pain), radiotherapy, palliative care team
- ***Fungating malignant ulcers*** e.g. breast, soft tissue sarcoma, etc.: topical dressing with metronidazole and honey, topical dressing with formalin-soaked gauze for multiple-site bleeding, antibiotics if there is evidence of systemic infection
- Malignant pleural effusion and/or widespread lung parenchyma metastasis: drainage of effusion by thoracocentesis under aseptic conditions; closed thoracostomy tube drainage (CTTD) if massive with tetracycline-induced pleurodesis; breathing support with bronchodilators, steroids, supplemental oxygen, opioid analgesics and a course of antibiotics
- Brain metastasis: steroids to reduce cerebral oedema, anticonvulsants if indicated, whole-brain radiation therapy. Refer for neurosurgical evaluation, solitary metastasis may be resectable.
- Spinal metastasis: steroids to reduce inflammatory oedema, immobilisation if spinal collapse is imminent, urgent radiation therapy to prevent spinal collapse. Urgent surgical decompression may relieve spinal cord compression, followed with radiation therapy. Pay attention to or refer for sphincteric (urinary and faecal) dysfunction and control
- Long bone metastasis and pathological fracture: analgesics, orthopaedic stabilisation and fixation, radiotherapy
- Limb lymphoedema associated with breast cancer: arm elevation, rubber ball squeeze, mild diuretics in early phases, multilayer bandaging or elastic garments, pneumatic compression and massage, control of co-morbidities like hypertension and diabetes mellitus, mild NSAIDs for lymphangitis, meticulous skin care and prevention of infection

Palliative/Supportive/Terminal care

- Involve palliative care team social workers, family support teams where available and as early as indicated
- Comprehensive end-of-life care addressing physical, psychosocial, spiritual and existential needs and concerns of patients.
- Delivered at home or in hospital, ambulatory clinic, hospice or palliative care uni

Prognosis

- Depends on tissue type, grade and immunohistochemistry; stage at presentation; adequacy of treatment

Screening and Early Detection

- Screening: To identify individuals at risk of specific cancers when they are yet to occur or manifest. Generally, yearly for every one above 40 years of age
  - Earlier and more frequently in those with specific risk factors e.g. family history, genetic predisposition, etc.
  - ***Early detection:*** To identify those already with cancer
  - Examples of screening/early detection modalities:
  - Breast: mammogram, breast ultrasound, clinical breast examination, breast self-examination, genetic testing e.g. BRCA
  - Colo-rectal: faecal occult blood test, colonoscopy, barium enema, digital rectal examination (DRE)
  - Cervical: pap smear, HPV
  - Prostate: prostate-specific antigen, DRE

Cancer Risk Prevention Strategies

- Avoid tobacco smoking, chewing, snuffing, or passive smoking
- Dietary modification e.g. more fruits, vegetables and plant-based food; regular physical activity
- Control of infections e.g. vaccination (e.g. HBV, HPV), Prevention, prompt treatment
- Reduce exposure to ionizing radiation e.g. sunscreen and protective clothing for albinos
- Avoid occupational exposure to chemicals
- Genetic risk assessment and counselling

Breast Cancer

Introduction

A malignant epithelial neoplasm of the breast. It is the most commonly diagnosed cancer in women and is the leading cause of new cases of female cancers in Nigerian women.

Risk factors

- Female gender
- Family history of breast cancer
- Nulliparity
- Late age at first term pregnancy
- Short duration of breast feeding
- Genetic factors
- Lifestyle and environmental factors
- Use of estrogen-containing contraceptive pills, etc

Clinical Features

- Breast: breast lump, bloody nipple discharge, breast or nipple ulceration
- Axilla: armpit swelling, upper limb lymphoedema

- Metastatic: respiratory (cough, breathlessness), liver (abdominal swelling, jaundice), bones (bone pain, pathological fracture), brain (seizures), spine (paraparesis or paraplegia), etc.

Investigation

- FNAC/core needle biopsy/incisional or excision biopsy: For histopathological and immunohistochemical analyses
- Chest x-ray, abdominal USS, bone scan, with or withoutCT chest/abdomen: For Staging
- Others: FBC, LFT, Electrolyte, Urea and Creatinine

Drug Treatment

- Chemotherapy
  - Neoadjuvant (locally advanced, locoregionally advanced, metastatic)
  - Adjuvants
  - Combination chemotherapy (depending on immunohistochemistry, performance index, etc.). Examples: EC, AC, FEC, Docetaxel, Capecitabine, etc.
- Radiotherapy (See section under radiotherapy above)
  - Hormonal therapy: dictated by immunohistochemistry
  - Tamoxifen: for premenopausal women, 20 mg daily for at least 5 years; for postmenopausal women with shifting to aromatase inhibitors later
  - Aromatase inhibitors: for postmenopausal women;
  - Anastrozole 1 mg daily,
  - Letrozole 2.5 mg daily,
  - Exemestane 25 mg daily
  - Trastuzumab for HER2 positive tumours

Surgery

- Lumpectomy/wide excision/quadrantectomy PLUS breast irradiation
- Mastectomy (Simple mastectomy with axillary clearance, modified radical mastectomy)
- Breast reconstruction (early or late)

Follow-up measures

- Lifestyle modifications (reduce exposure to estrogen, quit alcohol and smoking, etc)
- Monthly breast self-examination
- Clinical breast examination
- Periodic imaging e.g. mammogram, chest x-ray, abdominal USS, bone scan

Cervical Cancer

Introduction

A malignant tumour of the cervix. It is the third most common cancer in women globally. 85% of global burden and 88% of cervical cancer death occur in developing countries. Usually due to infection with human papilloma virus (HPV) . Spread through sex or direct contact in the genital area.

Risk factors
- Smoking
- AIDS
- Steroids
- Early onset of sexual activity
- Multiple sexual partners
- Contraceptive pills

Clinical Features
- Abnormal vaginal bleeding (usually post-coital),
- Copious foul-smelling vaginal discharge,
- Tiredness and weight loss,
- Dysuria
- Recto-vaginal fistula

Investigation
- Visual inspection of the cervix
- Pap smear
- HPV DNA test

Treatment
- Cryotherapy
- Cervical conization
- Surgical excision at early stage
- Hysterectomy in late stage
- Chemotherapy and radiotherapy in selected cases

Prevention
- Screening tests
- Timely follow up
- HPV vaccination

Colorectal Cancer

Introduction

Second most frequent cancer in males (after prostate cancer) and 4 inth both sexes (after breast, cervical and prostatic cancers), constituting 5.8% of all new cancer cases in Nigeria.

Risk factors
- Adenomatous polyps
- familial polyposis coli
- Dietary risk factors
- Obesity
- Sedentary lifestyle
- Schistosomiasis, uretero-sigmoidostomy

Clinical Features
- Elective: change in bowel habits, abdominal swelling, abdominal pain, tenesmus, weight loss, anaemia, secondary haemorrhoids
- Emergency: large bowel intestinal obstruction, perforation with peritonitis, lower gastrointestinal haemorrhage, fistulae (recto-vesical, recto-vaginal)

Investigations

- Diagnosis: Colonoscopy and biopsy, barium enema
- Staging: Abdominopelvic USS, Abdominopelvic CT scan, Chest X-ray/CT, IVU, Cystoscopy
- Treatment: Haematological, Biochemical, Tumour markers (CEA), Electrocardiogram, Echocardiography, etc.
- Screening/Early Detection:Digital rectal examination, Faecal tests (occult blood test, immunochemical test, DNA testing). Colonoscopy ,Double contrast barium enema

Treatment

- Surgery: depending on whether elective or emergency and on site
  - Caecum to hepatic flexure: right hemicolectomy
  - Transverse colon: transverse colectomy
  - Left colon: left hemicolectomy
  - Sigmoid colon: sigmoid colectomy
  - Rectosigmoid colon: anterior resection
  - Low rectal: abdomino-perineal resection with terminal colostomy, sphincter-saving excision
  - Anus: abdomino-perineal resection with terminal colostomy, excision plus chemoradiation
  - Bowel preparation
  - Before elective colorectal surgery
  - Regimes: 5-day (traditional, rarely practiced), 3-day, 1-day whole gut lavage, on-table lavage (intra-operative, in emergency situations)
  - Consists of mechanical cleansing (reduced faecal production, enhance faecal evacuation) and antibacterial agents (Erythromycin, Neomycin, Thalazole, Metronidazole)
  - Other surgical operations
  - Isolated hepatic metastatectomy
  - Emergency surgery for obstruction/perforation (resection +/- colostomy), lower gastrointestinal haemorrhage
- Chemotherapy
  - Often as adjuvant
  - Combination regimes: 5 Fluoro-uracil, Folinic acid, Oxaliplatin, Irinotecan, Capecitabine
- Targeted therapy
- Radiotherapy
  - Post-surgery
  - Palliative care
  - Chemo-radiation for anal carcinoma

Lung Cancer

Introduction

This refers to tumours originating in the lung parenchyma or within the bronchi. Incidence is rising due to increase in smoking in both sexes, with nearly half of new cases diagnosed in the low income countries.

Risk factors

- Smoking
- exposure to asbestos
- exposure to heavy chemicals (like radon, nickel, cadmium, chromium, silica, and arsenic)
- exposure to radiation
- COPD
- Chronic bronchitis and genetic mutations

C***linical Features***

- Local tumour effects: cough, breathlessness, haemoptysis, chest pain, weight loss, Horner syndrome
- Distant metastasis: liver, bone, brain
- Paraneoplastic syndrome: hypercalcemia, cushings's syndrome, hypoglycaemia, acromegaly, gynaecomastia

Investigations

- Bronchoscopy plus biopsy
- Mediastinoscopy
- Thoracoscopy or video-assisted thoracoscopy
- Radiologic: chest radiograph, contrast-enhanced chest CT, PET-CT
- Others: FBC, Electrolyte, Urea and Creatinine, LFT and Serum proteins

Treatment

- Depends on the staging
  - mainstay for stage I disease (wedge resection, segmentectomy, lobectomy, pneumonectomy, mediastinal node sampling)
  - Surgery + adjuvant chemotherapy: stages II and III disease
  - Palliative chemotherapy + radiotherapy: for stage IV disease
  - Targeted therapy: in selected cases (eg vascular endothelial growth factor inhibitor like bevacizumab)

Prevention

- Avoidance of smoking including secondhand smoke
- Reducing occupational exposure to lung carcinogens
- Reduction of air pollution

Hepatocellular Carcinoma (HCC)

Introduction

The most common primary liver malignancy. HCC has a huge burden on West Africa due to the high endemicity of a number of risk factors like hepatitis B, C, and HIV. In Nigeria, middle aged individuals, mainly males, are more commonly affected and they present late.

Risk factors

- Cirrhosis
- Hepatitis B and C infection
- alcohol intake
- diabetes

- obesity
- male sex
- aflatoxins
- metabolic and genetic diseases (eg haemochromatosis, Wilson's disease, α anti-trypsin deficiency, tyrosinemia, porphyrias)
- cigarette smoking.

Clinical Features

- Elective: Painful right hypochondrial mass, weight loss, early satiety, fatigue, ascites
- Emergency: Coagulopathy, encephalopathy, acute abdomen (rupture and haemorrhage)

Investigations

- Diagnosis: Liver biopsy
- Radiologic: Abdominopelvic USS, Abdominal CT
- Biochemical: LFT, and Serum proteins, Electrolyte, Urea and Creatinine, Tumour markers (α-fetoprotein, des-gamma-carboxy prothrombin, C-reactive protein)
- Haemotological: FBC

Treatment

- Treatment modality depends on tumour size, location, extrahepatic spread, and underlying liver function
- Surgery: Liver resection - early stages, solitary lesions; arterial ligation for non-resectable lesions
- Others: Systemic chemotherapy, percutaneous ethanol injection, radiotherapy, radiofrequency ablation

Prevention/Screening

- Hepatitis B screening and vaccination
- Abdominal USS/CT
- Serological markers: α-fetoprotein

Soft Tissue Sarcoma

Introduction

Rare disease affecting connective tissue, account for less than 1% of all new cancers yearly. There are more than 50 distinct biologic subtypes affecting blood vessel, lymphatic vessels, nerves, muscle, fat etc in any part of the body.

Clinical Features

- Lumps, pain, ulcers
- Features of metastases, typically to liver and chest

Investigations

- Diagnosis: Trucut/incisional/excision biopsy + histopathology; FNAC may be insufficient for necessary characterization and sub-typing
- Radiologic: Chest X-ray, MRI, CT
- Others: FBC, LFT and Serum proteins, Electrolyte, Urea and Creatinine

Treatment

- Surgery
  - Mainstay of treatment.
  - In early stage disease, the first surgery must be with curative intent
  - Simple excision is NOT advised
  - Wide excision: complete tumour excision with minimum of 2cm tumour-free margin in all planes around the tumour.
  - Radical excision: complete tumour excision with muscle plane or group
  - Resection of isolated metastasis (metastatectomy) e.g. localized liver, lung and brain metastases; when local control of the primary lesion has been achieved
  - For wide and radical excisions, two groups of surgeons are advised where feasible to ensure all-plane tumour-free margins: surgical oncologists and plastic & reconstructive surgeons.
- Radiotherapy
- Chemotherapy
- Targeted therapy

Gastric Cancer

Introduction

Classification is based on macroscopy (Ulcerative, polypoidal, infiltrative or schirrhus) and histopathology (Adenocarcinoma (90%), lymphoma, squamous cell carcinoma, sarcoma, carcinoid)

Clinical Features

- Elective: dyspepsia, early satiety, anorexia, weight loss, anaemia, with or without dysphagia, enlarged nodes (Virchow's node, Sister Mary Joseph node), palpable tumour
- Emergency: upper gastrointestinal haemorrhage, perforation, gastric outlet obstruction

Investigations

- Diagnosis: oesophagogastroduodenoscopy with biopsy for histopathology
- Others:
  - Upper GI (Barium) series
  - Abdominal CT scan
  - Tumour markers like CEA, CA 19-9
  - FBC
  - LFT and Serum proteins
  - Electrolyte, Urea and Creatinine

Treatment

- General: Fluid and nutritional resuscitation of the patient, correction of anaemia, etc.
- Surgery:
  - Surgical resection of the tumour offers the best hope
  - Subtotal resection: preferred to total gastrectomy because of the attendant Complications of the later

- Gastro-jejunostomy: palliative, in advanced cases with gastric outlet obstruction
- Chemotherapy: adjuvant and for inoperable cases
- Targeted therapy
- Radiotherapy
- Palliative care

Cutaneous Squamous Cell Carcinoma

Introduction

This is the second most common skin cancer, mostly located in the head and neck region.

Risk factors

- Albinism
- Ultraviolet radiation,
- Imunosuppression
- Ionizing radiation
- HPV infection

Clinical Features

- Shallow ulcers with elevated margins, pain, bleeding
- Local invasion or distant metastases

Complications

Recurrent bleeding, joint stiffness, muscle weakness, perineural invasion
Investigations

- Wedge biopsy for histopathological analysis
- Others: Plain x-ray, CT scan, MRI

Treatment

- Surgical excision with clear margins
- Others: radiotherapy, chemotherapy

LEUKAEMIA & LYMPHOMA: See section on Haematological diseases
PROSTATIC CANCER: See section on Urology

CHAPTER 12:

PSYCHIATRIC DISORDERS

Alcohol Dependence (Alcoholism)

Introduction

A disorder characterized by a wide spectrum of problems. Central feature is the continued use of alcohol which takes an increasingly dominant place in the user's life in spite of experience of harm related to drinking. Social and genetic factors are thought to be important in pathogenesis

Clinical Features

- Craving tolerance and intoxication
- Withdrawal episodes and compulsive desire to use alcohol,
- Associated physical, psychological, and/or social (e.g., interpersonal, occupational) impairments

Differential Diagnoses

- Dependence on (and withdrawal from) other substances (both prescription and street drugs)
- Co-morbid disorders (anxiety disorders, depressive disorder, bipolar disorder and idiopathic insomnia)

Complications

- Hypertension
- Liver cirrhosis
- Damage to other organs (including the brain)
- Accidents
- Delirium tremens
- Increased mortality (reduce life expectancy)
- Family, social and occupational disability

Investigations

- FBC and differentials, LFT
- Other Investigations as indicated for medical/physical Complications

Treatment Goals

- Reduction in alcohol consumption as an interim measure
- Abstinence as the desired goal
- Rehabilitation
- Prevention of relapse

Non-drug Treatment

- Psychosocial interventions
- Cognitive behavioural therapy
- Marital and family therapy
- Group therapy

Drug Treatment

Only occasionally required, and following careful assessment

Note

- Detoxification is required for severe withdrawal syndrome or delirium tremens
- This will involve the administration of a long-acting benzodiazepine (e.g. Chlordiazepoxide) and
- thiamine supplements over 7 - 10 days

Supportive Measures

- Rehabilitation:
  - ***Sustain abstinence***
    - Acquire an alcohol-free life style
    - Prevent relapse

Prevention

- Health education (including school health education, peer group ***education*** and self-help group e.g., alcoholics anonymous 'AA')
- Government regulation of alcohol use

Anxiety Disorder

Introduction

Generalized anxiety disorder (GAD) is characterized by persistent and exaggerated worry about things (health, family, work etc.) and tension, even when there is little or no cause for anxiety.

A chronic disorder affecting about 2 - 3% of the population.

Clinical Features

- Pre-occupations: often of diverse nature, poor concentration,
- Muscle aches, headaches and irritability
- Sweating, fatigue and insomnia,
- Shortness of breath, weakness or tiredness and tremors

Differential Diagnoses

- Medical causes of suggestive symptoms and signs (e.g. hyperthyroidism)

Complications

- Chronicity
- Co-morbid depression
- Substance use disorders
- Insomnia
- Poor quality of life
- Problems at school or work
- Medical morbidity (e.g. hypertension)

Investigations

- To exclude medical/physical cause(s)
- Use psychological questionnaires to confirm diagnosis

Treatment Goals

- Achieve remission of symptoms
- Prevent relapse

Non-drug Treatment

- Cognitive-behavioural therapy.

Drug Treatment

- Diazepam 10 - 20 mg orally daily

Or

- Fluoxetine 20 - 60 mg orally daily

Or

- Mirtazapine 15 - 30 mg orally daily

Supportive Measures

- Relaxation techniques
- Exercise
- Life style changes (regular exercise, balanced diet etc.)
- Acupuncture
- Psychotherapy

Notable adverse drug reaction,Contraindications and Caution

- The risk of dependence (and withdrawal syndromes) limits the utility of benzodiazepines for treatments of long duration

Prevention

- Avoid undue and extreme stress
- Avoid psycho-active substances

Bipolar Disorders

Introduction

A type of mood disorder in which there is (typically) alternation of a depressive phase and a manic or hypomanic phase. Experienced by about 1% of the adult population, at some point in their lifetime

About equal incidence between males and females

May be precipitated by psychosocial stress; strong genetic vulnerability often present

Clinical Features

- Depressive phase:
  - Low mood, loss of interest, reduced activity or energy, impaired appetite and sleep, ideas of worthlessness or hopelessness, suicidal ideation, other depressive symptoms and signs (psychological and somatic)
- Manic or hypomanic phase:
  - Elation, increased activity or energy, euphoria, irritability, expansive mood, disturbed sleep, grandiosity, disinhibition
  - Other manic or hypomanic symptoms and signs

Differential Diagnoses

- Schizo-affective disorder
- Schizophrenia
- Organic mood/affective disorder (including effects of drug abuse)

Complications

- Social and personal consequences of inappropriate behaviour (e.g. unplanned pregnancy, drug and alcohol abuse, sexually-transmitted infections, etc.)

- Suicide and Homicide
- Increased risk of morbidity (reduce life expectancy) (e.g. trauma and accidents)
- Poor performance at school or work
- Financial or legal issues
- Increased mortality

Investigations

- To rule out organic/medical causes
- FBC and Electrolyte, Urea and Creatinine

Treatment Goals

- Reduce risk to self and others
- Normalize mood
- Return to full functional status
- Prevent recurrence

Non-drug Treatment

- Cognitive-behavioural therapy as sole treatment in mild cases, and adjunct in all others
- Electroconvulsive therapy (ECT)
- An effective and essentially safe treatment for severe and acute presentations
- A course of 8-12 treatments are usually needed

Drug Treatment

- Treat underlying causes
  - Lithium: 1st line drug following established diagnosis
  - Adult: initially 1 - 1.5 g daily, Prophylaxis: initially 300 - 400 mg daily
  - Measure serum lithium concentration regularly (every three months on established regimens)
  - Adjust dosage to achieve serum levels of 0.6 - 1.2 mEq/L
  - Child: not recommended
  - Sodium valproate
  - Adult: 750 mg - 2 g orally/day
  - Child:
    - *Neonate*: initially 20 mg/kg orally once daily; usual maintenance dose 10 mg/kg, every 12 hours
    - *Child (1 month - 12 years):* initially 5 - 7.5 mg/kg every 12 hours, usual maintenance dose 12.5 -15 mg/kg, every 12 hours (up to 30 mg/kg twice daily)
    - *Child (12 - 18 years):* initially 300 mg every 12 hours, increased in steps of 200 mg daily at 3-day intervals; usual maintenance dose 0.5 - 1 g, twice daily (maximum 1.5 g daily)
  - Carbamazepine
  - Adult: 600 - 1,800 mg orally daily
  - Child (1 month - 12 years): initially 5 mg/kg orally at night or 2.5 mg/kg twice daily, increased as necessary by 2.5 - 5 mg/kg every 3 - 7 days.

Maintenance dose 5 mg/kg 2 - 3 times daily, increased slowly to usual maintenance of 400 - 600 mg, 2 - 3 times daily

– Antidepressants - TCAs or SSRIs may be indicated in depressive phase

Antipsychotics

– Haloperidol 1.5 to 3 mg orally 2 - 3 times daily (may be indicated in acute manic phase)
– Child (2 - 12 years): initially 12.5 - 25 µg/kg orally twice daily, adjusted according to response to maximum 10 mg daily
– Child (12 - 18 years): initially 0.5 - 3 mg daily, adjusted according to response to lowest effective maintenance dose (as low as 5 - 10 mg daily)

Supportive Measures

- Psychotherapy and social intervention for patient and relatives/caregivers

Notable Adverse Drug Reactions, Contraindications and Caution

More likely with doses above recommended upper limits

- Lithium
  - Gastrointestinal disturbances
  - Tremors
  - Confusion
  - Myoclonic twitches
- Carbamazepine:
  - Hypersensitivity reactions
  - Transient memory impairment is common following ECT

Prevention

- No primary preventive measures are clearly delineated
- Adherence to therapy with mood stabilizers until discontinuation is considered prudent (this is individually determined)

Delirium

Introduction

A transient disorder of brain function. Manifests as a global cognitive impairment and behavioural disturbance. More common at the extremes of life, though it can occur at any age. Incidence up to 15% has been reported among general medical inpatients; up to 40% among acutely ill geriatric patients. Poor detection and mis-diagnosis are common

Most common causes:

- Trauma
- Infections
- Metabolic derangements
- Side effects of drugs

Clinical Features

- Disturbance of consciousness, arousal and awareness,
- Disturbance of attention, disorientation, memory deficits and language disturbances,

- Perceptual disturbances, disorganized thinking and delusions
- Acute onset rapid fluctuations, disruption of sleep-wake cycle, and mood alterations
- Neurologic signs like myoclonus, asterixis and frontal release reflexes (sucking, grasping, groping etc.)

Differential Diagnoses

- Dementia
- Acute (idiopathic) psychotic disorders

Complications

- Usually transient but may be associated with increased morbidity (e.g. from falls) and mortality

Investigations

- Determined by any causal or contributing medical conditions

Treatment Goals

- Identify and ameliorate any causal or contributing medical conditions
- Improve cognition
- Normalize behaviour

Non-drug Treatment

- Nurse in a quiet, well-lit environment
- Support physical care, including food and fluid intake
- Provide orienting cues
- Physical restraint judiciously used when indicated

Drug Treatment

- High-potency antipsychotics in low dosages for sedation
  - Haloperidol
  - Adult: 0.5 - 1 mg orally or parenterally, every 6 – 8 hours
  - Child (2 - 12 years): initially 12.5 - 25 μg/kg orally twice daily, adjusted according to response to maximum 10 mg daily;
  - Child (12 - 18 years): initially 0.5 - 3 mg daily, adjusted according to response to lowest effective maintenance dose (as low as 5 - 10 mg daily)
  - Benzodiazepines
  - For severe agitation (i.e. life-threatening features) or patient seriously disrupting management

Supportive Measures

- Give reassurance to patient and relatives/caregivers about the transient nature of condition (No risk of "madness")
- Protect the airways
- Provide fluids and nutrition
- Assist with movement
- Treat pain
- Manage incontinence

Caution

- Close nursing care is required to prevent injuries and falls
- Avoid over-medication, especially as antipsychotics and sedatives used may worsen delirium

Prevention

- Early treatment of infective and metabolic conditions
- Care with the use of drugs (especially anticholinergic medications) in the elderly

Depression

Introduction

A disorder of mood and affect in which the predominant emotion is sadness/unhappiness It can occur alone (unipolar depression) or as part of an alternation disorder in which elevation of mood also occurs (bipolar disorder). Varies in severity from mild to severe. Occurs in about 2 - 5% of the population at any given time and in about 10 - 25% in their lifetime. Women are generally at an elevated risk

Clinical Features

- Sadness, unhappiness, feeling low, loss of interest in usual activities and reduced energy, Disturbance of sleep, appetite and impaired concentration
- Ideas of worthlessness, guilt, or failure, morbid or suicidal rumination or ideation
- Somatic complaints of various types

Differential Diagnoses

- Normal grief reaction
- Medical conditions causing lowering of mental and physical activities (e.g. anaemia, hypothyroidism), infections (e.g. viral)

Complications

- Worsening of co-morbid physical illness
- Suicide
- Recurrence (in 50% or

Investigations

- FBC and differentials
- Thyroid function test
- Indicative infection screen

Treatment Goals

- Normalize mood
- Prevent suicide attempts
- Return to active life
- Prevent recurrence

Non-drug Treatment

- Cognitive-behavioural treatment
- Inter-personal psychotherapy

Drug Treatment

- Tricyclic antidepressants (TCAs)
- Amitriptyline in increasing doses up to 150 mg orally/day
- Fluoxetine 20 - 80 mg orally/day

Supportive Measures

- Supportive psychotherapy for patients and
- Family/caregivers

Notable Adverse Drug Reactions, Contraindications, Caution

- Tricyclic antidepressants:
  - Dryness of the mouth
  - Urinary retention
  - Constipation
  - Blurring of vision
- ***Selective Serotonin Reuptake Inhibitors (SSRIs):***
  - Sleep disturbance
  - Sexual dysfunction
  - Serotonin syndrome
  - Cardiac toxicity, especially in overdose with TCAs and SSRIs
  - Increased suicidal ideation in adolescents
  - Should be used with caution in patients with epilepsy, history of mania, cardiac disease, diabetes mellitus, and bleeding disorders
  - Caution is also required in patients receiving concurrent electroconvulsive therapy (reports of prolonged seizures with fluoxetine)

Prevention

– Recurrence is reduced by continuing medication for at least 6 months after acute symptoms resolve

Insomnia

Introduction

Difficulty in falling asleep or staying asleep . May be primary and unrelated to any physical or mental disorder. May relate to a mental disorder, medical or physical conditions. May be an adverse effect of medication (or psychoactive substances). A common, often chronic problem; tends to increase with age

Clinical Features

- Early insomnia: difficulty in initiating sleep
- Middle insomnia: difficulty in going back to sleep after waking up at night
- Terminal insomnia: early awakening, commonly 2 hours or more before desiring to do so

Differential Diagnoses

- Useful to consider possible aetiological factors: medical, mental, situational, environmental
- Pain is a common factor

Complications

- Deteriorating physical and/or mental health
- Decline in overall wellbeing and quality of life

Investigations

- Mainly of the presumed underlying cause(s)

Treatment Goals

- To improve sleep, especially quality (sleep satisfaction) and quantity (duration of sleep)

- To remove underlying/associated factors
- Avoid sedatives: use for only short periods when indicated

Non-drug Treatment

- Sleep hygiene
- Behavioural modifications to enhance relaxation
- Avoid habits and lifestyles that promote insomnia
- Improve environmental/sleeping conditions

Drug Treatment

- Short-acting benzodiazepines for early insomnia

Or:

- Longer-acting benzodiazepines e.g .Diazepam at low doses: 2.5 - 10 mg for no more than 2 - 3 weeks for middle insomnia

Supportive Measures

- *Relaxation therapy: a useful adjunct for the most common forms of insomnia*

Notable Adverse Drug Reactions, Contraindications and Caution

- Benzodiazepines: dependence and rebound insomnia

Prevention

- Reduced stress exposure
- Caution with alcohol and psychoactive substances, such as coffee, kolanut
- Discourage misuse of "sleeping pills" e.g., bromazepam, diazepam

Panic Disorder

Introduction

A disorder characterized by episodic attacks of extreme fear, mostly unrelated to specific objects or situations. Associated with multiple somatic and cognitive symptoms. Each attack lasts for about 5 - 30 minutes. Often begins abruptly. Affects about 0.5 - 1.0% of the population

Clinical Features

A feeling of choking, pounding heart, chest pressure or pain, dizziness, shortness of breath, trembling, sweating, tingling or numbness in the hands or feet, hot flushes

Differential Diagnoses

- Other causes of intense fear (phobias, obsessive-compulsive disorders, etc.)
- Medical causes (e.g. hyperthyroid states, episodic hypoglycaemia, etc.)
- Seizure disorders

Complications

- Phobia
- Depression
- Suicide

Investigations

- As indicated to exclude medical aetiologies

Treatment Goals

- *R*educe intensity and frequency of attacks
- Reduce anticipatory anxiety

Non-drug Treatment

- Cognitive-behavioural therapy

Drug Treatment

- Fluoxetine
  - Adult: initially 20 mg orally once daily, increased after two weeks (if necessary) to 20 - 60 mg once daily (maximum 80 mg)
  - Elderly: 20 - 40 mg (maximum 60 mg for elderly) once daily
  - Discontinue in both adults and elderly if no improvement within 10 weeks in both adults and eld
  - Child and adolescent under 18 years: not recommended

Or:

- Amitriptyline 50 - 150 mg orally/day

Supportive Measures

- Psychotherapy, Relaxation techniques

Notable Adverse Drug Reactions, Contraindications and Caution

- Tricyclic antidepressants are cardio-toxic in overdose
- Increased risk of suicidal attempts by patients with panic disorder

Prevention

- No specific primary prevention measures

Schizophrenia

Introduction

A serious psychotic disorder characterized by multiple impairments in emotional, behavioural, cognitive, social, and occupational domains (among others). Affects about 1% of the population.

Onset usually in late adolescence or early adulthood. Strong genetic component to its aetiology; environmental factors, including pre-natal and obstetric factors, also implicated

Clinical Features

- Disorders of: Thought, perception, speech, cognition, behaviour, motor function

Differential Diagnoses

- Psychosis of other origin (including those due to organic factors), affective psychosis, epilepsy (especially of temporal lobe origin), drug effect, e.g. amphetamine intoxication

Complications

- Chronicity
- Suicide
- Increased physical morbidity
- Increased mortality

Investigations

- To exclude organic causes of acute psychotic presentations

Treatment Goals

- Resolution of psychotic symptoms
- Return to full functional status

- Enhance quality of life
- Minimize side-effects of medication
- Rehabilitation
- Prevent harm/relapse

Non-drug Treatment

- Psycho-social interventions as indicated (including social and occupational therapy)
- Psycho-education for patient and relatives/caregivers
- Supportive psychotherapy
- ECT (especially for catatonic forms)

Drug Treatment

- Chlorpromazine
  - Adult: initially 25 mg orally every 8 hours (or 75 mg at night), adjusted according to response to usual maintenance dose of 75 - 300 mg daily
  - Elderly: a third to half adult doses by deep intramuscular injection: 25 - 50 mg every 6 - 8 hours
  - Child
    - (1 - 5 years): 500 μg/kg orally every 6 - 8 hourly (maximum 40 mg daily)
    - 6 - 12 years: a third to half adult dose (maximum 75 mg daily)
- Haloperidol
  - Adult: initially 1.5 - 3 mg every 8 - 12 hours daily or 3 - 5 mg every 8 - 12 hours, in severely affected or resistant patients
  - In resistant schizophrenia, up to 30 mg daily may be needed, adjusted according to response to the lowest effective maintenance dose (as low as 5 - 10 mg daily)
  - Elderly: initially half adult dose
  - Child: initially 25 - 50 mg μg/kg daily in 2 divided doses (maximum 10 mg)
- Fluphenazine
  - Adult: initially 2 - 10 mg every 8 - 12 hours, adjusted according to response to 20 mg daily. Doses above 20 mg daily (10 mg in elderly) only with special precaution

Or:

  - 25 - 100 mg intramuscularly fortnightly to monthly
  - Child: not recommended

Supportive Measures

- Supportive psychotherapy
- Social and occupational therapy
- Cognitive therapy (as adjunct in the treatment of persisting psychotic experience)
- Rehabilitation

Notable Adverse Drug Reactions, Contraindications and Caution

- Extrapyramidal and Parkinsonian symptoms (may require anticholinergic medication)

- Tardive dyskinesia
- Weight gain
- Agranulocytosis (monitor blood counts in patients on clozapine)

Prevention

- No clear/specific scope for primary Prevention at present
- Secondary and tertiary:
  - Early and effective treatment
  - Rehabilitation to reduce disability

CHAPTER 13:

RESPIRATORY SYSTEM DISORDERS

Acute Epiglottitis

Introduction

Epiglottitis is inflammation of the epiglottis and adjacent supraglottic structures. It can progress rapidly to life-threatening airway obstruction if not treated. The condition is commonest in children.

Pathogens in children include *H. influenza* type B, types A, F, *Streptococci* and *Staph. aureus* The commonest is *H. influenza* type B.

In adults a wide range of pathogens, including viruses, bacteria, fungi are involved but *H. influenza* type B appears to be the most common.

In immunocompromised hosts, epiglottitis may be caused by *Pseudomonas aeruginosa* and *Candida spp.*

Non-infectious causes include, thermal injury, corrosive ingestion, foreign body ingestion

Rarely may occur as a result of graft-versus-host disease in transplantation.

Clinical Features

- Common presentation in children
  - Difficulty with breathing
  - Stridor
  - Hoarse voice
  - Pharyngitis
  - Fever
  - Sore throat
  - Tenderness of anterior neck
  - Cough
  - Difficulty swallowing
- Adult presentation usually less fulminant
  - Sore throat
  - Fever
  - Muffled voice
  - Drooling
  - Stridor
  - Hoarseness
  - Difficulty swallowing
  - Difficulty breathing

Differential Diagnoses

- Laryngotracheitis or spasmodic croup
- Uvulitis
- Bacterial tracheitis
- Peritonsillar or retropharyngeal abscesses
- Foreign body lodged in the larynx

- Angioedema
- Upper airway congenital anomalies
- Diphtheria

Complications

- Airway obstruction
- Epiglottic abscess
- Secondary infection
- Necrotizing epiglottitis (rare, in immunodeficiency)
- Death

Investigations

- Radiograph (lateral neck x-ray)
- "Thumb sign" appearance of the enlarged epiglottitis
- Ultrasound
- Microbiology

Treatment Goals

- Safeguard airway
- Control infection

Drug Treatment

- Amoxicillin/Clavulanic acid
- Adult 625 mg - 1g 12 hourly for 7 - 10 days
- Children 80-90 mg/kg 12 hourly (high dose) in view of epiglottitis being a serious infection)

Or

- Cefuroxime
  - *Adult* : 250 mg orally every 12 hours for 5 – 10days
  - *Child*: 125 mg orally every 12 hours for 5 – 10days

Or

- Ceftriaxone
  - Adult : 500mg – 1 g 12 hourly IM/IV for 5 – 10 days
  - *Child*:
    - neonate, infuse over 60mins, 20 – 50 mg/kg daily
    - Child under 50 kg: 20 -50 mg/kg daily by deep IM injection or by IV injection over 2 – 4 minutes or by IV infusion; up to 80 mg/kg daily in severe infections

Supportive Measures

- Oxygen
- Steam inhalation
- Nasotracheal intubation may be necessary (Caution: laryngeal spasm during intubation)
- Maintain adequate caloric intake and hydration

Notable Adverse Drug Reactions, Contraindications and Caution

- Cefuroxime: avoid in pregnancy and in patients with renal impairment
- Ceftriaxone: rashes, fever, GIT disturbances
- Dose reduction in the elderly patients with renal impairment

Prevention
- Haemophilus influenza vaccine
- Child 2 months – 18 years: 0.5 mls
- Should be part of childhood immunization

Acute Bronchitis
Introduction
An inflammation of the bronchial tubes.
Commonly caused by a variety of viruses, same as those that are responsible for common cold. Primary bacterial aetiology may also occur.
Acute bronchitis can last from a few days to 10days but the associated cough may last for several weeks after the infection has cleared up.
Bronchitis lasting up to 90 days is still usually classified as acute bronchitis.
Clinical Features
- Cough
- Sputum production
- Sputum may be clear, yellow or greenish
- Wheezing
- Muscle and backache
- Low grade fever
- Shortness of breath in severe cases
- Chest pain especially while coughing

Differential Diagnoses
- Cough-variant asthma
- Mycoplasma pneumonia
- Chlamydia pneumonia
- Bordetella pertussis

Complications
- Pneumonia
- Acute respiratory failure
- Repeated bouts of acute bronchitis over time may lead to COP

Investigations
- Chest x-ray
- Sputum tests
- (Quality sputum for culture and tests for evidence of allergy)
- Pulmonary function tests

Drug Treatment
- Antibiotics
  - Amoxicillin 500 mg PO 8 hourly for 5 – 7 days
  - Macrolide e.g. erythromycin 500 mg 8 hourly 5 – 7 days
  - Co-trimoxazole 960mg 12 hourly 5 – 7 days

Notable Adverse Drug Reactions, Contraindications and Caution
- Cotrimoxazole: Nausea, Skin rashes, rarely Stevens-Johnson syndrome

Acute Rhinitis (common cold, coryza)

Introduction

An acute inflammation of the nasal mucosa with variable degrees of pharyngitis.

Rhinoviruses are the commonest aetiologically important agents followed by the coronaviruses, the parainfluenza, RSV, influenza and adenoviruses in that order. Others include enteroviruses, rubella, varicella and possibly a sizeable group of undiscovered viruses.

Clinical Features

- Systemic complaints are often absent or modest if present
- Fever is usual

Other Features may include:

- Tickling sensation in the nose associated with itching of the nose and palate
- Occasional vertigo due to associated viral labyrinthitis
- Watery nasal discharge (rhinorrhoea), which may later become purulent
- Sneezing
- Headaches
- Nasal obstruction (usually alternating)

Differential Diagnoses

- Allergic rhinitis
- Bacterial rhinitis (often supervenes after the viral onset)

Complications

- Superimposed bacterial rhinitis
- Suspect this if symptoms last longer than 7-10days
- Sinusitis (suspect with worsening symptoms with facial pain)
- Lower respiratory infection
- Otitis media
- Obstruction of internal auditory meatus: may cause deafness.

Treatment Goals

- Relieve nasal mucosal oedema and obstruction
- Relieve pain/discomfort
- Treat Complications

Drug Treatment

- Symptoms of rhinorrhea and sneezing can be relieved with non-selective sedating antihistamines such as chlorpheniramine
  - Adult: chlorpheniramine 4 mg orally every 4 - 6 hours up to a maximum of 24 mg/day, maximum of 12 mg/day in elderly
  - Child:
    - 1-2 years 1 mg twice daily
    - 2-6 years 1 mg every 4 -6 hours (max 6 mg/day)
    - 6-12 years 2 mg every 4 -6 hours (max 12 mg/day)
- Symptoms of headache, myalgias and occasional fever
  - Analgesics
    - Paracetamol

- *Adults:* 1 g three times daily
- *Child:*
- 1 - 5 years 120 - 250 mg
- 6 - 12 years 250 - 500 mg
- 12 - 18 years 500 mg 6 hourly (max 4 doses/day)

- Non-steroidal anti-inflammatory drugs (IBUPROFEN) may improve symptoms in adults with rhinovirus infection.

• Symptoms of nasal decongestion
- Nasal sprays containing decongestants should not be used for more than 5 - 7 days to avoid rebound rhinitis medicamentosa on withdrawal e.g. Ephedrine hydrochloride nasal drops 1 - 2 drops into each nostril up to 3 - 4 times daily for a maximum duration of 7 days. Applicable to adults and children over 12 years

Notable Adverse Drug Reactions, Contraindications and Caution
• Paracetamol: raised liver enzymes, renal papillary necrosis
• Non-steroidal anti-inflammatory: Upper G.I bleeding drugs

Bronchial Asthma
Introduction
A chronic inflammatory disease of the airways that is characterized by hyper-responsiveness of the tracheo-bronchial tree to a multiplicity of stimuli
Manifests physiologically by wide-spread airway narrowing and clinically by paroxysmal attacks of dyspnoea, cough and wheezing
Acute episodes are interspersed with symptom-free periods
Clinical Features
• Episodic dyspnoea
• Cough: unproductive, or productive of scanty sputum
• Wheezing
• Tachypnoea
• Tachycardia
• Pulsus paradoxus in severe attacks
• Mildly raised blood pressure
• Rhonchi: inspiratory and expiratory
• Prolonged expiration
• Silent chest (an ominous sign)
Differential Diagnoses
• Chronic bronchitis
• Left ventricular failure
• Glottic dysfunction with respiratory obstruction
• Recurrent pulmonary emboli
• Eosinophilic pneumonia
• Carcinoid tumour
Complications
• Spontaneous pneumothorax
• Pneumo-mediastinum
• Atelectasis

Investigations

Diagnoses is based on:

- Airway reversibility to inhaled β - adrenergic agonist
- Isocapnoeic response to hyperventilation of cold air
- Sputum eosinophilia
- Chest radiograph: hyperinflation

Treatment Goals

- Arrest and reverse acute episodes
- Prevent (or at least reduce) frequencies of asthmatic attacks
- Achieve a stable asymptomatic state
- Maintain the best pulmonary function possible

Drug Treatment

Acute asthma episodes:

- Nebulised salbutamol
  - *Adult and child over 18 months: 2.5* mg repeated up to 3 times in the 1st hour and subsequently 4 hourly for the next 24 hours; may be increased to 5 mg if necessary
  - *Child under 18 months: 1.25* - 2.5 mg same procedure as above
  - More frequent administration may be needed in severe cases
- Intravenous aminophylline in patients with life threatening asthma not previously treated with theophylline and without contraindications.
  - *Adult*: 125 - 250 mg slowly (with close monitoring) over 20 minutes
  - *Child 1 month - 18 years:* by intravenous injection 5mg/kg (maximum 500 mg), and then by intravenous infusion
- Oral or Intravenous steroids where indicated
- Magnesium sulphate: 50mg/kg single dose given slowly intravenously (check deep tendon reflexes during administration)
- Adequate hydration
- Oxygen

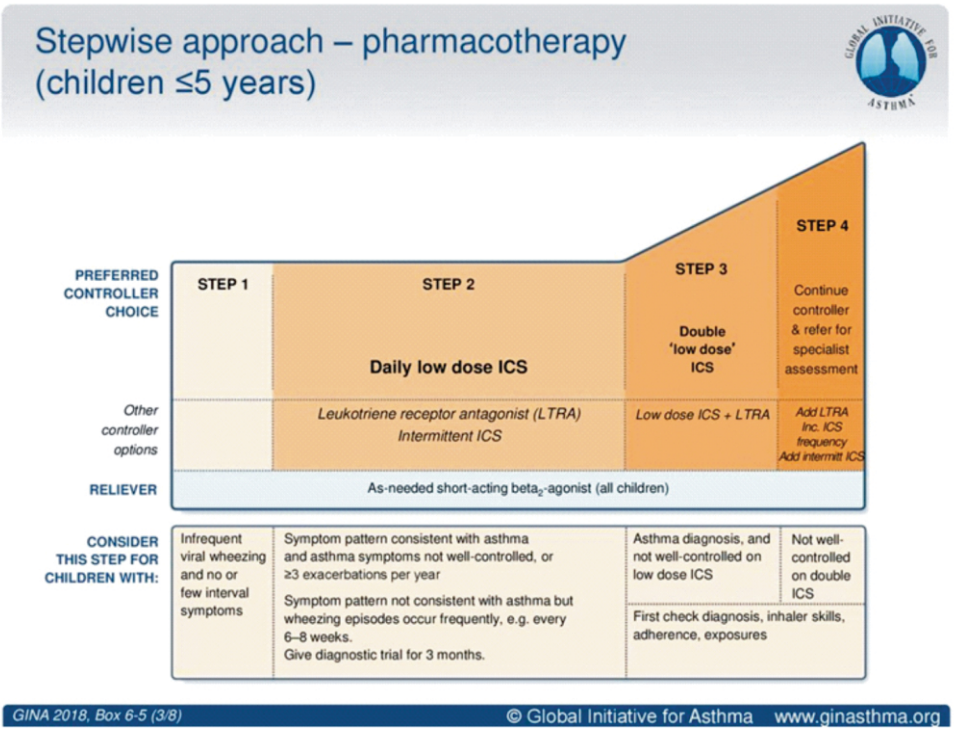

Figure 13.1: Pharmacotherapy of asthma for children aged 5 years and below: stepwise approach

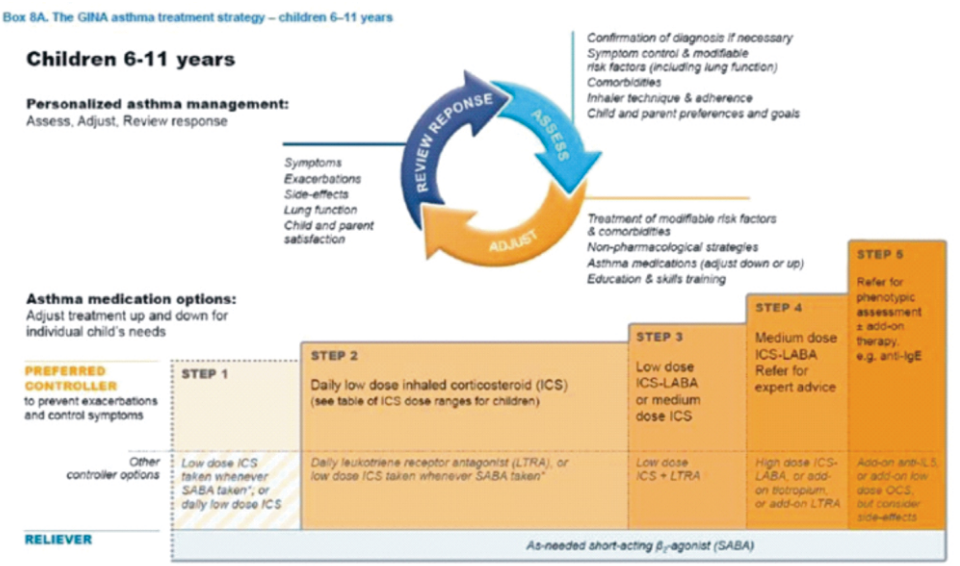

Figure 13.2: Pharmacotherapy of asthma for children aged 6 to 11 years: stepwise approach

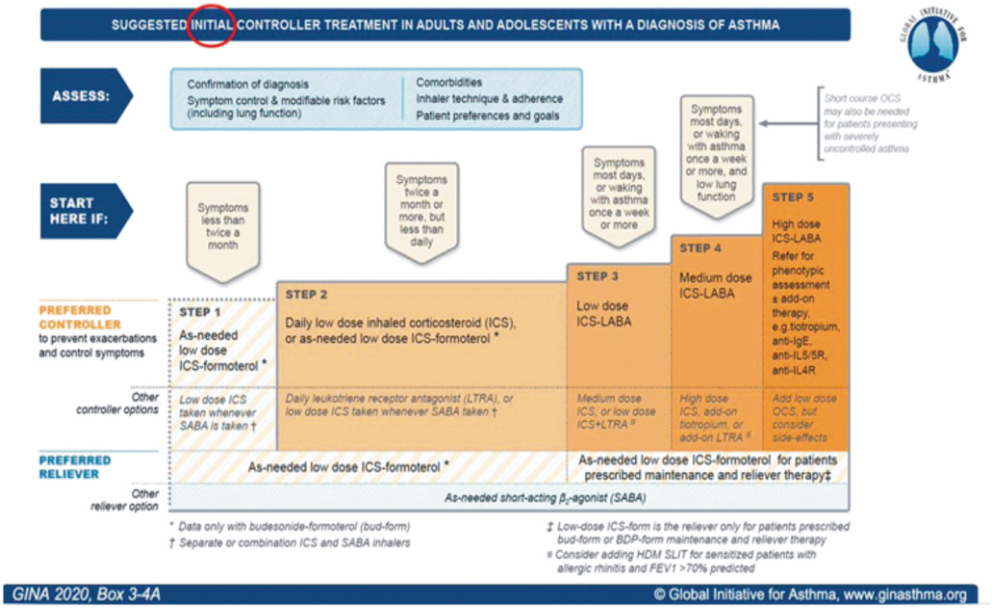

Figure 13.3: Suggested initial controller treatment in adults and adolescents with asthma

Intermittent symptoms

- Adult & Adolescents 12 years and older
  - As needed; low dose Inhaled Corticosteroids/Formoterol or low dose Inhaled Corticosteroid (ICS) taken whenever inhaled salbutamol (SABA) is taken
- Children 6 – 11 years
  - Low dose Inhaled Corticosteroid taken whenever inhaled salbutamol is taken or daily low dose ICS

Mild persistent asthma

Corticosteroids/formoterol

- *Adult & Adolescents 12 years and older*
  - Daily low dose ICS, or as-needed low dose ICS-formoterol (or, if not available, low dose ICS whenever SABA is taken). Consider also daily leukotriene receptor antagonist
- *Children 6 – 11 years*
  - Daily low dose ICS (or daily leukotriene receptor antagonist or low dose ICS taken whenever SABA is taken)

Inhaled salbutamol

- *Adult:* 100 - 200 µg for persistent symptoms (2 – 4 puffs) each use. Multiple dosing via spacer device
- *Child 1 month - 18 years:* 100 - 200 µg (1 - 2 puffs) via spacer device for occasional use only

Inhaled corticosteroid

- Beclomethasone dipropionate 100 -200 μg 3 – 4 times daily
- Budesonide: 100 -200 μg every 12 hours
- Fluticasone 50, 100, 125, 250 μg every 12 hours
- Leukotriene receptor antagonist (LTRA): eg. Singulair or Montelukast 4, 5, 10 mg

Moderate persistent asthma

- *Adult & Adolescents 12 years and older*
  - Low dose Inhaled Corticosteroid/Long acting beta agonist (ICS/LABA)
  - Medium dose Inhaled Corticosteroid/Long acting beta agonist (ICS/LABA)
  - Other option: Medium dose ICS or low dose ICS plus LTRA or
  - High dose ICS plus Tiotropium or LTRA
- *Children 6 – 11 years*
  - Low dose Inhaled Corticosteroid/Long acting beta agonist (ICS/LABA) or
  - Medium dose ICS or low dose ICS plus LTRA
  - May step up to Medium dose ICS/LABA or High dose ICS plus Tiotropium or LTRA
- Inhaled corticosteroid dosing
- Beclomethasone dipropionate ()
  - *Adult:* 100 – 200 μg 3 – 4 times daily
  - *Child under 2 years:* 50 μg every 12 hours; 2 -5 years: 100 - 200 μg every 12 hours; 5 - 12 years: 100 -200 μg every 12 hours; 12 - 18 years: 100 - 400 μg every 12 hours
  - Or budesonide 100–200 μg

Plus:

- Long- acting β agonist dosing: Salmeterol
- *Adult:* 50 μg twice daily, up to 100 μg
- *Child:*
  - *2 - 4 years:* 25 μg (1 puff) every 12 hours
  - *4 - 12 years*: 50 μg (2 puffs) every 12 hours
  - *12 - 18 years* 50 - 100 μg (2 - 4 puffs) every 12 hours

Severe persistent asthma

- Adult & Adolescents 12 years and older
  - High dose ICS-LABA plus add on Tiotropium or Anti-IgE or Anti-IL5/5R or Anti-IL4R
  - *Refer for phenotypic assessment*
- Children 6 – 11 years
  - *Refer for phenotypic assessment*
  - Add on Anti-IgE
- Other options
  - Add on Oral corticosteroid: Prednisolone
    - *Adult:* 40 - 50 mg orally daily for a few days, and then reduce gradually
    - *Child:* 1 - 2 mg/kg orally once daily for 3-5 days

Supportive Measures
- Supplemental oxygen Hydration
- Education on care and precipitating factors

Notable Adverse Drug Reactions, Contraindications and Caution
- In all cases, prescribers/dispensers should consult product literature to confirm the strengths of various aerosol preparations
- Aminophylline
  - Do not exceed 500 mg in 24 hours because of the risk of cardiac arrhythmias
  - Avoid in elderly or in patients with arrhythmias and hyperthyroidism
  - Exercise caution in hypertensive patients
  - May cause CNS stimulation with insomnia and convulsions
- Steroids
  - Immunosuppression, metabolic derangements, etc
  - Care should be taken in withdrawing steroids

Prevention
- Avoid precipitating factors
- Appropriate use of medicines
- Training of patients in the techniques of the proper use of aerosols/spacer devices is important

Chronic Obstructive Airways Disease (COAD)

Introduction

A pulmonary disorder of adults characterized by chronic airflow limitation in the small airways. Complicates chronic bronchitis and emphysema. Obstruction to air flow is only partially reversible with bronchodilator therapy. Two extreme types of COAD are recognized although there is a lot of overlap

Clinical Features

Depending on the predominant syndromes, could be described as follows:
- Pink puffers
  - Slowly progressive dyspnoea
  - Cough with scanty sputum
  - Asthenic features
  - Barrel-shaped chest
  - Wheeze
  - These patients mainly have emphysema
- Blue bloaters
  - Prolonged periods of cough and copious sputum production
  - Dyspnoea
  - Frequent respiratory infections
  - Central cyanosis
  - These patients mainly have chronic bronchitis

Differential Diagnoses
- Chronic persistent asthma
- Cystic fibrosis

Bronchiectasis

Introduction

An abnormal and permanent dilatation of medium sized airway due to damage of their walls. Usually arises from repeated bacterial or viral infections which result in inflammation and destruction of the structural components of the bronchial tree.

May be focal or diffuse.

Aetiology

- Congenital or acquired causes
- The most important cause is severe or repeated respiratory infections

Other causes include

- Cystic fibrosis
- Other hereditary disorders e.g. ciliary dyskinesia
- Immunodeficiency disorders
- Autoimmune disorders e.g. rheumatoid disease, ulcerative colitis, Sjogren syndrome
- Mechanical factors e.g. chronically enlarged lymph nodes with pressure effect, lung tumour
- Inhaled toxic substances e.g. silica, cola dust, tobacco smoke

Clinical Features

- Persistent or recurrent cough
- Purulent fetid sputum
- Haemoptysis
- Pleuritic chest pain
- With or without a history of preceding pneumonic illness
- Digital clubbing
- Crepitations, rhonchi and wheezes
- Cor pulmonale and right ventricular failure in chronically hypoxic patients

Differential Diagnoses

- Pulmonary tuberculosis
- Lung abscess
- Chronic bronchitis
- Bullous emphysema

Complications

- Massive haemoptysis
- Lung abscess
- Mycotic abscess
- Pulmonary amyloidosis
- Ventilatory failure
- Cor pulmonale and right ventricular failure

Investigations

- Chest radiograph: cystic spaces with air-fluid levels
- Bronchography: saccular, cylindrical or varicose bronchial dilatations
- CT scan (of the chest)

- Bronchoscopy: biopsies of endobronchial lesion
- Sputum microscopy, culture, Ziehl Nielson microscopy
- Ventilatory function test: obstructive pattern

Treatment Goals

- Eliminate underlying pathology
- Improve mucus clearance
- Control infection
- Reverse airflow obstruction

Drug Treatment

- Empirical antibiotics in acute exacerbations
  - Amoxicillin
    - *Adult*: 500mg – 1 g orally every 8 hours for 5 – 7 days
    - *Child*: 40 mg/kg orally in 3 divided doses daily
  - Cotrimoxazole
    - *Adult*: 960 mg orally every 12 hours for 5 – 7 days
    - *Child*:
      - 6 weeks to 5 months: 120 mg orally
      - 6 months – 5 years: 240 mg
      - 6 - 12 years: 480 mg
  - Appropriate antibiotics as soon as culture results are available
- Bronchodilators
  - Salmeterol
    - *Adult*: 2 puffs (50 μg) twice daily (Can be doubled in severe airway obstruction)
    - *Child*: same as adult dose (for children > 4years)
  - Salbutamol
  - *Adult*: 1 – 2 puffs (100 – 200 μg) 3 – 4 times daily
  - *Child*: usually 100 μg (1 puff) may be increased to 200 μg with more severe symptoms.

Supportive Measures

- Supplemental oxygen
- Postural drainage or suction
- Cessation of cigarette smoking

Notable Adverse Drug Reactions, Contraindications and Caution

- Prescribers / dispensers should consult product literature to confirm the strength of various aerosol preparations.
- Salbutamol: palpitations, tremors, nervous tension, muscle cramps, sleep disturbances, tachycardia, peripheral vasodilation, hypotension

Prevention

- Avoidance of smoking
- Timely and effective treatment of bacterial infections
- Respiratory care during childhood measles

Lung Abscess

Introduction

Defined as necrosis of the lung parenchyma, usually caused by microbial infection, often with an air-fluid level.

May be classified as acute (symptoms < 1month) or chronic (symptoms > 1month).
May also be classified as primary if it occurs in a previously healthy person or in a person prone to aspiration.
Secondary lung abscess commonly occurs in association with bronchogenic carcinoma or immunodeficiency states e.g. HIV infection.
Lung abscess may be associated with the following

- Pyogenic bacteria
- Tuberculosis
- Fungi
- Parasites
- Pulmonary infarction
- Primary or metastatic malignancies
- Silicosis
- Coal miner's pneumoconiosis

Clinical Features
Symptoms are indolent lasting several weeks:

- Cough, with purulent offensive sputum
- Fever, chills
- Night sweats
- Weight loss
- Pleuritic chest pain

Signs:

- Digital clubbing
- Crepitations
- Pleural friction rub

Differential Diagnoses

- Localized bronchiectasis
- Pneumonia
- Tuberculosis

Complications

- Cerebral abscess
- Empyema
- Amyloidosis

Investigations

- Sputum: Gram stain and culture
- Bronchoscopy
- Transthoracic aspiration
- Blood culture
- Chest radiograph

Treatment Goals

- Eradicate bacterial cause
- Drain abscess
- Preserve normal lung function

Non-drug Treatment
- Hydration
- Pain relief
- Physiotherapy

Drug Treatment
- Antibiotics
  - Metronidazole
    - Adult: 500 mg orally every 8 hours
    - Child:
      - neonate, initially 15 mg/kg orally then 7.5 mg/kg every 12 hours
      - 1 month – 12 years: 7.5 mg/kg (maximum 400 mg) every 8 hours
      - 12 – 18 years: 400 mg every 8 hours

Plus:
  - Amoxicillin
    - Adult: 500 mg orally every 8 hours for 7 – 10 days
    - Child:
      - less than 5 years: a quarter adult dose
      - 5 – 10 years: half adult dose

Or
  - Amoxicillin/clavulanic acid
    - Adult: 1 g/200 mg orally every 8 hours for 7 – 10 days (Definitive antibiotic therapy should be based on culture and sensitivity results)

Prevention
- Good dental care
- Adequate treatment of acute pneumonia
- Preventive with vaccination in persons at risk
  - HIV infected patients who are still capable of responding to a vaccine challenge.
  - Patients with recurrent sinopulmonary infection
  - Patients with or acquired hypogammaglobulinaemia

Chest Pain

Introduction

A common clinical symptom that may or may not have significant clinical implications

Clinical Features (with differential Diagnoses)
- Sharp, lancinating lateral chest pain, worse with breathing and coughing: pleurisy
- Dull aching lateral chest pain: chest wall pain, pleural effusion
- Central chest pain precipitated by a dry hacking cough: suggestive of tracheitis or tracheobronchitis
- Central chest discomfort/pain with sensation of heaviness or chest compression: suggestive of myocardial ischaemia
- Lateral burning chest pain associated with tenderness on physical contact: Bornholm's disease

Investigations
- Chest radiography
- Electrocardiography
- Echocardiography

Treatment Goals
- Treat primary cause
- Relieve pain

Drug Treatment
- Non narcotic analgesics
  - Paracetamol
    - *Adult:* 1 g orally every 8 hours
    - *Child:*
      - *1 - 3 months:* 30 - 60 mg every 8 hours
      - 3 - 12 months: up to 120 mg every 4 - 6 hours
      - 1 - 5 years: 120 - 250 mg every 4 - 6 hours
      - 6 - 12 years: 250 - 500 mg every 4 - 6 hours
      - 12 - 18 years: 500 mg every 4 - 6 hours
- Non-steroidal analgesics
  - Diclofenac sodium
    - *Adult*: 25 - 50 mg orally three times (daily depending on severity)
    - *Child 6 months -18 years:* 0.3 1 mg/kg by mouth or by rectum 3 times daily (maximum total dose 150 mg daily)
- Pain of more serious aetiology e.g. pain of lower or upper respiratory tract infection, or pain of myocardial ischaemia should be referred to an appropriate specialist

Cough

Introduction

The explosive expiration that clears the tracheo-bronchial tree of secretions and foreign particles or noxious gaseous materials

A defensive reflex reaction

Comes to medical attention only when it becomes troublesome, affects life style and/or when there is concern about its cause

Clinical Features

May be:
- Acute or chronic
- Seasonal
- Associated with breathlessness and or wheezing
- Productive of sputum: note colour, smell; haemoptysis
- Associated with fever
- Associated with chest pain: note location and character of pain
- Associated with risk factors, e.g. cigarette smoking
- Associated with the use of drugs for other illnesses
- Associated with other constitutional symptoms

Differential Diagnoses

Triggers of cough may rise from the upper or lower airways, or lung parenchyma Upper airways:

- Inhaled irritants: dust, fumes, smoke
- Upper airways secretion
- Gastric reflux
- Lower airways:
- Inflammation
- Viral bronchitis
- Bronchiectaesis
- Bacterial infection
- Bronchial asthma
- Endobronchial tuberculosis
- Bronchial infiltration/compression Parenchymal lung disease
- Pneumonia
- Lung abscess
- Interstitial or endobronchial oedema due to heart disease
- Drugs:
  - ACE inhibitors

Investigations

- Macroscopic and microscopic examination of sputum
- Sputum culture
- Exclude tuberculosis if cough is chronic
- Sputum cytology for malignant cells
- Chest radiograph where indicated
- HIV screen if history and Clinical Features are suggestive

Treatment Goals

- Identify and treat the underlying cause(s)
- Abolish cough

Non-drug Treatment

- Adequate rehydration to prevent inspissation
- Encourage expectoration for productive cough
- Do not use antitussives unless cough is dry, unproductive and distressing

Drug Treatment

- Cough suppressants: for dry, unproductive cough
  - Codeine cough linctus:*Adult:* 5-10ml 3-4 times daily
- Not recommended in children appropriate antibiotics for bacterial infections

Notable Adverse Drug Reactions, Contraindications and Caution

- Codeine cough linctus: sedation, constipation

Dyspnoea

Introduction

An abnormal and uncomfortable awareness of breathing
Effort of breathing is out of proportion with exertion needs
Patients often have difficulties in describing the discomfort of dyspnoea

Clinical Features
- Will depend on the underlying cause(s) of dyspnoea

Differential Diagnoses
- Pulmonary:
  - Obstructive airways disease: asthma, chronic bronchitis, emphysema
  - Parenchymal lung disease: pneumonia, pneumoconiosis, pulmonary fibrosis
  - Pulmonary vascular obstruction: pulmonary emboli
  - Chest wall disorders: respiratory muscle paralysis, kyphoscoliosis
- Cardiogenic:
  - Congestive cardiac failure
  - Left ventricular failure
    1. Metabolic:
  - Diabetic ketoacidosis
- Neurogenic:
  - Anxiety neurosis

Treatment Goals
- Treat cause(s) of dyspnoea
- Restore normal respiration

Non-drug Treatment
- Oxygen in appropriate concentration
- Other treatment will depend on the underlying/ precipitating cause

Non-Obstructive (Simple) Chronic Bronchitis (NCB)

Introduction

Chronic bronchitis denotes chronic or recurrent bronchial mucus hyper secretion resulting in chronic expectoration of sputum.

For clinical or epidemiological purposes, the term is applied to patients who have coughed up sputum on most days during at least three consecutive months in two successive years.

Non-obstructive Chronic bronchitis:
- In this condition there is Chronic or recurrent mucoid hyper secretion sufficient to cause expectoration but there is no air flow obstruction
- Between 10 -25% of adult population are affected by NCB
- It tends to be common in men.
- It is not well understood why some of these persons progress to chronic obstructive airway disease and some do not
- NCB has a generally good prognosis
- With smoking cessation and vigorous treatment early in the disease process the disease may be reversed
- The exact cause of the illness is not known
- More common in urban or industrial areas
- Some inhaled irritants play a role in persistence and aggravation of symptoms and pathology. These include, inhaled tobacco smoke, air pollutant, dusts, powder and noxious fumes

- Viral or bacterial infection may precipitate, or aggravate disease
- Although history of heavy smoking is common, disease may be observed in non -smokers
- Pathologically, there is hypertrophy and hyperplasia of mucus secreting glands relative to wall thickness.
- There are diffuse inflammatory changes of bronchial epithelium with ulceration, neutrophil infiltration, loss of cilia, bacterial invasion and area of squamous metaplasia. These changes interfere with muco-ciliary function.

Clinical Features:

Symptoms

- Most striking features are impressive history of cough with sputum production for many years
- Initially cough present during cold seasons, especially in the morning
- Over the years cough increases in frequency, severity and duration until cough is present all year round
- Sputum is usually scanty, mucoid and more in the mornings and occasionally blood stained

Signs

- Patient may be overweight
- Patient may not be in respiratory distress and respiratory rate may be normal
- Palpation of chest may reveal local tenderness over recently fractured rib
- Percussion notes resonant over the lungs
- Liver dullness and cardiac dullness normally preserved
- Breath sound is vesicular
- Positive signs are almost all referable to bronchial secretions
- Transient basal rales may be noted on inspiration. May clear completely with cough
- Finger clubbing is not commonly observed in pure chronic bronchitis

Differential Diagnoses

- Asthma
- Bronchiectasis
- Pulmonary TB
- Bronchogenic Ca

Complications

- Mucopurulent relapses due to secondary bacterial infection
- Progression to chronic obstructive airway disease

Investigations

- Spirometry may reveal no abnormality in lung function, since there is no airflow obstruction
- Chest Xray does not show any characteristic abnormality in simple chronic bronchitis
- Bronchography may reveal irregular narrowed or distorted bronchi. There

is however, no need for routine bronchography in chronic bronchitis.
- Sputum examination; In early stages, sputum may be mucoid. Sputum M/C/S may be necessary to detect bacterial infection
- Arterial blood gas studies may be unnecessary in straightforward uncomplicated NCB.

Non-drug Treatment
- Lifestyle modifications
  - Reduction of bronchial irritation
    - Smoking cessation
    - Avoidance of dusty and smoke laden environment

Drug Treatment
- Treatment of respiratory infections
  - Purulent sputum should be treated with amoxicillin 500 mg 8 hourly for seven days.
    - In the absence of response, a sputum culture and sensitivity is done and antibiotics changed to sensitive antibiotics
  - Mucolytics
    - Mucolytic expectorants appear to improve quality of life and decreases cough. Iodinated glyceryl at a dose of 60 mg four times daily for 1 to 8 weeks can be used
- Bronchodilators and steroids
  - May not be necessary in simple chronic bronchitis since there is no airway obstruction
- Physiotherapy
  - Postural drainage may be of value in patients with increased sputum production

Notable Adverse Drug Reactions, Contraindications and Caution
- Maculopapular reactions may occur in patients taking amoxicillin

Pneumonia

Introduction

An inflammation of the lung parenchyma

Various bacterial species, fungi and viruses may cause pneumonia

The setting in which infection is acquired could be a predictor of the infecting pathogen

Bacterial Pneumonia: is defined as bacterial infection of the lung parenchyma associated with recently developed radiological shadowing which may be segmental, lobar or multi lobar.

Types
- Community Acquired Pneumonia (CAP)
- Hospital Acquired pneumonia (HAP)
- Ventilator Associated pneumonia (VAP)
- Health care associated Pneumonia (HCAP)
- Pneumonia in the immunocompromised
- Aspiration pneumonia

Common bacteria causing CAP:

- *Streptococcus pneumonia*(Most common cause)
- *Mycoplasma pneumonia*
- *Legionella pneumophilia*
- *Chlamydia pneumonia*
- *Haemophilus influenza*
- *Staphylococcus aureus*
- *Chlamydia psittaci*
- *Coxiella burnetti*
- *Klebsiella pneumonia*
- *Actinomyces israelli*
- *Haemophilus influenzae*
- *Pseudomonas aeruginosa* (usually implicated in nosocomial pneumonia)

Clinical Features

- Typical pneumonia:
  - Sudden onset fever, chills and rigors
  - Cough with purulent sputum production
  - Pleuritic chest pain
  - Breathlessness with short inspiratory efforts

Signs:

- Fever
- Herpes labialis
- Tachypnoea

Signs of lung consolidation

- Pleural friction rubs
- Chest signs are very helpful depending on the phase of the inflammatory response
  - Dull percussion
  - Increased tactile and vocal fremitus
  - Bronchial breath sounds
  - Whispering pectoriloquy
  - Crepitations

Signs of severity

- Confusion
- Urea > 7mmol/L
- Respiratory rate > 30/min
- Systolic BP < 90
- Age ≤ 65years
- In Children: inability to feed or drink, cyanosis, alteration in level of consciousness

Score 1 point for any of the above features present

- 0 or 1- home treatment
- 2 - Hospital-supervised treatment
- 3 or more- manage in Hospital as severe pneumonia
- 4 or 5 – ICU Admission

- Atypical pneumonia:
  - Gradual onset
  - Dry cough
  - Prominent extra-pulmonary symptoms
  - Headache
  - Sore throat
  - Fatigue
  - Myalgia
  - Chest crackles or rales

Differential Diagnoses

- Acute bronchitis
- COPD Exacerbation
- Pulmonary embolism/infarction
- TB
- Pulmonary eosinophilia

Complications

- Empyema thoracis
- Pleural effusion
- Lung abscess
- Lobar collapse
- Deep vein thrombosis and pulmonary embolism
- Pneumothorax
- ARDS
- Multi organ failure
- Hepatitis, pericarditis, myocarditis, meningoencephalitis
- Pyrexia from drug hypersensitivity

Investigations

- FBC +ESR+ CRP
- Serum Electrolyte, Urea and Creatinine
- LFT
- Blood Culture
- Serology
- Cold agglutinins
- Arterial blood gases/ SPO_2
- Sputum gram stain, M/C/S
- Urine pneumococcal and legionella antigen
- Chest X-ray
- Pleural fluid M/C/S

Treatment Goals

- Eliminate the infection
- Return to normal lung function

Drug Treatment

General

- Oxygen to maintain PaO_2 at or above 8kPa

- IV fluids especially in severe cases
- Antipyretics
- Antibiotics
- Uncomplicated CAP and No modifying factor, no antibiotics use in the last 3 months:
- Co-amoxiclav
  - *Adult*: 1 g 12 hourly for 5 – 7 days
  - *Child*:
    - Neonate and premature infants, 25 mg/kg/dose 12 hourly
    - Infants up to 3 months, 25 mg/kg/dose 8 hourly
    - 3 months – 12 years, 25 mg/kg/dose 8 hourly increased to 6 hourly in more severe infections

Or

- Benzyl penicillin
  - *Adult*: initially 2 million units 6 hourly
  - *Child*:
    - preterm and neonate under 7 days, 25 mg/kg by IM injection Or by slow IV injection or infusion every 12 hours; double dose in severe infections
    - *Neonate* 7 – 28 days: 25 mg/kg 8 hourly; double dose in severe infections
  - 1 month – 18 years: 25 mg/kg, 4 – 6 hourly; Double dose in severe infections
  - Commence oral therapy as soon as possible

Or

- Macrolide (azithromycin 500 mg stat, then 250 mg daily, or clarithromycin 500 mg twice daily for up to 14 days)

Or

- Cefuroxime axetil
  - *Adult* :500 mg orally 8 hourly for 5 – 7 days
  - *Child*:
    - 3 months – 2 years 10 mg/kg (maximum 125 mg) orally 12 hourly
    - 2 – 12 years 15 mg/kg orally 12 hourly
  - 12 – 18 years 12 hourly; May double doses in severe infections.
- Fourth generation Cephalosporins: Cefpodoxime
  - Adult: 200 mg orally 12 hourly
  - Children: 4 mg/kg/dose orally 12 hourly

Patients with history of recent use of Antibiotics

- Respiratory quinolone (levofloxacin).
- Quinolones are generally better avoided in TB endemic areas because of their potential use as part of 2nd line regimen in the treatment of MDR-TB.
- Advanced macrolide+ amoxycillin
- Advanced macrolide+amoxycillin+clavulanic acid

Complicated CAP

- IV β lactam + advanced macrolide
- Iv respiratory quinolones+advanced macrolide

- Penicillin G+advanced macrolide
- Consider Pneumocystis jiroveci in HIV patients: Co-trimoxazole

Notable Adverse Drug Reaction, Contraindications and Caution

- Co-amoxiclav: Nausea, diarrhoea, skin rashes, contraindicated in penicillin hypersensitive individuals
- Cefuroxime: Nausea, vomiting, abdominal discomfort, headaches, rarely antibiotic associated colitis
- Macrolides: Similar to those mentioned above but usually milder. Hepatotoxicity and antibiotic associated colitis are quite rare

TABLE 13.1: TREATMENT SCHEDULE for COMMUNITY ACQUIRED PNEUMONIA - PAEDIATRIC ASSOCIATION of NIGERIA GUIDELINES

Category of children	Outpatient		Inpatient	
	First line	Alternatives	First line	Alternatives
< 2 months	Admit and treat as neonatal sepsis			
>= 2 months	High dose oral amoxicillin (90 mg/kg/day) in 2 divided doses for at least 5 days	High dose oral amoxicillin – clavulanic acid (amoxicillin component 90 mg/kg/day) in 2 divided OR Oral cefpodoxime (10 mg/kg/day) in 2 divided doses OR Oral cefuroxime 20 - 30 mg/kg/day in 2DD for at least 5 days	IV amoxicillin (150 mg/kg/day in 3 divided doses) AND IV gentamicin 5 to 7.5mg/kg/day	1. IV Ceftriaxone 100 mg/kg/day single dose on in 2 divided doses 2. IV Cefotaxime 50 to 100 mg /kg in 2 divided doses 3. IV Genticin and IV Cloxacillin 100 - 200 mg/kg/day in 4 divided doses 4. IV Cefuroxime 150 mg/ kg in 3 divided doses And IV Genticin
HIV infected children	High dose oral amoxicillin (90 mg/kg/day) in 2 divided doses for 10 days	High dose oral amoxicillin –clavulanic acid (amoxicillin component 90 mg/kg/day) in 2 divided OR Oral cefpodoxi me (10 mg/kg/day) in 2 divided doses OR Oral cefuroxime 20 - 30 mg/kg/day in 2DD for at least 10days	IV amoxicillin (150 mg/kg/day in 3 divided doses) AND IV genticin 5 to 7.5 mg/kg/day PLUS high dose co-trimoxazole (20 mg/kg/day of trimethoprim) for at least 10 days	1. IV ceftriazone 100 mg/kg/day single dose or in 2 divided doses OR 2. IV cefotaxime 50 to 100 mg /kg in 2 divided doses OR 3. IV cefuroxime 150 mg/ kg in 3 divided doses AND IV genticin PLUS high dose co-trimoxazole (20mg/kg/ day of trimethoprim) for at least 10days

Prevention
- Pneumococcal vaccine
- Haemophilus influenzae vaccine

Pulmonary Tuberculosis
Introduction
Tuberculosis (TB) is one of the oldest diseases known to affect humans
It is caused by bacteria of mycotuberculosis complex which includes *M. tuberculosis*, *M. bovis*, and *M. africanum*
M. tuberculosis is the most common cause of tuberculosis worldwide.
Transmission is by droplet infection.

Nigeria ranks 11thamong the high burden countries of TB in the world
Federal government of Nigeria established the National Tuberculosis and Leprosy Control Program (NTBLCS) in 1993 with the objective to reduce the prevalence of TB and Leprosy to a level at which they no longer constitute public health problem in the country

Almost every organ can be affected. The lung parenchyma are affected in more than 80% of the cases. This can be either as primary pulmonary disease (occurs mainly in childhood) or post primary pulmonary disease.
Those at risk of acquiring tuberculosis are:
- Contacts of patients with smear positive pulmonary disease
- Immunocompromised individuals, health works and people living in overcrowded conditions

Clinical Features
Symptoms
- Persistent cough
- Weight loss
- Drenching night sweats
- Chest pain (dull or pleuritic)
- Haemoptysis
- Anorexia

Signs:
- Physical examination may be normal
- Crepitations usually in the upper zone (earliest physical sign)
- Physical signs of consolidation, cavitation and fibrosis develop later
- Pallor and finger clubbing
- Erythema nodusum and phlyctenular conjunctivitis (Primary PTB)

Differential Diagnoses
- Pneumonia
- Carcinoma of the bronchus
- Lung abscess (especially due to *Klebsiella pneumoniae*)
- Pulmonary infarction

Complications

- Lung collapse
- Bronchiectasis
- Chronic Obstructive Pulmonary Disease
- Pleural effusion
- Cor pulmonale
- Destructive lung syndrome
- Lung abscess
- Acute Respiratory Distress Syndrome
- Spontaneous Pneumothorax
- Haemorrhage/Mycetoma

Extra-pulmonary TB

- Lymph node TB:
  - Painless swelling of lymph nodes (usually cervical and supracervical sites
  - Usually discrete in early disease; may become inflamed and have a fistulous tract draining caseous material)
- Pleural TB:
  - Fever
  - Pleuritic chest pain
  - Dyspnoea
  - Dullness to percussion
  - Absence of breath sounds
- TB of the upper airways:
  - Nearly always a complication of advanced cavitatory pulmonary TB
  - May involve the larynx, pharynx and epiglottis:
  - Hoarseness
  - Dysphagia
  - Dysphonia
  - Chronic productive cough
- Genitourinary TB:
  - Urinary frequency Dysuria Haematuria Flank pain
- Skeletal TB:
  - Weight bearing joints are affected: spine, hips and knees
- Spinal TB (Pott's disease):
  - Paraparesis Paraplegia
- TB meningitis:
  - Headache
  - Mental changes
  - Confusion
  - Lethargy
  - Altered sensorium
  - Neck rigidity
  - Ocular nerve paresis

- Hydrocephalus
- Gastrointestinal TB:
  - Commonly affects the terminal ileum and caecum
  - Abdominal pain (may be similar to that of appendicitis)
  - Diarrhoea
  - Intestinal obstruction
  - Haematochezia
  - Palpable mass Fever
  - Weight loss
  - Night sweats
  - TB peritonitis
- Pericardial TB:
  - Fever
  - Dull retrosternal pain
  - Friction rub
  - Cardiac tamponade
- Miliary TB:
- Fever
- Night sweats
- Anorexia
- Weakness
- Weight loss
- Cough
- Hepatomegaly
- Splenomegaly
- Lymphadenopathy
- Choroidal tubercles (pathognomonic)
- Meningitis

There are no clinical findings specific for a diagnosis of pulmonary TB; a history of contact with a smear positive pulmonary TB case, respiratory symptoms for more than 2-3 weeks not responding to broad spectrum antibiotics, and weight loss, failure to thrive may suggest TB

Investigations

- Bacteriologic examination:-
  - Sputum AFB X 3 (spot, morning, spot)
  - Sputum mycobacterial culture and drug susceptibility testing/Gene Xpert MTB-RIF Assay
- Radiologic Examination
  - Chest X-ray
- Other tests:-
  - Tuberculin skin test (low sensitivity and low specificity)
  - Haematologic - FBC and ESR
- In cases of diagnostic difficulties, one may need High Resolution CT and fibre-optic bronchoscopy with bronchoalveolar lavage and trans-bronchial

biopsy

Treatment Goals

- Cure the disease
- Prevent death from active TB or its late effects
- Prevent relapse of TB
- Decrease transmission of TB
- Prevent the development of acquired drug resistance

NTBLCP recommends that all TB cases and TB suspects should be managed in DOTs centres. This programme provides good quality drugs free of charge to all patients. It also implements international standards for tuberculosis care.

Drug Treatment

- Chemotherapy
  Standard drug regimens for Adults
  - 6 months regimen
  - **Initial Intensive Phase:** This is for 2 months using Rifampicin, isoniazid, pyrazinamide and ethambutol
  - **Continuation Phase:** 4 months using Isoniazid and rifampicin. In this regimen, there is fully supervised administration of drugs in both intensive and continuation phases

NOTE

- Pyridoxine 10mg is usually added to prevent peripheral neuropathy
- These drugs can be provided as fixed dose combinations to enhance adherence to therapy or lose tablets

Non-drug Treatment

- Contact tracing
- Health education of the patient

Table 13.2 Daily doses and adverse reactions of commonly used anti-tuberculosis drugs (Adults)

Drugs	Daily dose	Adverse Drug Reactions
Rifampizin taken 30 minutes before breakfast	10 mg/kg (maximum dose) 600mg	Drug interactions, hypersensitivity hepatitis fever
Isoniazid	5 - 10 mg/kg (maximum dose) 300mg	Hypersensitivity, polyneuropathy.
Ethambutol	15 - 20 mg/kg (maximum dose) 1.6g	Optic neuritis hypersensitivity
Pyrazinamide	20 - 35 mg/kg (maximum dose) 2.5g	Hepatitis, gout, hypersensitivity

Notable Adverse Drug Reactions, Contraindications and Caution

First line Anti-tuberculosis drugs though very effective, present problems in the treatment of patients such as:

- Pill burden
- Drug interaction
- Potentials for drug interactions with rifampicin and antiretroviral agents such as protease inhibitors (PIs) and non nucleoside reverse transcriptase inhibitor (NNRTIs)
- Rifabutin may be used in place of rifampicin but not easily available and expensive.
- Efavirenz in place of nevirapine
- Immune reconstitution syndrome
- Increased incidence of drug resistance cases

Standard drug regimen for Children

Two standardized treatment Regimen adopted for the treatment of all children diagnosed with susceptible TB in Nigeria:

- Standard six month treatment Regimen for all children with newly diagnosed or previously treated PTB disease
  Regimen 1 for Children: **2(RHZ+E)/4(RH)**
- Standard six month treatment Regimen for all children with newly diagnosed or previously treated EPTB disease
  Regimen 2 for children with EPTB: **2(RHZ+E)/10(RH)**
- Use of Pyridoxine (Vitamin B6) in children
  - Pyridoxine (vitamin B6) protects against isoniazid-induced peripheral neuropathy
  - Not routinely given but is recommended for severely malnourished and HIV-infected children
  - The recommended dose is 25 mg/ day until treatment is completed
- Monitoring of PTB Treatment

TABLE 13.3: Paediatric drugs and dosages for the management of Tuberculosis

Drug	Dosage (mg/kg)	Range (mg/kg)	Maximum dose (mg/day)
Isoniazid (H)	10	7-15	300
Rifampicin (R)	15	10-20	600
Pyrazinamide (Z)	35	30-4	2000
Ethambutol (E)	20	15-25	1200

- Monitoring for response to therapy (clinical improvement and bacteriologic clearance in sputum) and adverse drug reactions
- Routine laboratory monitoring for drug toxicity may not be necessary when there are no symptoms, signs or co-morbid factors like hepatic and renal disease

Multidrug Resistant Tuberculosis (MDR-TB)

- Drug resistance in mycobacteria comes about through random spontaneous mutation
- Emergence of this is creating additional barriers to effective tuberculosis control
- MDR-TB is caused by an organism resistance to at least isoniazid and rifampicin
- XDR-TB is MDR-TB plus resistance to any of the fluoroquinolones and one of the second line injectables.

MDR-TB Suspects

- Treatment failure with first line anti-tuberculosis drugs
- Symptomatic contacts to a known MDR-TB case

Diagnoses

- Send sputum samples to specialized facility for culture, molecular line probe and drug susceptibility
- Treatment – refer to designated treatment centres

HIV-Associated Pulmonary Tuberculosis

- Tuberculosis is an important opportunistic among HIV infected persons and commonest cause of death in such patients
- It directly attacks the critical immune mechanism involved in protection against Tuberculosis
- Presentation depends on the stage of HIV infection
- Diagnosis of tuberculosis in HIV patients may be difficult when the immunity is highly compromised (low CD4 count) because of atypical presentation, increase frequency of sputum smear negativity and atypical radiographic features
- All TB patients should be offered HIV counseling and testing; also. all HIV patients should be screened for TB

Treatment

- Commence anti-tuberculosis treatment
- Offer Co-trimoxazole preventive therapy
- Commence anti-retroviral therapy

CHAPTER 14:

RHEUMATIC AND MUSCULOSKELETAL DISORDERS

Introduction

Rheumatology is the specialty of Internal Medicine that deals with the diagnosis and medical management of NON TRAUMATIC diseases of the musculoskeletal system as well as systemic autoimmune rheumatic diseases.

Antiphospholipid Syndrome

Introduction

A hyper coagulable disorder manifesting as recurrent venous and arterial thrombosis. Results in adverse effects in pregnancy. Associated with heterogeneous antibodies, anti-cardiolipin antibodies . Anti-B_2glycoprotein 1 antibodies and lupus anticoagulant. Commonly seen in young females of reproductive age.It may occur in 1-6% of the general population. It may be primary (with no associated disease) or secondary (associated with another systemic disease such as Systemic lupus erythematosus

Pathophysiology

Poorly understood. Antiphospholipid antibodies (aPL) are produced due to chronic immune stimulation either from autoimmune disease, medication, infection or neoplasm. It affects platelets, increasing production of adhesion modules on endothelial cells thereby causing thrombosis.

Clinical Features

Patient typical present in 4 ways :

- Venous thrombosis (VTE) either deep venous thrombosis) Pulmonary Embolism
- Arterial thrombosis
- Pregnancy loss – 8%
- Thrombocytopenia – 22%

Other may include:

- Cutaneous - Livedo reticularis, Splinter haemorrhage superficial thrombophlebitis, Raynaud phenomenon
- Neurologic - Cerebrovascular accident, transient ischaemic attack, migraines, multi infarct dementia
- Renal - Renal artery/vein thrombosis, hypertension, glomerular thrombosis
- Pregnancy morbidities- Eclampsia/pre eclampsia, intrauterine growth retardation; small for age birth; three or more unexplained recurrent; consecutive pregnancy losses before 10 weeks cyesis; any unexplained pregnancy loss after 10 weeks cyesis
- Haemolysis, Elevated liver enzymes, and Low platelet count (HELLP) syndrome
- Pulmonary - Pulmonary embolism, pulmonary hypertension
- Valvular heart disease, renal thrombotic microangiopathy

Diagnosis

- Catastrophic APS - History of APS/ and or antiphospholipid antibodies
- 3 or more new organ thromboses
- Biopsy confirmation of microthrombi
- Exclusion of other causes of multiple organ thrombosis

Differential Diagnoses

- Thrombosis from Protein C and S deficiency
- Antithrombin III deficiency
- Factor V Leiden mutation
- Malignancy (Lymphoproliferative disorder)
- Thrombotic thrombocytopenic purpura

Investigations

- FBC and ESR
- Serology
  - Anti-B2 glycoprotein antibodies IgG, IgM, IgA
  - Anti-cardiolipin antibodies(aCL) IgG, IgM, IgA
  - Lupus anticoagulant(LAC)
  - Antinuclear antibody(ANA)
  - Other Antibodies to phospholipids(many are not yet in clinical use) eg phosphatidylserine, phosphatidic acid, phosphatidylinositol
- ECHO, Doppler US scan , CT angiogram and Brain CT scan

Non-drug Treatment

- Smoking cessation
- Avoidance of supplemental oestrogen
- Control of hypertension
- Close monitoring during pregnancy

Drug Treatment

- Low dose aspirin 75 mg - 325 mg daily. Some studies have demonstrated superiority of aspirin 150 mg over the 75 mg
- Tabs hydroxychloroquine 200 mg - 400 mg daily
- For venous events:
  - *Unfractionated heparin or low molecular weight heparin (e.g enoxaparin 20 - 80 mg/dL subcutaneously every 12 hours)*
  - *Tabs warfarin INR target 2 - 3 if single event; INR 3 - 4 if recurrent venous thrombosis. NOT TO BE USED IN PREGNANCY because of teratogenicity*
  - *Factor Xa inhibitors (e.g. rivaroxaban 15 mg twice daly for three weeks and then 20 mg daily to prevent recurrence)*
- For arterial event
  - Tabs warfarin
  - INR target (2 - 3) at moderate (3 - 4) at high
- Pregnancy morbidity prevention
  - Tabs aspirin 75 − 150 mg daily
  - Unfractionated or low molecular weight heparin (e.g enoxaparin 20 - 80 mg/dL subcutaneously every 12 hours depending on aPL titre

- Tabs hydroxychloroquine 200 mg daily

▪ Catastropic APS (CAPS)
- Life threatening situation developing from APS and characterised by thrombosis at multiple organ sites. Resultant ischaemic changes of the kidneys, lungs, heart, and brain commonly and intestinal, spleen, páncreas less commonly. CAPS is precipitated by infections, surgery, postpartum period, medications, malignancies, SLE flares
- IV heparin for 7 - 10 days
- IV Pulse methylprednisolone 500 − 1000 mg daily for 3 days
- IV immune globulins 0.4 g/kg body weight for 4-5 days
- Plasmapheresis
- IV cyclophosphamide 500 - 750 mg/m^2
- IV rituximab 500 mg - 1 g day 1 and day 15

Back Pain

Introduction

Defined as pain along the spine stretching from the neck downward and including the buttocks area. It affects the cervical, thoracic, lumbar, sacral and coccyx spines and is probably the commonest affliction of mankind. Affects all age groups and sexes. Most cases are due to mechanical causes – poor posture, overuse, unaccustomed exercises. Most back pains are from the soft tissues of the back: muscles, ligaments, tendons, and not from the bony or joint structure.Such pains do not need further investigations but there are 'red flag' clinical features that necessitate further investigations (X-ray, MRI, CT). These include:

- Back pain that disturb sleep
- Back pain that persists with recumbent position
- Back pain associated with constitutional disturbances such as fever, loss of weight, nausea, and general feeling of being unwell.
- Back pain associated with bowel disorders.
- Back pain associated with urinary symptoms.
- Back pain associated with muscle weakness
- Back pain associated with deformities of the back
- Degenerative arthritis: spondylosis, spinal canal stenosis, spondylolisthesis, osteomyelitis
- Primary or secondary malignancies, osteoporotic fractures, multiple myeloma, tuberculosis of the spine, spinal abscess

Clinical Features

- Back pain
- Radicular pain in the arms or legs
- Back stiffness
- Saddle anaesthesia
- Paraesthesia in the feet
- Back pain worsened by coughing or sneezing is suggestive of disc lesions
- Back deformity

Differential Diagnoses

- Referred pain from gastrointestinal structures, liver, gall bladder, pancreatic disease.
- Aortic aneurysms
- Tumours of the pleura, pericardium
- Pelvic inflammatory diseases
- Psychosomatic disorders

Investigations

- None, if the pain is mechanical
- Laboratory investigations to exclude other causes
- Imaging: Plain X-rays, CT Scan, MRI, Bone Densitometry, Radioisotope studies

Treatment Goals

- Relief of pain
- Treatment of underlying disease
- Treatment of complications

Treatment

Non-drug Treatment:

- Weight loss
- Education
- Avoidance of precipitating factors
- Physical therapy
- Acupuncture
- Bio feed back
- Back exercises e.g. Mackenzie Extension Exercises

Drug Treatment:

- Simple analgesics such as paracetamol up to 1 g three times daily, with or without the following
- Non steroidal anti-inflammatory drugs
  - Ibuprofen up to 2,400 mg daily
  - Naproxen: 500 mg twice daily
  - Diclofenac: 75 mg twice daily,
  - COX-2 inhibitors e.g. celecoxib: 200 mg daily.
- Muscles relaxants
  - tizanidine, up to 4 mg three times daily
  - baclofen 5 - 10 mg daily
- Narcotic analgesics: tramadol 50 mg three times daily
- Anti depressants
  - Amitriptyline 25 - 50 mg nocte
  - Selective Serotonin Re–uptake Inhibitors e.g. fluoxetine
- Anti–convulsants:
  - pregabalin up to 600 mg daily
  - gabapentin up to 1,500 mg daily

Gout

Introduction

Crystalline inflammatory disease, due to monosodium urate monohydrate crystals deposition in joints and tissues. Due either to excessive uric acid production from intrinsic purine metabolism or extrinsic (dietary). Also due to decrease renal excretion of uric acid and resultant accumulation in the blood. Commonly seen in males (40 years and above) and post-menopausal females. Four major types:

- Asymptomatic
- Acute
- Inter critical
- Chronic tophaceous

It could be either primary (no identifiable cause) or secondary. Secondary causes: dehydration, fasting, renal impairment, hypertension, malignancies such as lymphoma, leukaemia, psoriasis, sickle cell disease, use of cytotoxic agents, excessive alcohol intake especially beer

Low dose aspirin, Drugs such as pyrazinamide, diuretics.

Clinical Presentation

Acute Gout

- Usually mono–articular, occasionally polyarticular (in elderly persons and in renal failure)
- Sudden onset of pain and swelling
- Pain and swelling maximal within 24-48 hours
- Tendency to start at night or early hours of the morning
- Usually follows binge of alcohol or consumption of offal of animal meat
- Recurrent painful episodes
- Affects big toe (***podagra***), but also large joints – forefoot, ankles, knees, wrists commonly in African blacks.
- There may be associated fever, vomiting, diaphoresis, rigors

Chronic Tophaceous Gout

- Follows long standing attacks of acute gout, usually up to 7 years
- Tophi deposit in the skin, ear lobes, over joints,
- Tophi may also deposit in the kidneys and brain

Differential Diagnoses

- Septic arthritis, osteoarthritis, rheumatoid arthritis, gonococcal arthritis, traumatic synovitis, pseudogout, osteomyelitis, reactive arthritis

Investigations

- Serum uric acid - may be normal in acute gout
- Haematocrit, white blood cell count, ESR, lipid profile
- Creatinine, urea, eGFR - to exclude the usually associated renal impairment
- Cholesterol, triglycerides – usually elevated and co-existing with gout
- Plasma glucose (high serum uric acid may be a component of metabolic syndrome)
- Musculoskeletal ultrasound scan, radiographs, Dual energy computerized tomography

Treatment Goals

- Treatment of pain
- Lower serum uric acid to below 6 mg/100mL

Non-drug Treatment

- Dietary control – avoid offals, salmon, sea food, red meat, fructose drinks
- Avoid alcohol especially beer, wine
- Reduce weight
- Control cholesterol level
- Avoid tight shoes
- Rest affected joints
- Avoid surgical operation of tophi
- Apply cold/ice compress during acute attacks

Drug Treatment

Acute Gout

- NSAIDs at higher doses above normal e.g:
  - Naproxen: 500mg 2-3 times daily
  - Diclofenac: 75 mg twice daily
- Colchicine quite effective in acute attacks; loading dose of 1 mg followed 1 hour later by 0.5 mg on day 1 then continue with 0.5 mg twice a day for 1-2 weeks
- Prednisolone – 40 mg daily for 1 week then taper quickly and stop
- Intra articular steroids
- Biologic anti-interleukin 1: rilonacept, canakinumab, anakinra

Chronic Tophaceous Gout

- Allopurinol: xanthine oxidase inhibitor – gradual increase from 100 mg daily up to 600 mg daily
- Probenecid: dose of 500 mg to 2 g daily in two divided doses. Not recommended in patients with renal impairment
- Febuxostat: 40 − 120 mg/day, especially indicated in patients with renal impairment.
- Lesinurad: 200 mg daily + febuxostat or lesinurad 200 mg daily + allopurinol
- Pegloticase, a pegylated uricase 8 mg via IV infusion over 120 minutes every 2 weeks. Care must be taken to prevent anaphylaxis
- Sulfinpyrazone – uricosuric agent (recommended in patients with renal pathology)

Adverse Drug Reactions, Contraindications and Caution

- NSAIDs: dyspepsia, peptic ulcer disease, gastrointestinal haemorrhage, renal insufficiency, hepatotoxicity, heart failure (especially elderly persons)
- Allopurinol: elevated liver enzymes, allopurinol hypersensitivity syndrome – liver failure, renal failure, eosinophilia, hypersensitivity skin.

Idiopathic Inflammatory Myopathies

Introduction

Heterogenous group of disorder characterised by muscle weakness due to inflammation of skeletal muscles (myositis) and also sometimes smooth muscles. They are more appropriately called Idiopathic Inflammatory Myopathies because they may also be secondary. There are three types of the Idiopathic inflammatory myopathies

- Polymyositis (PM)
- Dermatomyositis (DM)
- Inclusion body myositis (IBM)

Aetiopathogenesis

This is unknown but has been attributed to interplay of genetic and environmental factors just as in other auto-immune diseases. Infectious agents like Group A streptococcus and *H. Influenzae* being mostly suggested

Clinical Features

- Painless symmetrical weakness of proximal muscles of both upper and lower limbs (worse in the mornings) with asscociated stiffness
- Difficulties in getting up in the mornings from the bed, ascending staircase, getting up from a sitting position especially from settee chairs.
- Difficulties in combing the hair, tying of head scarf, assessing objects from shelves.
- Dyspnoea arising from weakness of the intercostal muscles and smooth muscles of diaphragm. Dysphagia or reflux oesophagitis (due to weakness of the gastrointestinal muscles)
- Presence of constitutional symptoms: fatigue, fever, loss of weight, loss of appetite

Clinical Features

- Polymyositis with skin manifestation:
- Heliotrope rash: purplish to erythematous discolouration affecting the eyelids, malar region, nasolabial fold and forehead in Dermatomyositis
- Shawl sign rash: erythematous rash over the shoulder and proximal arm
- Mechanic hand: cracking and fissure of the skin of the finger pads especially the radial side of index finger suggestive of Antisynthetase syndrome
- Gottron papules/lesions: erythematous or hypopigmented or violet papules or plaques over the knuckles
- Holster sign: erythematous or violaceous rash seen over the lateral hip
- Nail fold abnormalities: periungual, erythema cuticular overgrowth

Inclusion Body Myositis (IBM)

- Asymmetrical painless muscle weakness, involving proximal and distal muscle
- Legs more affected than the hands
- Peripheral neuropathy

Differential Diagnoses

- Steroid myopathy

- Drug induced myopathies e.g. statins especially, procainamide and penicillamine
- Hypothyroid myopathy
- Metabolic myopathies e.g. diabetic
- Muscular dystrophy
- Polymyalgia rheumatica usually seen in elderly

Investigations

- Diagnosis is based on three planks – muscle enzymes, EMG, muscle biopsy. Probably the more commonly used set of criteria are the Bohan-Peter criteria
- Elevated muscle enzymes
  - Creatine kinase : many times upper limit of normal
  - Elevated aldolase,
  - Lactate dehydrogenaseElevated liver enzymesAlanine transaminase (ALT),aspartate transaminases(AST)
- ESR and CRP are usually elevated
- Serology
  - Antinuclear Antibodies (ANA) 50-80%
  - Anti-Mi2 associated with dermatomyositis
  - Anti-Jo1 associated with polymyositis
  - Anti-SR2 associated with severe resistance polymyositis
- ECG : arrhythmias seen in 90% of patient
- Muscle biopsy
- Pulmonary function test
- High resolution lung CT scan to exclude interstitial lung disease.
- Magnetic Resonance Imaging to differentiate acute inflammation from chronic muscle damage
- Electromyography (EMG)

Non-drug Treatment

- Physical therapy

Drug Treatment

- Topical steroids and topical calcineurin inhibitor for cutaneous manifestation
- High dose prednisolone 1 - 2 mg/kg (for short duration)
- Hydroxychloroquine 200 mg - 400 mg daily
- Steroid-sparing agents
  - Tabs methotrexate 10 - 25 mg once weekly plus Folic acid supplement 10mg weekly day after
  - Tabs azathioprine 2 − 3 mg/kg
  - Tabs cyclophosphamide 1 - 2 mg/kg/day
  - Tabs mycophenolate mofetil 1 g - 2 g daily
  - Tabs tacrolimus 0.1 to 0.15 mg/kg/day
  - IV rituximab 500 mg - 1 g day 0 and day 14
- IV immunoglobulin as specified by manufacturer
- IBM patient are usually non-responsive to steroid or immunosuppressant. Treatment is intravenous immunoglobulin

Osteoarthritis

Introduction

- Heterogeneous group of diseases. All forms of assault on the joint or any other arthritis will eventually result in osteoarthritis (OA). Degenerative disease of synovial joint – osteoarthritis; degenerative disease of intervertebral disc- spondylosis. Commonest type of arthritis, affects mostly the middle aged to elderly. Females more frequent affected than males.
- Mostly primary, but can be secondary. Previous trauma to the joint, meniscus injury, previous fracture, any previous arthritis e.g. Gout, RA; Congenital hip dysplasia; Epiphyseal: dysplasia; Hypermobility syndromes; Previous poliomyelitis in the limb; Glycogen storage disorder.
- Joints affected – mostly knee, also occasionally hip, ankle, distal interphalangeal joints, cervical, lumbosacral. Rarely thoracic spine.
- Spondylosis – cervical, lumbosacral, rarely thoracic spine

Clinical Features

- Joint pain – developing over several weeks or even years
- Initially pain on movement but later at rest
- Joint warm to touch
- Minimal joint morning stiffness
- Creakiness (crepitus) on walking
- Swelling of the joint may be bony – osteophytes, or soft due to effusion
- Presence of Heberden's nodes (distal interphalangeal joint); Bouchard's nodes (proximal interphalangeal joint)
- Joint deformities: knee - Genu varus, Genu valgum

Complications

- Joint deformity
- Immobility
- Joint subluxation
- Obesity: depression/anxiety

Differential Diagnoses

- Rheumatoid arthritis, gout, psoriatic arthritis, bursitis, ankylosing spondylitis

Investigations

- To exclude other diagnosis
- No blood tests diagnostic
- Imaging – X-ray; CT, MRI (hardly done because of cost)

Treatment Goals

- Reduce pain
- Enhance mobility
- Prevent deformities

Treatment

Non- drug Treatment

- Patient education
- Weight loss

- Avoidance of excessive flexion of joint such as the knee
- Knee brace, feet insoles, walking sticks
- Regular exercise – walking, bicycling, swimming. Avoid jogging, if knee is affected
- Physical therapy – quadriceps strengthening exercise, range of motion exercises
- Occupational therapy
- Acupuncture
- Transcutaneous electrical nerve stimulation

Drug Treatment

- Paracetamol – up to 4 g daily in divided dose
- Mainstay of treatment is NSAIDs (none is superior to the other); depends on patients response
  - Ibuprofen 200 mg daily up to 2,400 mg daily in divided doses
  - Diclofenac 75 mg - 150 mg daily
  - Naproxen 500mg twice daily
  - NSAIDs with misoprostol or a proton pump inhibitor (PPI)
  - COX-2 inhibitors: celecoxib – 200 mg daily
  - Local application – diclofenac gel
- Intra-articular hyaluronate
- Narcotic analgesics: codeine based compound, tramadol
- Local application – capsaicin cream, diclofenac
- Intra-articular steroid – not to be given more than four times in a calendar year

Adverse Drug Reactions, Contraindications and Caution

- NSAIDS: dyspepsia, peptic ulcer disease, gastrointestinal haemorrhage, perforation, hepatotoxicity, impairment of renal blood flow, pyloric stenosis, fixed drug eruptions, constipation, skin rashes

Indications for surgery

- Intractable pain
- Disability
- Deformity

Prevention

- Reduce weight
- Regular exercise

Septic Arthritis

Introduction

Septic arthritis is accompanied by articular manifestation due to presence of pathogen within a joint. Mostly due to bacteria, but can also be due to fungal, viral, or protozoan agent, rickettsia.

Two major entities: gonococcal and non-gonococcal. *Staphylococcus aureus* is the commonest organism but other organisms as well viz Streptococci, pseudomonas, anaerobes

Joint infection mostly as a result of haematogenous seeding during a bacteriaenic episode. May also occur secondary to penetrating cutaneous trauma. Uncommonly iatrogenic from local corticosteroid joint injection.

Risk Factors

- Extremes of life – very young and persons above 80yrs
- Immunosuppressive/ cytotoxic agents therapies
- Immunosuppression – HIV, chronic renal failure, hypogammaglobulinaemia
- Diabetes mellitus
- Previous intra-articular steroid
- Osteoarthritis
- Alcoholism
- Intravenous drug use
- Haemoglobinopathies
- Trauma to the joint
- Rheumatoid arthritis
- SLE

Clinical Features

- Usually mono-articular
- Acutely swollen joint
- Joint hot to touch, extremely painful
- Tenderness on palpation and movement
- High fever
- Rigors, diaphoresis

Differential Diagnoses

- Gout and pseudogout
- Reactive arthritis, haemarthrosis – possibly from aspirin
- Osteoarthritis
- Intra articular injury
- Osteonecrosis
- Metastatic carcinoma
- Fracture around the joint

Investigations

- Haematocrit, white blood cell count and differentials
- Joint aspirate – microscopy, culture and sensitivity
- Blood culture
- ESR, CRP
- X-ray of affected joints
- CT, MRI

Treatment

- Antibiotic treatment depending on bacteria isolated
- Cloxacillin or flucloxacillin - 25 mg/kg up to 1 g by IV every 6 hours
- Vancomycin - for MRSA 0.5 - 2 g/day orally divided every 6 - 8 hours
- Ceftriaxone1-2 g once daily (IM or IV) for suspected gonococcus or meningococcus

- NSAIDs
- Surgical: daily needle aspiration, open drainage, arthroscopic debridement with lavage, intravenous therapy for 10 -14 days and then oral antibiotics for up to 6 weeks

Complications

- Septicaemia
- Joint ankylosis

Rheumatoid Arthritis

Introduction

Rheumatoid arthritis is a chronic auto–immune inflammatory arthritis. Typically affects females more than males and constitutes 10-15% of all patients seen in rheumatology clinics in Nigeria. Affects all age groups but especially 40 years and above.

Risk factors: genetic such as shared epitope of HLA DRBI; environmental such as infective agent – parvovirus, Epstein Barr virus, mycoplasma, smoking.

Clinical Features

- Diagnosis based on the American College of Rheumatology criteria (ACR)
- Lately, the ACR and European League Against Rheumatism (ACR/EULAR) criteria
- Symptoms include constitutional features such as fever, loss of weight, loss of appetite, fatigue, nausea, anaemia
- Polyarthritis involving especially joints of the hands, elbows, shoulders, feet, knees, hip and temporo-mandibular
- Hardly ever affects joints of the spine except atlanto-axial joint
- Dryness of the mouth and eyes
- Subcutaneous nodules especially the elbow
- Internal organ involvement may include pleural effusion, interstitial pneumonitis, pericarditis, pericardial effusion, ischaemic heart disease, conjunctivitis, hepatosplenomegaly

Differential Diagnoses

- Generalized osteoarthritis
- Polyarticular osteoarthritis
- Polyarticular gout
- Systemic Lupus Erythematosus
- Spondyloarthropathy
- Reactive Arthritis

Investigations

- Haematocrit, white blood cell count, ESR, CRP
- Liver function tests (as most of drugs used could be hepatotoxic)
- Cholesterol, triglycerides
- Rheumatoid factors-this is diagnostic as well as Anti CCP
- Anti-Cyclic citrullinated peptide
- Radiology

- Plain radiographs especially of the hands and feet to demonstrate erosions
- Ultrasound of the joints to demonstrate synovitis and erosions
- CT scan, MRI
- Radioisotope

Treatment Goals

- To reduce pain and swelling
- To prevent joint destruction and deformities
- To prevent cardiovascular morbidities

Treatment

- Non–pharmacologic treatment as in osteoarthritis
- Disease Modifying Anti Rheumatic Drugs (DMARDS) are the mainstay and must be started immediately
- NSAIDs are supportive and should be stopped if no pain or if any adverse effects
- Synthetic DMARDs:
  - Methotrexate (gold standard) 7.5 mg - 25 mg once weekly orally or subcutaneously
    - Sulfasalazine tablets 1 g - 3 g daily in divided doses
    - Hydroxychloroquine 200 - 400 mg daily
    - Leflunomide 20 mg - 30 mg daily after loading dose (100 mg daily orally for the initial 3 days)
    - Azathioprine 2-3 mg/kg body weight daily especially in those who develop nodulosis with methotrexate
    - In some cases, combination therapy with methotrexate + sulfasalazine + hydroxychloroquine or methotrexate + leflunomide
- Biologic DMARD
  - Used accordingly to guidelines if disease activity is high after synthetic DMARDs
  - Numerous groups
  - Anti-TNF: oral etanercept: 50 mg twice weekly
  - B Lymphocyte depletor: rituximab 500 mg - 1 g Day 0 and Day 14
  - Other biologics- adalimumab, infliximab, golimumab, certolizumab pegol, abatacept
- Corticosteroids: Prednisolone at low doses, less than 15mg eventually phased out within 6 months; intra – articular steroid. Intramuscular such as methylprednisolone and dexamethasone
- NSAIDs – used only in exacerbation of pain

Adverse Drug Reactions, Contraindications and Caution

- NSAIDs – dyspepsia, peptic ulceration, gastrointestinal bleeding, hepatotoxicity, fixed drug eruptions
- DMARDs – susceptibility to infections, hepatotoxicity, elevated blood lipids, pancytopenia, bone marrow suppression, malignancy, teratogenicity

Scleroderma (Systemic Sclerosis)

Introduction

A connective tissue disease characterized by autoimmunity, vasculopathy and fibrosis (skin thickening and tightening). Two main forms:

- Localized
  - skin fibrosis without internal organ involvement
- Generalized
  - Limited cutaneous sclerosis (calcinosis, raynaud phenomenon (RP); esophageal dysmotility, sclerodactyl and teleanglectasis (formerly known as CREST syndrome)
  - Diffuse cutaneous systemic sclerosis (DCSS)
  - Scleroderma sine scleroderma – internal manifestation of scleroderma without skin involvement

Aetiopathogenesis

Aetiology is unknown. Genetics, female sex, environmental and infectious agents play a role. Seen in persons who have lost mutation in the antifibrotic pathway. Auto-antibodies produced activate fibroblast induce collagen production and prevent collagen degradation resulting in fibrosis.

Clinical Features

- Raynaud's phenomenon (RP) episodic bilateral colour changes of pallor, cyanosis and then erythema (white, blue and then red) in association with pain or paraesthesia
- Precipitated by cold or emotion seen on fingers, toes, nose and ears
- Skin**:** swelling and puffiness of fingers tightening, decrease flexibility of the skin, skin ulcer, telanglectasia, calcinosis
- Musculoskeletal:arthritis, arthralgia, muscle weakness
- Gastrointestinal: gastroesophageal reflux, dysphagia, dyspepsia, nausea, intestinal pseudo-obstruction
- Pulmonary: dyspnoea on exertion, non-productive cough
- Cardiac: pericarditis, pulmonary hypertension, congestive heart failure
- Kidney: sclerodermal renal crisis seen in DCSS characterized with microangiopathic haemolytic anaemic and hypertension

Differential Diagnoses

- Systemic Lupus Erythematosus (SLE)
- Rheumatoid arthritis
- Mixed connective tissue
- Nephrogenic systemic fibrosis (common in dialysis patient)
- Eosinophilic fasciitis
- Polyneuropathy, organomegaly, endocrinopathy, monoclonal gammopathy, scleroderma like skin change (POEMS syndrome)

Investigations

- FBC, haematocrit
- ESR, CRP
- Digital chest X-ray, HRCT scan with suspicion of ILD

- ECG, ECHO with suspicion of pulmonary hypertension
- Serology – Anti-Nuclear Antibody (ANA)
- Anti-topoisomerase 1 (anti-Scl 70) specific for diffuse sclerosis
- Anti-centromere (specific for Limited scleroderma)
- Others Anti-RNA polymerase I, II, and III, anti-U1 RNP (found in mixed connective tissue)

Treatment

Non-drug Treatment

- Smoking cessation
- Avoiding cold use of hand gloves and stockings
- Physiotherapy to minimize contractures

Drug Treatment

Symptomatic Treatment

- Raynaud's Phenomenon
  - calcium channel blockers (e.g. tabs nifedipine 10-20 mg daily as tolerated)
  - Phosphodiesterase inhibitor (e.g. tabs tadalafil 5 mg daily)
  - Selective serotonin uptake inhibitor (e.g. tabs fluoxetine 20 mg nocte daily
  - Prostacyclin
- Digital ulcers
  - Tabs tadalafil 5 mg daily
  - Tabs sildenafil 20 mg three times daily
  - Tabs bosentan 62.5 mg 12 hourly for patients less than 40 kg body weight. For those above 40 kg body weight, 62.5 mg 12 hourly for the first four weeks and then 125 mg 12 hourly afterwards
  - Scleroderma renal crisis:
  - Angiotensin converting enzyme inhibitor (tabs captopril 2.5 - 5 mg daily)
- Interstitial lung disease:
  - IV cyclophosphomide 1 g monthly for 9 months
  - Tabs mycophenolate mofetil 1 - 2 g daily
  - IV rituximab 500 mg - 1 g day 1 and day 15
- Pulmonary hypertension:
  - Phosphodiesterase inhibitor is the first line of action (e.g. tabs tadalafil 20-40mg daily, sildenafil)
  - Endothelin receptor antagonist (e.g. tabs bosentan 62.5 mg 12 hourly for patients less than 40 kg body weight
  - For those above 40 kg body weight, 62.5 mg 12 hourly for the first four weeks and then 125 mg 12 hourly afterwards
  - Prostacyclin (epoprostenol IV 1 - 2 ng/kg/min daily
  - Sometimes, combining the first two
- Gastrointestinal symptoms:
  - Proton pump inhibitors: tabs omeprazole 20 - 40 mg twice daily
  - H_2receptor blockers (tabs cimetidine 400 mg twice daily)
  - In severe cases of reflux, the two can be combined
  - Prokinetic agents: tabs metoclopramide 10 mg three times daily

Systemic Lupus Erythematosus

Introduction

Systemic lupus erythematosus (SLE) is a multisystemic auto-immune disorder with a broad spectrum of manifestations. Affects all organs and systems. Deposition of immune complexes. Presents as a chronic disease with a waxing and waning course. Significant morbidity and possible mortality. Affects mainly African Americans and Hispanics. Affects mostly females of child bearing age (16 – 55 years). Early damage due to the disease activity, renal; late disease damage due to infections and atherosclerosis, malignancies

Aetiology and Pathogenesis

- No definite aetiology, but genetic and environment factors implicated
  - Female sex
  - Genetic factors – commoner in monozygotic twins
  - Epigenetic factors
  - Environmental: ultraviolet rays; viral: Epstein-Barr virus (EBV); drugs (e.g. procainamide, hydralazine, methyldopa)
  - Oral drugs such as oral contraceptives

Clinical Features

- Affects all organs and systems – skin, joints, heart, lungs, kidneys, brain, pregnancy
- Diagnosis mostly by American College of Rheumatology (ACR) Criteria and , Systemic Lupus International Collaborating Clinics (SLICC) criteria
- Lately, the ACR/EULAR criteria which starts from a positive ANA of 1:80 or more in association with other clinical features.
- Usually presents with fever, polyarthralgia, fatigue, loss of weight, hair loss, skin rashes, mouth or pharyngeal ulcers.
- Specific organ involvement:
  - Lung: pleurisy, pleural effusion, pulmonary fibrosis
  - Heart: pericarditis, pericardial effusion, ischaemic heart disease
  - Kidneys: proteinuria, acute and chronic renal failure, nephrotic syndrome
  - CNS: meningitis, encephalitis, seizure, psychosis
  - Blood: hemolytic anaemia, leucopenia, thrombocytopenia
  - Pregnancy: antiphospholipid syndrome – recurrent pregnancy losses, intra-uterine growth retardation

Differential Diagnoses

- Rheumatoid arthritis
- Scleroderma,
- inflammatory myopathies
- Fibromyalgia
- Benign hypermobility Syndrome

Investigations

- Haematocrit, white blood cell count, platelet count
- ESR, CRP . ESR markedly high while CRP is normal or marginally raised.

Markedly elevated ESR may be suggestive of SLE if other conditions causing this have been eliminated. This is in lieu of serologies especially in patients who cannot afford the latter.

- Urine analysis and microscopy – for casts, RBCs, protein
- Electrolytes and urea
- Chest X-ray, ECG
- Serology – Anti–nuclear Antibody (ANA); Extractable Nuclear Antigen (ENA); Double stranded DNA
- Kidney Biopsy – as indicated

Non-Drug Treatment

- Avoid sunlight. Avoid physical and emotional stress. Physical Exercise. Sunscreen

Drug Treatment

- Corticosteroids: prednisolone 1-2 mg/kg and tailed o ffover 6months
- Anti-malarial: hydroxychloroquine 200-400 mg daily(a must for all lupus patients except where contra indicated). Eyes must be checked annually by opthalmologists for evidence of maculopathy
- Methotrexate(especially when arthritis or arthralgia are dominant) 10-25mg once weekly plus Folic acid supplement 10mg once weekly
- Azathioprine: 2-3 mg/kg body weight
- Mycophenolate mofetil:1g-3 gm daily in divided doses
- Cyclosporine: 2 - 6 mg/kg/day
- Cyclophosphamide: 200 mg/kg/day
- Tacrolimus 1 - 4 mg daily
- Voclosporin
- Biologic DMARDS: IV rituximab 500 mg - 1 g day 1 and day 15
  - Biologics: belumimab, anifrolumab
  - JAK inhibitors: tofacitinib, baricitinib

CHAPTER 15:

SKIN, HAIR AND NAIL DISEASES

BACTERIAL INFECTIONS

Cellulitis

Introduction

An acute suppurative bacterial infection of the skin and soft tissue, often with involvement of underlying structures: fascia, muscles and tendons. Most often due to ß-haemolytic streptococci or Staphylococcus aureus. Less common causes include: Anaerobic bacteria, Mycobacteria, Proteus, Pseudomonas and rarely Cryptococcus. Usually (but not always) follows some discernible wound. Often a complication of immunosuppression like diabetes and HIV/AIDS

Epidemiology

The prevalence is unclear. It is commoner in adult males above 45 years of age and young children. Risk factors include: immunosuppression, malnutrition, obesity, elderly persons, peripheral vascular disease, lymphoedema and recent injuries to the skin.

Clinical Features

- Areas of oedema; rapidly spreading
- Erythema (rapidly becomes intense and spreads)
- Tenderness and warmth
- Often accompanied by fever, lymphangitis, regional lymphadenitis
- Systemic signs of toxicity
- Area becomes infiltrated and pits on pressure
- Sometimes the central part becomes nodular and surrounded by a vesicle that ruptures and discharges pus and necrotic material

Differential diagnoses

- Erysipelas
- Deep vein thrombosis

Complications

- Unusual in immunocompetent adults; children and compromised adults are at higher risk
- Septicaemia
- Gangrene
- Metastatic abscesses
- Recurrent cellulitis may predispose to chronic lymphoedema

Investigations

- Blood culture
- Full Blood Count with differentials
- Fasting blood glucose
- HIV screening

- Wound swab for microscopy, culture and sensitivity
- Urinalysis

Treatment Goals

- Eradicate infection
- Treat underlying immune suppression (where applicable)
- Prevent Complications

Drug Treatment

- Ampicillin/cloxacillin

Adult: 500 mg - 1 g orally every 6 hours for 5 - 7 days
Child under 5 years: 125 mg every 6 hours for 5-7 days;
5 - 10 years: 250
Or:

- Cloxacillin
  - *Adult:* 500 mg orally every 6 hours for 5 - 7 days
  - *Child:*
    - under 5 years: 125 mg orally every 6 hours for 5-7 days
    - 5 - 10 years: 250 mg orally every 6 hours for 5-7 days
- Ciprofloxacin
- *Adult*: 250 - 750 mg orally every 12 hours for 5 – 7 days
- *Child*: see note on caution
- Ceftriaxone
  - *Adult:* 1 g intravenously or intramuscularly daily for 3 days
  - *Child:*
  - *N*eonate: 20 - 50 mg/kg by intravenous infusion over 60 minutes
  - 1 month - 12 years; body weight less than 50 kg: 50 mg/kg by deep intramuscular injection or intravenous injection over 2 - 4 minutes, or by intravenous infusion.
  - Intramuscular injections over 1 g should be divided over more than 1 site
  - Doses of 50 mg/kg and more should be given by intravenous infusion only
  - Use only when there is significant resistance to other drugs
- Tetanus Prophylaxis

Surgical Treatment

- May need incision and drainage or debridement

Notable Adverse Drug Reactions, Contraindications and Caution

- Ciprofloxacin is contraindicated in growing adolescents and children below 12 years; also contraindicated in pregnancy

Prevention

- Treat any wound promptly

Furunculosis (Boils)

Introduction

Infection of a hair follicle by staphylococcal organisms, that leads to an inflammatory nodule, with a pustular centre

A carbuncle is two or more confluent furuncles, with separate heads
Recalcitrant cases may occur with a background of immune suppression, Alcoholism, Malnutrition, Blood dyscrasias, Disorders of neutrophil function, Diabetes, AIDS
May occur in patients with atopic dermatitis
May be iatrogenic

Clinical Features

- Can be found on all body sites where hairs are present. It starts with a small, yellow creamy pustule that rapidly evolves into a red nodule, often with a central yellow plug
- As the lesion expands, it becomes painful and tense
- Associated with local oedema, lymphangitis, regional lymphadenopathy and fever
- Eventually, the central part of the nodule becomes soft and drains spontaneously
- Healing occurs after about 1 - 2 weeks with scar formation

Differential Diagnoses

- Folliculitis
- Cutaneous myiasis
- Acne inversa in the axilla or groin

Complications

- Cellulitis
- Septicaemia
- Cavernous sinus thrombosis when the lesions are on the head and neck

Investigations

- Wound swab for bacteriology and sensitivity
- Full Blood Count with differentials
- Fasting blood glucose
- HIV screening
- Urinalysis

Treatment Goals

- Treat infection
- Correct predisposing factors
- Prevent Complications

Drug Treatment

- Topical antibiotics
- Mupirocin cream or fusidic acid cream or ointment
- Resistance may set in with prolonged use of systemic antibiotic
- Usually unnecessary except for head and neck lesions, or when the boil is accompanied by fever, chills, regional lymphadenopathy, or a feeling of being unwell
- Co-trimoxazole
  - *Adult*: 960 mg orally every 12 hours for 5 - 10 days
  - *Child:*
    - 6 weeks - 5 months: 120 mg

- 6 months - 5 years: 240 mg
- 6 - 12 years 480 mg taken orally every 12 hours for 5 - 10 days

• Erythromycin
- *Adult and child over 8 years:* 250 - 500 mg orally every 6 hours

Or
- 1 g 12 hourly for 5 - 10
- *Child up to 2 years*: 125 mg orally every 6 hours; 2 – 8 years: 250 mg every 6 hours for 5 - 10 days

Surgical Treatment

A small puncture wound often gives less of a scar than allowing spontaneous rupture; it also reduces the pain

Should be under antibiotic cover to prevent septicaemia

Impetigo Contagiosa

Introduction

A superficial, highly contagious, bullous skin disorder caused by coagulase positive staphylococci and occasionally ß -haemolytic streptococci

Clinical Features

- Children are more commonly affected
- Initial lesions are superficial vesicles, or bullae found around orifices: eyes, nose and ears
- Begins with 2 mm erythematous macules which quickly develop into vesicles or bullae
- Blisters are superficial and rupture easily, releasing a thin straw-coloured seropurulent discharge
- The exudate dries to form loosely stratified golden yellow crusts; Auto-inoculation from fluid (from ruptured blister) leads to multiple lesions
- As the lesions spread peripherally and the skin clears centrally, large circles are formed by fusion of the spreading lesions to produce gyrate patterns
- Lesions heal without scarring, but may leave behind erythema and hyperpigmentation
- Other pruritic dermatoses may become impetiginized: Scabies, Pediculosis, Papular urticaria, Atopic eczema

Differential Diagnoses

- Ecthyma
- Herpes simplex

Complications

- Regional lymphadenopathy
- Cellulitis
- Rarely: septicaemia
- Rarely: acute glomerulonephritis, if nephritogenic strain of streptococci is involved

Investigations

- Wound swab for bacteriology and sensitivity

Treatment Goals
- Treat infection
- Treat underlying pruritic dermatoses
- Prevent Complications

Non-drug Treatment
- Debrid**e** crusted lesions with soap and water or desloughing antibacterial agents
- Dry weepy lesions with astringent such as dilute potassium permanganate, sodium chloride 0.9% solution,

Drug Treatment
- Erythromycin
  - *Adult and child over 8 years:*250 - 500 mg orally every 6 hours or 500 mg - 1g every 12 hours for 5 - 10 days
  - *Child up to 2 years:* 125 mg orally every 6 hours
  - *2 - 8 years*: 250 mg every 6 hours

Or:
- Co-trimoxazole
  - *Adult*: 960 mg orally every 12 hours for 5 - 10 days
  - *Child:*
    - *6 weeks - 5 months:* 120 mg orally every 12 hours for 5 - 10 days
    - *6 months - 5 years:* 240 mg orally every 12 hours for 5 - 10 days
    - *6 - 12 years:* 480 mg taken orally every 12 hours for 5 - 10 days

Supportive Measures
- Debride crusted lesions: Dislodging antibacterial agent; Avoid auto-inoculation e.g. with fingers, shaving brushes, handkerchiefs, or pillow cases
- Strict personal hygiene
- Treat underlying skin disease(s)

Notable Adverse Drug Reactions, Contraindications and Caution
- Sulphonamide and co-trimoxazole: Fixed drug eruption

DERMATITIS AND ECZEMA

Atopic Dermatitis (Atopic eczema)

Introduction

Inflammation of the superficial dermis and epidermis, leading to disruption of the skin

Dermatitis and eczema are used interchangeably, although eczema was initially used to refer to blistering dermatitis, being derived from a Greek term meaning 'to boil over'

Atopic dermatitis is a hereditary disorder characterised by dry skin, the presence of eczema, and onset less than 2

Epidemiology

A common condition in children; the overall prevalence is rising with a slight male preponderance

Clinical Features

- Atopic dermatitis looks different at different ages and in people of different races
- Pruritic, exudative, or lichenified eruptions on the face, neck, upper trunk, wrists and hands, and in the antecubital and popliteal folds
- Personal or family history (in about 70% of cases) of allergic manifestations e.g. asthma, hay fever, allergic rhino-conjunctivitis, or eczema
- Chronic or chronically relapsing dermatitis
- Dry skin
- The age at which eczema ceases to be a problem varies
- Many children show a significant improvement by the age of 5 years
- Most will have only occasional flare-ups by the time they are teenagers
- A few continue to have troublesome eczema in adult life, especially those children that suffer from hay fever

Differential Diagnoses

- Seborrhoeic dermatitis (especially in infants)
- Irritant or allergic contact dermatitis
- Nummular dermatitis
- Scabies
- Psoriasis (especially palmo-plantar)
- In infants, certain immunodeficiency syndromes

Complications

- Bacterial infections of the skin
- Eczema herpeticum
- Complications of over treatment with steroids

Investigations

- RAST or skin tests may suggest dust mite allergy
- Eosinophilia and increased serum IgE levels may be present but are nonspecific
- Blinded food challenges: for diagnosing food allergy

Treatment Goals

- Counseling
- Suppress inflammation
- Emollients
- Reduce itching
- Prevent Complications

Drug Treatment

Topical:

- Hydrocortisone 1% or betamethasone valerate 0.1%
  - Apply twice a day until the skin improves then decrease to once a day or less frequently as needed
- Tacrolimus 0.03% or 1% apply twice daily

Systemic therapy: Steroids (only to control acute exacerbations)

- Prednisolone
  - *Adults:* initially up to 10 - 20 mg orally daily

- Preferably taken as a single dose in the morning after breakfast
- In severe disease: up to 60 mg orally daily, as a short course for 5-10 days

Or:

- Triamcinolone acetonide 40 mg by deep intramuscular injection, into the gluteal muscle
  - Criteria for systemic steroid therapy
  - Failed maximal therapy; little improvement after environmental changes
  - Chronic unbearable, unrelenting itch
  - Erythroderma without infection
  - Social setting in which other modalities are impossible

Smallpox vaccination is absolutely contraindicated

Guidelines for the use of potent topical steroids in infants

- Do not use on the face, axillae, diaper area or flexures
- Do not use under occlusion
- Do not use for an area greater than about 25% of total body surface area
- Do not use for more than 2 weeks consecutively and do not give refills
- Do not dispense more than 50 g per week
- Always use sparingly

Supportive Measures

- Exclusive breastfeeding; milk substitute if need be
- Attention to cleanliness especially in the diaper region
- Avoid the use of antiseptic soaps
- Avoid excessive bathing, vigorous rubbing, or chafing
- Avoid unduly heavy, tight, or soiled clothing
- Treat local infections
- Pat (rather than rub) skin dry after bath and immediately lubricate skin with petroleum jelly or emulsifying ointment
- Showers should be warm to cool, not hot
- Tub soaking is good, if followed by adequate lubrication
- Avoid wool; polyester and nylon
- Emotional stress leads to increased scratching
- In patients and parents of affected children, other psychologic techniques may be useful
- Secondary skin infection with bacteria such as Staphylococcus aureus may worsen the dermatitis and itching
- Patients must consciously be shielded from anyone with varicella or herpes simplex
- Keep finger nails trimmed short
- Some kinds of soap may irritate and dehydrate the skin; use synthetic soap powders
- Reassure patients and/or anxious parents
- Use patient education handouts
- Allergy tests, restriction diets and environmental hypoallergenic changes will not cure eczema

Notable Adverse Drug Reactions, Contraindications and Caution

Steroids

- Increased susceptibility to infections and increased severity of infection
- Activation or exacerbation of tuberculosis, amoebiasis, strongyloidiasis
- Risk of severe chickenpox in non-immune patients
- Nausea, dyspepsia, hiccups
- Hypersensitivity reactions
- Atrophy of the skin; striae, telangiectasia, petechiae
- Glaucoma, cataracts
- Cushingoid syndrome, adrenal/pituitary suppression, hyperglycaemia and diabetes mellitus
- Suppression of growth in children
- Menstrual irregularities
- Oedema
- Electrolyte imbalance
- Hypertension
- Pseudo tumour cerebri

Contact Dermatitis

Introduction

An acute or chronic dermatitis that results from direct skin contact with chemicals or allergens

These agents could be Chemicals, Animal or plant products

Physical agents like heat, cold, ultraviolet rays or ionizing radiation

Classification

- Irritant dermatitis
- Acute irritant dermatitis
- Cumulative insult dermatitis
- Allergic contact dermatitis
- Phototoxic dermatitis
- Photo-allergic dermatitis

Clinical Features

- Acute phase
  - Tiny vesicles, weepy and crusted lesions
- Resolving or chronic contact dermatitis
  - Scaling, erythema, and possibly thickened (lichenified) skin
  - Itching, burning, and stinging may be severe
  - Contact dermatitis is recognized by the distribution and configuration of the lesion which usually corresponds to the contactant e.g.
  - Face: cosmetics
  - Photodermatitis: airborne allergens e.g. dust, fumes, sprays
  - Neck: nickel necklace, perfume, and collars of garments
  - Hands: various chemicals handled at home, at work and at leisure hours
  - Feet: shoes, socks, remedies for athletes' foot, etc

Differential Diagnoses
- Atopic dermatitis
- Seborrhoeic dermatitis
- Psoriasis
- Dermatophyte infection
- Lichen planus
- Face: lupus erythematosus, pellagra, rosacea

Complications
- Impetiginization
- Secondary dissemination

Investigations
- Patch test
- Occupational site assessment

Treatment Goals
- Cure the dermatitis
- Identify cause(s) and avoid further contact

Drug treatment
- As for atopic dermatitis

Supportive *M*easures
- Counseling (after identifying the cause)
- Allergen replacement

Exfoliative Dermatitis (Erythroderma)

Introduction

Refers to the involvement of all or most of the skin surface (~80%) by a scaly erythematous dermatitis

Usually, a secondary or reactive process to an underlying cutaneous or systemic disease

Some causes:
- Contact dermatitis
- Atopic eczema
- Seborrhoeic dermatitis
- Drug eruptions
- Lichen planus and lichenoid eruptions
- Crusted scabies
- Pediculosis corporis
- Dermatophytosis
- Psoriasis
- Pemphigus foliaceus
- Lymphomas and leukaemia
- Ichthyosiform erythroderma
- Pityriasis rubra pilaris

Clinical Features
- May be acute or chronic

- The irritating process is followed by a patchy erythema which spreads rapidly within 24 hours
- Pyrexia, malaise and shivering
- Scaling
- Irritation and tightness
- Skin feels cold
- The periorbital skin is inflamed and oedematous, resulting in ectropion, with consequent epiphora
- Moderate-to-gross generalized enlargement of lymph nodes in the absence of an underlying malignant lymphoma (dermatopathic lymphadenopathy)
- The nodes are rubbery in consistency
- The general picture is modified by the initial cause
- Pruritus is often intense if due to atopic eczema or lymphoma

Differential Diagnoses

- All the causes of exfoliative dermatitis listed above

Complications

- Hypothermia
- Hypoalbuminaemia
- Dehydration
- High output cardiac failure
- Septicaemia
- Enteropathy
- Steatorrhoea
- Anaemia

Investigations

- Full blood count and differentials; ESR
- Urea and Electrolytes
- Histopathology
- Blood culture

Treatment Goals

- Restore the skin to normal
- Treat underlying disease
- Prevent or treat Complications

Drug treatment

- Systemic steroids in high doses: Prednisolone 40 - 60 mg orally per day
- Treat impetiginization and septicaemia as appropriate (depending on results of culture and sensitivity)
- Further treatment depends on the cause of exfoliative dermatitis

Supportive Measures

- Adequate hydration
- Emollients for skin (see Atopic eczema)
- Keep warm
- Adequate nursing care
- Appropriate nutrition and haematinics

Prevention
- Avoid over-treatment of skin diseases and polypharmacy, generally
- Do not abuse the skin with "medicated" soaps and herbal concoctions (topical and oral)
- Get appropriate management of skin disease(s) from qualified personnel

PARASITIC DERMATOSES
Cutaneous Larva Migrans (Creeping eruption)
Introduction
An infection of the skin by various nematode larvae which migrate, but never reach internal organs or complete their life cycles. Migration leads to twisting, winding linear skin lesions produced by the burrowing of larvae
Victims are usually:
- People who go barefoot at the beaches
- Children playing in sandboxes and crawling on the bare ground
- Carpenters and plumbers working under homes
- Gardeners

The most common causes are cat and dog hookworm
- *Ancylostoma braziliense*
- *Ancylostoma caninum*
- *Necator americanus*
- *Gnathostoma spinigerum*
- *Strongyloides stercoralis*

Clinical Features
Shortly after entering the skin:
- The larvae elicit intense pruritus
- Tiny papules and even papulovesicles develop
- As the larvae begin to migrate:
- Intermittent stinging pain occurs
- Thin red, tortuous and minimally elevated lines are formed in the skin
- Rate of migration varies with the species
- Pruritus and excoriation promote secondary bacterial infections
- Intestinal infections with *Strongyloides stercoralis* may be associated with perianal larva migrans syndrome called 'larva currens' because of the rapidity of larval migration (up to 10 cm/hour)
- Larva currens is an autoinfection caused by penetration of the perianal skin by *Strongyloides stercoralis*

Differential Diagnoses
- Ring worm

Complications
- Secondary bacterial infection
- Fatal Strongyloides stercoralis hyper infection in immunocompromised patients

Investigation
- None useful to management

Treatment Goals
- Eradicate the larvae
- Eradicate gut Strongyloides
- Treat impetiginization
- Prevent re-infection

Drug treatment
- Ivermectin
  - *Adult:* 150 microgram/kg orally as a single dose
  - *Child* over 5 years old: 200 micrograms/kg orally daily for 2 days

Or:
- Albendazole
  - Adult: 400 mg orally twice daily for 2 days, repeated after 3 weeks if necessary
  - Child over 2 years: 400 mg once or twice daily for 3 days, repeated after 3 weeks if necessary
- Antihistamines for pruritus
- Antibiotics for secondary bacterial infections

Prevention
- Avoid direct contact of skin with sand

Guinea Worm Disease (Dracunculiasis)

Introduction
An infection by a very long nematode, *Dracunculus medinensis*
Contracted through drinking water contaminated with water fleas (cyclops) infected with Dracunculus
Except for remote villages in Rajastan desert of India and Yemen, the disease is now only seen in Africa, between the Sahara and Equator. Nigeria is one of the few countries with reports of >1,000 new cases a year. Efforts are currently going on to eradicate the disease in

Pathophysiology
In the stomach, the larvae penetrate into the mesentery where they mature sexually in 10 weeks
The female worm burrows to the cutaneous surface to deposit her larvae, causing specific skin manifestations
When the parasite comes in contact with water, the worm rapidly discharges its larvae, which are ingested by the cyclops

Clinical Features
- As the worm approaches the surface it may be felt as a cordlike thickening
- It forms an indurated cutaneous papule
- Several hours before the head appears at the skin surface there is (at the point of emergence)
- Local erythema

- Burning sensation
- Pruritus
- Tenderness
- Soon after, the papule blisters and a painful ulcer develops, usually on the leg
- Ulcer may occur on other parts of the body e.g. the genitalia, buttocks, or arms

Differential Diagnoses

- Sickle cell ulcer
- Stasis ulcer

Complications

- Secondary infection
- Cellulitis
- Erysipelas
- Progressive lymphoedema
- Osteomyelitis
- Arthritis
- Tetanus

Investigations

- Radiograph of the affected area if osteomyelitis and arthritis (or calcified worms) are suspected

Treatment Goals

- Resolve local inflammation to permit easier removal of the worm
- Extract the worm
- Prevent and treat Complications

Drug treatment

- Metronidazole
  - *Adult:* 400 mg orally every 8 hours for 7 days
  - *Child:* 7.5 mg/kg orally every 8 hours

Or:

- Mebendazole
  - *Adult:* 400 - 800 mg orally daily for 6 days
  - *Child over 1 year:* usually 100 mg orally twice daily for 3 days

Or:

- Ivermectin
  - *Adult:* 200 micrograms/kg orally as a single dose
  - *Child:* Consult a specialist
- Treat or prevent Complications with antibiotics

Worm extraction

Traditionally: Extract the worm slowly by winding it about a match stick or twig, removing 3 - 5 cm daily, with care not to rupture it

- In the event of such an accident, the larvae escape into the tissues and produce fulminating inflammation
- The process appears to be facilitated by placing the affected part in water several times a day

Notable Adverse Drug Reactions, Contraindications and Caution

- Metronidazole
  - Avoid high dose regimens in pregnancy
  - Avoid drinking alcohol during treatment and at least 48 hours after
- Ivermectin
  - Oedema (face and limbs)
  - Fever, pruritus, lymphadenitis, malaise, hypotension
  - Should not be used in the presence of concurrent Loa infection: risk of encephalopathic reaction to dying loa loa microfilariae
  - Should not be used in patients with central nervous system diseases (e.g. meningitis): increased penetration of ivermectin into the CNS
  - Caution in early pregnancy

Prevention

- Provide universal access to safe and portable water
- In hyperendemic areas, treat the whole population twice yearly with ivermectin

Myiasis

Introduction

Invasion of mammalian tissue by fly larvae. Furuncular myiasis may be caused by *Dermatobia hominis* or the Tumbu fly *Cordylobia anthropophaga.* Larvae of *D hominis* are often transferred by mosquitoes. The usual host is cattle. People living near cattle-rearing areas are particularly vulnerable. Eggs, living larvae, or both are deposited on the skin or mucous membranes or on clothing. The eggs hatch and produce larvae that then burrow into the skin and cause mild or severe inflammatory changes.

Clinical Features

- Furuncular myiasis looks like a furuncle (boil)
- Key feature is the presence of a tiny hole in the inflamed erythematous papule
- There may be a sensation of motion within the furuncle
- There may be intermittent stinging sensation
- In accidental myiasis, there is a pre-existing lesion, usually a leg ulcer, wound or ulcerated basal cell carcinoma

Differential Diagnoses

- Furuncles and carbuncles

Complications

- Secondary bacterial infection

Treatment Goals

- Extract the maggot
- Treat or prevent bacterial infection

Non-drug Treatment

- Apply petrolatum: the maggot crawls out to avoid asphyxiation

Or:

- Extract the maggot by compressing simultaneously from beneath on both sides with a pair of spatulae

Drug Treatment

- Prevent bacterial infection with oral antibiotics if lesions are multiple
- Wound myiasis is flushed out surgically with antiseptics: surgical debridement

Prevention

- Iron clothes that are dried in the open air

Onchocerciasis (River blindness)

Introduction

A common chronic filarial disease in tropical regions which frequently cause pruritus and blindness

Causative organism is *Onchocerca volvulus*

The microfilariae are transmitted by female *Simulium*, tiny black flies which breed along small, rapidly moving streams

Female worms release motile microfilariae into the skin, subcutaneous issues, lymphatics, and eyes. Interval from exposure to onset of symptoms can be as long as 1 - 3 years

Clinical Features

- Skin lesions, which may be localized or cover large areas
- Intense pruritus a cardinal symptom; may occur in the absence of the skin lesions
- Dermatitis
- Skin eventually becomes lichenified from chronic scratching
- Post inflammatory confetti-like depigmentation on the skin ("leopard skin") may occur in late onchodermatitis
- Onchocercomata
- Subcutaneous nodules which develop on various sites of the body and contain myriad adult worms which can live for up to 14 years.
- Firm, non-tender lymphadenopathy is a common finding in patients with chronically infected onchocerciasis
- "Hanging groin" describes the pendulous loose, atrophic skin sac that contains these large nodes
- Microfilariae in the eye may lead to visual impairment and blindness

Differential Diagnoses

- Scabies
- Pediculosis
- Papular urticaria
- Papulo necrotic tuberculids
- Pruritic papular eruption of HIV
- Other causes of generalized pruritus without a rash
- Other causes of subcutaneous nodules e.g.
  - Sparganosis

- Paragonimiasis
- Gnathostomiasis
- Cysticercosis
- Echinococcosis

Complication

- Blindness

Investigations

- Skin snip or punch biopsy for microfilariae
- Excise nodule for adult worms
- Mazzotti test reaction
- Slit lamp eye examination

Treatment Goals

- Kill the microfilariae
- Eliminate source of microfilarial release
- Prevent blindness

Drug Treatment

- Ivermectin
  - As a single oral dose of 150 microgram/kg in adults and children over 5 years
  - Repeat every 6 months for 2 years and yearly for 12 - 15 years or longer
- Eye involvement
  - Prednisolone 1 mg/kg orally should be started several days before treatment with Ivermectin

Surgical

- Excise individual nodules (nodulectomy)

Notable Adverse Drug Reactions, Contraindications and Caution

- No food or alcohol should be taken for at least 2 hours before or after dosage
- Pregnant women should not receive ivermectin until after delivery
- Breastfeeding mothers should not be treated until the infant is at least 1 week old

Prevention

- Use biodegradable insecticides to kill flies
- Netting and repellents remain crucial
- Provide access to safe and portable water
- In hyperendemic areas, treat the whole population twice yearly with ivermectin

Pediculosis (Lice)

Introduction

Diseases due to blood sucking lice. Can be divided into three conditions: Pediculosis capitis (head lice), which is caused by *Pediculus humanus* var. capitis; Pediculosis corporis (body lice) caused by P. humanus var. corporis and Phthirus pubis (pubic lice) caused by *Phthirus pubis*.
The arthropods are transmitted from human to human via:

Direct contact; Sharing of combs, brushes, towels (P. capitis); Sharing clothing (P. corporis); Sharing underwear and Sexual intercourse or any intimate personal contact (P. pubis).

Clinical Features

Pediculosis capitis

- Generally, the only complaint is pruritus
- Nits can easily be seen at the base of the hairs; careful inspection may reveal the adult louse
- Secondary impetiginization is common because of the itching
- Cervical nodes may become enlarged
- Children and individuals with long hair are more likely to be affected
- Homeless people and refugees are also vulnerable
- No age or economic stratum is immune
- School children who share school caps, hair brushes and combs, pillow cases are particularly vulnerable

Pediculosis corporis

- Pruritus may be the only symptom in some patients
- Chronic scratching may result in characteristic
- hemorrhagic puncta and linear excoriations
- Patient eventually develops intensely pruritic papules and nodules, numerous excoriations, secondary infections and even lymphadenopathy
- The combination of excoriations, hyperpigmentation, healed scars and secondary impetiginization is quite typical and known as "vagabond's skin"
- Overcrowding and poor personal hygiene promote infestation
- Refugees, destitutes and vagrants are particularly vulnerable

Pediculosis pubis

- Most often found in the pubic and axillary hairs
- Occasionally may be found on abdominal or trunk hairs
- On rare occasions may be seen on the scalp, eyebrows and even eyelashes
- Pruritus is also a symptom
- Classic clinical finding is the maculae ceruleae
- Indistinct blue-grey or slate-coloured macules ranging in size from several millimetres to several centimeters
- They result from the bite of the louse causing small intracutaneous haemorrhages
- The colour is due to blood whose haemoglobin has been altered by the saliva

Differential Diagnoses

Pediculosis capitis:

- Seborrhoeic dermatitis
- Pityriasis amiantacea
- Peripilar keratin
- Hair casts
- Piedra

Pediculosis corporis:

- Scabies
- Atopic dermatitis
- All pruritic dermatoses

Pediculosis. pubis:

- Scabies
- Candidiasis
- In the axillae Trichomycosis axillaris

Complications

- Secondary bacterial infection
- The body louse serves as a vector for diseases:
- Epidemic typhus (*Rickettsia prowazekii*)
- Trench fever (*Bartonella quintana*)
- Relapsing fever *(Borrelia recurrentis*)

Investigations

Pediculosis capitis and pubis:

- Examine louse or the nits on epilated hair strands (especially from behind the ears) under the microscope Pediculosis corporis
- Examine the seams of clothing for nits and lice

Treatment Goals

- Eradicate the lice
- Prevent re-infection
- Treat Complications

Drug Treatment

- Pediculosis capitis:

1% permethrin cream rinse

- The cream is lathered through the hair, left on for 10 minutes and thoroughly rinsed out
- A fine-tooth comb should be used to remove adherent nits
- Repeat treatment after a week

- Pediculosis corporis
  - Treat dermatitis with anti-pruritics or corticosteroids
  - Treat secondary infection with oral antibiotics

Supportive Measures

- Pediculosis capitis:
  - All contact individuals should be examined and treated as necessary
  - Pillow cases should be disinfested as for clothing.
- Pediculosis corporis:
  - Eradicate lice from clothing by laundering in hot water or machine-drying at a high temperature, followed by ironing the seams P. pubis:
  - Treatment is the same as for pediculosis capitis, with the exception that pediculosis of the eyelashes should be treated with an occlusive ophthalmic ointment applied to the eyelid margins for 10 days
  - Affected persons' sexual contact(s) should be treated simultaneously

Notable Adverse Drug Reactions, Contraindications, Caution

As stated under scabies

Prevention
- Improve personal hygiene
- Do not share hair combs, brushes, clothing, pants and pillows

Scabies
Introduction
An intensely pruritic infestation caused by human mite *Sarcoptes scabiei*. It is contracted by close contact and rarely via fomites. Occurs commonly in children and inmates of overcrowded institutions such as prisons and boarding houses. Infection of households is common. Sexual intercourse is also another possible method of spread among adults. Sharing a bed or using the same underwear will also suffice to contact the disease.

Clinical Features
- Severe pruritus worse at night is characteristic
- The typical lesion is the burrow - It is hardly seen because of the marked excoriation and secondary infection on the skin.
- Papulo-pustular eruptions with excoriation and impetiginization
- Characteristic sites of predilection:
  - Interdigital spaces of the fingers
  - Flexural surfaces of the wrist
  - Extensor surfaces of the elbows and knees
  - Anterior axillary area
  - Nipples
  - The phallus (especially in adults)
- General immune status and experience with S. scabiei play a role
  - In a normal host, the initial infection is asymptomatic for about 3 - 6 weeks during which time the individual is capable of transmitting the disease
  - All family or living unit members must therefore be treated, not just those who are itching
  - After a reinfestation, symptoms appear within 24 hours

Crusted scabies (Norwegian scabies)
- An uncommon variant of scabies
- Patient fails to mount a resistance and the mites proliferate dramatically
- May be found among HIV/AIDS patients, institutionalized inmates like prisoners, refugees, and psychiatric patients

Differential Diagnoses
- Infantile acropustulosis
- Atopic dermatitis
- Papular acral dermatitis of childhood
- Dermatitis herpetiformis

Complications
- Secondary bacterial infection leading to acute glomerulonephritis

Investigations
- Burrow scraping on to a glass slide for microscopy
- Video dermatoscopy

Treatment Goals

- Treat the infestation
- Treat secondary bacterial infection
- Relieve pruritus

Drug Treatment

- Scabicides:
  - Tetmosol soap to bathe for 2 – 4 weeks
  - Permethrin 5% cream
  - *Adult:* apply over the whole body and wash o ffafter 8-12 hours
  - *Child:* supervision required with application and rinsing

Or:

- Benzyl benzoate 25% in emulsion
  - *Adult:* apply over the whole body; repeat without bathing next day and wash o ff24 hours later. If necessary, apply a third time
  - *Child:* Benzyl benzoate is an irritant and should be avoided in children

Or:

- Precipitated sulphur 5 - 10% in petroleum jelly
  - Adult and child: apply over all the body daily for 7 - 10 days
- Anti-helminthic: Ivermectin
  - *Adult*: Single 200 microgram/kg oral dose for crusted scabies
  - *Child:* over 5 years: 200 micrograms/kg daily for 2 days
- Antihistamine:
- Chlorpheniramine
  - *Adult*: 4 mg orally every 4 - 6 hours; maximum 24 mg a day
  - *Child*:
    - *1 month - 2 years* 1 mg orally every 12 hours; 2 - 5 years: 1 mg every 4 - 6 hours;
    - *6 - 12 years*: 2 mg every 4 - 6 hours
- Topical antipruritic:
- Crotamiton cream (for residual itching)
  - *Adult*: apply every 8 - 12 hours
  - *Child*: less than 3 years: apply once daily only

PAPULOSQUAMOUS DISORDERS

Lichen Planus

Introduction

An inflammatory skin condition involving the skin and/or mucus membranes. It is a chronic, pruritic and papular condition

Some of the drugs known to cause lichen planus (LP):

- Chloroquine
- Quinacrine
- Quinidine
- Gold
- Streptomycin

- Tetracycline
- NSAIDs
- Phenothiazines
- Hydrochlorothiazide

Clinical Features

- LP has been found in children, young and middle-aged adults
- Skin lesions are flat-topped polygonal papules with a characteristic colour
- Violaceous in fair skinned people, but slate-grey on black skin
- Itching is mild-to-severe
- Like psoriasis, lesions often occur on sites of trauma and scratch marks (Koebner's or isomorphic phenomenon)
- Wickham's striae are fine white streaks present on the tops of papules
- The lesions are distributed mainly on: Flexor surfaces of the wrist, Lumbar area, The penis, tongue, buccal and vaginal mucous membranes
- On the buccal mucous membrane, it may present as white reticulate (lacy) pattern or plaque which may after several years transgress into squamous cell carcinoma

The nails are also affected with: Pitting, roughening and splitting (trachyonychia); Thickening (pachyonychia); Encroachment of the nail fold on the nail plate (pterygium unguium)

Total destruction of all 20 nails may precede, accompany, or follow the onset of skin lesions

The hair follicles in the scalp may also be affected (lichen planopilaris) with post-inflammatory scarring alopecia

Hepatitis C infection is found with greater frequency in lichen planus than in controls

Healing of the skin lesions leaves post-inflammatory hyperpigmentation

Differential diagnoses

Consider other papulosquamous disorders:

- Psoriasis
- Pityriasis rosea
- Lupus erythematosus
- Secondary syphilis
- Lichen striatus
- Parapsoriasis
- Pityriasis rubra pilaris
- Nummular eczema
- Oral lesions: Erosive lesions may mimic
- Aphthous stomatitis and herpes simplex
- White plaques may be confused with pre-malignant leukoplakia
- White sponge naevus

Complications

- 20-nail dystrophy
- Rarely, squamous cell carcinoma of oral and hypertrophic lichen planus

Investigations
- Histopathology
- Hepatitis C antigen

Treatment Goals
- Relieve itching
- Clear the lesions
- Suppress inflammation

Drug treatment
Topical corticosteroids:
- Beclomethasone dipropionate 0.1% cream; apply 1 - 2 times daily
- Not licensed for use in children under one year
- Bethamethasone valerate 0.1% cream and ointment
- Apply 1 - 2 times daily
- For isolated or hyperkeratotic lesions apply corticosteroids under occlusion or use intralesional triamcinolone (see Psoriasis)

Scalp lesions
- Topical corticosteroids
  - Clobetasol propionate 0.05% lotion; apply thinly 1 - 2 times daily for up to 4 weeks

Mouth lesions:
- Triamcinolone acetonide 0.1% in adhesive base apply a thin layer 2 - 4 times daily for a maximum of 5 days; do not rub in

Or:
- Tretinoin 0.025% cream
  - *Adult and child:* apply thinly 1 - 2 times daily
- Systemic corticosteroids
  - Prednisolone:
  - *Adult*: 20 - 40 mg orally daily for several weeks with reduction of dosage or switch to alternate-day therapy as soon as improvement is seen
  - *Child:* not recommended for children for this indication

Or:
- Triamcinolone acetonide 40 mg intramuscularly once or twice (at a 6-week interval)

Or:
- Ciclosporin
  - Adult and child over 16 years: 2.5 mg/kg daily in two divided doses
  - If good results not achieved within two weeks increase rapidly to maximum 5 mg/kg daily

Notable Adverse Drug Reactions, Contraindications and Caution
- See Psoriasis

Prevention
- Avoid precipitating drugs

Pityriasis Rosea

Introduction

A common, mild, inflammatory exanthem. Tends to be seasonal. More common during the fall, winter and spring in temperate countries. In Nigeria however, it is more during the early part of the rainy season (though cases are seen throughout the year) and the Harmattan season. Common among siblings or other family/household members. The seasonal clustering and household concurrence are suggestive of an infective origin. Increasingly regarded as a delayed reaction to a viral infection (most likely Human Herpes Virus Type 7).

Clinical Features

- Largely a disease of adolescents and young adults, but it has been described all age groups
- Rarely, there is an observable prodrome of pharyngitis, malaise and mild headache
- The initial lesion in 20 - 80% of cases ("herald patch") is often larger than the later lesions and precedes the general eruption by 1 - 30 days
- Often found on the trunk, but may appear on the face or extremities
- Oval lesions with a collarette of scales
- May be diagnosed as "ringworm" before the other lesions appear
- Other lesions consist of multiple erythematous macules progressing to small, red papules on the trunk
- Sun-exposed areas are spared
- Papules enlarge and become oval with long axes parallel to each other, and following lines of cleavage: the so-called "Christmas tree" pattern
- Pruritus is mild or absent
- Some lesions may be atypical: vesicular, crusted, purpuric, follicular, lichenoid, and psoriasiform
- A variant, inverse pityriasis rosea also occurs
- Believed to be commoner in blacks
- Affects the face, neck, distal extremities and the flexures
- Use of ampicillin early in the course of the eruption causes an explosive exacerbation of eruptions which become more inflammatory and urticarial
- A similar explosive eruption also occurs with the use of topical and/or oral herbal medicines (Agbo)
- Lesions may become impetiginized
- The disease persists for about 6 weeks, but may last for 3 – 4 months
- Healing may occur with post inflammatory hyper/hypopigmentation
- Recurrences are uncommon (about 1%) but the lesions are usually mild and localized

Differential Diagnoses

- Secondary syphilis
- Exanthematic or pityriasis rosea-like drug eruptions
- Lichen planus
- Guttate psoriasis

- Tinea corporis
- Tinea versicolor
- Seborrhoeic dermatitis
- Viral exanthems
- Pityriasis lichenoides chronica

Complications

- ***None***

Investigations

- ***Non-specific***
- ***VDRL***
- If secondary syphilis is suspected (e.g. lesions on palms and soles with/without lymphadenopathy)

Treatment Goals

- To relieve symptoms (if any)
- Reassure patients about the harmless, self-limiting nature of the eruption

Drug Treatment

Topical:

- Urea cream is useful as a hydrating agent: apply twice daily

Systemic:

- Oral antihistamine
- If pruritus is bothersome (see urticaria)

Systemic corticosteroids:

- If complicated by ampicillin exanthematic eruption
- Triamcinolone acetonide 40 mg intramuscularly as a single dose
- Antibiotics: If lesions are impetiginized
- Erythromycin 500 mg orally every 6 hours for 14 days

Notable Adverse Drug Reactions, Contraindications and Caution

- Antihistamine; Triamcinolone: see urticaria

Psoriasis

Introduction

A chronic inflammatory skin disease which is characterized by increased epidermal proliferation and epidermal thickening. Affects people of all ages in all countries. Cause remains largely unknown but it has been variously attributed to genetic, climatic, nutritional, ecological and immunological factors. It is characterized by erythematous lesions with silvery white scales.

Triggers include:

- Streptococcal or viral infections
- Emotional crises
- Pregnancy and delivery
- Trauma (Koebner phenomenon)
- Diet Alcohol
- Cigarette smoking
- Hypocalcemia

- Stress
- Infections e.g. streptococcal pharyngitis
- May occasionally be provoked or exacerbated by drugs: ACE inhibitors, Calcium channel blockers, β- adrenoceptor antagonists, Chloroquine, Lithium, Non-Steroidal Anti-inflammatory Drugs (NSAIDs), Terbinafine and Lipid lowering drugs

Clinical Features

Lesions are characterized by:

- Sharp borders
- Erythema
- Increased scales
- When scratched, scales fall o ffas tiny flakes that resemble scrapings from a candle (Candle sign)
- If the scales are removed (exposing the dermal papillae) punctate bleeding from the enlarged capillaries occur (Auspitz sign)
- Eruptive lesions may be intensely or mildly pruritic, or may be asymptomatic
- All lesions begin as small scaly macules but may take divergent paths as they spread centrifugally. Patterns seen may be: guttate, follicular, nummular, geographic, erythrodermic, annular, gyrate or serpinginous
- Favoured sites are:
  - Knees and elbows
  - Scalp
  - Palms and soles
  - Nails
- Intertriginous regions such as the gluteal cleft, groin, penis, labia, axillae, beneath the breasts and between the toes are involved (inverse psoriasis or psoriasis inversa)
- There could also be other organ involvement e.g. MSS in psoriatic arthritis
- The disease runs a chronic and highly variable course (waxes and wanes)
  - New lesions may replace older, regressing ones
  - Unstable lesions may evolve into psoriatic erythroderma or generalized pustular psoriasis
- HIV/AIDS can lead to the onset or worsening of psoriasis

Differential Diagnoses

Guttate psoriasis:

- Pityriasis lichenoides et varioliformis
- Acuta Pityriasis rosea
- Secondary syphilis (psoriasiform syphilis)
- Scalp, face, chest lesions:
- Seborrhoeic dermatitis
- Lupus erythematosus
- Chronic truncal psoriasis:
- Nummular dermatitis
- Lichen planus

- Small plaque parapsoriasis
- Tinea corporis
- Pityriasis rubra pilaris
- Intertriginous areas:
- Candidiasis
- Intertrigo
- Hailey-Hailey disease

Nail:

- Tinea unguium
- Lichen planus
- Trachyonychia

Complications

- Erythroderma
- Arthritis mutilans

Investigations

- Histopathology

Treatment Goals

- To retard epidermal proliferation
- Reduce inflammation
- Prevent Complications

Drug Treatment

Choice of treatment depends on the site, severity and duration of the disease, previous treatment, and the age of the patient

Topical treatment: Corticosteroid ointment

- Hydrocortisone for the face and flexures
- Betamethasone or clobetasol for the scalp, hands and feet
  - Application is followed by an occlusive dressing of a polyethylene film, which may remain in place for 12 - 24 hours to augment effectiveness

- Dithranol ointment 0.1% - 2% (for moderately severe psoriasis):
  - Initiate under medical supervision
  - Start with 0.1%; carefully apply to lesions only, leave in contact for 30 minutes, then wash o ffthoroughly
  - Repeat application daily, gradually increasing strength to 2% and contact time to 60 minutes at weekly intervals
  - Wash hands thoroughly after use
  - Avoid contact with eyes and healthy skin
- Coal tar solution (for chronic psoriasis):
  - Use either alone or in combination with exposure to ultraviolet light; apply 1 - 4 times daily, preferably starting with a lower strength preparation
- Coal tar bath:
  - Use 100 mL in bath of tepid water and soak for 10 - 20 minutes
  - Use once daily, to once every 3 days for at least 10 - 20 minutes, and for at least 10 baths

- Often alternated with ultraviolet (UVB) rays, allowing at least 24 hours between exposure and treatment with coal tar

- Urea 10% cream or ointment (for dry scaling and itching skin); Apply twice daily, preferably to damp skin
- Salicylic acid 3 - 5% in cold cream or hydrophilic ointment (for thick scaling)
- Tazarotene 0.05% and 0.1% gels
- May be combined with topical steroids for mild- to-moderate plaque psoriasis
- Tacrolimus ointment 0.1% or 0.03%
- For psoriasis in the flexures, face and penis, when potent steroids cannot be used and other agents are poorly tolerated

Small lesions and nail psoriasis

- Intra-lesional corticosteroid injections of triamcinolone are frequently used
  - Triamcinolone acetonide suspension 10 mg/mL may be diluted with sterile saline to make a concentration of 2.5 - 5 mg/mL
  - For nail lesions inject triamcinolone in the region of the matrix and the lateral nail fold

Scalp

Soften scales with salicylic acid 3% in mineral/olive oil, massage in and leave on overnight

- Then shampoo with a tar shampoo, and remove scales mechanically with a comb and brush
- Repeat daily until the scales are gone
- If 3% is not very effective, use 6% salicylic acid

Or:

Fluocinolone acetonide 0.01% in oil

- Apply and leave under a shower cap at night and shampoo in the morning
- After shampooing and while the hair is still wet, massage thoroughly into the scalp skin
- Attempting to remove scales by excessive brushing, scrubbing, or combing may result in sufficient trauma which usually worsens psoriasis (Koebner's effect)

Ultraviolet light (UVL)

- For psoriasis involving more than 30% of the body surface area, 290 - 320 nm ultraviolet B (UVB) three times weekly for 18 - 24 treatments
- Lubricating the skin surface with mineral oil or petroleum jelly before UVL produces uniform penetration by reducing the reflection of light from the disrupted skin surface

PUVA (psoralen plus ultraviolet A)

- For patients who have not responded to standard UVB treatment
- Severe psoriasis unresponsive to outpatient UVL, may be treated in a day care centre with the Goeckerman's regimen
- Use of crude coal tar for many hours and exposure to UVB light
- Systemic therapy: Antibiotics to eliminate streptococcal pharyngitis

Methotrexate

- Adult: 20 mg orally once weekly Child: not licensed for this indication Indicated for:

- Psoriatic erythroderma
- Moderate-to-severe psoriatic arthritis
- Acute pustular psoriasis (von Zumbusch type)
- Involvement of more than 20% total body surface area
- Localized pustular psoriasis that causes functional impairment (e.g. hands)
- Lack of response to phototherapy, PUVA, or retinoids

Cyclosporine

- Induction therapy is 2.5 - 3.0 mg/kg given in a divided dose twice daily
- Can be increased to 5.0 mg/kg/day until a clinical response is noted. The dose is then tapered
- On discontinuation a severe flare-up may occur, suggesting that an alternative treatment (e.g. phototherapy or acitretin) should be instituted as the cyclosporine dose is reduced

Supportive Measures

- Diet: fish oils rich in Q-3 polyunsaturated fatty acids
- Patient education
- Emotional support

Notable Adverse Drug Reactions, Contraindications caution and Contraindications

- Coal tar:
  - Contraindicated in inflamed, broken or infected skin
  - May cause irritation, photosensitivity reactions, Hypersensitivity
  - Skin, hair, fabrics and bathtubs discoloured brown and smelly
- Dithranol:
  - Irritant: avoid contact with eyes and healthy skin
  - Contraindicated in hypersensitivity; avoid use on face, acute eruptions, and excessively inflamed areas
  - Discontinue use if excessive erythema occurs or lesions spread
  - Conjunctivitis following contact with eyes
  - Staining of skin, hair and fabrics brown
- Urea:

- Avoid application to face or broken skin; avoid contact with eyes
- May cause transient stinging and local irritation

- Steroids:
  - When extensive areas are treated or when there is erythrodermic psoriasis, sufficient may be absorbed to cause adrenal suppression
  - May induce tachyphylaxis
  - Rebound often occurs after stopping treatment, resulting in a more unstable form of psoriasis
  - Intralesional injection may cause reversible atrophy at the injection site
- Salicylic acid:
  - Widespread application may lead to salicylate toxicity

- Ultraviolet light:
  - Burning of skin may cause Koebner's phenomenon and an exacerbation
  - Increased risk of skin cancer particularly in persons with fair complexions and albinos.
  - Examine periodically
  - Use protective glasses to prevent cataracts
  - Causes premature ageing of the skin

Should be administered only by experienced dermatologists

- Methotrexate:
- May cause blood disorders (bone marrow suppression), liver damage, pulmonary toxicity, GIT disturbances
- If stomatitis and diarrhoea occur, stop treatment
- Renal failure, skin reactions, alopecia, osteoporosis, arthralgia, myalgia, ocular irritation, may also occur
- May precipitate diabetes
- Monitor before and throughout treatment: blood counts and hepatic and renal function tests
- Contraception during, and for at least 6 months after treatment for both males and females
- Contraindicated in pregnancy and breast feeding. Folic acid may be given to reduce toxicity

Cyclosporin:

- Nephrotoxic: monitor kidney function
- Other side effects - Hypertrichosis, hyperuricaemia, thrombocytopenia, malignancies and lymphoproliferative disorders (similar to other immunosuppressive therapies)

Tacrolimus:

- See Atopic eczema

Prevention

- Avoid exacerbating factors e.g. abrasions, scratches, harsh fibre bathing sponges, and the drugs listed above
- Prevent streptococcal sore throat and treat promptly when it occurs

SUPERFICIAL FUNGAL INFECTIONS

Dermatophyte infections (Tinea)

Introduction

Superficial fungal infection that affects keratinized tissues. Fungi that usually cause only superficial infections on the skin are called dermatophytes and they are classified in three genera: Microsporum, Trichophyton and Epidermophyton. Can be acquired from humans, animals, soil or vegetable matter. Common in tropical climate (which is hot and humid). Infection could be spread by fomites. The mycoses caused by dermatophytes are called dermatophytosis, tinea, or ringworm

On certain parts of the body, they have distinctive features characteristic of that

particular site; therefore, the tineas are divided into:

- Tinea capitis (scalp)
- Tinea barbae (beard)
- Tinea faciei (face)
- Tinea corporis (trunk)
- Tinea cruris (groin)
- Tinea manuum (hand)
- Tinea pedis (feet)
- Tinea unguium or onychomycosis (nail)

Clinical Features

- Varied: depending on the site of the body involved
- Pruritis is a notable symptom

Tinea capitis:

- Scalp involvement is seen predominantly in children
- Lesions are varied in appearance: usually scaly, dry and annular, with or without alopecia
- Some appear diffuse and scaly and may involve the whole of the scalp
- Inflamed, pustular lesions (kerion) may develop when infection is from animal to man
- Pruritus usually leads to excoriation of lesions and secondary bacterial infection
- Hypersensitivity to the presence of the fungal elements may occur at distant sites ("Id" reaction)

Tinea barbae:

- Ringworm of the beard is not a common disease
- Occurs chiefly among those in agricultural pursuits, especially those in contact with farm animals
- Lesions present as severe, deep folliculitis with erythema, nodular infiltrates, scales and pustules
- Marked regional lymphadenopathy is the rule

Tinea faciei:

- Fungal infection of the face (apart from the beard)
- Frequently misdiagnosed, since the typical ringworm lesion is not commonly seen on the face
- Erythematous, slightly scaling, indistinct borders are usually seen
- People who use corticosteroids and combination steroid creams as cosmetic bleaching creams are prone to developing Tinea faciei
- The steroid effect makes the lesions atypical and hence it is referred to as Tinea incognito

Tinea corporis:

- One or more circular, sharply circumscribed, slightly erythematous, dry, scaly patches
- Lesions may be slightly elevated, particularly at the borders, where they are more inflamed and scalier than at the central parts
- Progressive central clearing produces annular outlines that give them the name "ringworm"

- In the presence of immune suppression from underlying illness, or chronic use of topical steroid creams lesions may be very extensive and atypical in appearance (Tinea incognito)

Tinea cruris:

- Occurs more commonly in adult men
- Leads to severe itching in the groin (crotch)
- Presents as slowly spreading erythematous patches with scaly borders on the upper inner aspects of the thighs

Treatment Goals

- To clear lesions and prevent recurrence

Drug Treatment

- Topical Ketoconazole
  - 2% cream apply twice daily
- Miconazole
  - 2% cream apply twice daily
- Systemic
  - Fluconazole
  - *Adult*: 50 mg orally daily for 2 - 4 weeks; up to 6 weeks in tinea pedis
  - *Child*: 1 month - 18 years 3 mg/kg (maximum 50 mg) daily for 2 - 4 weeks; up to 6 weeks in Tinea pedis

Notable Adverse Drug Reactions, Contraindications and Caution

- Fluconazole: numerous drug interactions
- Hepatotoxicity during long-term daily therapy

Prevention

- Do not share combs, hair brushes, school caps, shoes, socks or underwear
- Keep the feet dry; avoid tight-fitting covered shoes
- Aerate the feet as often as possible
- Use good antifungal powder on the feet after bathing e.g. Tolnaftate 1% powder
- Reduce perspiration and enhance evaporation from the crural areas by wearing loose pants (e.g. boxer pants) made of absorbent cotton fabric
- Apply plain talcum powder or antifungal powders in the flexures e.g. armpits, under the breasts, in the groin area
- Avoid exposure to animals with ringworm (M. canis) especially cats, dogs and (less commonly), horses and cattle
- Excessive perspiration is the most common predisposing factor in adult Tinea corporis
- Avoid excessively hot, humid environments, or take a cold shower after sweating

Pityriasis Versicolor (Tinea versicolor)

Introduction

Superficial yeast infection of the skin caused by *Malassezia furfur* species (normal commensal on the skin)

Common in warm humid climates

Predisposing factors:
- Occlusion of the skin with pomades and greases
- Immune suppression
- Hyperhidrosis
- Heat

Clinical Features
- Usually asymptomatic (or just mild itching)
- May be generalized in the immuno-compromised
- Fine scaly, guttate or nummular patches, particularly on young adults who perspire freely
- Individual patches are dirty, yellowish/ brownish/hypopigmented macules (hence the term versicolor)
- Larger irregular patches may evolve
- Sometimes follicular tendency is marked; more noticeable at the advancing edges of the irregular patches

Sites of predilection:
- Sternal region
  - Sides of the chest
  - Shoulders
  - Upper back
  - Face

Differential Diagnoses
- Seborrhoeic dermatitis
- Pityriasis alba
- Pityriasis rosea
- Leprosy

Complications
- None usually; only of cosmetic significance
  Malassezia furfur sepsis
- From contamination of the lipid-containing medium in immunocompromised patients receiving hyperalimentation through tubes

Investigations
- Skin scraping for KOH microscopy

Treatment Goals
- Improve appearance of skin

Drug Treatment
Topical:
- Selenuim sulphide shampoo
  - Apply on affected areas daily, leave on for 10 – 15 minutes and wash off
  - Continue for 3 weeks
- Ketoconazole shampoo
  - Use as above
- Miconazole cream
  - For limited areas
  - Apply twice daily for 3 weeks

Supportive Measures
- Deal with underlying predisposing factor(s)

Prevention
- Avoid hot, humid environments or clothing that promote perspiration
- Take a cold shower after perspiration
- Use any of the above shampoo washes once a month if predisposed

VIRAL INFECTIONS

Herpes Zoster

Introduction

A second infection with varicella-zoster virus (VZV), usually in adults and limited to a dermatome Synonyms: Zoster, from the Greek "zostrix", meaning belt Shingles, from the Latin "cingulus", also meaning belt

Clinical Features
- Vesicles arranged in one or more dermatomes unilaterally
- Initial pruritus, pain and paraesthesia
- Multidermatomal and disseminated forms may occur in immuno-compromised states especially HIV infection
- The early rash is vesicular, later becomes pustular and then ulcerates
- The whole episode may last 2 weeks

Differential Diagnoses
- Chicken pox

Complications
- Pain may persist long after rash has healed (post-herpetic neuralgia)
- Dissemination of infection in the immunocompromised
- Hemorrhagic and necrotic lesions
- Ramsay-Hunt syndrome (Herpes zoster of the ear resulting in severe ear pain, hearing loss and vertigo)
- Visual impairment due to corneal ulcers (Zoster ophthalmicus-V1)

Investigations
- HIV screening for all patients
- Full Blood Count with differentials
- ESR
- Exclude Hodgkin's disease and leukaemia

Treatment Goals
- Provide symptomatic relief
- Treat secondary infection
- Treat any identified predisposing factor

Drug Treatment
- Drying agents e.g. zinc oxide 5% (calamine) lotion
  - Apply twice daily
- Aciclovir
  - *Adult*: 800 mg orally five times daily for 5 - 7 days
  - Continue for at least 3 days after complete healing

- *Child: 12 - 18 years*: 5 mg/kg orally every 8 hours usually for 5 days

Or:

- Aciclovir cream 5%
  - *Adult:* apply five times daily for 5 - 10 days
  - *Child*: not listed for this indication in children
- Oral antibiotics to treat or prevent secondary bacterial infection

Herpetic neuralgia

- Amitriptyline 10 - 25 mg orally initially, gradually increased to 75 mg daily

Or

- Pregabalin: start with 75 mg twice or thrice daily, gradually increase dose depending on efficacy and tolerability to a maximum of 600 mg per day in divided doses

Notable Adverse Drug Reactions, Contraindications and Caution

Aciclovir

- Ensure adequate hydration
- Caution in pregnancy and breastfeeding
- May cause nausea, vomiting, dizziness
- Fatigue, pruritus and photosensitivity

Pregabalin

- Hypersensitivity reactions
- Ataxia, dizziness
- Suicidal tendencies
- Blurred vision
- Muscle spasms
- Peripheral oedema

Molluscum Contagiosum

Introduction

A common infection caused by a large epidermotropic pox virus. It is common in children. Spread by direct human to human contact. In adults it is often transmitted during sexual intercourse

Clinical Features

- Individual lesions are smooth-surfaced, firm, dome-shaped, pearly papules; average diameter 3 - 5 mm
- Some "giant" lesions may be up to 1.5 cm in diameter
- Characteristic central umbilication
- Spontaneous resolution is expected
- Host response plays an important role
- Children with widespread molluscum contagiosum usually have atopic dermatitis
- Consider HIV in adults

Differential Diagnoses

- Viral warts
- Giant molluscum contagiosum may mimic basal cell epithelioma

Complications
- Secondary bacterial infection

Investigations
- Histopathology of the expressed pasty core

Treatment Goals
- Eradicate the skin lesions

Non-drug Treatment
- Light electrosurgery with a fine needle
- Cryotherapy with trichloroacetic acid 35% - 100%
- Curettage and paint with iodine

Drug Treatment
- Cimetidine
- *Adult:* 40 mg/kg/day orally for 2 months
- *Child:* not licensed for use in children less than 1 year.
- *1 month - 12 years*: 5 - 10 mg/kg (maximum 400 mg) 4 times daily
- 12 - 18 years: 400 mg orally 4 times daily
- Antibiotics - To prevent or treat secondary infection

Prevention
- Avoid direct skin contact with an infected person

Varicella (Chickenpox)

Introduction

Varicella Zoster virus is caused by Human Herpes Virus 3. Transmission is by direct contact with the lesions and via the respiratory route. Initial replication occurs in the nasopharynx and conjunctivae. After the primary infection, the virus remains dormant in nervous tissue. Reactivation later in life is typically manifested as Herpes zoster

Clinical Features
- Incubation period is 10 - 21 days
- Vesicular eruptions consist of delicate "teardrop" vesicles on an erythematous base
- The eruption starts with faint macules that develop rapidly into vesicles within 24 hours
- Successive fresh crops of vesicles appear for a few days, mainly on the trunk, face, and oral mucosa
- New lesions usually stop appearing by the fifth day; the majority is crusted by the sixth day
- Most disappear in less than 20 days without a scar, except larger and secondarily infected lesions
- Low grade fever
- Malaise
- Headaches
- The severity of the disease is age-dependent
- Adults have more severe disease and a greater risk of visceral disease

Differential Diagnoses
- Variola minor
- Disseminated zoster in immunosuppressed patients
- Widespread papular urticaria
- Coxsackie and ECHO virus eruptions

Complications
- Secondary bacterial infection
- Pneumonia
- Cerebellar ataxia and encephalitis
- Reye's syndrome

Investigations
- Tzanck smear
- Direct fluorescent antibody (DFA) staining
- Polymerase Chain Reaction (PCR)

Treatment Goals
- Relieve itching and treat secondary bacterial infection
- Reduce severity and scarring

Drug Treatment
- Aciclovir
  - Adult: 10 mg/kg intravenously three times daily for 7 days in immunocompromised patients
  - Child: see Herpes zoster
- Antihistamine for pruritus
- Co-trimoxazole or erythromycin for secondary infection

Notable Adverse Drug Reactions, Contraindications and Caution

Aciclovir
- Ensure adequate hydration
- Caution in pregnancy and breastfeeding
- May cause nausea, vomiting, dizziness, fatigue pruritus and photosensitivity

Prevention
- Isolate patients from non-immune persons

Viral Warts (Verrucae)

Introduction

Infections caused by human papilloma viruses (HPV); include more than 80 types. Transferred between humans, or from animals to humans. Cause cutaneous tumours which tend to regress spontaneously but may rarely progress into cutaneous malignancies

Clinical Features
- Infection may be clinical, subclinical, or latent
- Clinical lesions are visible by gross inspection
- Subclinical lesions may be seen only by aided examination (e.g. the use of acetic acid soaking)

- Latent infection:
  - HPV virus or viral genome is present in apparently normal skin
  - Thought to be common, especially in genital warts, and explains in part the failure of destructive methods to eradicate warts
- Incubation period is highly variable; from weeks to years
- Auto-inoculation is the rule
- Lesions may also occur on scratches (Koebner's phenomenon)
- Lesions are classified according to their positions and shape:

Common warts

- Firm growths with rough surface; round or irregular, greyish or brown
- Generally, appear on areas that are frequently injured, such as the fingers, around the nails (periungual warts); knees, face and scalp

Plantar warts

- Develop on the soles of the feet, where they are usually flattened by the pressure of walking
- A reactive callus forms around lesions
- Multiple warts may coalesce, resembling a tile or mosaic floor (mosaic warts)
- May be extremely tender
- Unlike corns and calluses, plantar warts tend to bleed from many tiny spots, like pinpoints when pared down with a blade

Filiform warts

- Long, thin, small growths that usually crop up on the eyelids, face, neck, or lips
- People who chronically use corticosteroids as cosmetic bleaching creams are prone to multiple filiform warts

Plane warts

- More common in children and young adults
- Usually appear in groups as smooth, yellow-brown, small, flat papules; most frequently on the face

Genital warts

- Occur most often on warm, moist surfaces of the body
- In men, usual sites are the end and shaft of the penis, and below the foreskin (if uncircumcised)
- In women, lesions occur on the vulva, vaginal wall, cervix, and skin surrounding the vaginal area
- May develop in the perianal region or rectum
- Especially in homosexual men, and in women who engage in anal sex
- Usually appear 1 - 6 months after infection as soft
- erythematous papules, which may be greyish if hyperkeratotic
- New lesions develop rapidly and all coalesce, producing a cauliflower-like picture
- May grow rapidly in pregnant women, and immunocompromised patients

Differential Diagnoses

Common warts

- Keratoacanthoma
- Squamous cell carcinoma
- Seborrhoeic keratosis
- Hypertrophic lichen planus
- Tuberculosis verrucosa cutis
- Palmoplantar keratoderma
- Arsenical keratoses

Plane warts
- Epidermodysplasia verruciformis
- Syringomas
- Dermatosis papulosanigra
- Lichen planus
- Lichen nitidus

Genital warts
- Condylomata
- Pemphigus vegetans

Complications
- Squamous cell carcinoma of the perianal skin
- Cervical carcinoma from anogenital warts
- Obstructive laryngeal papillomatosis in babies infected through maternal birth canal

Investigations
- Histopathology if in doubt

Treatment Goals
- Eradicate the skin lesions
- Prevent Complications

Non-drug Treatment
- Liquid nitrogen freeze
- Electro-desiccation
- Laser surgery

Drug Treatment
- Salicylic acid with lactic acid plaster
  - Apply carefully to wart; rub wart surface gently with file or pumice stone once weekly
  - May need to treat for as long as 3 months
- Podophyllum resin
  - Apply weekly under supervision e.g. in genitourinary clinic
- Imiquimod 5% cream
  - Apply thinly once daily on 3 alternate days per week until lesions resolve (maximum 16 weeks)

Notable Adverse Drug Reactions, Contraindications and Caution

Salicylic acid plaster
- Avoid broken skin
- Not suitable for anogenital region or large areas
- Podophyllum

- Avoid normal skin and open wounds
- Keep away from face
- Should not stay on treated skin for more than 6 hours before washing

Prevention

- Women with genital HPV infection should have routine cervical cytologic screening
- Papanicolaou (PAP) smear to detect cervical dysplasia

MISCELLANEOUS DISORDERS

Acne Vulgaris (Pimples)

Introduction

One of the most common skin diseases. A disorder of the pilosebaceous follicles. Typically, first appears during puberty when androgenic stimulation triggers excessive production of sebum.

Many factors interact to produce acne in a given patient

- Genetics
- Sebum production
- Hormones
- Bacteria
- Properties of the sebaceous follicle
- Immunologic

Over-production of stratum corneum cells (hyperkeratosis) obstructs the hair follicles at the follicular mouth producing open comedones, or blackheads

Just beneath the follicular opening in the neck of the sebaceous follicle it causes microcomedones (closed comedones, or whiteheads)

There is an overgrowth of gram-positive bacteria in the obstructed follicle: *Propionibacterium acnes* or *Staphylococcus epidermidis*; distally *Pityrosporum ovale*

Rupture of the comedonal contents into the dermis induces a foreign body reaction and inflammation

Clinical Features

- Almost every individual has some degree of acne during puberty, with spontaneous resolution occurring in early adult life
- Occasionally, the disease persists into the fourth decade, or even remains a life-long problem
- Favoured sites are the face, upper back and upper chest and shoulders
- There may be mild soreness, pain, or itching
- May present differently in different age groups
- Pre-teens often present with comedones as their first lesions
- Teenage acne is invariably inflammatory and the lesions include firm red papules, pustules, abscesses, indurated nodules, cysts and rarely interconnecting draining sinus tracts
- Inflammatory acne can be classified as mild, moderate, or severe

Mild acne:

- Few-to-several inflammatory papules and pustules, but no nodules

Moderate acne:

- Several-to-many papules, pustules, and a few to several nodules

Severe acne (acne conglobata):

- Numerous fistulated comedones; extensive inflammatory papules; pustules; many cysts, abscesses, nodules, and draining sinuses
- The lesions may be generalized, involving even the buttocks
- Excoriation of acne papules and microcomedones are common, and scarring may result
- Usually, multiple shallow erosions or crusts are found

Differential Diagnoses

- Acne rosacea
- Dermatosis papulosa nigra
- Steatocystoma multiplex
- Syringoma
- Trichoepithelioma
- Warts
- Angiofibromas of tuberous sclerosis
- Molluscum contagiosum
- Steroid acne from the use of systemic steroids or topical fluorinated steroids on the face (often as cosmetic skin lightening creams)
- Some drugs may produce acneiform eruptions
  - Androgens
  - Adrenocorticotropic hormone (ACTH)
  - Glucocorticoids
  - Hydantoins
  - Isoniazid
  - Halogens (Fluoride, Bromide etc)

Complications

- Psychosocial problems from cosmetic disfigurement
- Post-inflammatory pigmentary changes
- Pitted scars
- Keloids
- Acne fulminans (acute febrile ulcerative acne conglobata with polyarthritis and leukemoid reaction)

Investigations

- Usually, none required
- In the presence of unusual acne, hirsutism, premature pubarche, or androgenic alopecia (especially when associated with obesity and/or menstrual irregularities):
- Screen for hyperandrogenism
- Blood levels of free testosterone,
- dehydroepiandrosterone, and androstenedione
  - If raised, test response of the hormones and cortisol to dexamethasone suppression

Treatment Goals

- Reduce severity of acne
- Prevent Complications

Drug Treatment

- Comedonal acne
  - Topical treatment only:
  - Tretinoin cream
  - *Adult*: 0.025% **or** 0.05% **or** 0.1% cream or gel applied nightly
  - *Child*: apply thinly 1 - 2 times daily

Or:

  - Benzoyl peroxide
  - *Adult*: 2.5% **or** 5% water-based or alcohol-based gels, applied twice daily
  - *Child 12 - 18 years:* apply 1 - 2 times daily preferably after washing with soap and water. Start with lower strength preparations
  - *Infantile acne: child 1 month to 2 years and neonates: apply 1 - 2 times daily. Start with lower strength preparations*

Or:

  - Salicylic acid solution 2%
  - Adult and child: apply up to 3 times daily
  - Tretinoin may be used at night and benzoyl peroxide or topical antibiotics in the morning because they have different modes of action and are complementary. It may take 8 - 12 weeks before observable improvement occurs
- Mild inflammatory acne
  - Treat as above
- Moderate inflammatory acne
  - Topical and systemic drugs:
  - Tetracycline: Adult and child over 12 years: 500 mg orally every 12 hours

Or:

  - Doxycycline
  - *Adult and child over 12 years*: 100 mg orally every 12 hours

Or:

  - Erythromycin
  - *Adult and child over 12 years:* 500 mg - 1 g every 12 hours
  - *Infants requiring oral therapy:* 250 mg once daily or 125 mg every 12 hours

Or:

  - Clarithromycin
  - 250 - 500 mg orally every 12 hours
  - In patients who do not tolerate any of the tetracyclines or who fail to improve
  - Review patient in 6 weeks and 3 - 4 months later
  - If there is marked improvement, taper the dose by 250 mg for

tetracycline every 6 - 8 weeks while treating with topicals to arrive at the lowest systemic dose needed to maintain clearing

- Antibiotic-resistant acne
  - Spironolactone may be added as an anti-androgen
  - Adult: 50 - 200 mg orally daily

Severe acne

- Start with systemic antibiotics as above
- Oral isotretinoin (13-cis retinoic acid)
  - *Adult:* 0.5 - 1 mg/kg/day for 20 weeks for a cumulative dose of at least 120 mg/kg
  - *Child 12 - 18 years*: 500 micrograms/kg once daily, increased if necessary, to 1 mg/kg in 1 - 2 divided doses
  - Occasionally, acne does not respond or promptly recurs after therapy, but may clear after a second course
  - At least a 4 month rest period from the drug is recommended before a second treatment course is considered

Acne fulminans

- Prednisolone 1.0 mg/kg daily for 7 - 10 days then taper o ffrapidly as isotretinoin is started Success has been reported with dapsone but only in toxic doses (100 mg three or four times daily)

Supportive Measures

- Use non-irritating cleansing agents to reduce facial sheen and bacterial flora
- Sunscreen is recommended for all (SPF 30 or higher)
- Emotional support
- Comedone extraction
- Intralesional injection for deeper papules and occasional cysts
  - Triamcinolone acetonide 2.5 mg/mL Or 0.05 mL per lesion (Dilute suspensions)
- Chemical peels for scars and post inflammatory hyperpigmentation
- Laser, dermabrasion for cosmetic improvement of scars

Notable Adverse Drug Reactions, Contraindications and Caution

Topical preparations:

- Creams and water-based gels are less irritating than alcohol/acetone-based gels
- Always initiate treatment with lower strength and increase as tolerance develops to initial irritant reaction
- Occasionally contact sensitivity may occur

Benzoyl peroxide

- May bleach fabrics, hair and skin
- Avoid contact with eyes, mouth, and mucous membranes

Antibiotic resistance may occur

- Avoid the use of different oral and topical antibiotics at the same time
- Vaginitis and perianal itching due to Candida may occur
- Tetracyclines, and doxycycline are contraindicated in pregnancy and in children less than 12 years

- May reduce the effectiveness of oral contraceptives
- Often cause GIT symptoms
- Doxycycline may cause photodermatitis
- Erythromycin cannot be used in conjunction with astemizole or terfenadine, as serious cardiovascular Complications may occur

Salicylic acid

- Significant absorption may occur from the skin in children

Isotretinoin

- Dry skin, lips and eyes
- Decreased night vision
- Epistaxis
- Hypercholesterolaemia
- Hypertriglyceridaemia
- Pseudo tumour cerebri and headaches
- Depression
- Musculoskeletal or bowel symptoms
- Thinning of hair
- Bony hyperosteoses
- Premature epiphyseal closure in children
  - Absolutely contraindicated during pregnancy (teratogenicity)
  - Obtain informed consent before use; start oral contraceptives one month before commencing therapy and continue for another month after conclusion of therapy
  - Women of childbearing age are strongly advised to avoid pregnancy for up to 3 years following cessation of therapy
  - Check cholesterol and triglyceride levels every 2 - 4 weeks while on therapy

Prevention

Avoid

- Oil-based cosmetics, hair styling mousse, face creams and hair sprays
- Medicines that may induce acne

Pruritus

Introduction

Commonly known as itching. The most common unpleasant experience involving the skin; provokes a desire to scratch. May be elicited by many normally occurring stimuli e.g. Light touch, Temperature change, Emotional stress and Chemical, mechanical, thermal and electrical stimuli.

Mediated by the release of chemical substances e.g. histamine, kinins, and proteases

Prostaglandin E lowers the threshold for histamine-induced pruritus, while enkephalins, pentapeptides which bind to opiate receptors in the brain modulate pain and itching centrally

Clinical Features

- At a low level, may merely be annoying
- May actually torture the patient, interfere with sleep and lead to less than optimal performance
- There are great variations from person to person
- In the same person there may be variation in reactions to the same stimuli
- In the elderly, senile pruritus due to dry skin may be particularly bothersome
- Psychologic trauma, stress, absence of distractions, anxiety, and fear may all enhance itching
- Tends to be most severe at the time of undressing for bed
- There are also regional variations
- The ear canals, eyelids, nostrils, and perianal and genital areas are especially susceptible to pruritus
- May be localized or generalized
- May or may not be associated with skin lesions
- Excoriations are typically linear and occur where the patient can reach with his hands
- The middle of the back is typically spared except when the patient has used a back scratcher
- The scratch is usually erythematous, with many tiny erosions scattered along it
- Fresh marks are usually weepy or bloody; older ones crusted
- Lesions may become impetiginized
- In addition to excoriations, some patients may have smooth, shiny fingernails (the polished nails of chronic pruritus)

• Pruritus without skin lesions suggests
  - Biliary obstruction
  - Diabetes mellitus
  - Uraemia
  - Lymphoma
  - Hyperthyroidism
  - Adverse reaction to medicines e.g. Histamine liberators, opioids
  - Occult scabies
  - Pediculosis
  - Onchodermatitis
  - Dermatitis herpetiformis
  - Atopic eczema in remission
  - HIV/AIDS
  - Systemic mastocytosis
• Polycythaemia vera is a notable cause of pruritus; usually induced by temperature changes
• Some patients complain of pruritus provoked by bath or immediately post-bath
• Factors include:
• Aquagenic pruritus
• Temperature-dependent pruritus due to cold/heat

- Cholinergic pruritus (when the core temperature is increased and there is sweating)
- Allergy to bath sponge or soap
- Mechanical scrubbing of the skin with coarse sponge causing degranulation of mast cells
- A forceful jet of water from the shower may trigger pruritus in some cases.

Differential Diagnoses

- All the above causes of pruritus

Complications

- Sleep disturbance
- Less than optimal performance at home, work or school
- Emotional disturbance
- Suicidal ideation

Investigations

- As suggested by meticulous history and physical examination

Treatment Goals

- Suppress itch
- Identify and treat cause(s)
- Improve quality of life
- Prevent Complications

Drug Treatment

- Ketotifen
  - *Adult:* 2 mg orally taken before bath (with food)
  - *Child 3 years and over:* 1 mg orally twice daily
  - Depressed, itchy individuals
- Doxepin
  - *Adult:* initially 75 mg orally daily in divided doses or as a single dose at bedtime
  - Increased if necessary to a maximum of 300 mg daily in 3 divided doses
  - Up to 100 mg may be given as a single dose
  - Elderly: initially 10 - 50 mg daily; range of 30 - 50 mg daily may be adequate
  - Not recommended for children

Pruritus associated with partial biliary obstruction and primary biliary cirrhosis

- Cholestyramine
  - *Adult:* 4 - 8 g orally daily in water (or other suitable liquid)
  - *Child:*
    - *1 month - 1 year:* 1 g orally once daily mixed with water
    - *1 - 6 years:* 2 g once daily
    - *6 - 12 years:* 4 g once daily
    - *12 - 18 years*: 4 - 8 g daily
    - adjusted according to response in all age groups

Pruritus of renal failure

- Activated charcoal
  - *Adult:* 50 g orally initially then 50 g every 4 hours
  - Treat vomiting with an anti-emetic because it may reduce the efficacy of charcoal treatment

- In cases of intolerance reduce the dose and increase frequency of administration (e.g. 25 g every 2 hours or12.5 g every hour). This may however compromise efficacy

Or:

- Ultra Violet B therapy
- Localized pruritus
- Corticosteroid creams for inflammatory skin disease

Or:

- Crotamiton cream 10%
  - *Adult*: apply topically 2 - 3 times daily
  - *Child*:
    - apply once daily for child below 3 years
    - over 3 years: apply 2 - 3 times daily

Or:

- Urea 10%, hydrocortisone cream 1 %, Adult and child: dilute with aqueous cream in first 1 week of use if stinging occurs

Or:

- Emulsifying ointment BP
  - Adult and child: can be used as soap substitute; rub on skin before rinsing o ffcompletely

Or:

- Doxepin hydrochloride
  - Adult: apply thinly 3 - 4 times daily (coverage should be less than 10% body surface area)

Adverse Drug Reactions, Contraindications and Caution

Cholestyramine

- Counsel patients
- Other drugs should be taken at least 1 hour before, or 4 - 6 hours after cholestyramine to reduce possible interference with absorption
- May cause constipation and gastrointestinal discomfort
- Interferes with the absorption of fat-soluble vitamins
- Supplements of vitamins A, D and K may be required
- Activated charcoal:

Risk of aspiration in drowsy or comatose patients

Risk of intestinal obstruction in patients with reduced gastro-intestinal motility

Black stools

- Doxepin:

Caution in patients with glaucoma, urinary retention, and severe liver impairment

May cause drowsiness, local burning, stinging, irritation and dry mouth

Prevention

- Use a cleansing bar (instead of soap) for baths
- Pat rather than rub skin dry after bath and immediately lubricate skin with petroleum jelly or emulsifying ointment

Urticaria and Angioedema

Introduction

An eruption of evanescent wheals or hives which can result from many different stimuli on an immunologic or non-immunologic basis. The most common immunologic mechanism is hypersensitivity mediated by IgE - Another mechanism involves activation of the complement cascade. The activation of cutaneous mast cells and their release of mediators is the unifying feature of most urticaria Mast cells are found in the immediate vicinity of blood vessels. They release preformed mediators (histamine, heparin and various enzymes) as well newly manufactured ones (prostaglandins, leukotrienes).
A hive or urticarial lesion is the result of localized oedema in the dermis

Aetiology

- Medications
- Food
- Aero-allergens
- Latex; seminal fluid (contact urticaria)
- Insect antigens (bees, wasps or hornet toxins)
- Infections and infestations (parasitic, fungal, Bacterial and viral)
- Foreign proteins (antisera, vaccinations)
- Physical stimuli (pressure, heat, cold, cholinergic stimuli, water, light and irradiations)
- Auto-immune disorders, enzyme defects (C1 esterase inhibitor deficiency)
- Psychosocial conflicts (stress, depression)
- Excessive mast cells (mastocytoma, urticaria pigmentosa)
- Pseudoallergy (mast cell degranulators e.g. NSAIDS; dyes, preservatives, contact urticaria)
- Serum sickness
- Malignancies
- Idiopathic

Clinical Features

May be acute or chronic:

- Acute urticaria is of sudden onset and lasts less than 6 weeks
- Chronic urticaria persists for more than 6 weeks with either:
  - Daily emergence of new wheals (chronic continuous) or
  - Occasional hive-free periods (chronic recurrent)
- The typical urticarial reaction is similar to the triple response of Lewis
- Initial erythema
  - Next oedema (the hive)
  - Finally, an erythematous ring surrounding the hive
- Urticarial lesions may:
  - Vary in size and shape over minutes to hours
  - Present an orange-skin appearance
  - Become bullous
- The pruritus associated with urticaria is usually extreme
- Excoriations are extremely unusual because the lesions are almost invariably rubbed, not scratched

- Dermographism is characterized by wheal and erythema after minor stroking of, or pressure on the skin
- Commonly found under pressure areas e.g. the belt line
- May persist for years, but spontaneous regression usually occurs within 2 years
- Angioedema is the involvement of deeper vessels
  - Characterized by painless, deep, subcutaneous swelling
  - Often involves periorbital, circumoral and facial regions; palms, soles and the genitalia
  - May target the gastrointestinal and respiratory tracts, causing abdominal pain, coryza, asthma and respiratory problems
  - Respiratory tract involvement may cause airway obstruction
  - Anaphylaxis and hypotension may also occur

Differential Diagnoses

- Gyrate erythemas
- Urticarial vasculitis
- Mastocytosis
- Pityriasis rosea (early lesions)

Bullous lesions:

- Pemphigus
- Pemphigoid
- Erythema multiforme
- Fixed drug eruption

Angioedema:

- "Calabar swelling"
- Cellulitis
- Idiopathic scrotal oedema of children
- Melkerson-Rosenthal syndrome

Cold urticaria:

- Cryoglobulinemia
- Immune complex diseases
- Systemic lupus erythematosus and other collagen vascular diseases
- Macroglobulinemia
- Mycoplasma infections (cold hemagglutinins)
- Syphilis
- Familial cold urticaria
- Acquired cold urticaria

Complications

- Emotional distress in chronic cases
- Fatality

Investigations

- Suggested by meticulous history and physical examination

Treatment Goals

- To alleviate symptoms
- Eliminate and treat cause

Drug Treatment

- Chlorphenamine maleate
  - *Adult*: 4 mg orally every 4 - 6 hours (maximum 24 mg daily)
  - *Child*:
    - under 1 year, not recommended
    - 1 - 2 years: 1 mg every 12 hours
    - 2 - 5years:1 mg every 4 - 6 hours (maximum 6 mg daily)
    - 6 - 12 years: 2 mg every 4 - 6 hours (maximum 12 mg daily)
    - If less sedation is required (e.g. day time)

Or:

- Loratadine
  - *Adult and Child over 6 years:* 10 mg orally daily
  - *Child 2 - 5 years:* 5 mg daily
- If persistent and chronic urticaria

Add Doxepin (oral form discontinued)

- *Adult:* apply thinly 3 - 4 times daily; usual maximum 3 g per application (total daily maximum 12 g)
- *Child*: not recommended for children under 12 years

Or:

(For symptomatic dermographism and chronic urticaria)

Plus**:**

- Ranitidine hydrochloride Adult: 150 mg orally every 12 hours or 300 mg at night

Not to be used alone for the treatment of urticaria

Refractory cases

- Systemic corticosteroids
  - Prednisolone 0.5 to 1.0 mg/kg orally daily or other systemic corticosteroids

Measures

- To relieve itching: Tepid or cold tub baths or showers
- Add starch, or sodium bicarbonate, menthol, or magnesium sulphate to bath water
- Do not scrub the body with sponge (it promotes degranulation of cutaneous mast cells)
- Avoid medicines likely to cause urticaria/angioedema
- Eliminate any suspected food
- Counseling

Notable Adverse Drug Reactions, Contraindications and Caution

- Chlorpheniramine maleate:
  - Patients not to drive or operate machinery
- Ranitidine:
  - Tachycardia, agitation, visual disturbances, alopecia, gynaecomastia and impotence
  - Caution in hepatic impairment, pregnancy and in breast feeding
- loratadine:
  - Headache, dry mouth, drowsiness, dizziness and nausea

- Caution in the elderly especially if renal function is compromised

- Doxepin:
  - Caution in cardiac disease
  - Contraindicated in recent myocardial infarction, arrhythmias, glaucoma and severe liver disease
  - May cause dry mouth, sedation, blurred vision, constipation, nausea, difficulty with micturition

Prevention

- Eliminate/avoid any identified/possible causal factor(s)

Vitiligo

Introduction

A disease characterized by acquired loss of melanocytes, leading to areas of depigmentation. Sometimes associated with uveitis and other autoimmune phenomena. Many autoantibodies can be demonstrated in vitiligo patients; those against melanocytes may rarely be demonstrable

Vitiliginous patches often follow a dermatome. A neurochemical mediator responsible for destroying the melanocytes has therefore been suggested

There is also an occupational vitiligo. Due to chemically induced depigmentation. Seen among workers who are in contact with para-phenolic compounds or hydroquinones (but this is considered a different disorder)

Clinical Features

All ages are affected

The dermatomal type is more common in the paediatric age

The completely depigmented patches have distinct borders

- A few patients may have inflammatory vitiligo with raised erythematous borders
- Some may have hypopigmented skin between the depigmented and normal skin (trichrome vitiligo)

The distribution may be:

Generalized (autoimmune type)

Segmental (dermatomal type)

The hairs on the patches eventually turn white (acquired poliosis)

The generalized type may be symmetrically distributed in the extremities

- Generalized vitiligo continues to spread while new lesions develop for years

Spontaneous repigmentation may occur

Favoured sites are

- Extensor surfaces of the extremities
- Face and peri-orificial surfaces (around the mouth, eyes, nipples, umbilicus, penis, vulva, and anus)

Focal vitiligo may affect one non-dermatomal site e.g. lips, vulva or penis

Universal vitiligo applies to cases where the entire body surface is depigmented

Generalized vitiligo may be associated with:

- Hyperthyroidism
- Hypothyroidism
- Pernicious anaemia
- Diabetes mellitus
- Addison's disease

Local loss of pigment may occur around a naevus and melanomas, the so-called halo phenomenon

Vitiligo-like leucoderma occurs in about 1% of melanoma patients

- Usually, a good prognostic sign since it suggests an effective immune reaction against the tumour cells

Segmental vitiligo affects only one part of the body

- It spreads rapidly in that area and then stabilizes
- It is not associated with autoimmune diseases
- Favoured sites are the trigeminal area or an intercostal nerve distribution (zosteriform pattern)

Just as with albinism, the interplay between the melanocytes of the eyes, ears, and skin is apparent

The prototype is Vogt-Koyanagi-Harada syndrome:

Vitiligo of the face, eyelashes, and scalp hair in association with

- Uveitis
- Dysacoussis
- Alopecia areata

Chemical vitiligo affects sites of contact with the chemicals

- When the chemicals are inhaled or a substantial quantity is absorbed through the skin, the distribution of the white patches may simulate the generalized autoimmune type

Differential Diagnoses

- Post-burns depigmentation
- Tertiary stage of pinta
- Morphoea
- Lichen sclerosis
- Pityriasis alba
- Tinea versicolor
- Piebaldism
- Hypomelanosis of Ito

Complications

- Emotional problems due to cosmetic disfigurement

Investigations

- Exclude other autoimmune diseases if clinically suggestive
- See also notes on caution below

Treatment Goals

- Re-pigmentation
- Improve cosmetic appearance
- Emotional support

Topical

- Corticosteroids

- Hydrocortisone 1% or betamethasone valerate
  - *Adult:* 0.1% apply once or every 12 hours (for focal or limited lesions)
  - *Child*: apply 1 - 2 times daily
- Psoralen: 8 - methoxypsoralen (MOP)
  - 0.05% - 0.1% in combination with ultraviolet-A radiation (PUVA) for focal or limited lesions
  - *Adult and child:* apply twice weekly
- Tacrolimus 0.1% ointment twice daily for 24 weeks

Systemic

- Systemic 8 - methoxypsoralen
  - *Adult*: 0.5 mg/kg orally
  - The initial UVA dose is 1 or 2 J/cm2, gradually increased
  - Two or three treatments are done per week for 3 – 6 months
- Systemic corticosteroids
  - Prednisolone tablets 0.5 - 1.0 mg/kg orally day
  - May occasionally be used to arrest the autoimmune process

Surgical

- Pigmented skin grafted onto vitiliginous patches
  - Often the transferred melanocytes repigment the depigmented areas
  - The various techniques include:
    - Suction blister grafts
    - Mini-punch grafts
    - Transfer of either pure melanocyte cultures or mixed epidermal cultures to a prepared site

Supportive Measures

- Camouflage (cover-up cosmetics)
- Patient education and emotional support

Notable Adverse Drug Reactions, Contraindications and Caution

- Corticosteroids:
  - See Dermatitis and Eczema
- 8-MOP:
  - Inadvertent sunburns with blistering
- Systemic psoralen is contraindicated in:
  - Known photosensitivity
  - Porphyria
  - Liver disease
  - Systemic lupus erythematosus
- If systemic therapy is to be used the following should be done before therapy
  - Ophthalmological examination
  - Full Blood Count
  - Liver function tests
  - Antinuclear Antibody Test
  - Acquired ochronosis

PUVA therapy should be supervised by an experienced dermatologist

CHAPTER 16:

SURGICAL CARE

Introduction

Surgical Care are initiatives aimed at reducing or eliminating complications arising from the provision of surgery to patients that need surgical operations. This is generally referred to as perioperative care which consists of preoperative, intra-operative and postoperative care.

Goals of Peri-operative care

Based on the evidence that majority of Complications and mortality following elective surgery are avoidable and can be prevented. These are:

- Prevent avoidable Complications
- Ensure early identification of Complications and prompt treatment
- Prevent avoidable mortality
- Ensure quick recovery and return to activities
- Ensure safe and smooth surgery
- Ensure optimal patient outcomes

Pre-operative care

Aims at preventing and/or minimizing the risk of adverse cardio-pulmonary events during and after surgery.

Clinical evaluation

- History of cough is indicative of Cardiopulmonary disorders such as chest infections, Bronchial asthma, chronic obstructive airways diseases, hypertension, heart failure etc.
- Patient may have metabolic disorders like Diabetic Mellitus etc, Haematologic disorders like the haemoglobinopathies eg Sickle cell disease. Other patients may give history of allergy to drugs, talc, elastoplast, antiseptics, etc.
- Drug history like Propranolol, diuretics, steroids and other hormonal agents; prednisolone, oral contraceptives; tricyclic antidepressants, which may interfere with healing process.
- Social habits like cigarette smoking, alcohol use etc may have effects on anaesthetic outcome.
- Previous anaesthetic experience, type and how long ago are important

Investigations

Cardiopulmonary:

- Chest radiograph: especially for patients 60 years and above, and those with chest infection gives evidence of chest infection and cardiomegaly
- ECG: for patients over 60 years and those with heart disease or hypertension
- Pulmonary function tests may be necessary in patients with obstructive airways disease

Metabolic:

- Urine sugar to exclude diabetes mellitus in patients with history of polyuria, polydipsia and polyphagia

- Serum electrolytes and urea
- Haematologic: Haemogram and complete blood count in all patients
- Haemoglobin genotype in patients with suspected haemoglobinopathies
- Clotting profile (PT, KCCT) where there is suspicion of bleeding diathesis e.g. in jaundiced patients

***Others**:*

- Other Investigations as may be indicated by individual clinical circumstances

Pre-operative correction of abnormalities and preparation for surgery

Cardiopulmonary:

- Rehydrate adequately, using appropriate fluids
- Control blood pressure in hypertensives
- Treat chest infections with appropriate antibiotics
- Manage obstructive airways disease

Metabolic conditions and derangements:

- Correct electrolyte deficits, especially hypokalaemia
- Correct acidosis (by adequate rehydration in patients without renal impairment)
- Diabetes should be controlled (Patients already controlled will need their therapy to be converted to soluble insulin for long surgical procedures)

Haematological:

- Correct anaemia
  - Cause(s) of anaemia should be identified and treated to at least 10g/dl
  - Haemogram 6 - 9 g/dL: correction may be achieved by haematinics; reschedule surgery
  - Haemogram <6 g/dL: correction may require blood transfusion
  - Emergency surgery: correct anaemia by blood transfusion
  - Blood transfusion should be avoided as much as practicable.
  - Patients with sickle cell anaemia: haemogram should be brought up to 8 g/dL
  - These patients must be adequately hydrated to avoid sickling and sludging within the bloodstream
  - Short day case procedure: imperative to admit the patient with sickle cell anaemia at least a day before surgery to achieve adequate hydration
  - Suspected bleeding diathesis
  - Intramuscular vitamin K (10 mg daily), at least 48 - 72 hours before surgery
- For major surgery, blood should be grouped, cross-matched and stored

Other disorders:

- Any associated medical condition should be treated /controlled before embarking on surgery. This should be done in conjunction with the physician as much as possible
- Patients who require nutritional rehabilitation:
- If surgery is elective reschedule it, and give adequate time to achieve improved nutritional status, otherwise morbidity and mortality may be increased

- High- risk patients are those at high risk of developing postoperative complications
  - Deliberate and meticulous efforts should always be made to adequately evaluate them and ensure optimal fitness for surgery
  - Elderly patients (age >60 years) and obese patients: - risk of deep vein thrombosis, atelectasis
  - Cancer-risk of deep vein thrombosis, atelectasis, haemorrhage
  - Women on oral contraceptive pills-risk of deep vein thrombosis
  - Co-existing chronic medical conditions-risk of wide ranging complications
  - Sickle cell anaemia-risk of sickling crises, deep vein thrombosis

Consent for surgery

- Details of the surgery should always be explained to the patient (or relatives) in very simple language before surgery
- Should include a mention of the possible/common complications
- A signed consent should be obtained, in the presence of a witness (usually a nurse)
- Obtaining consent should be done by the surgeon himself
- There are a number of evidence-based risk stratification to guide in predicting the risk of adverse events and help in instituting appropriate measures to prevent these events (Tables 1 and 2).

Table 16.1: Cardiac risk stratification in patients undergoing non-cardiac surgery

Risk	Examples
High (≥5% cardiac risk)	• Emergent major operations, particularly elderly • Aortic or major vascular surgery • Peripheral vascular surgery • Upper abdominal
Intermediate (1%–5% cardiac risk)	• Intraperitoneal and intrathoracic surgery • Carotid endarterectomy • Head and neck surgery • Gynaecologic surgery • Neurosurgery • Orthopaedic surgery • Urologic surgery
Low (<1% cardiac risk)	• Endoscopic procedures • Superficial procedures • Cataract surgery • Breast surgery • Ambulatory surgery

- Cardiac events include fatal and non-fatal cardiac events
- Incorporates peri-operative cardiovascular events within 30 days after surgery
- In addition to the cardiac risk stratification, note the American Society of Anaesthesiologist's physical status classification summarized below, which is a subjective assessment of patient's overall health.

I. Patient is a completely healthy fit patient
II. Patient has mild systemic disease
III. Patient has severe systemic disease that is not incapacitating
IV. Patient has incapacitating disease that is a constant threat to life
V. A moribund patient who is not expected to survive without the operation
VI. A declared brain-dead patient whose organs are being removed for donor purposes

- The addition of "E" (except VI) denotes Emergency surgery: (An emergency is defined as existing when delay in treatment of the patient would lead to a significant increase in the threat to life or body part)

Intra-operative care

The focus of intra-operative care is to ensure a safe and smooth surgical procedure. The entire team in the operating room, including surgical team, anaesthesia team and peri-operative nursing team, should work together as a team and take responsibility for intra-operative care to ensure a smooth and safe operation. The WHO's 'Surgical Safety Checklist' is a helpful guide for safe and effective intra-operative care. This checklist can be modified to suit each hospital based on local realities.

Post-operative care

An excellently performed operation can be marred by poor post-operative care and inadequate attention to patient's post-operative needs.

Meticulous and efficient care in the postoperative period is paramount for adequate patient recovery and success of surgery

A well-planned and supervised postoperative care ensures a smooth recovery, and helps to prevent or limit postoperative morbidity and mortality

Preoperative, intraoperative and postoperative care is a continuum and interlinked

Many of the instructions and therapy started in the preoperative period may need to be continued into the postoperative period

The surgeon himself must be involved in the postoperative care and not leave it to others, who may not have much ideas or information about the surgery

Initial recovery

Close monitoring and observation:

- The first 4 - 6 hours after a major surgery and general anaesthesia are critical
- The patient is still drowsy and recovering from the effects of anaesthesia
- The cardiopulmonary status (pulse rate, blood pressure, respiration) needs to be monitored very closely (every 15 minutes) in order to promptly detect any abnormality
- Where available, electronic monitors with an alarm system should be used

Airway management

- Airways need to be kept patent
- Prevent the tongue from falling backwards by positioning patient in the left lateral position
- The neck should be prevented from falling on itself as this can occlude the airway
- Secretions should also be cleared using a low-pressure suction

Nursing position

- Different operations require specific positioning in the postoperative period to reduce venous pressures, keep airways patent, enhance drainage etc
- The surgeon should be conversant with the specific positions and give appropriate instructions

Analgesia/Pain management

- Pain is a most undesirable effect of surgery. Patients should not be allowed to suffer from pain unduly. The appropriate analgesic technique should be chosen for the nature of surgical procedure performed. Adequate analgesia will ensure early ambulation and help to limit atelectasis
- The following principles should guide the use of analgesia for control of postoperative pain: Multimodal approach: should be pre-emptive and preventative
- Use of local anaesthetics:
  - Improve analgesia
  - Decrease opioid requirements
  - Decrease opioid-related side effects
  - Can be given via:
  - Wound infiltration
  - Epidural
  - Peripheral nerve blocks
- Opioids remain the mainstay of surgical pain control
- Pain should be continuously evaluated using appropriate pain assessment tools to help in ensuring adequate and appropriate management
- The following analgesic guide is helpful in the control of postoperative pain (Figure 1)

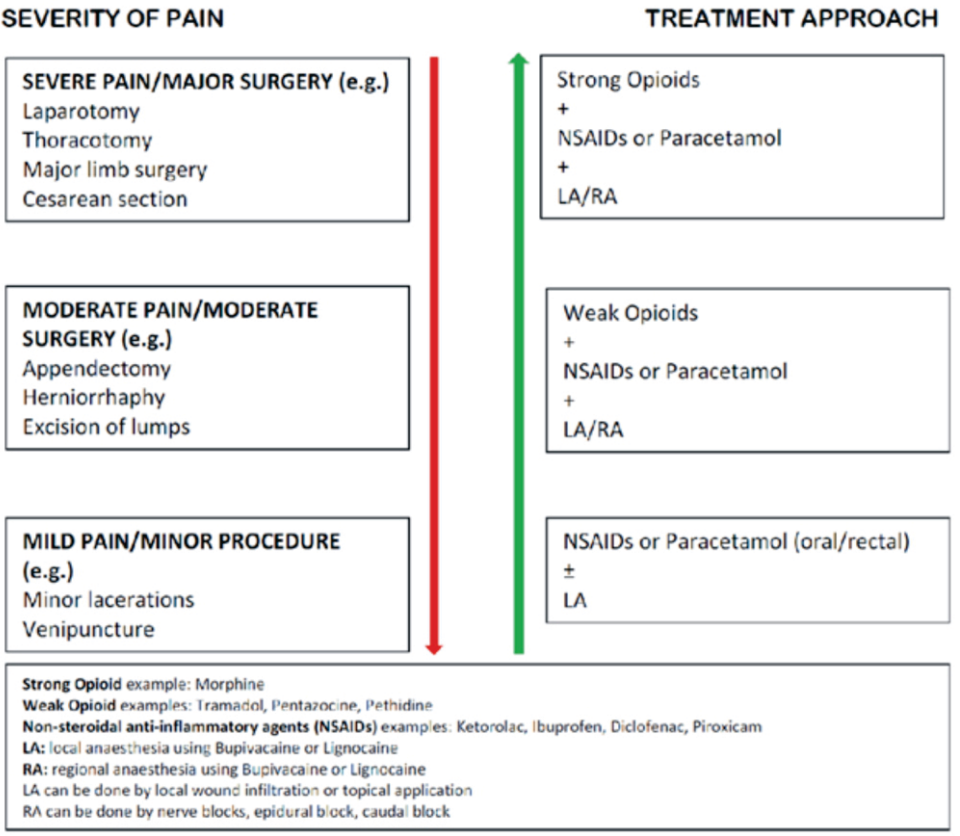

Figure 16.1: Guide for postoperative analgesia

Nasogastric decompression

- The stomach may need to be kept decompressed for 24 - 48 hours, particularly following gastrointestinal surgery
- Decompression:
- Prevents abdominal distension and
- Prevents tension on abdominal fascial closure I
- Prevents splinting of the diaphragm and atelectasis
- The widest possible bore of nasogastric tube for patient's age should be chosen
- The nasogastric tube should be removed as soon as it is no longer needed, evidenced by:
- Progressively diminishing effluent (<500 mL/24 hours in an adult)
- Change from bilious colour to clear colour of gastric juice

Fluid and electrolyte balance

- Ensure that the patient receives adequate amounts of intravenous fluids if oral intake is prohibited
- Choose an appropriate fluid to provide enough calories and electrolytes
- Glucose 5% in sodium chloride 0.9% or lactated Ringer's solution is appropriate for most adults

- After the 48 hours, the daily requirement of potassium should be provided if oral intake is still prohibited, especially if nasogastric drainage is ongoing
- This should be in the form of potassium chloride added to intravenous fluids
- Assess fluid and electrolyte balance on a daily basis and correct deficits
- All intake (intravenous fluids, drugs, blood etc.) and output (urine, nasogastric drainage, other tubes, etc.) as well as insensible losses should be carefully recorded

Nutrition

- Following major surgery, adequate nutrition should be provided for the patient, particularly if oral intake is going to be prohibited for more than 48 - 72 hours. This can be done in the form of parenteral nutrition

Chest physiotherapy*:*

Bed-ridden patients and patients who have had chest or upper abdominal surgery are prone to basal atelectasis and hypostatic pneumonia

- These should be prevented by appropriate chest physiotherapy
- Ensure adequate analgesia to enhance chest excursion
- Encourage coughing and expectoration with a hand supporting any abdominal wound
- Periodic chest percussion to loosen bronchial secretions
- Ambulate as early as possible

Mobilization and ambulation

- Mobilize and ambulate patients as early as is practicable to avoid the complications of prolonged recumbency
- Ambulation should be gradual: prop up in bed, sit out of bed, short walks, etc.
- Early ambulation should help prevent hypostatic pneumonia and eep vein thrombosis (very important in obese and elderly patients)

Antibiotics

- Appropriate antibiotics as indicated
- Irrational or indiscriminate use is not to be encouraged

Wound care

Specific surgical wounds are cared for in different ways

- Clean surgeries: do not open wound (unless indicated) until day 5 - 7
- Inspect wounds immediately if there are features suggestive of surgical site (wound) infection
  - Undue pain
  - Undue swelling
  - Discharge of serosanguinous fluid or pus infected wounds:
- Wound swab for microbiological culture and sensitivity tests
- Adequate local wound care
- Appropriate antibiotics
- If there are systemic features (e.g. fever, anorexia) systemic treatment with antibiotics may be necessary

Care of indwelling tubes, catheters and drains

- All indwelling catheters, tubes and drains should be monitored and

appropriately managed to avoid infection, dislodgement/displacement
- They should be removed as soon as they have served their purpose(s)

General Complications in the Post-operative Period

Look out for general Complications and treat accordingly

- Postoperative pyrexia may be due to:
  - Malaria
  - Atelectasis and hypostatic pneumonia
  - Wound infection
  - Urinary tract infection
  - Deep vein thrombosis
  - Wound infection

Acute Abdomen

Introduction

These are abdominal conditions causing sudden or severe pain, that requires immediate or urgent attention.

Cause may be surgical in nature or medical diseases. Medical conditions should always be borne in mind as they would usually not require surgical intervention.

Common surgical and medical causes are detailed in Table 2. In newborns, intestinal obstruction (Table 3) is the commonest cause of acute abdomen and their care is different from that of adults and older children.

Table 16.2: Causes of acute abdomen

Surgical pathology	Medical disease
Inflammatory/Infective Appendicitis, cholecystitis, pancreatitis, salpingitis, diverticulitis, primary peritonitis, intra-abdominal abscess	Metabolic disease Diabetes mellitus, porphyria
Gastrointestinal perforation Perforated typhoid enteritis, perforated peptic ulcer, GI perforation from trauma, perforated GI neoplasms,	Haematologic disease Haemoglobinopathy (e.g. sickle cell disease, thalassaemia), leukaemia
Intestinal obstruction/strangulation Inguinal & other external hernias, internal hernias, intussusception, peritoneal adhesions, volvulus, obstructing GI neoplasms	Gastrointestinal infections/infestations Gastroenteritis, typhoid enteritis, parasitic infestation
Intra-abdominal haemorrhage Trauma (spleen, liver, other solid viscera), ectopic pregnancy, ruptured aortic aneurysm, ruptured neoplasm (e.g. primary liver cell carcinoma)	Extra-abdominal Infection/infestations Lower lobar pneumonia, malaria

Surgical pathology	Medical disease
Biliary tract obstruction	
Urinary tract obstruction	
Gynaecologic disease Twisted ovarian cyst, salpingitis, ectopic pregnancy, bleeding graafian follicle, complicated uterine fibroids	
Non-specific pain	

Table 16. 3: Causes of neonatal intestinal obstruction

Common causes
Anorectal malformation
Intestinal atresia
Hirschsprung's disease
Intestinal malrotation and midgut volvulus
Incarcerated and strangulated inguinal/other hernia
Less common causes
Meconium obstruction (plug and ileus)
Extra-luminal compression from masses
Congenital peritoneal bands
Others: Non-specific pain, etc

Clinical Evaluation

A detailed history should be taken and meticulous and thorough physical examination done. However, prompt resuscitation should not be sacrificed for taking too much time for history and examination. Clinical evaluation and resuscitation should as much as feasible be done simultaneously to save time. In Acute abdominal pain note the following:

- Location
- Onset and progression
- Nature and character
- Aggravating and relieving factors
- Abdominal distension
- A past history of similar pain suggests complication of an underlying condition
- In typhoid perforation, fever precedes abdominal pain, while the reverse is true for acute appendicitis
- Nausea and vomiting:
  - A frequent finding
  - Common in intestinal obstruction
- Altered bowel habits:
  - Diarrhoea may suggest an infective/inflammatory condition
  - Constipation occurs in intestinal obstruction and late in peritonitis
  - The presence or absence of blood, mucus in stool should be ascertained
- Fever:
  - An early feature in inflammatory/infective conditions
  - A late feature in most other causes of acute abdomen
- Gynaecologic history:
  - Last menstrual period: this will help in the suspicion of ectopic gestation and bleeding graafian follicle
  - Vaginal discharge: salpingitis
- Urinary symptoms:
  - Pain on micturition
  - Pus in urine or cloudy urine
  - Urethral discharge
  - Loin pain
- Past medical history:
  - Diabetes mellitus
  - Sickle cell disease
- Physical examination:
  - General examination
  - Dehydration
  - Temperature (the exact temperature should be taken with a thermometer: oral, axillary or rectal temperature)
  - Pallor
  - Jaundice
  - Foetor (as in diabetic ketoacidosis etc.)

- Haemodynamic status:
- Pulse rate: >100/minute is abnormal
- Blood pressure: <100 mmHg systolic and <60 mmHg diastolic pressures indicate hypotension in an adult
- Chest:
- Examine carefully for evidence of chest infection
- Abdomen :
- Distension
- Presence of scars of previous surgery or bruising in trauma
- Visible peristalsis (suggests intestinal obstruction)
- General peritonitis: There may be no movement with respiration
- Ascertain the site of tenderness
- Localized:
- Right iliac fossa (appendicitis, gynaecologic conditions etc.)
- Right hypochondrium (cholecystitis)
- Generalised: varied causes. As much as possible any palpable mass should be characterized
- If tenderness is not too marked, ascertain the presence of free fluid in the peritoneal cavity by shifting dullness or fluid thrill (ascites)
- Listen for bowel sounds
- Diminished or absent in peritonitis; exaggerated in early stages of intestinal obstruction
- Rectal examination:
- Look for perianal soilage
- Presence or absence of faeces in rectum
- Palpate rectovesical pouch or rectouterine pouch (of Douglas) for bogginess and tenderness indicating a pelvic collection of pus or blood
- Examine the faeces on the examining finger for blood, mucus Vaginal examination:
- May be necessary to exclude gynaecological conditions

Differential Diagnoses

- Give very careful thought to findings at clinical evaluation and list of possible causes in Table 2, and then make a list of 3 – 5 possible differential diagnoses before proceeding to carry out relevant investigations.

Investigations

Plain radiography

- Abdomen:
  - Supine and upright films to identify features of intestinal obstruction (dilated bowel loops and multiple fluid levels)
  - A radio-opaque shadow may be seen in the region of the urinary tract in ureteric colic
- Chest:
  - An upright film may identify gas under the diaphragm in gastrointestinal perforation

- Chest infection should also be looked for
- Abdomino-pelvic ultrasonography:
  - Should help to ascertain the cause of pain in a proportion of the patients (e.g. cholecystitis, gynaecologic conditions, urinary calculi, and degenerating masses)
  - May identify injured solid organ in trauma
- Diagnostic peritoneal lavage:
  - Useful in abdominal trauma to identify haemoperitoneum and leakage of gastrointestinal contents and secretions of other organs into the peritoneal cavity
- Biochemical tests:
  - Urinalysis: test the urine for sugar, protein, ketones, etc
  - Random blood sugar to exclude diabetes mellitus
  - Serum electrolytes and urea; correction may be needed
  - Serum amylase to exclude acute pancreatitis
- Haematological tests:
  - Haemogram to exclude anaemia
  - Packed cell volume may not be reliable because of haemoconcentration from dehydration
  - If there is suspicion of sickle cell disease, the haemoglobin genotype should be obtained
  - A complete blood count may show evidence of acute infection (leucocytosis, neutrophilia)
  - Blood should be grouped, and compatible blood cross-matched and made ready

Other Investigations:

- Computed tomography may be needed when there is diagnostic confusion
- Cultures: any suspicious fluid and materials should be obtained and sent for microbiology and culture (e.g. vaginal discharge, peritoneal fluid)

Treatment

- Resuscitation and general measures
- In most patients, resuscitation and institution of some general measures are necessary before proceeding to definitive treatment of the condition
- Time taken to adequately resuscitate the patient is critical to achieving a good outcome and preventing/minimizing morbidity and mortality
- Monitor closely by repeated examinations and electronic monitoring to identify when patient is adequately resuscitated
- Avoid time wasting as well as identify patients who are not responding to resuscitation and require additional measures
- Surgery may become part of resuscitation as a damage control measure but such surgery is usually limited in extent

General measures

- Rehydration and correction of electrolyte derangements
- Correct shock by giving crystalloids (sodium chloride 0.9%, Ringer's lactate) or colloid (e.g. dextran)

- Maintenance fluids are calculated based on degree of dehydration
- Correct electrolyte deficits (especially potassium)
- Nasogastric decompression: the largest possible size of tube for patient
- Aspirate intermittently using low pressure suction or large syringe
- Urethral catheterization (to monitor urine output)
- Correct anaemia (by blood transfusion)
- Commence broad spectrum, intravenous antibiotics effective against likely microorganisms
  - Do not give aminoglycosides until urine output is adequate
- Monitor the following parameters to ensure adequate rehydration:
  - Cardio-respiratory stability
  - Pulse rate
  - Blood pressure
  - Central venous pressure
  - Pulmonary capillary wedge pressure
  - Urine output, volume, colour
  - Hydration status
  - Skin turgor
  - Sensorium
  - Ascertain level of consciousness
  - Evidence of adequate resuscitation
  - Pulse rate begins to fall towards, or below 100 beats/minute
  - Blood pressure: begins to rise towards normal
  - Urine output: 50 - 100 mL/hr (1 - 2 mL/kg/hr); clear or amber
  - O_2saturation (from pulse oximeter) 80% and above

Definitive Treatment

Once the patient is adequately resuscitated, definitive treatment can proceed

- Surgical conditions:

Most of the surgical conditions will require urgent laparotomy after adequate resuscitation

  - Evacuation of pus, blood and all infected material
  - Meticulous examination of all organs and recesses
  - Identify primary pathology
  - Identify other associated/coexisting pathology
  - Treat identified pathologies on their merits
  - Cleanse peritoneal cavity with large volumes of warm sodium chloride 0.9%

Note: Neonates should be referred to the nearest secondary or tertiary facility where an anaesthesiologist is readily available

- Medical conditions:
  - Consult a physician as appropriate, to treat the condition accordingly
  - It is important that repeated examination and monitoring continues during and after definitive treatment to identify any problems and promptly attend to them

Prognosis

- Outcome and survival depend on:
- Early presentation and diagnosis
- Prompt and adequate resuscitation before surgery
- Appropriate and meticulous surgery and other treatments as indicated

Prevention of Blood Loss and Blood Transfusion in Surgery

- Blood transfusion is the introduction of whole blood or blood components into the blood stream of an individual
- Should be used appropriately because its use is not without Complications and untoward effects
- Several techniques and manoeuvres (Table 4) are available to help minimize blood loss at surgery, and hence minimize blood transfusion

Table 16.4: Use of simple techniques to minimize blood loss at surgery

Techniques
Elevation of site of surgery
Pressure (digital and sponge)
Electrocautery
Clipping and ligature
Surgical glues (e.g. fibrin glue)
Tourniquets (elastic bandage or pneumatic, useful in limbs, remember tourniquet time, remember tore move before closure of skin wound)

- Blood and its commonly used components:
- Whole blood
- Packed red cells
- Fresh frozen plasma
- Clotting factor concentrates
- Platelet concentrate

Basic principles of blood transfusion:

- Appropriate use
- Adequate evaluation before transfusion to ascertain the indication, amount and component required

- Screening for communicable diseases (HIV, hepatitis, etc.) before transfusion
- Adequate grouping and cross-matching before transfusion
- Store under at appropriate temperature
- Use blood fractions whenever possible to avoid wastage
- Use autologous blood whenever possible to minimize risk of transfusing communicable diseases Transfusion is not a substitute for meticulous and appropriate surgical techniques

Indications for blood transfusion

- To replace lost blood volume
- Haemorrhage from trauma and other forms of blood loss
- Operative haemorrhage
- To improve oxygen carrying capacity
- Various types of anaemias
- To replace clotting factors
- Some liver diseases
- Deficiency states

Complications

- Early Complications:
  - Immune reactions
  - ABO incompatibility
  - Rhesus incompatibility
  - Febrile reactions
  - Allergic reactions
  - Reactions to plasma proteins
- Biochemical Complications:
  - Hyperkalaemia
  - Citrate toxicity (hypocalcaemia) Haemoglobinaemia Infective Complications: Bacteraemia
  - Transfusion of parasites (e.g. malaria)
  - Transfusion of viruses (HIV, Hepatitis B, C, D)
- Physical Complications:
  - Volume overload
  - Air embolism
  - Hypothermia
- Complications of massive blood transfusion:
  - Massive transfusion refers to the single transfusion of 50 - 100% of the equivalent of an individual's blood volume in less than 24 hours
  - 2.5 - 5 litres in adults and 40 - 80 mL/kg body weight in children

The Complications are related to:

- Volume overload
- Transfusion of old blood
- Electrolyte derangements (especially potassium and calcium)
- Transmission of infections
- Delayed Complications:

- Haemosiderosis
- Post transfusion purpura

• Autologous transfusion

Transfusion of the patients' own blood

- Advantages
- Reduced risk of transmitting communicable diseases
- Overcomes the problem of shortage of blood
- Types and methods
- Pre-deposit blood
- Usually best done in conjunction with haematology staff
- The patient donates one unit of blood at a time (e.g. weekly) several weeks before the elective surgery
- Following donation, the patient is given haematinics, and sometimes erythropoietin to enhance bone marrow function; the blood is stored for later use
- Pre-operative isovolaemic haemodilution
- Just before elective surgery, 1 - 2 units of blood are taken from the patient and replaced by volume expanders such as Ringer's lactate, sodium chloride 0.9%, or colloid
- The blood taken is transfused intraoperatively after all haemostasis has been secured
- Intraoperative blood salvage
- Appropriate for patients undergoing laparotomy or thoracotomy for haemorrhage into these cavities

(e.g. traumatic haemothorax, splenic injury, ectopic gestation)

- The blood is collected in an appropriate blood bag and then transfused using a blood giving set with

filter

- Special salvage equipment may be available sometimes
- Contaminated blood must not be transfused

Contraindications to autologous transfusion

• Pregnancy
• Chronic medical conditions
• Cancer
• Situations where the blood may have become contaminated (this is for intraoperative blood salvage)
• Children:

Other sources of blood include umbilical cord blood

Alternatives to blood transfusion

• Since blood transfusion is attended by several untoward effects and Complications, efforts are continuously being made to identify alternatives to transfusion
• Most of these are experimental at the moment and are not practicable in the clinical setting

Prevention and Control of Surgical Site Infection

Introduction

Postoperative surgical site infection (SSI) is a rather common, but undesirable complication. Increase postoperative morbidity and may sometimes lead to mortality. Efforts therefore need to be made to prevent it.

Prevention requires a good appreciation of the risk stratification according to type of surgical wound as well as the indications for the utilization of antibiotic prophylaxis.

Wounds are classified into I Clean (Risk of SSI, >2%), II Clean contaminated (Risk of SSI, 4-8%), III Contaminated (Risk of SSI >20%), IV Dirty/Infected (Risk of SSI <40%)

Prophylactic antibiotics for Prevention of SSI

Indications

- Clean wounds require no antibiotic use, except in implants, prosthesis, valvular heart disease, immunosuppression and patients on steroids where prophylactic antibiotics are needed
- Clean-contaminated and contaminated wounds require prophylactic antibiotics, while dirty/infected wounds require therapeutic antibiotics

Goals of antibiotic prophylaxis

- To prevent postoperative infection in susceptible patients

Principles of antibiotic prophylaxis

- Should be used only where there is a high risk of bacterial contamination
- Intravenous route is preferred to achieve optimum effect
- Should be given not >2 hours before surgical incision (many surgeons prefer to give at the time of induction of anaesthesia)
- Should be repeated intraoperatively if the surgery lasts for >3 hours
- Not more than 2 - 3 doses (not longer than 24 hours) should be given after surgery
- Antibiotics should be reinstituted if infection occurs

Choice of antibiotics

- Should depend on the known prevalent bacteria in the part of the body
- Broad spectrum antibiotics are preferred
- Combination of antibiotics (with synergistic actions) is preferred to a single antibiotic
- Should be used only when scientific evidence shows benefit

Indications for antibiotic prophylaxis

- Clean-contaminated and contaminated surgical wounds
- Patients with increased risk of infection: e.g. Immunosuppresion, diabetes mellitus, severe malnutrition, patients on steroids, patients on cytotoxic chemotherapy
- When prosthesis or implants are used
- To prevent infective endocarditis in patients with valvular heart disease or prostethic heart valves
- Patients with peripheral vascular disease undergoing surgery on that limb

Complications

- Antibiotic misuse
- Antibiotic resistance
- Side effects of antibiotics (e.g. pseudomembranous colitis)
- False sense of surgical security
- Antibiotic prophylaxis should be effective and efficient

Overview of the Treatment of Solid Tumours in Surgical Practice

Introduction

Cancer incidence is increasing all over the world but most especially in low- and medium-income countries. Cancer is now one of the leading causes of death from non-communicable diseases.

Effective modern treatment of cancer is best accomplished when different modalities of treatment like surgery, use of drugs, ionizing radiation and symptomatic palliation are brought together to complement each other.

Surgical treatment of Cancer:

- Surgery is the oldest modality for the treatment of cancer. This modality plays a key role in the treatment of every stage of solid tumours and remains the cheapest disease changing cancer treatment
- Surgery can be used in the Prevention of cancer where it may be employed to treat precancerous conditions to forestall the development of cancer. Young men with uncorrected cryptorchidism for example can be subjected to orchidectomy to prevent testicular cancer
- Different cancer predisposing hereditary diseases like germline BRCA 1 and 2 mutations, familial adenomatosis polyposis coli etc., can undergo prophylactic removal of predisposed organs to forestall development of cancer. Surgical treatment of cancers can be with curative intent or for palliation of symptoms
- In organ confined tumours, Surgery is usually the primary treatment. Alone, surgery can cure about 70% of such tumours but will depend on addition of systemic drugs and or radiotherapy as adjuvants to achieve a cure in the other 30%
- Sometimes, adjuvant drug treatment is brought upfront before surgery to downstage the tumour and enable surgical extirpation. The key principle in surgical treatment of organ confined tumours is a complete removal with a margin of normal tissue. This may involve such radical surgeries like limb amputations, mastectomies, nephrectomies, pneumonectomies etc.
- In some instances, the magnitude of the surgery becomes extended to achieve a cure or to improve the chances of achieving a cure, like in radical or modified radical mastectomies, radical or modified radical neck dissections etc. The emergence of effective non-surgical treatment of solid tumours has impacted well on the use of surgery for the treatment of cancer
- Where such effective alternate modalities exist, the magnitude of curative