



REPUBLIC OF ZAMBIA
Ministry of Health

STANDARD TREATMENT GUIDELINES,
ESSENTIAL MEDICINES LIST
AND
ESSENTIAL LABORATORY SUPPLIES LIST
FOR ZAMBIA

Recommendation for Citation

Ministry of Health, Zambia National Formulary Committee. 2013. Standard Treatment Guidelines, Essential Medicines List, Essential Laboratory Supplies for Zambia. 3rd ed. Lusaka, Zambia: Ministry of Health.

Support for the revision and publication of the Standard Treatment Guidelines was provided by the U. S. Agency for International Development (USAID) through the Rational Pharmaceutical Management Plus Program (cooperative agreement number HRN-A-00-00-00016-00) and the Strengthening Pharmaceutical Systems Program (cooperative agreement number GHN-A-00-07-00002-00) of Management Sciences for Health. The opinion expressed herein does not necessarily reflect the views of the USAID.

Contents	
Forward	xii
Acknowledgments	xiii
Zambia National Formulary Committee	xiv
Introduction	xviii
I.0 GASTRO-INTESTINAL CONDITIONS	1
1.1 Abdominal Pains	1
1.2 Diarrhoea	5
1.3 Dysentery	10
1.4 Cholera	13
1.5 Helminthes Infestation	18
1.6 Giardiasis	24
2.0 CENTRAL NERVOUS SYSTEM CONDITIONS	26
2.1 Mental Health and Psychiatric Illnesses.	26
2.1.1 Anxiety Disorders	27
2.2 Epilepsy	50
2.3 Febrile Convulsions	52
2.4 Rabies	52
3.0 INFECTIONS	56
3.1 Malaria	56
3.2 Uncomplicated malaria	56
3.3 Severe Malaria	57
3.4 Tuberculosis	65
3.4.1 Pulmonary tuberculosis	66
3.4.2 Pleural tuberculosis	66
3.4.3 Pericardial tuberculosis	66
3.4.4 Lymph node tuberculosis	66
3.4.5 Meningeal tuberculosis	66
3.4.6 Bone tuberculosis	66
3.4.7 Gastrointestinal tuberculosis	67
3.4.8 Genito-urinary tuberculosis	67
3.4.9 Dermal tuberculosis	67
3.4.10 Adrenal tuberculosis	67

	3.4.11 Multidrug-resistant TB (MDR-TB),	72
	3.4.12 TB and Immunocompromised Patients	73
3.5	Meningitis	76
3.6	Anthrax	81
3.7	Sexually Transmitted Infections (STI)	83
	3.7.1 Urethral Discharge	84
	3.7.2 Gonococcal urethritis	84
	3.7.3 Non-Gonococcal Urethritis	85
3.8	Gonorrhoea in Neonates	87
	3.8.1 <i>Ophthalmia Neonatorum</i>	87
	3.8.2 <i>Vaginal Discharge and Lower Abdominal Pain in Women</i>	88
	3.8.3 <i>Pelvic Inflammatory Disease</i>	88
	3.8.4 <i>Vulvovaginitis</i>	90
	3.8.5 <i>Urinary Tract Infection</i>	92
	3.8.6 <i>Genital Ulceration</i>	92
	3.8.7 <i>Syphilis</i>	92
	3.8.8 <i>Chancroid</i>	94
	3.8.9 <i>Lymphogranuloma Venereum</i>	95
	3.8.10 <i>Herpes Genitalis</i>	97
	3.8.11 <i>Granuloma Inguinale (Donovanosis)</i>	99
	3.8.12 <i>Genital Growth</i>	100
	3.8.13 <i>Hepatitis</i>	102
	3.8.14 <i>Acute Epididymo - Orchitis</i>	104
	3.8.15 <i>Urinary Tract Infection</i>	109
	3.8.16 <i>Acute Pyelonephritis</i>	111
3.9	The Plague	113
	3.9.1 <i>Bubonic Plague</i>	114
	3.9.2 <i>Primary Pneumonic Plague</i>	139
3.10	Human Immunodeficiency Virus (HIV) & Acquired Immune Deficiency Syndrome (AIDS)	116
	3.10.1 <i>WHO Clinical Staging of HIV disease in Adults and Adolescents</i>	116
	3.10.2 <i>Clinical indications to change ARVs due to toxicity</i>	144

3.10.3	<i>Laboratory indications to change ARVs due to toxicity</i>	145
3.10.4	<i>Managing toxicity</i>	145
3.10.5	<i>Prevention of Mother-to-Child HIV Transmission (PMTCT)</i>	150
3.10.6	<i>Practical hints</i>	156
3.11	Health workers in place of work	158
3.12	Rape case	159
4.0 DISEASES & CONDITIONS AFFECTING		
ENDOCRINE SYSTEM		
		166
4.1	Diabetes Mellitus	166
4.2	Type 2 Diabetes Mellitus (T2DM)	168
4.3	Hyperglycaemic/Ketoacidosis Coma/Precoma	172
4.4	Diabetes Mellitus in Pregnancy	176
5.0 OBSTETRIC AND GYNAECOLOGICAL CONDITIONS		
		178
5.1	Ante-Natal Care	178
5.2	Normal Labour	179
5.3	Antepartum Haemorrhage (APH)	181
5.4	Post Partum Haemorrhage (PPH)	185
5.5	Unconscious Obstetric Patient	187
5.6	Pre-Eclampsia and Eclampsia	188
5.6.1	<i>Mild pre-eclampsia</i>	188
5.6.2	<i>Severe Pre-eclampsia</i>	188
5.6.3	<i>Eclampsia</i>	188
5.6.4	<i>Pre-eclampsia management as an outpatient</i>	189
5.6.5	<i>Pre-eclampsia and eclampsia in labour</i>	189
5.6.6	<i>Pre-eclampsia and eclampsia in labour</i>	192
5.6.7	<i>Care for the neonate</i>	192
5.7	Medical Diseases in Pregnancy	194
5.7.1	Diabetic Mellitus	194
5.7.2	Cardiac diseases	194
5.7.3	Malaria in Pregnancy	195
5.7.4	HIV in Pregnancy	196

5.8	Abortion	196
5.9	Menstrual Disorders	197
	5.9.1 Dysmenorrhoea	197
	5.9.2 Amenorrhoea	198
	5.9.3 Oligomenorrhoea	199
	5.9.4 Polymenorrhoea	200
	5.9.5 Meno-metrorrhagia	200
	5.9.6 Post menopausal bleeding	200
6.0	RESPIRATORY TRACT DISEASES	202
6.1	Respiratory Tract Infections	202
	6.1.1 Upper Respiratory Tract Infections	202
	6.1.2 Lower Respiratory Infections	204
6.2	Lower obstructive airway diseases	213
	6.2.1. Asthma	213
	6.2.2. Emphysema	218
7.0	CARDIOVASCULAR DISORDERS	219
7.1	Hypertension	219
	7.1.1 Primary Hypertension	220
	7.1.2 Secondary Hypertension	221
	7.1.3 Systolic Hypertension	222
	7.1.4 Hypertensive Crises	222
7.2	Congestive Heart Failure	225
	7.2.1 Cardiogenic shock	229
	7.2.2 Dilated Cardiomyopathy	230
7.3	Myocardial Infarction	232
7.4	Angina Pectoris	235
7.5	Pulmonary Oedema	236
7.6	Rheumatic Fever	237
7.7	Cardiac Arrhythmias	240
7.8	Cardiopulmonary Resuscitation and Advanced Cardiac Life Support	243

8.0 MALIGNANCIES	245
8.1 Leukaemias	245
8.2 Lymphomas	252
8.2.1 <i>Hodgkin's Disease</i>	252
8.2.2 <i>Non-Hodgkin's Lymphoma</i>	254
8.2.3 <i>Highly Aggressive NHL</i>	255
<i>Burkitt's Lymphoma</i>	255
<i>Carcinoma of the Breast</i>	257
<i>Cervical Cancer</i>	259
<i>Ovarian Cancer</i>	260
<i>Endometrial Cancer</i>	261
<i>Vulval Cancer</i>	263
<i>Prostate cancer</i>	264
<i>Testicular Tumours</i>	265
<i>Seminomas</i>	266
<i>Penile Cancer</i>	267
8.3 Non-Melanoma Skin Cancer	268
8.3.1 <i>Squamous Cell Carcinoma of the skin</i>	268
8.3.2 <i>Basal cell carcinoma</i>	268
8.3.3 <i>Melanoma</i>	269
8.3.4 <i>Kaposi's sarcoma</i>	270
8.3.5 <i>Oesophageal Carcinoma</i>	271
8.3.6 <i>Colorectal Carcinoma</i>	273
8.3.7 <i>Gastric Cancer</i>	275
8.3.8 <i>Pancreatic Cancer</i>	276
8.3.9 <i>Anal Cancer</i>	277
8.3.10 <i>Astrocytomas</i>	279
8.3.11 <i>Lung Cancer</i>	281
8.3.12 <i>Nasopharyngeal Carcinoma</i>	282
8.3.13 <i>Thyroid Cancer</i>	284
8.3.14 <i>Paediatric Cancer</i>	286
8.3.15 <i>Retinoblastoma</i>	288
8.3.16 <i>Nephroblastoma (Wilm's Tumour)</i>	296
8.3.17 <i>Rhaldomyosarcoma</i>	301

9.0 EYE DISEASES	304
9.1. The Red Eye	304
9.1.1 With Pain	304
9.1.1.1 Iritis	304
9.1.1.2 Corneal Foreign Body	305
9.1.1.3 Acute Angle Closure Glaucoma	306
9.1.1.4 Chemical Conjunctivitis	307
9.1.1.5 Corneal Ulcers	309
9.1.1.6 Penetrating & Perforating Eye Injuries	311
9.1.2 Without Pain	313
9.1.2.1 Bacterial Conjunctivitis	313
9.1.2.2 Viral Epidermic heamorrhagic conjunctivitis	314
9.1.2.3 Allergic conjunctivitis	314
9.2 Trachoma	315
9.3 Lumps & bumps on and around the eye ball	317
9.3.1 Styte	317
9.3.2 Tarsal Cyst (Chalazion)	318
9.3.3 Orbital dermoid Cyst	318
9.3.4 Pingicula	318
9.3.5 Pterygium	318
9.4 Common Eye Diseases Associated With Hiv & Aids	321
9.4.1. <i>Moluscum Contangiosum</i>	321
9.4.2 <i>Herpes Zoster Ophthalmicus</i>	322
9.4.3. <i>Cytomegalovinus Retinitis (CMV)</i>	323
9.5 Optics & Refraction	324
9.5.1 Refractive Errors	325
9.5.2. Low Vision (VA range of 6/18 – 6/60)	326
9.6. Strabismus (Squint)	326
9.7 Systemic Eye Diseases and the Eye	329
9.7.1. Eye Diseases associated with Hypertension	329
9.7.2 Dysthroid eye disease	332
9.7.3. Diabetes Mellitus	334

9.8	Ocular Emergencies	337
	9.8.1 Absolute	337
	9.8.2 Relative	337
9.9	Glaucoma	340
	9.9.1 Primary angle closure Glaucoma	340
	9.9.2 Primary open angle glaucoma	340
	9.9.3. Primary Congenital Glaucoma	342
10.0	ANAEMIA AND NUTRITIONAL CONDITIONS	344
10.1	Anaemia	344
10.2	Malnutrition	348
10.3	Vitamin Deficiencies	353
10.4	Vulnerable Group Feeding	357
11.0	SKIN CONDITIONS	358
11.1	Bacterial Infections	358
	11.1.1 Abscess	359
	11.1.2 Impetigo	360
	11.1.3 Eczema	360
11.2	Fungal Infections	362
	11. 2.1 Tinea corporis	363
	11.2.2 Tinea corporis	364
	11.2.3 Tinea capitis	365
	11.2.4 Cutaneous Candidiasis	366
11.3	Viral Skin Infections	367
	11.3.1 Chickenpox	367
	11.3.2. Herpes Zoster	368
	11.3.3. Herpes Simplex	368
11.4	Parasitic Infestations	369
	11.4.1 Pediculosis (lice)	369
	11.4.2 Scabies	370
12.0	CONDITIONS OF THE EAR, NOSE & OROPHARYNX	371
12.1.	ORAL DISEASES	371
	12.1.1 Dental caries	371
	12.1.2 Periodontal disease	372
	12.1.3 Oral candidiasis	374

12.1.4	<i>Herpes simplex stomatitis</i>	375
12.1.5	<i>Mouth Ulcers</i>	376
12.2	Pharyngeal Diseases	377
12.2.1	<i>Tonsillitis and Pharyngitis</i>	377
12.2.2	<i>Peri-tonsillar abscess</i>	379
12.2.3	<i>Epiglottitis</i>	381
12.3	Nasal Diseases	381
12.3.1	<i>Acute sinusitis</i>	381
12.3.2	<i>Allergic rhinitis</i>	382
12.4	Ear Conditions	383
12.4.1	<i>Acute Otitis Media</i>	383
12.4.2	<i>Chronic suppurative otitis media</i>	384
13.0	SURGICAL CONDITIONS	385
13.1	Injuries	385
13.1.1	<i>Minor injuries</i>	385
13.1.2	<i>Major injuries</i>	386
13.1.3	<i>Specific injuries</i>	387
13.2	Bites	396
13.3	Testicular Torsion	397
13.4	Strangulated Hernia	398
13.5	Hydrocele	399
13.6	Varicocele	399
14.0	POISONING	400
14.1	Management	400
14.2	Treatment of specific common poisoning	402
14.2.1	<i>Aspirin and other salicylates</i>	402
14.2.2	<i>Carbon monoxide</i>	402
14.2.3	<i>Ethanol</i>	403
14.2.4	<i>Insecticides</i>	403
14.2.5	<i>Paraffin, petrol and other petroleum products</i>	404
14.2.6	<i>Paracetamol poisoning</i>	405
14.2.7	<i>Chloroquine poisoning</i>	405
14.2.8	<i>Mushroom or other foods poisoning</i>	406
14.2.9	<i>Snake Bites</i>	406

15. DISORDERS OF THE RENAL SYSTEM	408
15.1 Metabolic disorders	408
15.4 Catherter related blood stream infections(CRBSIO)	408
15.5 Glomerular disorders	408
15.6 Hypertension	408
15.7 Renal & pancreatic transplant	408
16. INFECTIVE ENDOCARDITIS	
Zambia Essential Medicine List (ZEML)	444
Essential Laboratory Supplies List	476
Appendix A	497
Appendix B	498
Initial Management of Severe Malaria	
Antimalarial Treatment	

FOREWORD

Achieving long term improvements in rational use of medicines and care of the sick requires building the competences of the health care professionals. This second edition of the Standard Treatment Guidelines is an update of the earlier version contributing to rational and cost effective health care designed under the aspirations and spirit of increasing efficacy of decision making and precision in prevention, diagnosis, treatment, alleviation of disease and improved quality of life for the Zambian people as cited in the National Drug Policy.

I commend the European Union under HSSP for technical and financial assistance to the Zambia National Formulary Committee for developing and producing these Standard Treatment Guidelines as an educational strategy for managing the common conditions afflicting the Zambian people. As usual, the book has been improved to make it more user-friendly, pocket size, with information on disease conditions definitions, diagnoses and on how to develop therapeutic interventions. The Committee upheld the original intent of making the document a reference material for all health care providers, particularly medical doctors, pharmacists, dentists, nurses, clinical officers and all those with a primary responsibility for prescribing, dispensing and administration of medicines.

The first edition proved to be a very popular reference document to medical students and other health care workers contracted to provide health services in Zambia. This book is designed to augment that erstwhile intent. I recommend that you read and use the information herein to serve better those most in need. Whether you work at the University Teaching Hospital, Lukulu, Monze, Chama or Chinyama Litapi, the information will help you provide good quality, safe, effective and affordable health care.



Dr. Jabbin Mulwanda

Permanent Secretary - Health Services
MINISTRY OF HEALTH

ACKNOWLEDGMENTS

The Zambia National Formulary Committee is grateful to the Ministry of Health for the support given to review and produce the second edition of the Standard Treatment Guidelines, Essential Medicines List, and Essential Laboratory Supplies for Zambia. The committee is indebted to the USAID-supported Rational Pharmaceutical Management Plus (RPM Plus) and Strengthening Pharmaceutical Systems (SPS) Programs that collaborated with the Antimicrobial Resistance Advocacy Working Group (AWG) for the technical and financial support towards the development of this book.

It is the spirit of the physicians' workshop on the implementation of the 2004 Standard Treatment Guidelines to support the antimicrobial resistance (AMR) containment in Zambia, June 27-29, 2005, that inspired the AWG for continued support to the Zambia National Formulary Committee to review the STG, particularly on the management of infectious diseases to promote rational use of antimicrobials to preserve their effectiveness. Drug resistant microbes causing public health diseases such as TB, Malaria, and HIV/AIDS now threaten successful treatment of infectious diseases. Health gains achieved by priority health programs - including tuberculosis (TB), malaria, acute respiratory infections (ARI), diarrheal diseases, sexually transmitted infections (STIs) and HIV/AIDS - are increasingly threatened by the growing worldwide problem of antimicrobial resistance (AMR). If we do not preserve our heritage of current antimicrobials, in few years we are going to have hospitals filled with patients with resistant infections.

Finally we thank the untiring efforts and commitment provided by the Committee members and those co-opted to contribute. This book was written by interdependent

team of reviewers and editors who worked together on all aspects of reviewing, writing, editing and producing the book. Each member brought a wealth of knowledge, talent and experience in health care. Together the committee members met several times and at different venues, critically analyzed the revisions and shared their experiences with evidence to produce this document with a power to improve the alleviation, provide relief to ailments and care of the people.

We also thank individuals and groups of professionals who offered constructive critique of the first edition that enabled improvements on this document.

Zambia National Formulary Committee 2014-2017

1. Dr. Kor Chiyenu - Consultant Physician, UTH (Chairperson)
2. Mr. Oliver Hazemba - Senior Technical Advisor Management Sciences fo Health (Vice Chairperson)
3. Dr. Owen Ngalamika - Dermatologist, UTH
4. Mr. Pious Hachizo - Senior Pharmacist - Cancer Diseases Hospital
5. Mrs. Ilitongo Saasa Sondashi - Pharmacist - Lusaka DHO
6. Mr. Billy Mweetwa - National Programme Officer, Essential Medicines WHO
7. Dr. Sally Trollip - Physician UTH
8. Dr. Maureen Chisembele - Obstetrician/Gynaecologist
9. Mr. Enock Chikatula - Pharmaceutical Services Manager, UTH
10. Dr. Pauline Musukwa Sambo - Oncologist, UTH
11. Mr. George Kadimba - District Pharmacist Lusaka DHO
12. Mr. Boyd Mwanashimbala - Principal Pharmacist - Rational Drug Use, MOH
13. Mr. Luke Alutuli - Principal Pharmacist Logistics MOH
14. Dr. Kennedy Lishimpi - Director Clinical care and Diagnostics Services
15. Mr. Abraham Mukesela -Principal Pharmacist Lusaka Province

16. Dr. Mweemba Aggrey - Nephrologist UTH
17. Mr. Maxwell Kasonde - Public Health Pharmacist, Ministry of Health
18. Dr. Gloria Munthali - Paeds
HIV Coordinator
19. Dr. Susan Citonje Musadabwe - Senior Medical Superintendent
Cancer Diseases Hospital
20. Dr. Francis Simenda - Consultant Chainama Hospital
21. Ms. Anne Zulu - Director, Pharmaceuticals Standards,
Medical Stores Limited
22. Mr. Chikuta Mbewe - Deputy Director, Pharmaceutical Services MOH

Other Technical Reviewers

1. Mr. George Kadimba - Lusaka District Pharmacist
2. Mr. Billy Mweetwa - Pharmacist WHO

Design and print

Pro-print Limited

Secretariat

1. Mrs. Ilitongo Saasa Sondashi - Pharmacist - Lusaka DHO
2. Mr. Boyd Mwanashimbala - Principal Pharmacist
Rational Drug Use - MOH
3. Mr. Luke Alutuli - Principal Pharmacist Logistics Management
4. Mrs. Elis Mwanza - Secretary, DCCDs, MOH
5. Mr. Nyambe Sitali - Office Assistant
6. Mr. Victor Kamuhuza - Office Assistant

INTRODUCTION

The Standard Treatment Guidelines were developed after wide consultations and discussions with healthcare providers at three tiers of the health delivery system – practitioners, program managers and health economists. While most of the key information has been retained, extensive revisions were carried out on some of the chapters such as HIV and AIDS, psychiatric conditions, STI, and eye conditions. While some of the changes to treatment strategies were motivated by the dynamism of the conditions and availability of more effective medicines and conformity with national disease specific guidelines, some of them were influenced by the new treatment strategies as guided by the World Health Organization and evidence from clinical studies. Antiretroviral therapy of HIV infections in adults, adolescence, infants and children were adopted from WHO guidelines as recommended for public health approach. The guidelines are based on a comparison between various drug therapies and on consideration of value for money and the most effective, affordable and current practices that produce health outcomes of improved quality of life and alleviation of suffering. They are also based on the essential drugs and medical supplies concepts to meet the basic health needs of the Zambians as close to the family as possible as visualised from the National Drug Policy.

The essential medicines and laboratory supplies listed in the Essential Medicines and Essential Laboratory Supplies Lists are linked to the standard treatment guidelines as indicative of public health priorities for the pharmaceutical systems. The lists are based on national clinical choices that the Government of the Republic of Zambia makes available and accessible to its citizens at all times. The medicines and supplies selection was also based on

sound and adequate information of efficacy from clinical settings, evidence of performance from different health care settings, availability in a form in which quality, stability in the Zambian weather and storage settings, bioavailability and users are assured. In addition total cost of treatment and methodology of administration were also considered.

The Medicines and Therapeutic Committees and hospital and district health management teams are mandated to use these Guidelines and Lists as management tools to improve the quality of the health care delivery and meet the public health responsibility of transparency and accountability. Individual health care professionals are encouraged to use the guidelines as a companion in the course of health care delivery provision.

ARRANGEMENT OF INFORMATION

The guideline text divisions into chapters according to a particular system of the body or an aspect of medical care has been retained.

Chapters are divided into sections providing introductory notes for health care providers who include doctors, pharmacists, nurses and other health professionals. This information is intended to assist with decision making and selection of appropriate treatment.

Descriptive information about the disease or condition is outlined in the following manner:

- Definition of disease or condition
- Clinical features
- Complications
- Treatment
 - Supportive
 - Drugs
- Prevention

GENERAL TREATMENT OF POISONING

This chapter deals with the management of cases of poisoning or suspected poisoning in general and specific poisoning health facilities.

ZAMBIA ESSENTIAL MEDICINES LIST

This list contains an appropriate range of essential medicines for the various levels of health care delivery institutions in the country.

ESSENTIAL LABORATORY SUPPLIES & REAGENTS

This list contains the most essential laboratory supplies and reagents for laboratory use.

APPENDIX

This part deals with three appendices, i.e. drug use in pregnancy and during lactation as well as a haematological appendix.

INDEXES

Two indexes have been included; one lists the drugs in alphabetical order by approved name or INN, and the other lists the diseases and conditions dealt with in the guidelines.

PRESCRIBER CONTROL AND DRUG AVAILABILITY

No prescriber categories are provided in the text of this edition. Medicines and Therapeutics Committees are expected to control the prescribing practices of respective institutions:

- i. expected and Therapeutic Committees should actively define policies for prescribing within a hospital, health centre, clinic or district.
- ii. The range of availability of drugs in any institution should be restricted according to the level of institution and to the categories of staff prescribing.

Prescribers are advised to follow rational prescribing practices, outlined in these standard treatment guidelines which emphasise the public priority use of essential medicines and laboratory supplies and economic treatment regimes

REVISION OF STANDARD TREATMENT GUIDELINES CONTENTS

The Zambia National Formulary Committee recognises the fact that the field of treatment regimens and drugs is dynamic, thus revision of the guideline contents will be continuous. Contributions are encouraged and should be submitted for consideration by the Zambia National Formulary Committee through the Ministry of Health.

Dr. Kor Chiyenu

Chairman, Zambia National Formulary Committee

1 GASTRO-INTESTINAL CONDITIONS

1.1 ABDOMINAL PAINS

Abdominal pains include gastritis and peptic ulcer disease

1.1.1 Gastritis

This is divided into acute and chronic gastritis. In acute gastritis there is inflammation of the superficial gastric mucosa. It can occur as a result of ingestion of drugs such as acetyl salicylic acid and other non-steroidal anti-inflammatory drugs (NSAID) and alcohol.

Chronic gastritis is divided into 3 categories:

Type A (autoimmune) gastritis seen in pernicious anaemia and also in other autoimmune diseases.

Type B (bacterial) gastritis, which is associated with *Helicobacter pylori*.

Type C (chemical) gastritis, which is due to repeated injury with bile reflux or chronic ingestion of NSAIDs.

Clinical features

- Indigestion
- Vomiting
- Gastrointestinal haemorrhage
- Epigastric pain

Most chronic gastritis is asymptomatic

Diagnosis

- Endoscopy

Treatment

- Remove offending cause

1.1.2 Chronic Peptic Ulcer Disease

Most peptic ulcers occur in the stomach or proximal duodenum but can also occur in the oesophagus (with oesophageal reflux).

Clinical features

- Epigastric pain
- Indigestion
- Flatulence
- Heartburn
- Anorexia; weight loss may occur

Diagnosis

- Endoscopy
- Barium meal

Many patients, particularly the young presenting with indigestion, can be treated symptomatically for 4-5 weeks without investigation.

Complications

- Reflux oesophagitis may be complicated by peptic stricture which is characterised by intermittent dysphagia over a long period.
- Change of the oesophageal mucosa (Barrettes oesophagus) which is pre-malignant.
- Anaemia and frank haemorrhage
- Recurrent aspiration pneumonia when stricture formation is present
- Perforation of peptic ulcer
- Pyloric stenosis

Treatment

Drugs

Antacids: Antacids often relieve symptoms. They are best given when symptoms occur or are expected usually between meals and at bedtime

- Magnesium trisilicate compound, 250-500mg to chew when required or
- Aluminium hydroxide 500mg-1g to chew when required or
- Magnesium trisilicate suspension 250mg with dried aluminium hydroxide 120mg 10ml orally 3 times daily or
- Aluminium hydroxide (dried aluminium hydroxide 500mg) 5-10ml orally 4 times daily; children 6-12 years 5ml orally 3 times daily or
- Adults 1-4 tablets to be chewed 4 times daily between meals and at bed time or as required

Ulcer healing drugs

a) *H₂-receptor antagonists*

Cimetidine 400mg tablets twice daily (with breakfast and at night) or 800mg at night for at least 4 weeks. Maintenance 400mg at night or 400mg morning and night.

- Reflux oesophagitis:

Cimetidine 400mg 4 times daily for 4 – 8 weeks.

Ranitidine 150mg tablets twice daily (with breakfast and at night) or 300mg at night for 4 – 8 weeks, up to 6 weeks in chronic episodic dyspepsia. Maintenance 150mg at night.

- Reflux oesophagitis:
Ranitidine 150mg twice daily or 300mg at night for up to 8 weeks or if necessary 12 weeks.

b) *Proton pump inhibitors*

- Omeprazole 20mg tablets daily for 4 weeks followed by a further 4 – 8 weeks if not fully treated.
Long term management of acid reflux disease.
Omeprazole 10mg daily increasing up to 20mg if symptoms return. Not recommended for children.

- c) *Tripotassium dicitratobismuthate (Bismuth chelate)*
Liquid 12mg/5ml. 10ml twice daily or 5ml 4 times daily for 28 days followed by a further 28 days if necessary. Not recommended for children.

Tablets 120mg. 2 tablets twice daily or 1 tablet 4 times daily for 28 days followed by a further 28 days if necessary.

d) *Triple therapy regimens*

1 week regimen:

- Amoxicillin, 500mg 3 times daily
Plus
- Metronidazole, 400mg 3 times daily
Plus
- Omeprazole, 20mg twice daily or 40mg once daily for 7 days

Or

- Clarithromycin, 500mg daily twice daily
Plus
- Metronidazole, 400mg (or tinidazole 500mg) twice daily

Plus

- Omeprazole, 20mg twice daily or 40mg once daily for 7 days

1.2 DIARRHOEA

Definition

Diarrhoea is an increase in the frequency and volume of stools with an alteration in the consistency, mainly due to increased water content. There are two types of diarrhoea:

- Acute
- Chronic

1.2.1 Acute diarrhoea

This is diarrhoea of sudden onset, often short-lived and is self-limiting. It requires no investigation or treatment. It is often seen after dietary indigestion. It may also be as a result of infections.

1.2.2 Acute diarrhoea in children

This is commonly of viral origin (rotavirus, Norwalk virus, adenoviruses or enterovirus), but may also be caused by bacteria or other parasitic infections.

Clinical features

In addition to diarrhoea, there may be fever, abdominal pain and vomiting. If the diarrhoea is particularly severe, dehydration can be a problem.

With mild dehydration there may be no signs. With moderate dehydration, the child may present with the following:

- Irritability, restlessness
- Sunken eyes
- Dry mouth and tongue
- Absence of tears
- Thirst
- Skin pinch goes back slowly

With severe dehydration, the child may present with:

- Lethargy or loss of consciousness
- Absence of tears
- Very dry mouth and tongue
- Thirst associated with poor drinking
- Skin pinch that goes back very slowly

Treatment

Investigations are necessary if diarrhoea has lasted more than 1 week. In the mean time supportive treatment should be given.

Stools should be sent for microscopy and culture; any infective causes should be treated appropriately.

Fluid management – See section on cholera.

In addition, the child should continue to feed on breast milk or other feeds.

Anti-diarrhoeal drugs are not recommended

Prevention

- Provision of clean water/sanitation
- Good disposal of faecal matter
- Boiling drinking water
- Chlorination of drinking water
- Personal hygiene – hand washing preferably with soap:
 - after use of toilet
 - when preparing food
 - before eating

1.2.3 Acute diarrhoea in adults

Clinical features

In addition to diarrhea, there may be fever, abdominal

pain and vomiting. Dehydration can also be a problem if the diarrhoea is severe. This may be mild, moderate or severe in nature.

- *Mild dehydration:* The patient does not show enough signs to classify as moderate or severe dehydration.
- *Moderate dehydration:* The patient has two or more of the following signs:
 - Restlessness
 - Irritability
 - Sunken eyes
 - Dry mouth and tongue
 - Absence of tears
 - Thirsty, drinks eagerly
- *Severe dehydration:* The patient is classified as having severe dehydration if there are two or more of the following signs:
 - Lethargic or unconscious; floppy
 - Absence of tears
 - Very dry mouth and tongue
 - Very thirsty, drinks poorly or unable to drink
 - Pinched skin goes back very slowly

Other signs in adults and children above 5 years are absent radial pulse and low blood pressure.

Diagnosis

Investigations are necessary if the diarrhoea lasts more than one week, i.e., stool microscopy, culture and drug susceptibility.

Treatment

1. Fluid replacement

Fluid therapy (see section on cholera)

2. Drug treatment

In chronic diarrhoea and HIV related diarrhoea where the cause has not been found:

- Loperamide 2mg three times daily
- Codeine phosphate 30mg 4 times daily

Any infective causes should be treated according to sensitivity patterns.

Prevention

As for acute diarrhoea in children

1.2.4 Chronic/Persistent Diarrhoea

This generally is diarrhoea lasting more than 2 weeks.

Causes include:

- Infections such as giardia, cryptosporidium, Isospora belli and microsporidia in AIDS patient.
- Colonic lesions such as carcinoma, Crohn's disease and ulcerative colitis
- Coeliac disease
- Tropical sprue
- Chronic pancreatitis
- Pseudomembranous colitis
- Thyrotoxicosis
- Diabetes

Clinical features

Clinical features may include:

- Diarrhoea, bloody diarrhoea or steatorrhoea
- Abdominal pain and vomiting
- Weight loss
- Anaemia

Diagnosis

Investigations

- Stool microscopy, culture and sensitivity

- Special tests may be needed for certain parasites such as cryptosporidium, isospora and microsporidia
- Rectal/jejunal biopsy
- Barium enema
- Full blood count

Treatment

Treat infective causes of the chronic diarrhoea.

- *Fluid therapy* – Oral fluid use should be stressed except for patients presenting with severe dehydration in whom intravenous fluids should be used. However, even with severe dehydration, oral fluids should be given concurrently. Fluid management is as for cholera.

Drug treatment

Antidiarrhoeal agents

- Loperamide 2mg three times daily
- Codeine phosphate 30mg four times daily
- Nitazoxanide 100mg suspension;
Child 1-3 years 5ml 2 times a day with food for 3 days;
4-11 years 10ml 2 times a day with food for 3 days;
12 years and above, 500 mg tablets 3 times a day with food for 3 days.

Treat specific causes such as:

- *Giardia* – Metronidazole, 400mg 8 hourly orally for 7 days
- *Isospora belli* – Co-trimoxazole, 960mg four times daily orally for 10 days. Give pyrimethamine for sulpha allergic patients. Recurrences tend to occur.
- *Cryptosporidia* – Albendazole, 400mg twice daily orally for one month may help although HAART with immune reconstitution is the main line of management

Prevention

- As for acute diarrhoea.
- Prevention of HIV infection

1.3 DYSENTERY

Definition

Dysentery is the passage of bloody diarrhoea or mucus or both in stool. There are two types of dysentery:

- Bacillary
- Amoebic

1.3.1 Bacillary Dysentery

Bacillary dysentery is caused by the bacteria *Shigella* which has a short incubation period, usually being 2 days.

Clinical features

- Acute onset
- Malaise
- Fever
- Watery diarrhoea
- Bloody diarrhoea with mucus
- Faecal urgency
- Severe cramping abdominal pain
- Nausea
- Vomiting
- Headache
- Convulsions (in children)
- Tenesmus
- Mild or moderate dehydration

Diagnosis

- Stool Microscopy may show leukocytes
- Stool culture and susceptibility test

Treatment

Drugs

- The first drug of choice is Nalidixic Acid.
- Adult: 1g orally 4 times a day for 7 days
- Child: 50mg/kg body weight orally in 4 divided doses for 7 days

Or

- Ciprofloxacin – children, 15mg/kg; adults, 500mg twice daily for 3 days.

Use of Ciprofloxacin in children is contra-indicated except where benefit outweighs risk.

Complications of Shigella type 1 infection:

- Arthritis
- Conjunctivitis
- Colonic perforation
- Septicaemia
- Haemolytic uraemic syndrome
- Metabolic disorders
- Encephalopathy
- Toxic mega colon and
- Rectal prolapse in children

Prevention

- Drink clean, boiled/chlorinated water
- Good sanitation
- Good personal hygiene

1.3.2 Amoebic Dysentery

Amoebic Dysentery is caused by the parasite Entamoeba histolytica.

Clinical Features

- Bloody diarrhoea with mucus
- Low grade fever

- Dehydration is unusual

Diagnosis

- Stool microscopy
- Sero diagnosis

Treatment

Drugs

- Metronidazole
Adult:
800mg orally 3 times daily for 5 days followed by diloxanide furoate 500mg TDS for 10 days (for eradication of cysts)
Child:
1 – 3 years, 200mg orally 8 hourly for 5 days;
3 – 7 years, 200mg orally 6 hourly for 5 days;
7 – 10 years, 400mg orally 8 hourly for 5 days
Or
- Tinidazole
Adult: 2g daily for 2 – 3 days.
Child: 50 – 60 mg/kg orally for 3 days.

Avoid use of anti-diarrhoea agents

Supportive

- Fluid replacement – Refer to chapter 1.5
- Analgesis

Complications

- Fulminant colitis
- Colon perforation
- Peritonitis
- Chronic infection
- Stricture formation
- Severe haemorrhage
- Amoebic liver abscess
- Amoeboma

Prevention

- Good disposal of excreta – good pit latrines, flush toilets
- Provision of clean water
- Boiling water. This kills amoeba cysts if water is boiled for at least 10 minutes.
- Chlorination of water – effects variable on amoeba.
- Personal hygiene – washing of hands after use of toilet, when preparing food and before eating.

1.4 CHOLERA

Definition

Cholera is an illness characterized by excessive diarrhoea and vomiting caused by the organism *Vibrio cholerae*. It is transmitted by the faecal–oral route.

Clinical features

The incubation period varies from a few hours to 6 days. Cholera may be present as a mild illness indistinguishable from diarrhoea due to other causes. Classically, however, it has three phases:

- Evacuation phase characterised by abrupt onset of painless, profuse watery diarrhoea associated with vomiting in severe forms. Stools may be rice–water.
- Collapse phase is reached if appropriate treatment is not given. This is characterised by features of circulatory shock (cold clammy skin, tachycardia, hypotension and peripheral cyanosis) and dehydration (sunken eyes, hollow cheeks and diminished urine output. There may also be muscle cramps.

Children may also have convulsions due to hypoglycaemia. Complications such as renal failure and aspiration of vomitus may occur.

- Recovery phase occurs if the patient survives the collapse phase.

Diagnosis

- Largely clinical
- Stool and rectal swabs for culture

Treatment

1. Rehydration

Patients should be assessed for degree of dehydration.

Management of mild dehydration

Give Oral Rehydration Salt (ORS) solution or any fluids after each loose stool.

ORS Dose	
Age	Amount after each loose stool
Less than 24 months	50 – 100ml after each loose stool
2 – 5 years	100 – 200ml
10 years and above	As much as the patient wants

ORS and other fluids should be continued until diarrhoea stops. Breast-fed children should continue to breastfeed normally. Encourage the patient to eat.

Management of moderate dehydration (some dehydration in children)

Give ORS in the first 4 hours as follows:

Age	Less than 4 mnths	4-11 mnths	12-23 mnths	24-59 mnths	5-14 years	15 yrs and above
Weight	Less than 5kg	5-10 kg	10-12 kg	12-19 kg	16-29 kg	30kg and above
Amount in ml (approx)	150ml per hour	400ml per hour	600ml per hour	1,500ml per hour	2,000ml per hour	3,800ml per hour

- Monitor the patient frequently
- Reassess the patient after 4 hours using the classification of dehydration. If signs of (moderate) dehydration are still present, repeat the same management. If patient shows signs of severe dehydration change management to that of severe dehydration.
- Patients should be encouraged to eat and drink as much as they want.
- If child vomits, wait 10 minutes and then continue giving ORS slowly, i.e. every 2 – 3 minutes.
- Encourage mother to continue breastfeeding.
- For infants less than six months who are not breastfed also give 100 – 200ml clean water during this period.

Management of severe dehydration

Start intravenous drip with Ringers Lactate or Sodium Chloride 0.9% w/v (normal saline) immediately (give ORS while drip is being set).

Patients below 1 year:

- Give 100ml/kg in 6 hours as follows:
30ml/kg in the first 1 hour then
70ml/kg in the next 5 hours
Reassess the patient very frequently.
- If the patient can drink, give about 5ml/kg per hour of ORS in addition to the IV fluid.
- Assess state of re-hydration after six hours using the classification of dehydration level chart; classify and manage accordingly.
- If the patient shows no sign of dehydration after treatment with IV fluids or ORS, continue ORS as follows:
 - Less than 24 months old
= 100ml after each loose stool
 - 2 – 9 years old
= 200ml after each loose stool
 - 10 years or more
= as much as patient wants (at least 300ml)

Patients 1 year and above:

- Give IV fluids, 100ml/kg in 3 hours as follows:
30ml/kg as rapidly as possible (within 30 minutes), then
70ml/kg in the next 2¹/₂ hours
Reassess the patient very frequently.
- If the patient can drink, give about 5ml/kg per hour of ORS in addition to the IV fluid.
- Assess state of rehydration after 3 hours using the classification of dehydration on treatment charts; reclassify and manage accordingly.
- If the patients show no sign of dehydration after treatment with IV fluids or ORS continue ORS as follows:
 - 24 months old
= 100ml after each loose stool

- 2 – 9 years old
= 200ml after each loose stool
- More than 9 years
= as much as patient wants (at least 300ml)

Drugs

Medicines should only be given according to the sensitivity patterns.

Recommended Antibiotics		
ANTIBIOTICS	CHILDREN	ADULTS
<i>Doxycycline</i> One single dose	–	300mg
<i>Tetracycline</i> 4 times daily for 3 days	(For children >12 years) 12.5mg/kg	500mg
<i>Erythromycin</i> Adults: 4 times daily for 3 days Children: 3 times daily for 3 days	10mg/kg	250mg

- Doxycycline is WHO antibiotic of choice for adults (except pregnant women) because only one dose is required.
- Erythromycin may be used when the other recommended antibiotics are not available, or where *V. cholerae* is resistant to them.

Prevention

- Drink clean boiled/chlorinated water
- Good sanitation
- Good personal hygiene and sanitation

1.5 HELMINTHES INFESTATION

Definition

Helminthic infestation is infection with worms, which belong to several different classes, i.e. Nematodes, Cestodes and Trematode or flukes.

These affect various parts of the body such as the skin, muscles, lymphatics, blood or gastrointestinal tract. Trematodes or flukes will be presented under schistosomiasis.

1.5.1 Nematodes

1.5.1.1 Non-intestinal

1.5.1.1.1 Filariasis

The adult worms are threadlike. The large females give birth to larvae known as microfilaria. These require two hosts to complete their lifecycle. The first host is the mosquito culex, aedes, anopheles or other type of flies such as simulium.

Clinical features

Wuchereria bancrofti

Adult worms are found in the lymphatics and lymph nodes. Larvae grow and mature in the regional lymph nodes for up to 18 months. The patient then presents with fever ranging 39° - 41°C accompanied by lymphangitis, both of which subside in 3 – 5 days. The involved lymphatics appear as red streaks on the skin, are tender and cord-like. The lymphatics of the epididymis,

testes and spermatic cord may be involved. The obstruction phase follows if treatment is not given. This presents with oedema of the lower limbs and scrota. Long standing oedema produces thick rough skin which may ulcerate.

Complications

Tropical eosinophilia is characterized by either lymphadenopathy, splenomegaly or cough, bronchospasm and asthma like picture.

Loa loa

Clinical features are caused by adult worms which prefer the subconjunctival and periobital tissues. The main features are calabar swellings – painless, localised, transient, hot soft tissue swellings often near joints. They last from a few hours to several weeks. Urticaria, pruritis, lymphoedema, arthritis and chorioretinitis may occur. A meningoencephalitis like picture may occur during treatment.

Onchocerciasis

The incubation period averages 1 year. Initially a papular, reddish, itchy rash occurs. After repeated infection subcutaneous nodules develop. The nodules may be associated with genital elephantiasis, hydrocele and ocular lesions. Ocular lesions are serious and may cause blindness. Initially there is excessive tear production, photophobia and the sensation of a foreign body in the eye. Then conjunctivitis, iridocyclitis, chorioretinitis, secondary glaucoma and optic atrophy may occur.

Treatment

Wuchereria bancrofti

- Diethylcarbamazine 2 – 6mg/Kg daily in divided doses for 2 – 3 weeks. The course is repeated after

6 weeks. Supportive care is antihistamines or steroids for allergic reactions that can occur. Also associated bacterial infections should be treated and reconstructive surgery can be done on unsightly tissue.

Loa loa

- Diethylcarbamazine, 2 - 6mg/kg daily for 2 – 3 weeks

Ochocerciasis

- Ivermectin 150mcg/kg orally as a single dose. Annual retreatment must be given until adult worms die. In endemic areas not all patients need treatment. Indications for treatment are the threat of eye damage and severe pruritis.

Prevention

- Primary prevention is aimed at vector control and protection of humans from vectors.
- Mass chemotherapy with diethylcarbamazine has been found to be effective in bancroftian filarasis and loasis.

1.5.1.2 Nematodes – Intestinal

Clinical features

1.5.1.2.1 *Ascaris lumbricoides* (roundworm)

Infection is acquired by ingesting contaminated food.

Infection may be asymptomatic but heavy infections are associated with nausea, vomiting, abdominal discomfort and anorexia. Worms may obstruct the small intestine.

Heavy infections in malnourished children may worsen the malnutrition.

1.5.1.2.2 *Strongyloides stercoralis*

Infection occurs by penetration of the skin by larvae. After penetration of the skin, a local reaction occurs with itching, erythema, oedema and urticaria. This subsides within 2 days. A week later migration of adolescent worms causes irritation of the upper airways, producing cough and occasionally severe respiratory symptoms. After about 3 weeks intestinal colonization occur leading to abdominal discomfort, intermittent diarrhoea and constipation.

Heavy infection may lead to persistent diarrhoea, nausea, anorexia and steatorrhoea.

1.5.1.2.3 *Necator americanus* (hookworm)

Local irritation occurs at the site of larval entry in the skin. 2 weeks later mild and transitory pulmonary symptoms appear. Usually patients are asymptomatic. Once larvae reach the small intestine with heavy infections there may be symptoms and signs of anaemia.

1.5.1.2.4 *Trichuris trichiura* (whipworm)

Most infections are asymptomatic. Heavy infection is associated with bloody diarrhoea and mucus, abdominal discomfort, anorexia and weight loss. It may also cause appendicitis and rectal prolapse in children.

1.5.1.2.5 *Enterobius vermicularis* (threadworm)

Intense anal pruritis which is usually nocturnal. Scratching results in dissemination of eggs.

Diagnosis

Treatment

Ascaris lumbricoides (roundworms)

- Mebendazole 100mg twice daily for 3 days.

Strongyloides stercoralis

- Thiabendazole 1.5g twice daily for 2 days or Albendazole. In the hyper-infected patient with disseminated disease therapy should be for 5 days or longer. As there may be gram negative septicaemia in this group treatment should include intravenous broad spectrum antibiotics.

Hookworm – *Necator americanus*

- Mebendazole 100mg twice daily for 3 days. A repeated course may be necessary.

Trichuris trichura (whipworm)

- Mebendazole 100mg twice daily for 3 days.

Enterobius vermicularis

- A single dose of Mebendazole 100mg followed by a second dose 2 weeks later. Family members should also be treated.

Prevention

- Personal hygiene, good sanitation and good living conditions.

1.5.2 Cestodes or Tapeworms

Clinical features

Taenia saginata is prevalent in humans in all beef eating countries. *Taenia solium* is found in pork eating areas. Symptoms are mild with vague epigastric and abdominal pain and occasional diarrhoea and vomiting. Weight loss is unusual. Appendicitis and pancreatitis rarely occur. Proglottids may be found in the faeces, bed or underclothing.

Diagnosis

Treatment

- Praziquantel, 10mg/kg as a single dose.

Prevention

- Careful inspection of beef or pork for cysticerci (encysted larval forms)
- Refrigeration of beef at -10° for 5 days or cooking at 57°C for a few minutes.

1.5.3 Trematodes or Flukes

1.5.3.1 Schistosomiasis (Bilharziasis)

This is caused by blood flukes (trematodes).

Human infestations occur after penetration of the skin or mucous membranes by cercaria, the infective form of the host released by the intermediate snail host into fresh water.

The female fluke produces several hundred eggs a day which penetrate the venous walls, creating small bleeding into the urine (*Schistosoma haematobium*) or stool (*Schistosoma mansoni*).

Clinical features

The first clinical sign is a local inflammatory response – swimmer’s itch. Within a week or more there is a more generalised allergic reaction with fever, urticaria and malaise. Nausea, vomiting and profuse diarrhoea as well as respiratory symptoms namely cough are common.

Complications

Chronic Schistosomiasis with *S. mansoni* may lead to portal hypertension with marked hepatosplenomegaly. In *S. haematobium* infestation there is development of dysuria and haematuria. Later there may be development

of obstructive uropathy, chronic pyelonephritis, renal failure and bladder carcinoma.

Diagnosis

Treatment

- Praziquantel tablet

Dose:

For Schistosomiasis caused by all species, the usual dosage for adults and children older than 4 years is 60mg/kg body weight given in three equally divided doses in intervals of 4 – 6 hours on the same day. Some clinicians recommend a lower dosage of 40 mg/kg as a single dose or in 2 equally divided doses on the same day, which has been effective in the treatment of schistosomiasis in some patients.

Prevention:

- Use of latrines
- Preventing children from playing in infected water
- Washing with water from a protected well or boiling for 1 – 2 minutes or else use water that has been left to stand for more than 48 hours (this kills the cercaria)

1.7 GIARDIASIS

Definition

An intestinal disease caused by infection with *Giardia lamblia*. Prevalence is high in the tropics. Spread is faecal-oral and person to person. The infective form is the cyst.

Clinical features

Many individuals are asymptomatic and are carriers. Others develop diarrhoea, nausea, anorexia, abdominal discomfort and distension. Stools may become pale. If the illness is prolonged, weight loss may develop.

Complication

Growth retardation in children.

Treatment

Adult:

Metronidazole, 2g as a single dose for 3 successive days.

Children:

Sometimes a second or third course may be necessary.

Prevention

- Personal hygiene
- Improvement of water quality
- Boiling water for at least 10 minutes.

The effects of chlorination are variable.

2 CENTRAL NERVOUS SYSTEM CONDITIONS

2.1 MENTAL HEALTH AND PSYCHIATRIC ILLNESSES

Introduction

The current etiological formulation of mental disorder is based on the biopsychosocial model meaning symptomatology is as a result of the interaction of 3 domains: biological, psychological and social. The treatment approach therefore must consist of the same model.

Psychiatric Disorders

Anxiety Disorders

- Generalized anxiety disorder
- Obsessive compulsive disorder
- Social anxiety disorder
- Post-traumatic stress disorder
- Panic attack disorder

Mood Disorders

- Bipolar mood disorder
- Bipolar 1 disorder
- Depressive disorder
- Major depressive disorder

Psychotic Disorders

- Brief psychotic disorder
- Schizophrenia
- Paranoid disorder
- Delusion disorder

Diagnosis

for the psychiatric disorders are based on Diagnostic and Statistical Manual (DSM) IV or International Classification of Diseases (ICD)

2.1.1 Anxiety Disorders

Introduction

The essential feature about these disorders is that a patient has episodic subjective experiences of false alarm of impending danger when objectively none exists.

2.1.1.1 Generalised Anxiety Disorder

Definition

Generalized anxiety disorder is characterized by **excessive** level of anxiety and worry almost all the time and the patient has great difficulties in controlling the worry. Patients usually present with somatic complaints.

Clinical Features

- Excessive worry about all activities in life
- Anticipation of doom in all undertakings
- Restlessness
- Insomnia
- Tremors
- Muscle tension
- Poor concentration and memory

Differential Diagnosis

The differential diagnosis is extensive because worry and anxiety are seen in many conditions.

Psychiatric

- Major depressive disorder
- Social anxiety disorder
- Post-traumatic stress disorder

- Panic attack disorder
- Anaemia

Medical

- Hyperthyroidism
- Chronic obstructive airways disorders (asthma, emphysema)
- Seizure disorders
- Drug intoxication/withdrawal
- Cardiac arrhythmias

Management

Investigation

- FBC
- TSH (T3, T4)
- Blood glucose
- CXR
- EEG
- ECG

Treatment

Treatment can either be by psychological (counselling and psychotherapy) or Psychopharmacological. The two treatment approaches can be used singly or in combination depending on the etiological factors at play.

Short Term

1. Psychopharmacology

- Alprazolam 0.25 mg (250 mcg) given 2 or 3 times daily. If required, increases may be made in 0.25 mg (250 mcg) according to the severity of symptoms and patient response. It is recommended that the evening dose be increased before the daytime doses. Very severe manifestations of anxiety may require larger

initial daily doses. The optimal dose is one that permits symptomatic control of excessive anxiety without impairment of mental and motor function. Exceptionally, it may be necessary to increase the dosage to a maximum of 3 mg daily, given in divided doses.

Elderly and Debilitated Patients

The initial dosage Alprazolam is 0.125 mg (125 mcg) 2 or 3 times daily. If necessary, this dosage may be increased gradually depending on patient tolerance and response

Short courses of treatment should be the rule for the symptomatic relief of excessive anxiety and the initial course of treatment should not last longer than 1 week without reassessment. If necessary, drug dose can be adjusted after 1 week. Prescriptions should be limited to short courses of therapy.

- Lorazepam is given as a second-line drug of choice. Initial adult daily oral dose is 2 mg in three divided doses of 0.5 mg, 0.5 mg and 1 mg, or two divided doses of 1 mg and 1 mg. The daily dose should be carefully increased or decreased by 0.5 mg depending upon tolerance and response. The usual daily dose is 2 to 3 mg. The optimal dose may range from 1 to 4 mg daily in individual patients. Usually, a daily dose of 6 mg should not be exceeded.

The initial daily dose in elderly and debilitated patients should not exceed 0.5 mg and should be very carefully and gradually adjusted, depending upon tolerance and response.

- Diazepam 2mg 3 times daily increased if necessary to 10-15mg daily in divided doses may be used in

the absence of the above-mentioned drugs.

- Sertraline 50 mg once per day is recommended as the initial dose. A gradual increase in dose may be considered if no clinical improvement is observed. Dose changes, if necessary, should be made at intervals of at least 1 week. Do not exceed a maximum of 200 mg/day. The full antidepressant effect may be delayed until 4 weeks of treatment or longer.

Administer with food once daily preferably with the evening meal, or, if administration in the morning is desired, with breakfast. Used with caution in patients with renal and/or hepatic impairment.

Maintenance

When a satisfactory clinical response has been obtained, the dose should be reduced (within the 50 to 200 mg range) to the minimum that will maintain relief of symptoms.

Psychotherapy – supportive therapy

Long Term

- Cognitive behaviour therapy

Note

Due to the potential for dependence, benzodizepines must be given for 2-6 weeks followed by tapering over a period of 1-2 weeks.

Obsessive Compulsive Disorder

Definition

The essential feature is the symptom of recurrent obsessions or compulsions or both.

Obsessions are defined as recurrent, persistent ideas, images or impulses. **Compulsions** are behaviours or mental acts that are repetitive, purposeful, and intentional that are performed in response to the obsession in a stereotyped fashion.

Clinical Features

Obsessions

Recurrent and persistent ideas, thoughts, impulses, or images that are experienced as intrusive and senseless and cause marked anxiety or distress

Thoughts, impulses are not simply excessive worries about problems. The person attempts to ignore or suppress such thoughts or to neutralize them. The person recognizes that the obsessions are the product of his or her own mind.

Compulsions

Repetitive behaviours or mental acts performed in response to an obsession or rigidly applied rules. Behaviours are designed to neutralize or prevent distress or some dreaded event or situation, but are excessive or not realistically connected with what they are meant to neutralize. The person recognizes his or her behaviour is excessive or unreasonable (except children). Obsessions/compulsions cause marked distress, are time-consuming (more than 1 hr/day), or significantly interfere with the person's normal routine. If another axis 1 disorder is present, the content of the obsessions or compulsions is not restricted to it. Disturbance is not due to the direct physiologic effects of a substance or general medical condition.

Differential Diagnosis

- 1) Obsessive compulsive personality.
- 2) Obsessive compulsive disorder spectrum. Bear

similarities with OCD.
Trichotillomania
Body dysmorphic syndrome
Tourette disorder
Olfactory reference syndrome

Treatment

Short Term

Drugs

- Fluoxetine 20 mg/day to 60 mg/day is recommended and total dose should not exceed a maximum of 80 mg/day
- Clomipramine
Adults: Initiate with daily doses of 25 mg. Dosage may be increased by 25 mg, as tolerated, at 3 to 4 day intervals up to a total daily dose of 100 or 150 mg by the end of 2 weeks. Thereafter, the dose may be gradually increased over a period of several weeks to 200 mg. Doses in excess of 200 mg/day are not generally recommended for outpatients. However, in the treatment of severe cases of Obsessive Compulsive Disorder, daily doses of up to 250 mg may be required

Children and Adolescents: In children aged 10 to 17 years, an initial dose of 25 mg/day is recommended. This may be increased by 25 mg, as tolerated, at 3 to 4 day intervals. By the end of 2 weeks, patients may be titrated up to 100 to 150 mg/day or 3 mg/kg, whichever is lower. Thereafter, the dose may be gradually increased to 200 mg or 3 mg/kg whichever is lower. A total daily dose above 200 mg should not be used in children or adolescents.

Elderly and Debilitated Patients: Initially, 20 to 30 mg daily in divided doses is suggested, with very gradual increments, depending on tolerance and response. Blood pressure and cardiac rhythm should be checked frequently, particularly in patients who have unstable cardiovascular function.

Psychological

- Cognitive behaviour therapy
- Exposure and response prevention

Long Term

- Cognitive behaviour therapy (exposure and response prevention).

Social Anxiety Disorder

Definition

The essential feature of social anxiety disorder is excessive and persistent fear of being in a given social situation where the person might be exposed to scrutiny of others.

The exposure to or anticipation of the feared situation causes marked anxiety and the person either avoids the situations or endures it with significant distress.

Clinical Features

- Tremors
- Palpitation
- Sweating
- Restlessness

These occur in social settings in which patients are pre-occupied with feelings of being negatively evaluated by others.

Differential Diagnosis

- 1) Shyness
- 2) Avoidant personality disorder
- 3) Panic attack

Treatment

Short Term

Drugs

- Alprazolam 250-500 micrograms 3 times daily or
- Lorazepam or 1-4 mg daily in divided doses as in generalized anxiety disorders above.
- Fluoxetine 20 mg administered once daily in the morning. A gradual dose increase should be considered only after a trial period of several weeks if the expected clinical improvement does not occur

Long Term

- Cognitive behaviour therapy.

Post Traumatic Stress Disorders (PTSD)

Definition

Post Traumatic Stress Disorders are caused by a severe psychic-trauma. A psychic-trauma is defined as an inescapable event that overwhelms an individual's existing coping mechanisms.

Clinical Features

The clinical features fall into 3 domains.

1. Re-experiencing

The trauma is re-experienced in the following ways:

- a) Frequent intrusive memories of the event
- b) Nightmares of the event
- c) Flash backs
- d) Low self-esteem

2. Avoidance

All reminders of the events are persistently avoided

3. Autonomic Hyperactivity

- a) Insomnia
- b) Irritability
- c) Hypervigilance

Diagnosis

Differential Diagnosis

- a) Acute stress disorder
- b) Adjustment disorder
- c) Obsessive compulsive disorder
- d) Schizophrenia
- e) Drug/alcohol use disorder (intoxication)

Investigation

None

Treatment

The principle treatment modality for PTSD is psychotherapy, such as supportive, psychodynamic cognitive behavioral, and with medication used to augment the psychotherapy and help reduce the symptoms.

The goals of treatment are:

- To help patients regain self-esteem.
- To again feel in control of themselves and their lives (the opposite of the feelings of helplessness experienced in the trauma).
- To re-work their shattered assumptions.

Phase oriented models are used to conceptualize treatment.

Phase I (Supportive psychotherapy)

Establishing safety, stabilization, symptom reduction and the therapeutic alliance.

Phase II (Cognitive behavioral therapy)

Dealing with traumatic event; e.g., through remembering, desensitization, de-conditioning and mourning.

Phase III (Insight-oriented psychotherapy)

Restructuring personal schema and integrating the trauma into a meaningful life narrative; i.e., putting the trauma into perspective and moving forward in developing a positive life.

Drug Therapy

The best approach is to choose a medication based on the more problematic target symptoms. This may require a combination of medications, e.g., an SSRI to decrease numbing (withdrawal from society and becoming emotionally indifferent) and depression, and a benzodiazepine (Lorazepam) and a beta blocker (Propranolol) (titrate the dose) to decrease autonomic hyperarousal.

Panic Attack Disorder

Definition

A panic attack is referred to as a recurrent unexpected discrete episode of intense discomfort or fear.

Clinical features

Palpitations, pounding heart, or accelerated heart rate, sweating, trembling or shaking, sensations of shortness of breath or smothering, feeling of choking, chest pain or discomfort, nausea or abdominal distress, feeling dizzy, unsteady, lightheaded, or faint, derealization (feelings of unreality) or depersonalization (being detached from oneself), fear of losing control or going crazy, fear of dying, paresthesias (numbness or tingling sensations), chills or hot flushes.

Diagnosis

It must meet the ICD 10/DSM IV diagnostic criteria.

Differential Diagnosis

- a) All types of anxiety disorders
- b) Anaemia
- c) Angina
- d) Asthma
- e) Hyperventilation
- f) Epilepsy
- g) Cocaine
- h) Myocardial infarction
- i) Migraine
- j) Transient ischemic attack
- k) Pheochromocytoma
- l) Hallucinogens

Treatment

Short Term

1. Drugs

- Lorazepam 2mg Initial adult daily oral dosage in three divided doses of 0.5 mg, 0.5 mg and 1 mg, or in two divided doses of 1 mg and 1 mg. A daily dose of 6 mg should not be exceeded. Initial daily dose in elderly and debilitated patients should not exceed 0.5 mg and should be very carefully and gradually adjusted, depending upon tolerance and response.
- Fluoxetine: 10mg; initial dosage is 20 mg administered once daily in the morning. A gradual dose increase should be considered only after a trial period of several weeks if the expected clinical improvement does not occur.

Long Term

2. Psychotherapy

- a) Behaviour therapy
 - Applied relaxation
 - Deep breathing exercise
 - In-vivo exposure

2.1 Mood Disorders

Introduction

Mood disorders are mental disorders whose primary psychopathology is the disturbance of mood. The mood disturbances can either be low (depressed) or high manic/hypomanic.

Bipolar Mood Disorders

This is a spectrum of disorders which is characterized by cyclical disturbance of mood, cognition and related behaviours. It can either present with maniac/hypomania symptoms or as depression alternating with mania/hypomania. It consists of:

- Bipolar disorders
- Cyclothymia
- Mood disorder due to general medical condition
- Drug/alcohol induced mood disorder

Bipolar 1 Disorder

Definition

It is a sub type of Bipolar Spectrum of Disorders characterized by episodes of manic presentation or alternating episodes of mania and major depressive disorder.

Clinical Features

It is subdivided into 3 domains:

1. Biological

- Too busy to eat or sleep (Good appetite and sleep)
- High energy

2. Psychological

- Over familiarity, high self-esteem, grandiose ideas, freely expressed over-confidence.

3. Social

- Impulsive, disinhibited (unstoppable) and hyperactive.

Diagnosis

Bipolar mood disorder is a spectrum of disorder. It is critical to make a definite diagnosis because of treatment implication.

NOTE: Mania is a cluster of signs and symptoms with a variety of underlying psychopathology. It is not a diagnosis.

Differential Diagnosis

- Major depressive disorder
- Schizoaffective
- HIV
- Syphilitic encephalitic
- Alcohol/drug induced mood disorder

Investigation

Diagnosis

- FBC, UIE, LFT, EEG, TSH, B12
- Pregnancy test
- Pre-treatment Evaluation

A general medical assessment, including history, physical examination, and laboratory evaluation focusing on organ systems potentially affected by each agent, is important prior to starting these medications.

Severity	Treatment	Dosage
Mild	(Monotherapy) Mood stabilizer	Lithium – 300mg 3 times a day
Moderate	Monotherapy Mood stabilizer	Carbamazepine – 200 – 600mg/day
Severe	Mood stabilizer and Antipsychotic	Sodium valproate 250mg 3 times/day
Severe with psychosis	Mood stabilizer and Antipsychotic	

Treatment

Treatment selection depends on illness severity, associated features such as rapid cycling or psychosis, and, where possible, patient preference.

Short Term

Intermediate

During intermediate phase, doses will be titrated according to the side effects, therapeutic effect and drug blood level.

Long Term

Patients will be maintained on the mood stabilizer which resulted into their recovery. Antipsychotic must be tapered down slowly over a period of two – three weeks and finally withdrawn.

Note: A blood level of Lithium 0.8-1.2 mEq/L generally is required to treat acute onset of episodes of bipolar mood disorders. (A steady-state, stable blood level the morning before the first dose of the day). Changes in

dosage require monitoring of lithium levels at least every 5-7 days after the change. Some patients require (and tolerate) levels up to 1.5mEq/L. although higher levels are not advisable because of the risk of toxicity. Treatment with lithium alone may have a relatively slow response rate (up to 2 weeks after a therapeutic blood level) is established.

Lithium should only be used where blood levels of Lithium can be monitored.

Depressive Disorders

Definition

A spectrum of disorders which is characterized by a low or depressed mood. They consist of:

- Major depressive disorder single episode
- Major depressive disorder recurrent
- Dysthymia
- Adjustment disorder with depressed mood
- Mood disorder due to general medical condition
- Substance induced mood disorder

It is therefore vital to make a definite diagnosis because of management implications. They have different treatment, course and prognosis.

Major Depressive Disorder

Definition

This is one of the depressive spectrum of disorders what man psychopathology is a depressed mood and lack of anhedonia (loss of interest in all general life activities).

Clinical Features

Clinical presentation falls into 3 domains

Biological:

Insomnia/Hyperinsomnia/hi fatigue, weight loss/gain, Agitation/retardation (psychomotor retardation)

Psychological:

Depressed mood, loss of interest in pleasure (anhedonic), sense of guilt, worthlessness, hopelessness, helplessness and sometimes suicidal

Cognitive:

Poor attention, concentration and memory

Diagnosis

Differential Diagnosis

Bipolar mood disorder with depressive episode

Schizoaffective

Adjustment disorder with depressed mood

Substance induced mood disorder

Mood disorder due to general medical condition

Sad mood

Bereavement

Investigations

FBC, VDRL, TSH, LFT, Drug Screen.

Hamilton depressive scale

Becks depression inventory

Treatment

The treatment of major depressive disorder consists of antidepressant, psychotherapy and ECT (electroconvulsive therapy) or a combination of these.

Acute Phase

Severity of Major Depressive Episode	Pharmacotherapy
Mild	Antidepressants if preferred by patient
Moderate to severe	Antidepressants are treatment of choice (unless electroconvulsive therapy (ECT) is planned)
With psychotic Features	Antidepressants plus antipsychotics or ECT

Intermediate Phase

Titrate the medication according to side effect and clinical response.

Long Term Phase

1. Continue with antidepressants
2. Psychotherapy (cognitive behaviour therapy)
3. Taper the antipsychotic and discontinue over the period of three to four weeks

Psychotic Disorders

Psychosis refers to loss of contact with reality (impairment in reality testing). It is **not** a diagnosis but a symptom of mental disorders with a variety of underlying etiological factors. It is characterized by **delusions, hallucinations** and **thought disorders**.

Brief Psychotic Disorder

Definition

An acute transient psychotic episode of abrupt onset. Although it can follow a stressful life event, it may be the first clinical feature of a primary mental disorder in a predisposed person.

Clinical Features

- 1) Delusions
- 2) Hallucinations
- 3) Disorganized speech (e.g. frequent derailment or incoherence)
- 4) Grossly disorganized or catatonic behavior

Investigations

FBC, U/E, LFT, TSH, EEG, CXR, ECG, Drug Screen.

Differential Diagnosis

1. Schizophreniform
2. Major depressive disorder
3. Bipolar mood disorder
4. Drug/alcohol induced psychotic disorder
5. Delirium

Treatment

Short Term

1. Hospitalisation:
For diagnostic evaluation and monitoring signs and symptoms
2. Psychopharmacotherapy:
 - Antipsychotic - See table (flow chart)
 - Adjunctive (Benzodiazepine) - Diazepam, Lorazepam

Long Term

The clinical presentation of brief psychotic disorder is polymorphic. A long term follow up is advisable to establish the underlying primary mental disorder.

Schizophrenia

Definition

It is a spectrum of disorders which share similar etiological factors but differ in clinical presentation, course and prognosis.

Clinical Features

- Delusions
- Hallucinations
- Disorganized speech (e.g., frequent derailment or incoherence)
- Grossly disorganized or catatonic behaviour
- Negative symptoms, i.e., affective flattening, alogia, or avolition.

Differential Diagnosis

- All psychotic disorders including Substance-induced psychotic disorder:
 - (i) Intoxication
 - (ii) Withdrawal states and Psychotic disorder due to general medical condition

Either	Treatment Algorithm
Agree choice of antipsychotic with patient	Or, if not possible:
Agree choice of antipsychotic with patient and/or care	Or, if not possible:
Start second-generation antipsychotic or	First generation antipsychotic Titrate, if necessary, to minimum effective dose Adjust dose according to response and tolerability
Effective	Assess over 6-8 weeks
	Not effective
	Not tolerated or poor compliance

Either	Treatment Algorithm
<p>Continue at dose established as effective</p> <p>Change drug and follow above process consider use of either an SGA or an FGA</p>	<p>If poor compliance related to tolerability discuss with patient and change drug</p>
<p>Treatment resistance (Clozapine)</p>	<p>Not effective</p> <p>If poor compliance related to other factors, consider depot or compliance therapy or compliance aids</p>
<p>Repeat above process</p>	<p>Relapse or acute exacerbation of schizophrenia (full adherence to medication confirmed)</p> <p>Treatment algorithm</p>

Either

Investigate social or psychological precipitants

Treatment Algorithm

Provide appropriate support and/or Therapy

Continue usual drug treatment

Acute drug treatment required
Switch to a different, acceptable Antipsychotic if appropriate
Assess over at least 6 weeks

Treatment ineffective
Switch to clozapine

Relapse or acute exacerbation of schizophrenia (adherence doubtful or known to be poor)

either

Investigate reason for poor adherence

Confused or disorganized
Lack of insight or support
Discuss with patient
Consider compliance therapy or depot Antipsychotics

Treatment Algorithm

Simplify drug regimen

Poor tolerated treatment
Discuss with patient

Switch to acceptable drug (see recommendations on page ...

2.2 EPILEPSY

Definition

This is a recurrent abnormal paroxysmal neuronal discharge. Patients may present in several forms, i.e. from simple seizures which will only bring about headache, bad smell or loss of posture and of consciousness to generalized tonic, clonic seizures (grandmal seizures)

Clinical features

These vary depending on the type of seizure involved.

Generalised tonic to clonic seizures (grand mal)

These may occur with or without the initial warning aura, characterized by outcry, loss of consciousness, falling and jerking of the limbs, trunk and head. Urinary or fecal incontinence may occur. The attack usually lasts 2 to 5 minutes and will be followed by any of the following - deep sleep, muscle soreness or headache.

Petit mal attacks

Characterized by clouding of consciousness, which could last from 1 - 30 seconds with or without loss of muscle tone. The patient will suddenly stop all activity and have a blank stare. Activity will only be resumed after the attack is over. Commonly occurs in children.

Myoclonic seizures

This is characterised by jerking of one or more muscles in any part of the body with or without consciousness. The jerking may start in one part of the body and spread.

Diagnosis

Diagnosis is mainly clinical.

Management

The objective is to control the seizures and prevent

reoccurrence.

- A detailed history should be taken and should include
- An eyewitness account of the seizure (if possible)
- Prior trauma, infection, alcohol or other drug involvement will call for review of need for continued treatment
- If it is status epilepticus, establish if the patient has been taking medication regularly in the last 2 weeks before the seizure (including dosage and frequency). Record of other medication used recently

History of family seizures or other neurological disorders

Treatment

Drugs

Most patients will respond favourably to single drug treatment provided in table _____ on anticonvulsants (i.e. phenobarbitone, carbamazepine or phenytoin). Patients who do not respond favourably to maximum doses of these drugs should be referred for specialist treatment.

Patients who have **not** had seizures for two or more years, neurological signs or symptoms, unacceptable behavioural change or adverse reaction to drugs should all be referred to a **specialist** for possible discontinuation of drugs.

Supportive

Counseling is necessary for both the patient and caregivers. Take blood for

- Urea and electrolytes,
- Glucose
- Ca⁺, Mg⁺⁺
- Full blood count
- Arterial gases, and

- Anticonvulsant concentrations

Investigate and exclude possible underlying causes of seizures, e.g. drugs, alcohol, meningitis, hypoglycaemia, trauma, etc.

2.3 FEBRILE CONVULSIONS

These are convulsions occurring mostly among children between six months and five years. They occur during a bout of fever, which is due to an underlying infection. In general, the seizures follow the pattern of clonic-tonic seizures seen in grand mal epilepsy or generalised seizures, but may be atypical and involve only one side of the body.

Management

Prolonged febrile convulsions of 15 or more minutes or those occurring in a child of known risk e.g. a child with ventricular peritoneal shunt must be treated actively.

Drugs

- Diazepam orally or rectally or intravenously 0.6 – 0.8mg/kg in 24 hours in divided doses is effective in reducing further febrile seizures in children.
- Paracetamol 10mg/kg 4 times a day as required

Supportive

- Tepid sponging
- Use of antipyretics
- Caregivers will need counseling about treatment of recurrences

2.4 RABIES

Definition

This is a disease caused by a virus that affects brain cells.

This virus is usually found in animals and is transmitted to man.

Animals, which may carry rabies virus, include:

Domestic

Dogs

Cats

Wild

Hyenas

Foxes

Wild dogs

Bats

Clinical features

Fulminant encephalitis with convulsions, circulatory and respiratory failure. Hydrophobia (fear of water) occurs in advanced stages of the disease.

Dignosis

Investigation

- Taking a good history
- Laboratory investigation by means of immunofluorescent microscopy of smear from the cornea or of a skin biopsy
- Brain examination of dead animals or sacrificed animals

Treatment

Standardised treatment of all animal bites and scratches; these should be thoroughly cleansed and flushed with soap and water.

Antibiotics and tetanus toxoid should also be administered. Administration of antirabies vaccine as soon as possible after exposure.

The human diploid vaccine may be used as follows:

Condition of animal	Treatment in case of: Bite Lick
Healthy, vaccinated with valid certificate	None
Healthy, not vaccinated	None
	None
Unknown or escaped	Vaccine + serum Vaccine
Rabid or suspected	Vaccine + serum

Recommended regimen

1 dose to be given on day 0; day 3; day 7; day 14 and day 28.

If the animal is proved to be healthy after the tenth day, no more vaccine is necessary.

All bites by rabid dogs should be reported to the Veterinary Office.

Prevention

Veterinary precautions, which include vaccination of domestic animals, eradication of stray dogs and surveillance control of the epidemiological situation in the wildlife population.

Pre-exposure vaccination:

This is administered to high-risk population groups, e.g. veterinary staff and wildlife department personnel. Two

doses of human diploid vaccine with one month's interval, followed by a booster after one year. Repeat booster after every three years.

2.5. Commonly Used Anticonvulsants in Adults

SEIZURE TYPE	First-line	Starting dose	Commonest Daily Dose	Maintenance Dose	Dosage Interval
Partial Seizures Simple Partial Complex partial Secondary Generalized	Carbamazepine	100-200mg	800mg	400-2000mg	2-4 times a day
	Lamotrigine (monotherapy)	25mg	100mg	100-200mg	1-2 times a day
	(Adjunctive VP)	25mg	25-50mg	100-200mg	1-2 times a day
	(Adjunctive W/T VP)	50mg	300mg	200-400mg	1-2 times a day
	Valproate	50mg	300mg	200-400mg	2 times a day
Generalised Seizures Absences	Phenytoin	100-200mg	300mg	100-700mg	1-2 times a day
	Ethosuximide	500mg	1000mg	500-2000mg	1-2 times a day
	Lamotrigine (monotherapy)	25mg	25mg	100-200mg	1-2 times a day
	(Adjunctive VP)	25mg	25mg	100-200mg	1-2 times a day
	(Adjunctive W/T VP)	50mg	300mg	200-400mg	1-2 times a day
Atomic/clonic	Valproate	600mg	1000mg	1000-2000mg	2 times a day
	Lamotrigine (monotherapy)	25mg	25mg	100-200mg	1-2 times a day
	(Adjunctive VP)	25mg	25mg	100-200mg	1-2 times a day
	(Adjunctive W/T VP)	50mg	300mg	200-400mg	1-2 times a day
	Valproate Sodium	600mg	1000mg	1000-2000mg	2 times a day
Tonic – Clonic	Carbamazepine	100-200mg	800mg	400-2000mg	2-4 times a day
	Lamotrigine (monotherapy)	25mg	100mg	100-200mg	1-2 times a day
	(Adjunctive VP)	25mg	25-50mg	100-200mg	1-2 times a day
	(Adjunctive W/T VP)	50mg	300mg	200-400mg	1-2 times a day
	Valproate Sodium	50mg	300mg	200-400mg	2 times a day
Myodonic	Clonazepam	1mg	6mg	4-8mg	1 at night (3-4 times a day)
	Valproate Sodium	600mg	1000mg	1000-2000mg	2 times a day

SEIZURE TYPE	Second-line	Starting Dose	Commonest Daily Dose	Maintenance Dose	Dosage Interval
Partial Seizures Simple Partial Complex partial Secondary Generalized	Acetazolamide	250 mg	500-750mg	250-1000mg	3-4 times a day
	Gabapentin Phenobarbitone	300mg 30-60mg	600-2400mg 120mg	900 – 1200mg 60-240mg	3 times a day 1-2 times a day
	Acetazolamide Clonazepam	250 mg 1mg	500-750mg 6 mg	250-1000mg 4-8mg	3-4 times a day 1 at night (or 3-4 times a day)
Atomic/clonic	Acetazolamide Carbamazepin Phenobarbitone Phenytoin	250mg 100-200mg 30-60mg 100-200mg	500-750mg 800mg 120mg 300mg	250-1000mg 400-2000mg 60–240mg 100-700mg	3-4 times a day 3 times a day 1-2 times a day 1-2 times a day
	Tonic – Clonic	250mg 300mg 30-60mg	500-750mg 600-2400mg 120mg	250-1000mg 600-2400mg 60-240mg	250-1000mg 600-2400mg 1-2 times a day
	Myodonic	120mg	500-750mg	250-1000mg	3-4 times a day

Commonly Used Anticonvulsants in Children

Condition	First-line	Starting dose (mg/kg per 24 hours)	Target dose for initial assessment of effect (mg/kg per 24 hours)	Incremental Size (mg/kg per 24 hours)	Dose Interval (days)	Usual Effective dose (mg/kg per 24 hours)	Frequency of dosing (times per 24 hours)
Partial Seizures Simple Partial Complex partial Secondary Generalized	Carbamazepine	5	12.5	2.5	3-7	12-25	2-3
	Lamotrigine (monotherapy) (Adjunctive VP)	- 150microgram 300microgram	-	- 300microgram 300microgram	- 14 14	- 1-5 1-5	- 1-2 1-2
	Valproate	5-7.5	30	10	10	12.5-15	2
	Phenytoin	1.5-2.5	7	2.5-5	10	5-9	1-2
	Ethosuximide	5	15	10	15	10-20	2
Generalised Seizures Absences	Lamotrigine (monotherapy) (Adjunctive VP)	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 1-5 1-5	- 1-2 1-2
	Valproate	5-7.5	5-7.5	5-7.5	5-7.5	12.5-15	2
	Lamotrigine (monotherapy) (Adjunctive VP)	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 1-2 1-2
Atonic/clonic	Valproate Sodium	5-7.5	5-7.5	5-7.5	5-7.5	5-7.5	2
	Carbamazepine	5	12.5	2.5	3-7	12-25	2-3
Tonic – Clonic	Lamotrigine (monotherapy) (Adjunctive VP)	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 150microgram 300microgram	- 2-3 2-3
	Valproate Sodium	5-7.5	5-7.5	5-7.5	5-7.5	5-7.5	- 150microgram 300microgram
Myoclonic	Clonazepam	50microgram	1	1	50microgram	1	5-7.5
	Valproate Sodium	5-7.5	5-7.5	5-7.5	5-7.5	12.5-15	1 2

SEIZURE TYPE	Second-line	Starting dose (mg/kg per 24 hours)	Target dose for initial assessment of effect (mg/kg per 24 hours)	Incremental Size (mg/kg per 24 hours)	Dose Interval (days)	Usual Effective dose (mg/kg per 24 hours)	Frequency of dosing (times per 24 hours)
Partial Seizures Simple Partial Complex partial Secondary Generalized	Acetazolamide	2.5	7.5	5-7	1	5-7	2-3
	Gabapentin	10	10	0	1,2,3	10-20	1-
	Phenobarbitone	1-1.5	1-1.5	2	1	2.5-5	1-2
	Acetazolamide	2.5	7.5	5-7	1	5-7	2-3
Generalized Seizures Absences	Clonazepam	50microgram	1	1	50microgram	12.5-15	1
	Acetazolamide	2.5	5-7.5	5-7	1	5-7	2-3
Atonic/clonic	Carbamazepin	5	10	2.5	3-7	2.5-5	2-3
	Phenobarbitone	1-1.5	1-1.5	2	1	2.5-4	1-2
	Phenytoin	1.5-2.5	7.5	2.5-5	1	2.5-5	2
	Acetazolamide	2.5	5-7.5	5-7	1	5-7	2-3
Tonic – Clonic	Gabapentin	10	10	0	1,2,3	10-20	1
	Phenobarbitone	1-1.5	1-1.5	2	1	2.5-4	2-3
	Acetazolamide	2.5	5-7.5	5-7	1	5-7	2-3
Myoclonic	Acetazolamide	2.5	5-7.5	5-7	1	5-7	2-3

3

INFECTIONS

3.1. MALARIA

Definition

Malaria is a protozoal infection of the genus Plasmodium. It is transmitted through the bite of an infected female mosquito belonging to the genus Anopheles. It is characterised by paroxysms of chills, fever and sweating, and may lead to anaemia and splenomegaly.

Malaria parasites comprising 4 species, each one with a different biological pattern may affect man. Plasmodium vivax, Plasmodium falciparum, Plasmodium malariae and Plasmodium ovale. In Zambia Plasmodium falciparum is the most prevalent.

Clinical features

Diagnosis

- Take a good history and include all the physical examination and make a differential diagnosis.
- Confirm the presence of parasites and complications by laboratory methods

3.2 UNCOMPLICATED MALARIA

Prodromal symptoms are usually non-specific and are often characterised by intermittent febrile illness. Fever is the most common symptom. Headache, aching joints, back pain, nausea and vomiting and general discomfort usually accompany the fever.

The patient may not present with fever but may have had a recent history of fever. This is due to the natural malaria cycle. A history of fever during the previous two days along with other symptoms of malaria is a critical basis for suspecting malaria.

It is equally important to note that fever is a common symptom for other infections besides malaria, such as ear infections, measles and pneumonia. Malaria has been nicknamed “the Great Imitator” because of this. The possibility of other infections, either co-existing with malaria or as the sole cause of fever, should always be borne in mind in arriving at the diagnosis. It is therefore important to carry out a differential diagnosis.

In children, the onset of malaria may be characterized, in the early stages, only by symptoms like poor appetite, fever, restlessness, cough, diarrhoea, malaise and loss of interest in the surroundings.

3.3 SEVERE MALARIA

P falciparum infection in the presence of any life-threatening condition is considered as severe malaria. All life-threatening conditions and the presence of any danger signs in the presence of an acute febrile illness should be considered as possible severe malaria. Some of the danger signs include:

- Excessive vomiting
- Inability to drink or breast feed
- Extreme weakness
- Convulsions
- Drowsiness
- Loss of consciousness
- Abnormal breathing

Severe headache, sleepiness and loss of consciousness are some of the commonest indications of severe malaria. Jaundice is another early sign.

A patient in whom malaria is suspected and is severely ill requires urgent attention and should be referred to an appropriate health facility, where applicable. Severe malaria particularly in pregnant women and children under five should be managed as an emergency situation.

Other symptoms and signs of severe malaria include:

- Convulsions (> 2 episodes within 24 hours)
- Coma or altered level of consciousness
- Drowsiness/lethargy
- Prostration (inability to seat or stand without support)
- Respiratory distress
- Pulmonary oedema
- Shock (cold moist skin, low blood pressure, collapse)
- Severe vomiting (vomiting everything)
- Severe anaemia (Hb<5g/dl or Hct<15%)
- Haemoglobinuria
- Hypoglycaemia (blood glucose <2.2mmol/L or <40mg/%)
- Splenomegaly
- Hepatomegaly
- Abnormal bleeding (spontaneous prolonged bleeding from puncture sites)

Initial Management of Severe Malaria

Antimalarial Treatment

(Artesunate Injection)

See Appendix B page 505

Table 1: Signs and symptoms of malaria

Uncomplicated Malaria	Moderately severe Malaria	Severe and complicated malaria
Fever (<_37.5 0C)	Nausea	Severe anaemia (Hb<5g/dl)
Headache	Vomiting	Jaundice
Sweats and chills	Dehydration	Drowsiness
Body pains	Diarrhoea	Shock
Acute gastroenteritis	Extreme weakness	Convulsions
		Respiratory distress
		Unconsciousness/coma
		Change in behaviour
		Hyperparasitaemia
		Prostration, i.e., generalized weakness, inability to stand or walk)
		Abnormal bleeding

Treatment

Uncomplicated Malaria

1. The first line of treatment for malaria is artemisin based combination therapy. For instance. Artemether 20mg + Lumefantrine 120mg tablets

Table 2:

Age (years)	Weight (kg)	Number of tablets per dose 0h, 8h, 24h, 36h, 48h, 60h	Artemether (A) + Lumefantrine (L) per dose
<1	<5	Not recommended	
1-5	5-14	1	20mg A + 120mg L
6-8	15-24	2	40 mg A + 240mg L
9-12	25-34	3	60mg A + 360mg L
Over 12	>35	4	80mg A + 480mg L

Artemether 20mg + Lumefantrine 120mg is not recommended in pregnancy and lactating mothers. Where there is no suitable alternative drug, it should be used.

For those weighing 5kg body weight and below, the drug of choice is Sulphadoxine 500mg + Pyrimethamine 25mg for simple uncomplicated malaria.

The dosage for Sulfadoxine 500mg + Pyramethamine 25mg is a single treatment of half a tablet.

Table 3:

Wt (kg)	Age (years)	Number of Tablets
5-10	2-11months	0.5
10.1-14	1-2	0.75
14.1-20	3-5	1
20.1-30	6-8	1.5
30.1-40	9-11	2
40.1-50	12-13	2.5
>50	14+	3

For unconscious, persistently vomiting, convulsing or severely ill patients treat as for complicated malaria, resuscitate and refer.

Severe malaria

Children:

By intramuscular injection; Quinine 10mg/kg body weight diluted in saline or water for injection (to a concentration of 60-100mg salt/ml), repeated after 4 hrs and then 12 hourly. A loading dose is not recommended by this route. By intravenous injection; Quinine loading dose of 20mg/kg body weight diluted in 10ml of 5% or 10% dextrose (or isotonic fluid if hypoglycaemia is excluded) per kg body weight by intravenous infusion over 4 hours. After 12 hours maintenance dose of 10mg/kg body weight given over 2 hours, repeated 12 hourly until patient can swallow, then oral quinine 10mg/kg body weight 8 hourly to complete 7 day course of treatment

Adults:

By intramuscular injection; Quinine 10mg/kg body weight diluted in saline or water for injection (to a concentration of 60-100mg salt/ml), repeated after 4 hours and then 8 hourly. A loading dose is not recommended by this route. By intravenous injection: loading dose of Quinine 20mg/kg body weight diluted in 10ml of 5% or 10% dextrose

(or isotonic fluid if hypoglycaemia is excluded) per kg body weight by intravenous infusion over 4 hrs. After 8 hours maintenance dose of 10mg/kg body weight given over 4 hours, repeated 8 hourly, until patient can swallow or after coma resolution, then oral quinine 10mg/kg body weight 8 hourly to complete 7 day course of treatment.

Table 4: Oral Quinine 300mg tablet dosage schedule

Age Years	Number of tablets per dose
<1	0.25
1-3	0.5
4-6	0.75
7-11	1
12-15	1.5
15+	2

Quinine is sometimes used in combination with Tetracycline or Clindamycin, Doxycycline in places where there is reduced sensitivity to Quinine. In Zambia, Quinine sensitivity is still very high and there is no justification for using the combination.

Malaria in Pregnancy

Intermittent presumptive treatment (IPT) - Sulphadoxine + Pyrimethamine is the drug of choice for prevention of malaria in pregnancy. 3 tablets Sulphadoxine + Pyrimethamine are given after 16 wks following the last menstrual period (LMP). Two more doses are given at least 4 weeks apart during the second and third trimester. A total of 3 doses should be given during the entire duration of pregnancy.

Individuals who are intolerant to SP should be counselled about personal preventive measures to reduce contact with mosquitoes.

Summary of management of Malaria

Take and record a confirmatory history

1. Do a confirmatory clinical assessment including body temperature.
2. Make a differential diagnosis on clinical basis.
3. Do a lumbar puncture if there is need to exclude meningitis
4. Prepare a thick and thin blood smear
5. Do a full blood count
6. Decide on treatment and method of administration.
7. Keep treatment, follow-up and referral records. Record treatment failures and adverse events.
8. Give oral, subcutaneous or intramuscular medications
9. Decide on the need for referral

Supportive therapy

- Monitoring of fluid and electrolyte balance
- Correction of fluid and electrolyte imbalance
- Correct management of anaemia
- Management of hypoglycemia
- Management of any other complications

Referred Patients

Patients referred from the community need to have a thorough clinical examination to exclude other causes of fever.

Criteria for Referral from Health Centre to Hospital

The following are criteria for referral from the Health Centre to Hospital:

1. Neurological manifestation e.g. convulsions and altered/disturbed consciousness.
2. Persistent vomiting.

3. Hyperpyrexia ($> 39^{\circ}\text{C}$).
4. Hypothermia ($< 35.7^{\circ}\text{C}$).
5. Severe Anaemia.
6. Jaundice.
7. Pregnancy with fever
8. Failure to respond to treatment after 2 days.
9. Reaction to drugs interfering with normal daily activity
e.g. severe rash, severe itch, sulphonamide sensitivity.
10. Conditions that cannot be managed locally.
11. Rapidly deteriorating condition of the patient.
12. Conditions that cannot be managed locally

Prevention

- Get rid of mosquito breeding sites near residential areas
- Use impregnated mosquito nets, repellents and sprays,
- Give public health education on the dangers of malaria and how to prevent it.
- Counselling Points:
- Provide health education information on malaria i.e. personal protection measures e.g. bed nets, repellents, general sanitation around the house and in the community, such as reducing breeding sites and clearing of vegetation.
- Advise carer on the need for growth monitoring, feeding, Vitamin A supplementation and immunisation in children.
- Prophylaxis in sickle cell anaemia and post splenectomy use Pyrimethamine 25mg once weekly.

Zambia has no prophylaxis policy for visitors. Recommendations are provided from their country of origin. Some countries e.g. United Kingdom are using Mefloquine. Sulphadoxine/Pyrimethamine is not recommended for this purpose.

The use of other drugs like amodiaquine, dapsone-pyramethamine, (maloprim) and mefloquine for prophylaxis needs further evaluation and is not therefore recommended.

3.4 TUBERCULOSIS

Definition

Tuberculosis is an infectious disease that is caused by tubercle bacillus, *Mycobacterium tuberculosis*. The principal route of infection is the respiratory tract through the inhalation of infected air-droplet nuclei. Infection may rarely occur through the gastrointestinal tract from the ingestion of infected unpasteurised milk. Exposure to infection may lead to infection which may be latent. Subsequent progression to active disease occurs in approximately 10% during the life time in people with a latent infection and an intact immune system. Progression of a latent infection occurs at a higher rate in individuals infected with the Human Immuno-deficiency Virus. In HIV-infected patients pulmonary tuberculosis is the commonest form of tuberculosis.

Clinical features

Pulmonary Tuberculosis accounts for approximately 80% of the cases of tuberculosis, with smear positive tuberculosis being the major source of infection. Extra-pulmonary tuberculosis may involve many sites of the body such as the pleura, pericardium, lymph nodes, meninges, bones, gastro-intestinal tract, genito-urinary system, epididymis, eyes and skin.

3.4.1 Pulmonary tuberculosis

Pulmonary tuberculosis classically presents with symptoms of prolonged cough (> 2 weeks duration), which is usually productive; and with or without a history of haemoptysis, fever, night sweats and loss of weight. Radiological changes that occur include cavitation,

parenchymal infiltrates and lymphadenopathy. Sometimes Xrays may not show any abnormality. Radiological findings in HIV-infected individuals depend on the degree of immunosuppression. Atypical findings are more common in these patients.

3.4.2 Pleural tuberculosis

Pleural tuberculosis may present with a cough which may be non-productive, pleuritic chest indent pain, systemic symptoms of fever and night sweats.

3.4.3 Pericardial tuberculosis

Pericardial tuberculosis may present with chest pain or with features of tamponade such as dsypnoea, tachycardia, hypotension, pulsus paradoxus and sudden collapse of patient.

3.4.4 Lymph node tuberculosis

Lymph node tuberculosis may affect any site though it is more common in the cervical region. Lymph nodes are usually painless. Where caseation with liquefaction and sinus formation occurs, they may be painful.

3.4.5 Meningeal tuberculosis

Meningeal tuberculosis is usually of insidious onset with symptoms of headache, neck stiffness, indent vomiting and disordered consciousness.

3.4.6 Bone tuberculosis

Bone tuberculosis may affect any bone though it is more common in the thoraco-lumbar spine leading to gibbus formation due to vertebral collapse and may result in paraplegias. Osteomyelitis and cold abscess formation may also occur.

3.4.7 Gastrointestinal tuberculosis

Gastrointestinal tuberculosis may affect any part of the gastrointestinal tract, though intestinal involvement presenting as diarrhoea, malabsorption, intestinal obstruction and ascites are common.

3.4.8 Genito-urinary tuberculosis

Genito-urinary tuberculosis involving the kidneys may be asymptomatic, causing symptoms such as haematuria and sterile pyuria with extensive renal involvement. Infertility, salpingitis and tubal abscess are presentations of infection of the fallopian tubes while epididymal tuberculosis may present as painless swellings. Phlyctenular conjunctivitis, iritis and choroiditis are manifestations of eye infection.

3.4.9 Dermal tuberculosis

Dermal tuberculosis may include lupus vulgaris and erythema nodosum.

3.4.10 Adrenal tuberculosis

Adrenal tuberculosis may cause Addison's disease.

Complications

Complications of pulmonary tuberculosis include pneumothorax, empyema or pyopneumothorax and laryngitis with advanced disease. Respiratory failure and right ventricular failure may develop as a late complication due to extensive pulmonary destruction and fibrosis. Colonization of cavities with *Aspergillus fumigatus* may occur resulting in haemoptysis.

Constrictive pericarditis is a complication of TB. Meningeal tuberculosis as a result of TB of the spine may result in permanent neurological deficits. Gastrointestinal tuberculosis may lead to the development of ascites and mal-absorption.

Diagnosis

Take good history, chest x-ray, sputum smear, ESR and Hb. You may need to do a tuberculin test to make an informed decision.

Treatment

Treatment of tuberculosis should be based on demonstration of the mycobacteria by both sputum smear histology and culture. Clinical and radiological findings of dual HIV/TB infection have changed. Identification of smear positive cases should form the basis for treatment as these are cases responsible for continued transmission of infection. In the presence of clinical picture, treatment may be started using standard treatment Directly Observed Therapy (DOTs). The basic principle underlying the treatment of tuberculosis is the use of multi-drug treatment for a prescribed period to avoid the development of drug resistance. There is no place for the use of monotherapy in the treatment of tuberculosis nor for a trial of treatment.

Drugs

Treatment for tuberculosis is provided free of charge in all public health institutions. The basis of treatment for tuberculosis is the use of multi-drug treatment for 8 months. Directly Observed Treatment (DOTs) is the mechanism by which the supervision of each dose of drug occurs, ideally by a member of the health care staff or by family, friends or community health workers.

Treatment is divided into an Intensive phase in which the patient should visit the clinic daily for review and medication for the first two months, followed by a Continuation phase of 6 months whereby the patient visits the clinic once every 4 weeks to collect drugs.

A pyridoxine supplement of 50mg daily should be given throughout treatment and especially so in lactating and pregnant women.

CORTICOSTEROIDS Indicated in meningeal and pericardial tuberculosis and should be stated at the same time as antituberculous therapy. There may be need for pericardiocentesis in TB pericarditis

Treatment of tuberculosis has been classified into two categories.

Table 5

Adults		Paediatrics	
Category I	Category II	Category I	Category II
New smear positives (+) Smear negative (-) and extra pulmonary	Smear + re-treatment cases including treatment failure, treatment after default, and relapses for smear positive cases	New uncomplicated cases of TB	Re-treatment cases and severe, complicated TB. i.e., TB meningitis, miliary TB, spinal TB

a) Recommended Adult Treatment Dosage

i. Category I New smear positive patients

Weight in Kg	Intensive phase 2 months	Continuation Phase 6 months
	RHZE	EH
30-37	2	1
38-54	3	2
55-70	4	3
>70	5	3

R – Rifampicin, H- isoniazid, Z – Pyrazinamide,
E – Ethambutol, S – Streptomycin.

ii. Category II smear positive re-treatment patients

Weight	Intensive Phase 3 months			Continuation Phase 5 months
	2 months		1 month	
	RHZE + S		RHZE	RHE
30-37	2	0.5g	2	2
38-54	3	0.75g	3	3
55-70	4	1.0g	4	4
>70	5	1.0g	5	5

Recommended Paediatric Treatment Dosage

i. Category I. New uncomplicated

Weight in Kg	Intensive phase 2months		Continuation phase 4 months
	RH + Z		RH
6 – 11	1/2	1/2	1/2
12 – 18	1	1	1
19 – 26	1 1/2	1	1 1/2
27 – 37	2	1 1/2	2
> 38	3	2	3

ii. Category II Re-treatment and severe, complicated NEEDS REVISION

Weight	Intensive Phase 3 months			Continuation Phase 5 months
	2 months			
	RHZE +			RHE
6 - 11	1/2	1/2	0.1g	½
12 - 18	1	1	0.2g	1
19 - 26	1 1/2	1	0.5g	1 ½
27 - 37	2	1 1/2	0.5g	2
>38	3	2	0.5g	3

Pregnancy and Breast Feeding:

The standard regimen (above) may be used during pregnancy and breast-feeding; pyridoxine supplements are advisable. Streptomycin should not be given in pregnancy.

In exceptional circumstances, ethambutol can be used in young children (e.g. drug resistance). However care is needed in young children receiving this drug because of the difficulty involved in obtaining reports of visual symptoms and in testing eye sight.

3.4.11 Multidrug-resistant TB (MDR-TB),

Multidrug-resistant tuberculosis (MDR TB) is a form of tuberculosis that is resistant to two or more of the primary drugs Isoniazid and Rifampicin used for the treatment of tuberculosis. In Zambia, the Chest Diseases Laboratory reported Multi- drug resistant (MDR) that is resistance was 1.8% for new cases and 2.3% for previously treated cases 2003.

All suspected MDR-TB specimen should be referred to the national TB reference laboratory. MDR TB patients should be referred for specialist treatment and where appropriate facilities for infection control exist.

Use at least four drugs with either certain, or almost certain, effectiveness. Drug susceptibility testing (DST) should generally be used to guide therapy. Ciprofloxacin must not be used as an antituberculosis agent because of its weak efficacy compared with other fluoroquinolones. Patients should be treated for 18 months past culture conversion. There is a role for adjunctive measures such as surgery and nutritional and social support which should be used appropriately.

Treatment involves use of drugs from group 1 to group 4. Group 1 drugs are first line drugs to which resistance has not been documented. Efficacy for a first line drug should be questioned if it was used in a previously failed regimen despite a DST report to the contrary. Group 2 drugs are the injectables either amikacin or kanamycin. Capreomycin may be used when there is resistance to amikacin or Kanamycin.

Group 3 drugs include fluoroquinolones such as moxifloxacin, gatifloxacin, levofloxacin and ofloxacin. Group 4 drugs are added based on estimated susceptibility, drug history, efficacy, side-effect profile and cost.

Ethionamide or prothionamide is often added because of low cost; however, these drugs do have some cross-resistance with isoniazid. cycloserine is used often in conjunction with either Ethionamide or prothionamide when group 4 drugs are required.

Group 5 drugs are not recommended by WHO for routine use in MDR-TB treatment because their unclear efficacy regimens is unclear in humans. Most of these drugs are expensive, and in some cases require intravenous administration. However, they can be used in cases where adequate regimens are impossible to design with the drugs from group 1-4.

Group 5 include clofazimine, linezolid, amoxicillin/clavulanate, thioacetazone, imipenem/cilastatin high-dose isoniazid, clarithromycin.

Recognized earlier in 2006 in South Africa, extensively drug resistant TB (XDR-TB) is MDR-TB that is also resistant to three or more of the six classes of second-line drugs. Currently there is no documented evidence of XDR-TB in Zambia.

3.4.12 TB and Immunocompromised Patients:

All TB diagnosed patients should be counselled and tested for HIV. Immunocompromised patients may develop tuberculosis owing to reactivation of previously latent disease or due to new infection. Multi-resistant *Mycobacterium tuberculosis* may be present or the infection may be caused by other mycobacteria e.g. *M. avium* complex in which case specialist advice is needed.

Culture should always be carried out and the type of organism and its sensitivity confirmed. A minimum duration of treatment of 9 months is currently recommended for *M. tuberculosis* infection as re-infection is a common feature in these patients.

In TB/HIV co-infection treat all patient for TB regardless of CD4 count.. Start ART as soon as TB medications are tolerated (usually within 2-3 weeks). ART is not required for all patients with CD4 >350 and no other Stage III or IV illness. Use TDF/FTC or 3TC + EFV. Avoid use of NVP. If patient has renal insufficiency ABC + 3TC + EFV is an alternative.

In patients already on ART Start TB treatment immediately and if ART regimen includes Nevirapine, substitute Nevirapine with Efavirenz and continue ART. If on LPV/r start Rifabutin in place of Rifampicin or add Ritonavir 300mg BD or double LPV/r dosing. Evaluate for clinical failure and consider for second line ART in consultation with HIV specialist. Double dose LPV/r is associated with liver toxicity, and requires close monitoring of liver function. Increase LPV/r from 2 tabs BD to 3 tabs BD for 2 weeks, and then to 4 tabs BD for the remainder of TB treatment.

If pregnant woman on ART develops TB change NVP to EFV if after 1st trimester or switch to TDF/FTC or 3TC/AZT or ABC/3TC/AZT if during 1st trimester or evaluate for clinical failure and consider second line ART in consultation with HIV specialist. If on ATT and tests positive for HIV Start ART as soon as baseline laboratories and treatment preparation completed.

Monitoring

Since isoniazid, rifampicin and pyrazinamide are associated with liver toxicity hepatic function should be checked before and during treatment with these drugs. Patients on dual treatment of HIV and TB are likely to have liver/renal toxicity and should therefore be monitored closely.

before and during treatment with these drugs. Patients

Supportive

Non-adherence is the major reason for the failure of otherwise effective drug regimens to achieve high cure rates in the management of tuberculosis. Both patient-related and service-related factors contribute to poor patient compliance. Hence education of both health care staff and patients is an important part of the management package. An adequate system of defaulter-tracing would also contribute to higher cure rates. In areas with high rates of dual HIV/TB, nutritional support and integration of Home Based Care units and the treatment of tuberculosis is important to ensure that supervision of treatment occurs. Hospitalization during the first two months of treatment is not routinely done and is reserved for those who are severely ill or who have complications of the disease.

Prevention

The most effective method for preventing the spread of tuberculosis is the identification and effective treatment of the infectious cases i.e the smear positive cases. The effectiveness of vaccination using BCG is controversial with results of efficacy studies varying from 0% to 80%. The current WHO recommendation is that BCG should be given at birth to infants in high prevalence areas but avoided where the HIV disease is symptomatic.

Poor hygiene, malnutrition and overcrowding in places such as prisons, orphanages, boarding schools and others facilitate the spread of tuberculosis. Hence the fight against tuberculosis should involve the improvement of socio-economic factors. In case of childhood TB, contact tracing of an adult should be made, as well as drug treatment.

Prophylaxis

If a child is exposed to positive pulmonary TB, particularly under 5 years of age, provide prophylactic treatment with Isoniazid 5mg/Kg orally once daily for 6 months.
treatment.

3.5 MENINGITIS

Definition

This is inflammation of the meningeal covering of the brain or spinal cord. Both brain and meninges can be involved. This inflammation could be caused by bacteria, viral or fungal infections, malignancies, chemical reaction, intrathecal infections and also due to injury or trauma.

Clinical Features

Clinical presentation is the same despite different causative agents; but the commonest causative agent is bacteria and these include, Gram negative organisms i.e. E. coli in children, H. influenzae type b, group B Streptococcus, Streptococcus pneumoniae, Neisseria meningitidis and Cryptococcus in immune compromised patients.. Factors such as age, head trauma, and compromised immunity may be helpful in predicting causative agents.

The relative incidence of meningitis for children remains high in the first 2 years of life. The incidence of meningitis is high during the 1st month of life with most infections being due to gram negative organisms i.e. E-Coli in children and group B Streptococcus.

Presentation of patients with meningitis varies according to age group.

In Adults and older children

- Headache
- Neck stiffness/ache
- Common presentations
- Fever
- Vomiting
- Seizures
- Confusion
- Drowsiness



- Loss of consciousness
- Vascular collapse (Waterhouse – Friderichsen syndrome)

In infants

- Fever
- Vomiting
- Irritability
- Convulsions
- High-pitched cry and
- Bulging of the anterior fontanel are commonly present
- Stiffness of the neck may be absent
- There may be enlarging of head size

Signs of Meningitis

Other signs elicited during physical examination that suggest meningitis include:

- Neck stiffness
- Positive kernig's sign
- Brudzinski's sign
- Cranial nerves abnormality may occur (facial nerve palsy, oculomotor nerve palsy and occasional deafness).

Complications

These include:-

- seizures
- loss of consciousness
- hydrocephalus, thrombophlebitis
- cranial palsies
- hemiplegia and
- death.

Long term complications include mental retardation, hearing loss, sometimes blindness, epilepsy

Diagnosis

This is confirmed by laboratory investigations.

Perform a lumbar puncture for gram stain culture and sensitivity for glucose and protein.

Cerebral spinal fluid maybe cloudy , indicating bacterial meningitis..

Bacterial Meningitis

Initial therapy should be guided by the patient's age, the clinical circumstances, and suspected pathogen and later by the CSF results. Antibiotics are the mainstay of therapy and should be instituted parenterally at the initial stage. Benzyl penicillin or ampicillin is given I.V. .

Adults:

Benzyl penicillin:

4 mega units I.M or Ampicillin 100mg - 200mg/kg I.V.
6 hourly.

The Penicillin is usually given with Chloramphenicol injection at a dosage of 50 – 100mg/kg every 6 hours.

Intravenous antibiotic injection should be put in place for the first 72 hours or for as long as the patient is unconscious and then changed to the oral form. Treatment should generally be continued for at least 1 week after the fever subsides and the CSF returns towards normal.

The various antibiotics and combinations used in bacterial meningitis include:

In infants:

- i. Ampicillin, 100 – 150mg /kg I.V (0 – 7 days old) 8 – 12 hourly.
150 – 200mg/kg I.V. (> 7 days old) 6 – 8 hourly plus.
Cefotaxime, 200mg/kg I.V. every 6 hours.
- ii. Ampicillin, as above plus.
Gentamycin, 7.5mg/kg I.V (0 – 7 days old) 8 hourly.
5mg/kg I.V. (> 7 days old) 12 hourly.

In children > 1 month old Cefotaxime, as above or Ceftriaxone, 20 -50mg/kg daily as a single dose can be increased up to 80mg/kg as a single dose in severe infection or Ampicillin, 100 – 200mg/kg I.V. 6 hourly Chloramphenicol, 50 – 75mg/kg I.V 6 hourly

Fungal Meningitis

Fungal meningitis is usually caused by Cryptococcal neoformans. This is commonly seen in immunocompromised individuals such as people with HIV/AIDS or individuals with malignancies or on immunosuppressant drugs.

The drug of choice is amphotericin B. and fluconazole for at least 10 days and followed by daily fluconazole. The amphotericin B. Dosage is 0.7mg/kg IV daily by slow infusion over 4 hours. Current treatment guidelines do not support the slow dose escalation of amphotericin B and are associated with poorer patient outcomes.

Caution

Amphotericin B the daily dosage should not exceed 1mg/kg for adults or children.

Flucytosine is added at 150mg/kg/day every 6 hours for 6 weeks, but this is associated with increased risk of bone marrow toxicity and clinical research showed no increased benefit when compared to amphotericin B and fluconazole.

Fluconazole is also effective for cryptococcus infection, but should not be used as monotherapy, particularly in the initial period of treatment.

Treatment of Cryptococcal Meningitis:

Amphotericin B 0.7mg/kg IV + Fluconazole 800mg Po daily for at least 10 – 14 days, followed by daily maintenance fluconazole 800mg for 8 – 10 weeks, then daily chronic suppression with 200mg until CD4 count >200 for at least 6 months for HIV + patients.

Management of intracranial pressure is essential and may require repeated lumbar punctures to drain CSF to reduce the pressure. Children can be treated with 3 to 6mg/kg/day.

- Tuberculous meningitis may complicate pulmonary tuberculosis especially in patients with immune deficiency, also in children between 1 and 5 years and in the elderly. These should be treated with anti-tuberculosis therapy, which should be prolonged for an extra 3 months.

Supportive

- Fever, dehydration, and electrolyte disorders require correction.
- Care must be taken not to over hydrate patients with cerebral oedema.
- Convulsion and status epilepticus are treated appropriately.
- All patients with presumed bacterial meningitis (of unknown aetiology) should be isolated for the first 24 hours of therapy.

Viral meningitis may complicate viral infection in other parts of the body e.g. herpes meningitis. Most common causes of viral meningitis or encephalitis are herpes viruses.

Human Herpes Virus (HHV3 or Varicella Zoster Virus): commonly causes Chicken pox or shingles. If you suspect a VZV meningitis or encephalitis:

- Acyclovir IV 10mg/kg q 8 hours for 14 – 21 days in adults, but can use higher doses in neonates upto 20mg/kg IV Q8hrs to reduce rates of relapses. Oral Acyclovir should not be used, as therapeutic levels will not be achieved.

Children 5mg/kg 8 hrly.

Prevention

- Avoid overcrowding
- Immunisation against Meningococcal Meningitis.

3.6 ANTHRAX

Definition

This is a highly infectious disease of animals especially ruminants, transmitted to man by contact with the animal or animal products (carcasses) or faeces. The causative organism, *Bacillus anthracis* is a large gram-positive, facultatively anaerobic, encapsulated rod. The spores are resistant to destruction, remaining viable in soil and animal products for decades.

Human infection is usually through the skin, but has occurred following ingestion of contaminated meat. Inhalation of spores under adverse conditions (e.g. the presence of an acute respiratory infection) may result in pulmonary anthrax (woolsorters disease) which is often fatal.

Clinical Features

The occupational history of the patient is often important. The incubation period varies from 12 hours to 5 days.

The cutaneous form:

begins as a red-brown papule that enlarges with considerable peripheral erythema, vesiculation, and induration. Central ulceration follows, with serosanguineous exudation and formation of a black

eschar. Local lymphadenopathy may be seen; occasionally fever, malaise, nausea, vomiting, myalgia and headache.

Pulmonary Anthrax:

This follows rapid multiplication of spores in the mediastinal structures. Serosanguineous transudation, pulmonary oedema, and pleural effusion occur. Initial symptoms are insidious and resemble influenza. Fever increases, within a few days and severe respiratory distress develops. Chest – x-ray may show diffuse patchy infiltration; the mediastinum is widened because of enlarged haemorrhagic lymph nodes.

Treatment

Treatment is mainly by antibiotic, penicillin is the antibiotic of choice – procaine penicillin G 600,000 unit I.M twice daily for 7 days prevents systematic spread and induces gradual resolution of the pustule.

Or

Tetracycline 2gm per day in 4 divided doses for seven days.

Or

Erythromycin at 500mg 6 hourly is a good alternative in children or pregnancy for seven days.

For Pulmonary anthrax: Early and continuous I.V. therapy of benzyl penicillin 20 mega units per day may be life saving.

If treatment is delayed (usually because the diagnosis is missed), death is likely to occur.

Prevention

A vaccine is available for those at high risk (veterinarians, laboratory technicians, butchers and employees of textile mills processing goat hair); advocating use of personal protective equipment, gloves, overalls, boots should be encouraged.

missed), death is likely to occur.

3.7 SEXUALLY TRANSMITTED INFECTIONS (STI)

Sexually Transmitted Infections (STIs) are among the most common causes of all Out Patient Department (OPD) attendances in Zambia.

There are three approaches to management of STIs,

- Aetiological; where one collects specimens for laboratory identification of causative agent prior to treatment,
- Clinical; where one depends on past experience and own knowledge, and
- Syndromic; where one identifies on the basis of symptoms and signs and treats to cover the majority of organisms that may cause those symptoms.

The syndromic approach to managing Sexually Transmitted Infections has been adopted by the Ministry of Health for the management of STIs in public health institutions in Zambia. Syndromic case management is based on identifying consistent groups of symptoms and easily recognized signs and providing treatment which will deal with the majority of organisms responsible for producing each syndrome. Using syndromic approach, a diagnosis is made by taking a client's history and examining them to verify their STI problem.

There are 8 common syndromes namely:

- urethral discharge,
- vaginal discharge,
- genital ulcer,
- genital growth ,
- lower abdominal pain ,
- inguinal bubo,
- scrotal swelling and
- neonatal conjunctivitis.

-

3.7.1 Urethral Discharge

This is a condition in which there is dysuria coupled with often copious, mucoid discharge from the urethral meatus. Two common conditions presenting with urethral discharge are

- a) Gonococcal urethritis
- b) Non-gonococcal urethritis

3.7.2 Gonococcal urethritis

Definition

This is an acute inflammatory condition of the columnar epithelial lining of the urethra. It is caused by a gram-negative intracellular diplococcus, *Neisseria gonorrhoea*.

Clinical Features.

The incubation period is 3 to 7 days and the patient will present with dysuria.

(difficulty in micturition), followed by urethral discharge of copious, mucoid fluid.

which is sometimes pussy. Frequency and urgency may develop as the disease.

spreads to the posterior urethra. Examination of the discharge shows a purulent,

yellowish green urethral discharge. The lips of the meatus may be red and swollen.

Complications

These include:

- Acute epididymo-orchitis: This is an important complication, which is usually
- unilateral swelling and tenderness of the testis and epididymis. Bilateral
- epididymo-orchitis may result in sterility.
- Urethral strictures: This is a late complication occurring in cases which are treated

- inadequately or not at all. This could occur 10 to 25 years after an initial infection
- or in cases of recurrent infections.

Disseminated Gonococcal Infection: This is an arthritis-dermatitis syndrome in which the patient presents with a mild febrile illness, malaise, migratory polyarthralgia or polyarthritides and a few pustular skin lesions.

3.7.3 Non-Gonococcal Urethritis

Definition

The term Non-gonococcal urethritis is used to describe other causes, of urethritis apart from *Neisseria gonorrhoeae*. The organisms commonly responsible are *Chlamydia trachomatis* and *Ureaplasma urealyticum* among more than 20 known organisms.

Clinical Features

Symptoms usually occur 7 to 28 days after intercourse; usually mild dysuria and discomfort in the urethra and a clear to purulent mucoid discharge. Although the discharge may be slight and the symptoms mild, they are frequently more marked in the morning when the lips of the meatus are often stuck together with dried secretions.

On examination the meatus may be red, with evidence of dried secretion on underwear. Occasionally the onset is more acute, with dysuria, frequency and a copious purulent discharge.

Diagnosis

This is based on bacteriological examination of the discharge to exclude gonorrhoea.

Complications

These include epididymitis and urethral stricture. Perihepatitis could also occur.

Treatment

Syndrome	Causal Pathogens	Recommended regime	Recommended regime for children
Urethral Discharge	Neissera Gonorrhoea Chlamydia	Ciprofloxacin 500mg stat Plus Doxycycline 100 bd X 7/7	Spectinomycin 40mg/kg IM stat (maximum 2g stat) >8years old Erythromycin 50mg/kg/day in 4 doses for 14 days

Persistent urethral discharge one week after treatment consider *Trichomonas vaginalis*, then treatment Metronidazole 2g PO stat for adults Metronidazole 5mg/kg body weight for children

Prevention

Avoiding multiple sexual partners and unprotected casual sexual intercourse. Condom use is advised.

3.8 GONORRHOEA IN NEONATES

3.8.1 Ophthalmia Neonatorum

Definition

Ophthalmia Neonatorum is inflammation of the conjunctiva in the neonatal period (day 1 to day 28) due to infection with *Neisseria gonorrhoeae*. The gonococcus produces a toxin which dissolves the cornea and can lead to blindness. The infection is acquired during birth when passing through the birth canal. The incubation period is 3 to 5 days.

Non gonococcal conjunctivitis is due to *Chlamydia trachomatis*, *Staphylococcus aureus* and *Streptococcus pneumoniae*.

Clinical features

It commonly presents with purulent, copious eye discharge usually in both eyes. Itching and redness are also present. The neonate may also present with septicæmia with fever, rash and joint swelling.

Diagnosis

This is confirmed by taking an eye swab for culturing for Gonorrhoea.

Treatment

Note: The use of antibiotic eye ointments in gonococcal conjunctivitis is of no documented benefit. Systemic treatment is recommended for all symptomatic cases

NOTE: The baby's mother and partner(s) should receive syndromic treatment for Gonorrhoea and Chlamydia. Breastfeeding mothers should be given Gentamicin and not Ciprofloxacin for gonorrhoea but for Chlamydia give Erythromycin

Neonatal Conjunctivitis	Gonorrhoea	Spectinomycin 50mg/kg IM stat
	Plus Chlamydia	Plus Erythromycin 50mg/kg PO QID X 7 days Normal Saline lavage of the affected eye

Prevention

Women with pelvic inflammatory disease or urinary tract infection in pregnancy should be treated promptly before delivery. Every child's eyes should be swabbed with cotton wool soaked with povidone-iodine or normal saline immediately after birth. Apply any of the following

- Povidone-iodine
- Silver nitrate 1% aqueous solution stat
- Erythromycin 0.5% ophthalmic ointment stat
- Tetracycline ophthalmic ointment 1% stat
- Normal Saline

3.8.2 Vaginal Discharge and Lower Abdominal Pain in Women

There are various gynaecological conditions that could present with vaginal discharge and lower abdominal pain. These include:

Pelvic Inflammatory Disease (PID)

Vulvovaginitis

Urinary Tract Infection (UTI)

3.8.3 Pelvic Inflammatory Disease

Definition

Pelvic inflammatory disease is a condition involving the pelvic organs i.e. cervix (cervicitis), uterus (endometritis), salpinx (salpingitis) and ovaries (oophoritis).

Organisms that may be responsible for this disease are- Neisseria gonorrhoeae, and Chlamydia trachomatis. Endogenous aerobic bacteria such as E. coli, Klebsiella, Proteus and Streptococcus species and endogenous anaerobes such as Bacteroides, Peptostreptococcus and Peptococcus; Mycoplasma hominis and Actinomyces israelii affect predominantly the vagina presenting as vaginal discharge but ascend through the cervical tract to cause Pelvic Inflammatory Disease (PID). PID is a disease of the young woman.

Some of the predisposing factors are:

- Sexual intercourse
- Induced abortion
- Dilatation and curettage or endometrial biopsy
- Intrauterine device (IUD) insertion or use
- Hysterosalpingoscopy
- Laparoscopy
- Radium insertion into the endometrial cavity.

Clinical Features

Symptoms

- Lower abdominal pain
- Copious purulent vaginal discharge may be present or absent
- High-grade fever is an indicator for admission
- Nausea
- Vomiting
- Painful sexual intercourse (dyspareunia)

Signs

- Occasional diarrhoea
- Lower abdominal tenderness with rebound is an indicator for admission
- Adnexia tenderness
- Cervical excitation

Complications

- Peritonitis
- Tubo-ovarian abscess
- Hydrosalpinx
- Ectopic Pregnancy
- Chronic Pelvic Pain
- Infertility
- Mortality
- Indications for immediate referral to gynaecology or surgery
 - missed/overdue period
- recent delivery or abortion
- abdominal guarding or rebound tenderness
- abnormal vaginal bleeding
- abdominal mass
- temperature above 38 degrees Celsius

3.8.4 Vulvovaginitis

Definition

Vulvovaginitis is an inflammatory condition affecting the vulva and the vagina. The causative organisms include; *Candida albicans*, *Chlamydia trachomatis*, *Trichomonas vaginalis*. Bacterial vaginosis.

Clinical Features

Symptoms

- Vaginal itching
- Burning sensation

Signs

A watery, thick or mucoid, foul-smelling and yellowish or brown vaginal discharge is sometimes present.

Diagnosis

Insert a speculum into the vagina and using a swab take two specimens one from the cervical for gram stain and culture on Gonococcal media for gonorrhoea, the second for wet mount and microscopy for Candida, Trichomonas.

Complications

- Secondary bacterial infection,
- Skin excoriation
- Dermatitis.

Treatment

Vaginal Discharge and lower Abdominal Pain	Neisseria gonorrhoeae	Adults: Ciprofloxacin 500mg PO stat Plus Doxycycline 100 bd PO X 7/7	Children: Spectinomycin 40mg/kg IM stat (maximum 2g stat) >8years old Erythromycin 50mg/kg/day in 4 doses for 14 days
	Chlamydia	Plus Metronidazole 2g PO stat	Metronidazole 5mg/kg body weight
	Trichomoniasis	Plus	
	Bacterial Vaginosis	Fluconazole 150mg PO stat	
	Vaginal Candidiasis		

3.8.5 Urinary Tract Infection

(refer to STI)

3.8.6 Genital Ulceration

Definition

Genital Ulceration is the loss of continuity in the epithelial surface covering the genital area.

Ulcerative lesions of the genitalia are common outpatient problems. Men are more commonly affected than women. There are many causes including:

Chancroid

- Granuloma inguinale (Donovanosis)
- Herpes genitalis
- Lymphogranuloma venereum
- Syphilis

3.8.7 Syphilis

Definition

This is an infection caused by spirochaetes called *Treponema pallidum*, a corkscrew shaped organism with an incubation period of 9 to 90 days

Clinical Features

Primary syphilis, , presents with a painless papule at the site of inoculation which then ulcerates .The ulcer called chancre, is often solitary with a firm, indurated base and is therefore often referred to as hard sore. Oral and vulva lesions may be subtle. In men the chancre could be found on the glans penis, shaft, anus and rectum whereas in women it is found on the vulva, cervix and perineum. Chancres may also be found on the skin or mucous membrane of the anogenital area as well as the lips, tongue, buccal mucosa, tonsils or fingers. Rarely chancres

can be found on other parts of the body, often producing such minimal symptoms that they are ignored. There may be bilateral inguinal lymphadenopathy. Without treatment the ulcer heals in 3-6 weeks.

Secondary syphilis presents 6 to 12 weeks after infection with cutaneous rashes which may be generalized and also affect the soles and palms. The rash can mimic any skin disease ranging from circular plaques like psoriasis, or light copper coloured scaly macules like pityriasis rosea. Patchy hair loss is a common presentation. In the mouth are found snail track ulcers which are slimy superficial erosions. Condylomata lata are flat warty papules and plaques found on the genitalia and perineal skin. Generalised enlarged lymph nodes may occur. Other areas may be involved as well such as eyes (uveitis), bones (periosteitis), joints, meninges, kidneys (glomerulitis), liver and spleen.

Tertiary syphilis. Presents 10 to 25 years after initial infection. The patient may present with cardiovascular complications. These include dilated aneurysm of the ascending aorta, narrowing of the coronary aorta or aortic valvular insufficiency. The central nervous system complications include dementia and psychosis and meningovascular neurosyphilis.

Congenital syphilis presents with clinical features like those of secondary syphilis in adults. Mild constitutional symptoms of malaise, headache, anorexia, nausea, bone pains and fatigability are present as well as fever, anaemia, jaundice, albuminuria and neck stiffness.

Diagnosis

Collect blood specimen and allow to clot, send to the laboratory for identification of antibodies to *Treponema pallidum* using screening methods like VDRL (Venereal Disease Research Laboratory), RPR (Rapid Plasma Reagin)

Treatment

Adult:

Benzathine Penicillin 2.4M.U IM weekly for a total 3 doses
Alternatively give Procaine Penicillin 1.2M.U IM daily for
10 days

Or

Erythromycin 500mg 4 times a day for 14 days in
penicillin allergy and children (50mg/Kg body weight)

Or

In non-pregnant adults Doxycycline 100mg twice daily for
14 days

Child:

Benzathine Penicillin 50 000units/kg IM weekly for a total
of 3 doses

Treatment of Genital Ulcers

Most patients with primary or secondary syphilis infection have Jarisch – Herxheimer reaction within 6 hours to 12 hours of initial treatment. The reaction is manifested by generalized malaise, fever, headache, sweating rigors and a temporary exacerbation of syphilitic lesions. This usually subsides within 24 hours and poses no danger other than the anxiety it produces.

3.8.8 Chancroid

Definition

This is an acute, localized, contagious disease characterised by painful genital ulcers and suppurative inguinal lymph nodes. The causative organism is *Haemophilus ducreyi* a short, slender, gram-negative bacillus with rounded ends and usually found in chains or groups.

Clinical Features

The incubation period is 3 to 7 days. Small, painful papules rapidly break down to become shallow ulcers with ragged undermined edges. The ulcers, which vary in size and often coalescing, are shallow, non-indurated, painful and surrounded by a reddish border. The inguinal lymph nodes become enlarged, tender and matted, forming a fluctuant abscess (Bubo) in the groin. The skin over the abscess becomes red and shiny and may break down to form a sinus. Chancroid may coexist with other causes of genital ulcer.

Complications

- Phimosis
- Urethral stricture
- Urethral fistula
- Severe tissue destruction leading to phagedenic ulcer which may grow rapidly and cause auto amputation of the penis. Biopsy the ulcer to distinguish from squamous cell carcinoma.

Treatment

- Ciprofloxacin 500mg twice daily orally for three days.
- Or
- Erythromycin 500mg orally 6 hourly for 7 days

3.8.9 Lymphogranuloma Venereum

Definition

This is characterized by transitory primary ulcerative lesion followed by suppurative lymphadenitis. It is caused by serotypes of chlamydia trachomatis L1, L2, L3 which are distinct from those causing trachoma, urethritis, cervicitis and inclusion conjunctivitis.

Clinical Features

The incubation period is 3 to 12 days. A small, transient, non-indurated vesicular lesion is formed that rapidly ulcerates, heals quickly and may pass unnoticed. Usually the first symptoms are unilateral, tender enlarged inguinal lymph nodes, enlarging above and below the inguinal ligament giving rise to the characteristic groove sign. They progress to form a large, tender fluctuant mass that adheres to the deep tissues and inflames the overlying skin. Multiple sinuses may develop and discharge purulent or bloodstained material. Healing eventually occurs with scar formation. The patient may have constitutional symptoms of fever, malaise, joint pain, anorexia, and vomiting. Backache is common in women in whom the initial lesion may be on the cervix or upper vagina resulting in the enlargement and suppuration of perirectal and pelvic lymph nodes. This results in formation of rectovesical and rectovaginal fistulas. Aspirate suppurating glands with a wide bore needle through intact skin. Avoid incision and drainage through fluctuant area which results in chronic sinus formation.

Treatment

Drugs

- Doxycycline 100mg orally twice daily for 14 days
or
- Alternative and/or in pregnancy

Inguinal Buboe	Chancroid	Ciprofloxacin 500mg PO BDX3 days
	Lympho granuloma Venerium	Doxycycline 100 BD X 14days

- Erythromycin 500mg orally 6 hourly for 14 days.

All sexual partners should be examined. The patient should be kept under observation for 6 months after apparently successful treatment.

3.8.10 Herpes Genitalis

Definition

Herpes Genitalis is an infection of the genital or anogenital area by herpes simplex virus (herpes virus hominis type 2). Type 1 (HSV-1) is the most common cause of genital ulceration in developed countries. It is moderately contagious and usually spreads by sexual contact. Lesions usually develop 4 to 7 days after sexual contact. The condition tends to recur because the virus establishes a latent infection of the sacral sensory nerve from which it reactivates and re-infects the skin.

Clinical Features

The primary lesions are more painful, prolonged and widespread than those of recurrent infections. Itching and soreness usually precede a small patch of erythema on the skin or mucous membrane. A small group of painful vesicles develops, they erode and form several superficial, circular ulcers with a red areola, which coalesce.

The ulcers become crusted after a few days and generally heal with scarring in about 10 days. The inguinal lymph nodes are usually slightly enlarged. Tender lesions in men may occur on the prepuce, glans penis, and penile shaft whereas in women may occur on the labia, clitoris, perineum, vagina and cervix. In addition to pain, in primary infection, the patient may experience generalized malaise, fever, difficulty in micturition or difficulties in walking.

Diagnosis

This is mainly clinical but can be confirmed by tissue culture.

Scrape the roof of the blister and make a smear. Stain with papanicolou stain. Giant multinucleated cells are diagnostic

Complications

- Aseptic meningitis
- Transverse myelitis
- Autonomic nervous dysfunction involving the sacral region leading to urinary retention.

Drugs

- Acyclovir 200mg orally 5 times daily for 7 days for initial infection.
- Acyclovir 200mg orally 5 times daily for 5 days for recurrent infection.

Genital Ulcer Disease	Syphilis	Benzathine Penicillin 2.4M.U IM weekly X 3 doses	Benzathine Penicillin 50 000units/kg IM weekly X 3 doses
	Chancroid	Ciprofloxacin 500mg PO BD X 3 days	
	Herpes Genitalis	Acyclovir 400mg TDS X 7 days	Acyclovir 20mg/kg 8 hourly for CNS and disseminated disease; extend therapy to 21days; for disease limited to skin and mucous membranes for 14 days
	Lympho granuloma Venerium	Doxycycline 100 BD X 14days	

3.8.11 Granuloma Inguinale (Donovanosis)

Rare in Zambia

Definition

This is a chronic granulomatous condition usually involving the genitalia and spreads by sexual contact. It is common in the tropical and subtropical climate and is caused by gram-negative, *Calymmatobacterium granulomatis* an intracellular bacillus found in mononuclear cells.

Clinical Features

The initial lesion is a painless, beefy-red nodule. Multiple nodules appear and coalesce to form a large elevated, velvety, granulomatous mass. The incubation period is 1 to 12 weeks. The sites of infection in men are penis, scrotum, groin and thighs, whereas in women the vulva, vagina and perineum are the common sites, with the face being affected in both sexes. In homosexual men the anus and buttocks are affected. There is no lymphadenopathy. The infection may involve other parts of the body. Progress is slow but the eventual lesion may cover the whole external genitalia, the deep seated ulcers causing lymphatic obstruction and elephantiasis of the genitalia.. Healing is also slow and often leads to scar tissue formation. Secondary infection is common and can cause gross tissue destruction.

Complications

- Anaemia
- Weight loss

Diagnosis

Do a punch biopsy of the lesion and crush between two glass slides. Stain with Wright's or Giemsa Stain to show gram negative rods within macrophages. Secondly, send the biopsy for histopathology to rule out squamous cell carcinoma. Thirdly, diagnosis can be based on clinical findings that are often characteristic i.e. bright, beefy- red granulomatous lesions.

Treatment

Prevention:

- Condom use is advisable

Drugs

- Erythromycin 500mg orally 6 hourly for 14 to 21 days.

3.8.12 Genital Growth (Condylomata Acuminata)

Definition

This is a fleshy growth found around the anogenital region caused by Human papilloma virus infection HPV6 and 11 but HPV 16 and 18 are associated with cancer of the cervix.

Clinical Features

Lesions can be subclinical (not visible to the naked eye) or overt anogenital warts.

Visual inspection of overt disease (fleshy growth of the lower genital tract) detects obvious lesions, which are often multifocal in distribution. However, the appearance and size depends on their location, the trauma to which they are subjected and the degree of irritation.

Genital growths	Genital warts (Condylomata Acuminata)	Podophylline 25% topically by physician weekly till resolved	Cauterisation (i) 0.5 - fluorouracil cream (ii) Trichloroacetic acid (iii) Cryosurgery (iv) Electro cauterisation (v) Laser vapourisation (vi) Surgical removal
	Condylomata lata	Benzathine Penicillin 2.4 MU IM weekly for 3 doses	Benzathine Penicillin 50 000iu/kg IM weekly for 3 doses

For Cervical Warts DO NOT CAUTERISE

Diagnosis

This is based on direct inspection. If uncertain, confirmation can be done by biopsy. May predispose to cancer of the cervix.

Treatment

Podophyllin paint compound (Podophyllin resin 15% in compound benzoin tincture) - applied every week until lesions disappear. The application should not be left on for more than 4 hours. Where possible, application should be done in the clinic.

Or

Silver nitrate crystals 5 % daily until lesions disappear. Recurrence is common.

Prevention

Avoid multiple sexual partners.

Condom use is advised.

Special Considerations pertaining to syndromic management

Pregnant women

- Vaginal discharge syndrome: for Neissera gonorrhoeae give Spectinomycin 2g IM stat; for Chlamydia give Erythromycin 500mg QID for 7days
- Genital Ulcer Disease: for Chancroid give Erythromycin 500mg QID X 7 days; for LGV give Erythromycin 500mg QID for 7 days; for Herpes Genitalis give Acyclovir as in the non pregnant. In the event of an outbreak during labour, consult a gynaecologist to consider an emergency Caesarian Section; for Donovanosis give Erythromycin 500mg QID for 3 weeks until all lesions have completely healed.
- Genital Growths: Genital warts, LEAVE ALONE, wait until delivery, then decide on surgical management. During labour, if the pelvic outlet is obstructed, or vaginal delivery would result in excessive bleeding, Caesarian Section is indicated. For cervical warts, refer to gynaecologist for pap smear to rule out CIN, because cauterization can lead to vaginal fistulas or perforation. For anal warts, refer to surgeon because cauterization could lead to fistula formation. For urethral-meatal warts, refer to surgeon
- HIV Infected
Genital Ulcer Disease: in Chancroid, since the ulcers heal slower, it is recommended that the courses of treatment take longer, give Erythromycin 500mg QID for 7 days.

Children

- For children treated with erythromycin, follow up for symptoms of pyloric stenosis which present with vomiting and abdominal discomfort/distention

3.8.13 Hepatitis

Definition:

Acute inflammation of the liver caused by primarily human viruses from A to E; B and C

Mode of transmission

- Cutaneous, or
- Mucous membrane exposed to contaminated blood
- Unprotected sex by infected partner, or through
- Contaminated needle by injection,
- and perinatal transmission

The clinical features of acute hepatitis are common to all of them and these are:

- Malaise
- Nausea
- Abdominal pain
- Anorexia
- Jaundice
- Dark urine
- Fever
- Rash
- Athralgia

	Hepatitis B	Hepatitis C
Incubation	60 – 180 days	15 – 180 days
Transmission	Blood borne Sexual	Blood borne Sexual
Progression to chronicity	Occasionally varies by age	Usually
Etiologic agent	Hepatitis B Virus	Hepatitis C Virus
Comments	Vaccine available	Not available
Serologic diagnosis	HBsA, IgM anti-HBc	HCV RNA; anti HCV

Treatment

Counsel patient for HIV AIDS and if negative give

Lamivudine 150mg twice a day.

If positive refer to ART Clinic.

Prevention

Hepatitis B vaccine is available for children, but no vaccine for Hepatitis C

Safe sex

Avoid use of contaminated needles.

3.8.14 Acute Epididymo - Orchitis

This is an inflammation of the epididymis and the testes.

It is usually a complication of urethritis which is not treated at all or which was improperly treated.

Clinical Features

Presentation is mucoid, pussy urethral discharge, painful scrotal swelling usually unilateral but could be bilateral, the pain is gradual and dull. Milking of the urethra produces pussy discharge. Diagnosis is confirmed by culture of urethral discharge. Complications include atrophy of the testes, infertility.

Supportive

- Bed rest,
- scrotal support or elevation,
- scrotal ice packs,
- analgesics.

The causative organism in men less than 35 years of age is usually *Neisseria gonorrhoeae*, or *Chlamydia trachomatis*.

Treatment

Drugs

The best antibiotics are those that are sensitive to the above organisms.

1. Ciprofloxacin 500mgs stat oral + Doxycycline 100mgs OD for 7 days.

Or

2. Ceftriaxone 1gm (I.M.) once + Doxycycline 100mg 12 hourly for 7 days.

Erythromycin may be substituted for Tetracycline or doxycycline at 500mg every 6 hours for 7 days.

In men older than 35 years of age, cause is mostly due to coliform gram -negative bacilli. Gentamicin 80mg 8 hourly for 7 days or a 3rd generation cephalosporine as above may be used until sensitivity is determined.

Prevention

- Avoiding multiple sexual partners
- Usage of condoms.

Acute Testicular Torsion

This is the twisting of the testis on its cord, but could also be defined as twisting of the testis along its vertical axis resulting in compromised vascular supply to the testis and the adjoining spermatic cord. It may be spontaneous or following strenuous activity, it may also result from anomalies in development of the tunica vaginalis and the spermatic cord.

Clinical Features

The immediate symptoms of torsion include:

- Severe local pain
- Nausea
- Vomiting
- Scrotal swelling (oedema) + darkish discoloration
- Fever

Torsion must be differentiated from inflammatory conditions within the scrotum, trauma and testicular tumour.

Signs

Elevation and rotation of testis

Treatment

Immediate surgical intervention is advised if torsion is suspected, surgical exploration within a few hours offers the only hope of testicular salvage. Fixation of the contralateral testis is performed to prevent torsion on that side.

Acute Strangulated Hernia

This a condition in which the incarcerated bowel that protrude through the inguinal canal cannot be reduced and the vascular supply to that part of the bowel is cut off i.e. necrosis of herniated bowel.

Clinical Features

The patient presents with an acute painful inguinal swelling usually extending into the scrotum. There is usually a previous history of a reducible inguinal hernia with strangulation now occurring as a complication.

Symptoms include:

- Painful inguinoscrotal area
- Fever
- Vomiting
- Irritability and restlessness.

Hernia must be differentiated from hydrocele, in the former, the examiner cannot palpate the cord above the mass, whereas with hydrocele normal cord structures are usually palpable above the mass.

In strangulated hernia there is a previous history of a swelling. A hydrocele is often cystic and can be trans-illuminated using a torch.

Treatment

The basic line of management is immediate surgical intervention and relieving the obstruction. It is mandatory to inspect the bowel if emergency resection is done and also anastomosis of the viable segments.

Testicular Tumours

These are malignant growths arising from the testis. Testicular tumours accounts for the majority of solid malignancies in males older than 30 years of age.

Pathology

Most malignant testicular tumours arise from the primordial germ cell and are classified as seminoma, teratoma, embryonal carcinoma, teratocarcinoma and chorio-carcinoma in order of increasing malignancy.

Clinical Features

The usual presenting sign is a scrotal mass, increasingly progressive in size and sometimes associated with pain. Many patients relate the mass to minor trauma indicating the time when the mass, was first discovered. Haemorrhage into a rapidly expanding tumour may produce exquisite local pain and tenderness. A firm mass arising from the testis is cause for immediate clinical suspicion of testicular tumour.

Diagnosis

- Physical examination
- Ultrasound may localise the lesion to the testis.
- Exploration, exposing and clamping the cord through an inguinal incision before mobilizing the tumour.
- Chest x-ray and IVU is done to rule out metastasis.

- Prognosis depends on the histological finding and the extent of the tumour.

Treatment

Inguinal orchidectomy must be performed and transabdominal retroperitoneal lymph node dissection is usually recommended for terato and embryonal carcinoma and adult teratoma.

Irradiation may be effective in seminoma, using 30 to 50ay (3000 to 5000 rads) to abdominal and mediastinal lymphatics as well as left supraclavicular areas, depending on the staging.

Hydrocele

Definition

This is a condition characterised by accumulation of fluid in tunica vaginalis presenting as a cystic scrotal mass. The fluid is accumulated as a result of over production or reduced absorption of lymphatics or venous obstruction in he cord or retroperitoneal space.

Clinical Features

Usually patients present with an intrinsic scrotal mass, often cystic and painless but occasionally may be painful when severely distended and unilateral. It is transilluminable. In hydrocele the cord can be palpated above the cystic mass.

Treatment

This is surgical, hydrocelectomy – opening the sac and draining the fluid, then everting the testis, although aspiration with needle may produce temporary relief.

Acute Mumps Orchitis

This is an inflammatory condition of the testis caused by the mumps virus. It is paramyxovirus. About 20% of post-pubertal male patients have testicular inflammation, usually unilateral.

Clinical Features

There is testicular swelling associated with inflammation in other organs – parotid gland, pancreas, meninges, etc. Testicular atrophy may ensue.

Treatment

This is symptomatic – analgesics may be used for pain and generalised malaise.

Varicocele

This is a collection of large veins, usually occurring in the left scrotum and feeling like a “bag of worms”. It is present in the upright position and should empty in the supine position.

Clinical Features

May produce pain or feeling of scrotal fullness.

Treatment

Surgical correction (Varicocelectomy)

3.8.15 Urinary Tract Infection

Definition

This is an infection, often bacterial, of the ureters, bladder and urethra. Urinary tract infection occurs much more frequently in women than in men, especially in pregnancy.

Most urinary tract infections are commonly caused by gram-negative bacteria, including E.coli, Klebsiella species, and Proteus species. Less commonly caused by gram positive cocci such as Staphylococcus species (especially non coagulase Staphylococcus, and Enterococci).

Clinical Features

In general, symptomatic urinary tract infections are characterised by irritative symptoms of the urinary bladder i.e.

- Frequency,
- Urgency and
- Dysuria (pain on passing urine).

Urinary tract infections may also be asymptomatic and diagnosis is coincidental on testing the urine and possibly culture of the urine.

Predisposing factors to urinary tract infections include catheterisation, colposcopy, cystoscopy and following intravenous urogram (I.V.U).

Complications

These include:

- Chronic pyelonephritis
- Prostatitis in men
- Acute epididymo orchitis

Diagnosis

This is made by history, physical examination and laboratory investigations. Mid stream specimen (MSSU) urine is collected for microscopy, culture and sensitivity. The diagnosis is based on colon count of bacteria of more than 10⁵/ml on culture.

Treatment

This should be instituted based on the common cause of UTI. Treatment should be reviewed as soon as the sensitivity results are ready.

Drugs

Based on sensitivity.

Nitrofurantoin 50 – 100mg 12 hourly for 5 to 7 days

OR

Nalidixic Acid 250mg 8 hourly for 5 days

If there are complications these drugs are used for at least 14 days or more.

Refer repeated infections to higher level.

Supportive

Increase water intake, prophylactic antibiotic therapy for those who have multiple repeated urinary tract infection or those who have congenital abnormality of the urinary tract predisposing them to multiple repeated infection before surgical correction of such abnormality.

3.8.16 Acute Pyelonephritis

Definition

This is bacterial infection of the kidney and renal pelvis, often bilateral. Escherichia coli is the commonest bacteria isolated, others include Klebsiella sp, Proteus mirabilis, Enterobacter, also Enterococcus and Staphylococcus aureus.

Clinical Features

Pyelonephritis is especially common in girls or in pregnant women and after bladder catheterization or instrumentation. It is not common in men who are free from urinary tract abnormalities.

Typically, the onset is rapid and characterised by chills, fever, loin pains, nausea, and vomiting. Symptoms of lower urinary tract infection, including frequency, dysuria occur concomitantly in a third of patients. Physical examination reveals some abdominal rigidity especially

in the loin of the infected side. In children, symptoms often are slight and less characteristic.

Diagnosis

Diagnosis is made by urinalysis, microscopy, culture and sensitivity. On urinalysis, the pH may be alkaline because of urea-splitting organism, proteinuria is minimal. White blood cells (WBC) greater than 10/ml are usually found in fresh uncentrifuged urine; and haematuria is common. Culture usually shows greater than 10⁴ colony forming units (CFU)/ML. On microscopy presence of microscopic casts, WBC greater than 10/ml are usually found per High Power Field (HPF).

Complications

These include chronic pyelonephritis, chronic renal failure.

Treatment

Initial treatment can be oral for those less ill, but will be parenteral for most patients. After 24 to 48 hours without fever, most patients receiving I.V. therapy can be switched to oral regimes.

In uncomplicated cases a single agent may be used:

- Amoxicillin, tablets 250mg – 500mg 8 hourly Adult
- Ciprofloxacin, tablet 500mg – 1gm 12 hourly Adult for 14 days.
- Cefotaxime, 1g 12 hourly for 14 days
- Ceftriaxone, I.V., 1gm once daily for 14 days
- Most treatments are used for 2 weeks, but up to 6 weeks may be required to prevent relapse.

3.9 The Plague

Definition

This is an acute, severe infection appearing in , bubonic, septicemic or pneumonic form, but pharyngeal and meningial could also be found. This is caused by a bacteria called *Yersinia pestis*; a short bacillus that often shows bipolar staining (especially with giemsa stain). Plague often occurs primarily in rodents e.g. rats. Plague is transmitted from rodent to man by the bite of an infected flea vector. Man to man infection occurs through inhalation of droplets in pneumonic plague. Septicaemia and meningial plague are due to haematological spread.

Clinical Features

Symptoms

- Headache
- Severe malaise
- Vomiting
- Chills
- Muscle pain
- Cough
- Abdominal pain
- Chest pains

3.9.1 Bubonic Plague

This is the commonest form. The incubation period varies from a few hours to 12 days, but is usually 2 to 5 days. Onset is abrupt often associated with chills, fever, rapid pulse with low blood pressure (hypotension) may occur. Enlarged lymph nodes (buboes) appear very shortly before the fever. The femoral and inguinal lymph nodes are most commonly involved; followed by axillary cervical or multiple nodes. Typically the nodes are extremely tender and firm, surrounded by considerable oedema. The liver and the spleen may be palpable. The mortality rate of untreated patient is about 60%.

3.9.2 Primary Pneumonic Plague

This has 2 to 3 days incubation period, followed by abrupt onset of high fever, chills, tachycardia and headache, often severe. Cough is not prominent initially. Cough develops within 20 to 24 hours with the sputum, mucoid at first, and rapidly becomes bloody.

Chest X-ray shows progressive pneumonia. Most untreated patients die within 48 hours of onset of symptoms. Diagnosis is based on recovery of the organisms which may be isolated from blood, sputum or lymph node aspirate. Needle aspiration of bubo is preferable since surgical drainage may disseminate infection. Inject sterile Phosphate Buffered saline in the bubo and aspirate the pus.

Treatment

Drugs

Uncomplicated plague

Treatment in Adults

- Streptomycin, 15mg/Kg 12 hourly for 10 days or Gentamicin 5mg/Kg IM or IV
- qid or Doxycycline, 100mg po bid or Chloramphenicol 25mg/Kg IV qid
- Tetracycline, 250mg -1g orally 6 hourly for 7 to 10 days or
- Chloramphenicol, 25mg/kg I.V or orally 6 hourly for 7 to 19 days.

Treatment in pregnancy

- Gentamycin, 5mg/Kg IM
- Doxycycline, 100mg po bid

Treatment in children

- Streptomycin, 15mg/Kg IM BID
- Gentamycin, 2.5mg/Kg IM
- Doxycycline, 2.2mg/Kg IV BID
- Chloramphenicol, 25mg/Kg IV QID

Prevention

This is based on rodent control and the use of repellent to minimize fleabites. Through immunization with standard killed plague vaccine gives protection to at risk individuals e.g. veterinary doctors.

3.10

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS)

Definition

HIV: Human Immunodeficiency Virus. This is the virus that causes HIV infection and AIDS.

AIDS: Acquired Immune Deficiency Syndrome. AIDS is the severest stage of the clinical spectrum of HIV infection. It occurs when the immune system of a person who is HIV-infected becomes so suppressed that they are vulnerable to opportunistic infection and neoplasms.

ART: Antiretroviral Therapy. A combination of antiretroviral drugs used in the management of HIV/AIDS.

Clinical Features

The WHO clinical staging is used to determine the severity of HIV infection based on the presenting opportunistic infections in a confirmed HIV infected individual. WHO staging can be used to make decisions for initiation, switching or stopping ART.

3.10.1 WHO Clinical Staging of HIV disease in Adults and Adolescents

CLINICAL STAGE 1

- Asymptomatic
- Persistent generalized lymphadenopathy

CLINICAL STAGE 2

- Moderate unexplained weight loss ((under 10% of presumed or measured body weight) (Unexplained refers to where the condition is not explained by other conditions e.g. nutrition or exercise regime intended to lose weight) (Assessment of body weight among

pregnant women needs to consider the expected weight gain of pregnancy)).

- Recurrent upper respiratory tract infections (sinusitis, tonsillitis, otitis media, pharyngitis)
- Herpes zoster in last 5 years
- Angular cheilitis
- Recurrent oral ulceration
- Papular pruritic eruptions
- Seborrhoeic dermatitis
- Fungal nail infections

CLINICAL STAGE 3

- Unexplained severe weight loss ((over 10% of presumed or measured body weight) (Assessment of body weight among pregnant women needs to consider the expected weight gain of pregnancy)).
- Unexplained chronic diarrhoea for longer than one month
- Unexplained persistent fever (intermittent or constant for longer than one month)
- Persistent oral candidiasis
- Oral hairy leukoplakia
- Pulmonary tuberculosis
- Severe bacterial infections (e.g. pneumonia, empyema, pyomyositis, bone or joint infection, meningitis, bacteraemia)
- Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis
- Unexplained anaemia (below 8 g/dl), neutropenia (below $0.5 \times 10^9/l$) and/or chronic thrombocytopenia (below $50 \times 10^9 /l$)

CLINICAL STAGE 4

- HIV wasting syndrome (> 10% wt loss and > 1 mo diarrhea and > 1 mo fever)
- *Pneumocystis pneumonia*
- Recurrent severe bacterial pneumonia
- Chronic herpes simplex infection (orolabial, genital or anorectal of more than one month's duration or visceral at any site)
- Oesophageal candidiasis (or candidiasis of trachea, bronchi or lungs)
- Extrapulmonary tuberculosis
- Kaposi sarcoma
- Cytomegalovirus infection (retinitis or infection of other organs)
- Central nervous system toxoplasmosis
- HIV encephalopathy
- Extrapulmonary cryptococcosis including meningitis
- Disseminated non-tuberculous mycobacteria infection
- Progressive multifocal leukoencephalopathy
- Chronic cryptosporidiosis
- Chronic isosporiasis
- Disseminated mycosis (extrapulmonary histoplasmosis, coccidiomycosis)
- Recurrent septicaemia (including non-typhoidal *Salmonella*)
- Lymphoma (cerebral or B cell non-Hodgkin)
- Invasive cervical carcinoma
- Atypical disseminated leishmaniasis
- Symptomatic HIV-associated nephropathy or HIV-associated cardiomyopathy

Diagnosis

- Early Diagnosis (DNA PCR)

Rapid antibody detection

- Screening test – Determine test
- Conformation test – Unigold Test
- Tie breaker test – Bioline test.

Clinical Management

Full History

- Full History
- History of the presenting complaint
- ICF for TB (Cough, Fever, Weight loss and night sweats)
- HIV history
- HIV Risk factors
- Past medical history
- Social history
- Drug history
- Reproductive history

Full Physical Exam

Baseline Laboratory investigations

- FBC(Hb, Hct), CD4, ALT, Creatinine

Eligibility Criteria For initiating ART

Prior to initiating ART in all patients ensure that:

1. Documented treatment preparation is completed
2. Disclosure is documented
3. Co-trimoxazole prophylaxis is initiated
4. Minimum baseline laboratories are completed: CD4, ALT, Creatinine, Hct/Hgb
5. Absence of the danger signs of un-resolved Opportunistic Infections (OIs) listed below is documented
 - a. Persistent fever
 - b. Persistent cough
 - c. Severe persistent headache
 - d. Anaemia (Hgb < 8 or Hct < 24)
 - e. Weight loss > 10%

If ANY of the above five symptoms are PRESENT then investigate and treat as appropriate (see review of undiagnosed OIs on next page)

1. Initiate diagnosis with sputum for AFB, CXR, cryptococcal antigen, and oxygen saturation
2. Based on test results initiate appropriate therapy
3. Initiate ART two weeks after documented response to OI treatment
4. If no clear diagnosis obvious from diagnostic test, then consult an HIV Specialist before initiating ART

Zambian Recommendations for initiating antiretroviral therapy in adults and adolescents with documented HIV infection.

Clinical Stage	CD4 available	CD4 not available
I	CD4 guided	Do not treat
II	CD4 guided	Total Lymphocyte Count <1200*
III	Treat	Treat
IV	Treat	Treat

*CD4 count strongly recommended

CD4 criteria for initiation of ART

CD4 count (cell/mm ³)	Recommendation
<350	Treat all irrespective of clinical stage

Note: Measure CD4 after stabilization of any inter-current illness

Table 5:
Conditions to Initiate ART irrespective of CD4 count

Condition	Recommendation
HIV positive partner in Discordant Couple (see below) Hepatitis B Virus Infection (chronic hepatitis B)*	Treat all irrespective of CD4 count

*Patients testing HBsAg positive with CD4 counts greater than 350 cells/mm³ should have ALT or AST checked and if elevated initiate HAART. For patients with normal baseline ALT or AST recheck both ALT or AST and HBsAg in 6-12 months.
If ALT or AST are elevated, or persistent HBsAg then start ART regardless of CD4 count or WHO staging. If signs of liver cirrhosis an positive HBsAg start HAART regardless of ALT or AST values.

Care for Patients Who Are Not Yet Eligible For HAART

Patients not eligible for initiation of HAART must also be monitored closely:

- To assess disease progression
- To identify eventual eligibility for HAART initiation

Table 6:
Follow-up for non-ART eligible patients

CD4 count (cell/mm ³)	Follow Up Actions
>500	Schedule follow up visits for every 6 months
350-500	Schedule follow up visits for every 3 months, with CD4 count every 6 months

For patients Eligible provide the following risk reduction:

- Finish reduction
- Treat presenting problem
- Identify latent opportunistic infections e.g. screen for TB
- Provide Cotrimoxazole prophylaxis -960mg daily (800mg Sulphadoxine + 160mg Trimethoprim)
- Provide close follow up of patient on ART in the first 2 weeks, after one month and every 3 months
- Conduct laboratory investigations

Prevention and care for PLWHA's

- People with HIV can live full and healthy lives if they take care of themselves and access treatments.

Advise how to prevent other infections.

- Observe high standards of hygiene
Continue counseling and health education on HIV AIDS
Improve nutrition by providing supplementary food
- Address food security: arrange for supplements if available and needed.
- Give priority to patients with weight loss or wasting.
- In certain settings, supplements may be important for treatment adherence especially in first 3 months.

Considerations before starting ARV therapy:

- Effectiveness of regimen.
- Potential for serious adverse effects and toxicity.
Side effects and tolerability.
- Potential for interactions with other drugs.
- Potential for treatment options should the initial drug combination fail.
- Cost and availability.
- Patient readiness and likelihood of adequate adherence.
- Presence of pregnancy or the risk of becoming pregnant.

- Presence of tuberculosis and other illnesses -anemia, peripheral neuropathy, kidney disease, hepatitis.
- Ability of the patient to return for regular and reliable follow-up

Recommended Antiretroviral Regimens

The following are the recommended regimens for first line and second line therapy.

Table 7: Recommended Regimens

First Line Regimen		Second Line Regimen		
TDF*/FTC or 3TC	EFV or NVP ³	AZT ¹	3TC ² or TDF/FTC ⁵ or 3TC	LPV/r6
		d4T4/3TC2		
<p>* TDF has been associated with renal toxicity: if CrCl <50 ml/min, initiate therapy with ABC/3TC</p>				
<ol style="list-style-type: none"> 1. AZT/3TC/LPV/r is preferred second line regimen for patients failing Tenofovir based first line. 2. Lamivudine (3TC) or Emtricitabine (FTC) are continued in the second line regimen because their resistance mutations decrease viral replication capacity, increase the HIV susceptibility to Tenofovir (TDF) and AZT 3. For women who have had exposure to sdNVP without tail coverage with 7 days of AZT + 3TC within the last 12 months (for PMTCT), do not use a Nevirapine or Efavirenz containing regimen, use LPV/r. If unsure whether tail coverage for sdNVP was provided then use LPV/r 4. Stavudine (d4T) is associated with long term toxicity and should only be used in the second line if AZT cannot be taken 5. TDF mutations can increase HIV susceptibility to AZT and may increase AZT efficacy, while TDF may maintain some activity 6. If unable to tolerate LPV/r then refer to HIV Specialist. 				
<ol style="list-style-type: none"> 1. Lamivudine (3TC) or emtricitabine (FTC) are continued in the second line regimen because their resistance mutations decrease viral replication capacity. increase the susceptibility to Tenofovir (TDF) and AZT. 2. If unable to tolerate LPV/r then refer to HIV Specialist for additional options 3. For women who have had exposure to Nevirapine within 6 months for PMTCT, do not use a Nevirapine containing regimen. 4. 3TC resistance reduce efficacy of ABC, therefore, Didanosine (ddl) will be substituted for 3TC. 5. D4T should only be used in doses of 30mg to avoid adverse effects and toxicity. 				

TDF has been associated with renal toxicity: If CrCl <50 ml/min , initiate therapy with ABC/3TC

1. AZT300/3TC150/LPV/r 133.3/33.3 is preferred second line regimen for patients failing tenofovir based first line
2. Lamivudine150 (3TC150) or emtricitabine (FTC200) are continued in the second line regimen because their resistance mutations decrease viral replication capacity, increase the susceptibility to tenofovir (TDF/300) and AZT.
3. Tenofovir (TDF) mutations can increase susceptibility to AZT and may increase AZT efficacy, while TDF may maintain some activity
4. Stavudine (D4T) is associated with long term toxicity and should only be used in the second line if AZT cannot be taken
5. If unable to tolerate LPV/r then refer to HIV Specialist for additional options
6. For women who have had exposure to nevirapine within 6 months for PMTCT, do not use a nevirapine containing regimen.

Follow up Schedule and laboratory testing

Timeline	Clinical	Laboratory	Other
Baseline 2 weeks (1st month) preferably (next 3 months)	Complete History & Physical (including ART history, current meds Counselling/Education Risk Reduction Adherence Complaints Fears	Creatinine* (preferable for all cases but required if to start TDF) ALT and/or AST** (required if to start NVP) Hb, WBC (required if to start AZT) CD4	RPR (repeat yearly) PAP smear (if unavailable, then visualization with acetic acid screening) If available, HBsAg

Timeline	Clinical	Laboratory	Other
New illnesses	Urine protein if available chemistry panel to include glucose, cholesterol, triglycerides Counselling/Education Risk Reduction Adherence Complaints Fears Side effects New illness/IRIS	Pregnancy testing in women of reproductive age If on NVP-ALT and/or AST	
Every month for first 3 months			
At 3 months visit next 6 months	As above	If on AZT-Hb If on NVP-ALT	

Timeline	Clinical	Laboratory	Other
		If on TDF- Creatinine* viral load if available	
	Targeted history & physical Counselling/Education	If on TDF- Creatinine* WBC,Hb,ALT	Repeat PAP at 6 months and if normal every 12 months If visual screen only with acetic acid, repeat as with Pap smear if normal; if abnormal, refer for treatment
Every 6 months throughout.	Risk Reduction	CD4, viral load if available	

Timeline	Clinical	Laboratory	Other
	<p>Adherence</p> <p>Complaints/side effects</p> <p>Fears</p> <p>New illness</p>	<p>If on PI containing regimen, consider Chemistry profile (including LFTs, glucose, cholesterol, and triglycerides) on a yearly basis if normal, if abnormal, treat as indicated.</p>	

TREATMENT FAILURE

Clinical

Treatment failure should be considered when clinical symptoms appear whilst on therapy that is suggestive of deteriorating status.

Immunological

Treatment failure is indicated by a drop of CD4 values to below pre-treatment levels or 50% from the peak value on treatment or persistent CD4 levels below 50 cells/mm³ after 12 months on therapy. NB. Patients initiating at very low CD4 may not be able to mount an adequate CD4 recovery; in this case viral load is indicated.

Virologic

Wherever facilities are available to test for viral load, the following may suggest failure:

- Plasma HIV viral load >400 copies/ml after 6 months on therapy.

Note: Blips (single levels of 50-1000 c/ml are not considered as failure, repeat viral load as soon as possible.

And patients who appear to be failing on treatment while viral load is undetectable should be considered to have undiagnosed opportunistic infections or other concomitant illness .

It should not be concluded, on the basis of clinical criteria, that an ARV regimen is failing until there has been a reasonable trial of first-line therapy lasting at least six months, adherence has been assessed and optimized, intercurrent opportunistic infections have been treated and resolved, and IRIS has been excluded. Clinical events that occur before the first six months of therapy are excluded from this definition of failure because they often represent immune reconstitution inflammatory syndromes related to pre-existing conditions.

Factors leading to treatment failure

- Poor adherence to treatment
- Prior exposure to antiretroviral treatment with development of resistance
- Primary viral resistance (infected with resistant HIV strain)
- Inadequate drug absorption
- Suboptimal dosing (e.g. sharing dose because of side effects)
- Inadequate or inconsistent drug therapy
- Drug interactions

MANAGEMENT OF HIV INFECTION IN CHILDREN

Clinical Features

Clinical Staging of HIV disease in Children

Clinical stage 1

- Asymptomatic
- Persistent generalized lymphadenopathy

Clinical stage 2(i)

- Unexplained persistent hepatosplenomegaly
- Papular pruritic eruptions
- Extensive wart virus infection
- Extensive molluscum contagiosum
- Recurrent oral ulcerations
- Unexplained persistent parotid enlargement
- Lineal gingival erythema
- Herpes zoster
- Recurrent or chronic upper respiratory tract infections (otitis media, otorrhoea, sinusitis, tonsillitis)
- Fungal nail infections

Clinical stage 3 (i)

- Unexplained moderate malnutrition not adequately responding to standard therapy
- Unexplained persistent diarrhoea (14 days or more)
- Unexplained persistent fever (above 37.5 °C, intermittent or constant, for longer than one month)
- Persistent oral candidiasis (after first 6 weeks of life)
- Oral hairy leukoplakia
- Acute necrotizing ulcerative gingivitis/periodontitis
- Lymph node TB
- Pulmonary TB
- Severe recurrent bacterial pneumonia
- Symptomatic lymphoid interstitial pneumonitis
- Chronic HIV-associated lung disease including bronchiectasis
- Unexplained anaemia (<8.0 g/dl), neutropenia ($<0.5 \times 10^9/L3$) or chronic thrombocytopenia ($<50 \times 10^9/L3$)

Clinical stage 4 (i) (ii)

- Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy
- Pneumocystis pneumonia
- Recurrent severe bacterial infections (e.g. empyema, pyomyositis, bone or joint infection, meningitis, but excluding pneumonia)
- Chronic herpes simplex infection; (orolabial or cutaneous of more than one month's duration, or visceral at any site)
- Extrapulmonary TB
- Kaposi sarcoma
- Oesophageal candidiasis (or Candida of trachea, bronchi or lungs)
- Central nervous system toxoplasmosis (after the neonatal period)
- HIV encephalopathy
- Cytomegalovirus (CMV) infection; retinitis or CMV

infection affecting another organ, with onset at age over 1 month

- Extrapulmonary cryptococcosis (including meningitis)
- Disseminated endemic mycosis (extrapulmonary histoplasmosis, coccidiomycosis)
- Chronic cryptosporidiosis (with diarrhoea)
- Chronic isosporiasis
- Disseminated non-tuberculous mycobacteria infection
- Cerebral or B cell non-Hodgkin lymphoma
- Progressive multifocal leukoencephalopathy
- HIV-associated cardiomyopathy or nephropathy

(i) Unexplained refers to the condition not explained by other causes.

(ii) Some additional specific conditions can be included in regional classifications (e.g. Penicilliosis in Asia, HIV associated rectovaginal fistula in Africa).

Diagnosis

Making any diagnosis will depend on the age of the child. Laboratory tests provide confirmation of the status.

Types of testing

Virological

PCR used to test children under 18 months. The first test can be done from 6 weeks as recommended by the paediatric and PMTCT guidelines.

Antibody

Used to test children over 18 months. ELISA is less reliable in infants less than 18 month because they may still be carrying maternal HIV specific antibodies.

Using Elisa test in children.

Two positive ELISA are used to diagnose HIV over 18 months.

- A positive rapid test in a child 18 months and above

means that the child is infected

- A positive rapid test in a child less than 18 months is not conclusive. This only means exposure to maternal antibodies
- A negative rapid test in a child 18 months and above, three or more months after cessation of breast feeding (or a child who has never breastfed) means the child is not infected
- A negative rapid test in a child still breastfeeding or recently stopped breastfeeding is insufficient to exclude HIV infection. The test must be repeated at least 3 months after breastfeeding ceases

Clinical Management

Goals of ART in Children

- Prolong the lives of children
- Promote optimal growth and development
- Preserve, enhance or reconstitute the immune system
- Reduce opportunistic infections and improve the quality of life
- Suppress HIV replication and prevent disease progression

Ten point Package for comprehensive Pediatric Care:

1. Confirm HIV status as early as possible
2. Monitor the child's growth and development e.g. play at school.
3. Ensure that immunizations are started and completed according to recommended schedule
4. Provide prophylaxis for opportunistic infections against PCP,PTB Children under five exposed to sputum positive TB.
5. Actively look for and treat infections early
6. Counsel the mother and family on:
 - Optimal infant feeding to minimize MTCT, prevent malnutrition and promote growth and development

- Good personal and food hygiene to prevent common infections, and encourage to seek prompt treatment for any infections or other health related problems
 - Follow up according to national recommendations
7. Conduct disease staging for the infected child
 8. Offer ART for the infected child and parents, if eligible
 9. Provide psychosocial support for the infected child and mother
 10. Refer the infected child for higher levels of specialized care if necessary, or for other social or community based support programs

Initial evaluation

Full History

- General health status
- Milestones, immunizations and growth monitoring
- Drug history
- HIV Risk factors
- Reproductive history of the mother and father.
- Physical Exam
- Laboratory investigations

Eligibility Criteria for ART

The child (<14 years) has medical eligibility for ART if:

When to Start ART

Universal treatment for all HIV infected Zambian infants and young children under 24 months irrespective of immunological or clinical stage is highly recommended. For all children 24 months or older, clinical and immunological thresholds should be used to identify those who need to start ART (see Table 5.2).

Children Under 24 months:

Initiate ART irrespective of CD4 count or WHO clinical stage

Children 24 and above:

Clinical criteria

- Initiate ART in children with WHO HIV clinical stages 3 and 4, irrespective of CD4 count.

Immunologic criteria

- Children between 24 and 59 months: Initiate ART with CD4 count of ≤ 750 cells/mm³ or %CD4+ <25%, whichever is lower, irrespective of WHO clinical stage
- Children 5 years of age and above: Initiate ART with a CD4 count of ≤ 350 cells/mm³, irrespective of WHO clinical stage.

Presumptive diagnosis of HIV infection:

- Initiate ART for any child less than 18 months of age who has been given a presumptive clinical diagnosis of HIV infection.

Treatment Failure

Treatment failure is defined by persistent viraemia after 24 weeks of HAART in an adherent patient. In the absence of viral load measurement, clinical and immunological criteria can be used to identify treatment failure. However, there may be conditions where there is discordance among treatment failure scenarios, e.g. discrepancy between clinical and virological parameters.

When treatment failure is confirmed, switching to a new second-line regimen becomes necessary. In the absence of viral load testing, cases of suspected treatment failure should be referred to the most senior/ experienced treatment provider for assessment and possible switch to second line treatment.

For children Not eligible provide the following:

Counselling and health education at school and home

- Risk reduction: ABC (where applicable)
- Positive living
- Nutrition
- Prophylaxis
- Continued clinical reviews and CD4 monitoring

For children Eligible provide the following:

- Treat presenting problem
- Identify latent opportunistic infections e.g. screen for TB
- Provide Cotrimoxazole prophylaxis
- Provide close follow up of patient on ART in the first 2 weeks, after one month and every 3 months
- Conduct laboratory investigations

Recommendations			
Situation	Age	When to Start	When to Stop
HIV Exposed Infant (Defined as a child born to an HIV infected mother or breastfeeding from an HIV infected mother, until infection can be excluded.	4-6 weeks of age (or when first recognized)	Initiate Cotrimoxazole prophylaxis in ALL infants born to an HIV infected mother irrespective of any ARVs received during pregnancy and/ or labour.	Discontinue Cotrimoxazole prophylaxis after exclusion of HIV infection. 3 weeks after complete cessation of breastfeeding (PCR is negative or antibody test is negative)

Situation	Age	When to Start	When to Stop
HIV Infected infant (including all infants identified as HIV infected during the first year of life by PCR or clinical diagnosis of HIV infection with positive antibody test)	24 months	Cotrimoxazole prophylaxis is indicated regardless of CD4 percentage or clinical status or WHO stage	Children <5 years: Maintain on Cotrimoxazole prophylaxis until age 5 years irrespective of clinical and immunologic response Children > 5 years: Can be reassessed and consideration to discontinue Cotrimoxazole prophylaxis should be in accordance with recommendation for adults and adolescents.
	24 months to 4 years	WHO clinical stages 2,3 and 4 regardless of CD4 percentage OR any WHO stage and CD4 <25%	
	< 5 years	Follow adult recommendations	
Presumptive Symptomatic HIV Disease	18 months	Start (or continue) CTX prophylaxis regardless of CD4.	
Any Child with a history of PCP	All ages	Administer secondary prophylaxis	

Cotrimoxazole Prophylaxis Infants and Children
Prevention for PLWHA's
- Continued counseling

Drug Treatment

Recommended first line

Regimen of 2 NRTI plus 1 NNRTI: a Preferential order

AZT b + 3TC c + NVP d / EFV e

d4T b + 3TC c + NVP d / EFV e

ABC + 3TCc + NVP d / EFVe

- a. The use of AZT, d4T, ABC with 3TC results in several possible dual nucleoside combinations.
- b. AZT should not be given in combination with d4T.
- c. Where available, FTC can be used instead of 3TC in children over 3 months of age.
- d. NVP should be used with caution in post-pubertal adolescent girls (considered as adults for treatment purposes) with baseline CD4 absolute cell counts >250/mm³.
- e. EFV is not currently recommended for children under 3 years of age and should be avoided in post-pubertal adolescent girls who are either in the first trimester of pregnancy or are sexually active and not receiving adequate contraception.

Dosing schedules in children

Age-related Immunologic and Clinical Considerations to Switching to Second-line Therapy

Criteria	< 2 years of age*	≥2 years to <5 years of age	≥5 years of age
WHO Staging	New stage 3 or 4 event (appearance or		
CD4%	%CD4+ values fall to <25%	%CD4+ <15%	n/a
CD4 Absolute	n/a	≤200 cells/mm ³ 50% fall from on-treatment peak or Fall below the base line Cd4 count.	≤200 cells/mm ³ or 50% fall from on-treatment peak or Fall below the base line Cd4 count.

*For children under two years, consultation with experienced clinician is required

Preferably, at least two CD4 measurements should be available. Use of %CD4+ in children <5 years and absolute CD4 counts in those ≥5 years of age is preferred. If serial CD4 values are available, the rate of decline should be taken into consideration.

Second line treatment

Recommended Second-line Regimens in Infants and Children

Recommend second-line regimen: boosted PI component + two NRTI components	
First-line regimen at failure	Preferred second-line regimen
AZT/d4t+3TC+ NVP/EFV	ABC + 3TCa + LPV/rc or TDF+FTC/3TC (in children >12 years of age)
ABC + 3TC+ NVP/EFV	AZT + 3TC+ LPV/r
ABC+3TC+AZT/d4t	3TC + EFVb /NVP+LPV/r or TDF+FTC/3TC +LPV/r (in children >12 years of age) (In consultation with paediatric HIV specialist)
AZT/d4t+3TC+LPV/r ABC+3TC+LPV/r	ABC+3TC+NVP/EFV AZT+3TC+NVP/EFV (In consultation with paediatrics HIV specialist)

- a. Continuation of 3TC in second-line regimens may be considered.
- b. EFV is currently not recommended for children <3 years of age, and should be avoided in post pubertal adolescent girls who are either in the first trimester of pregnancy or are sexually active and not using adequate contraception.
- c. LPV/r is available as solid and liquid co-formulations.

Once a child is on ART, in addition to the parameters used before ART, clinical assessment should cover the child's and caregiver's understanding of the therapy as well as anticipated support and adherence to the therapy. Observation of the child's responses to therapy should be at the minimum and should also include symptoms of potential drug toxicities or treatment failure. Particularly important signs of infants' and children's responses to ART include the following:

- improvement in growth in children who have been failing to grow
- Improvement in neurological symptoms and development in children with encephalopathy or who have been demonstrating delay in the achievement of developmental milestones; and/or
- Decreased frequency of infections (bacterial infections, oral thrush and/or other opportunistic infections).

The frequency of clinical monitoring depends on the response to ART but should be at a minimum of at weeks 2, 4, 8 and 12 after starting ART and then every 2-3 months once the child has stabilized on therapy. In infants and children who were started on ART on the basis of a presumptive clinical diagnosis of severe HIV disease, HIV infection status should be confirmed as soon as possible.

Week 0:

- Initiate ART. Dispense 2 week's worth of medication.
- Ensure that patient/family know what to do in the event of new symptoms or problems

Week 2:

Increase dose of nevirapine, if no side effects

Week 4:

- Symptom checklist (and targeted physical examination if needed).
- Adherence assessment and support
- Dispense 4 week's worth of ART

Week 8:

- Symptom checklist
- Comprehensive physical examination – recalculate ART dosing based on new height/weight
- Adherence assessment and support
- Dispense 1 week's worth of ART

Week 12:

- Symptom checklist
- Comprehensive physical examination – recalculate ART dosing based on new height/weight
- Adherence assessment and support
- Dispense ART – if patient is doing well and adherence is excellent, consider dispensing 2 month's worth of ART.

After the 12-week initiation period, children who are doing well may be seen once in two months. Adherence should be reviewed with the parent/caregiver as well as the older child at every visit. The visits should also include:

3.10.2 Clinical indications to change ARVs due to toxicity

Symptom	
Nausea	Severe discomfort or minimal intake for > 3 days
Vomiting	Severe vomiting of all foods/fluids in 24 hours or orthostatic hypotension or IV therapy required
Diarrhoea	Bloody diarrhoea or orthostatic hypotension or IV therapy required
Fever	Unexplained fever of > 39.6 C (103 F) > 1-2 weeks
Headache	Severe or requires narcotic therapy
Rash	Moist desquamation, ulceration, or mucous membrane involvement, suspected Stevens-Johnson , Toxic Necrolysis(TEN) erythema multiforme, exfoliative dermatitis, or necrosis requiring surgery
Allergic reaction	Angioedema or anaphylaxis
Peripheral neuropathy	Severe discomfort, objective weakness, loss of 2–3 previously present reflexes or absence of 2–3 previously present sensory dermatomes
Fatigue	Normal activity reduced <50%

3.10.3 Laboratory indications to change ARVs due to toxicity

Parameter	Grade 3 toxicity
Hematology	
Hemoglobin	< 7.0 g/dl
Absolute neutrophil count	< 250 mm ³
Chemistries	
Bilirubin	> 3.0–7.5 x upper limits of normal
Creatinine	> 1.2–1.5 (<2 yr), 1.7–2.0 (>2yr)
Liver function tests	
AST (SGOT)	> 10 upper limits of normal or rapidly increasing
ALT (SGPT)	> 10 upper limits of normal or rapidly increasing
Pancreatic enzymes	
Amylase, lipase	> 2–3x upper limits of normal

3.10.4 Managing toxicity

The guiding principles in management of ARV toxicity

- Determine the seriousness of the toxicity
- Evaluate concurrent medications and establish whether the toxicity is as a result of ARV medicine or to a non ARV medication taken at the same time
- Consider other disease process such as other opportunistic infections.
- Manage the toxicity according to severity.
- Severe life-threatening conditions – immediately discontinue all ARV medicines, manage the adverse event symptomatically and reintroduce the ARV using

modified regimen when patient is stable.

- Severe reactions: substitute the offensive medicine without stopping ART
- Moderate reactions: Consider continuation as long as feasible. If there is no improvement with asymptomatic therapy, consider single drug substitution, i.e., peripheral neuropathy or lipodystrophy
- Mild reactions: these are bothersome but do not require any change with the medicine
- Stress the maintenance of adherence despite toxicity for mild and moderate reactions
- If there is a need to discontinue the medication because of life-threatening toxicity, all ARV discontinued until the patient is stable.

Treatment Failure

The detection of clinical events classified within the WHO clinical staging may also reflect progression of the disease when a child is on ART. Consider treatment failure when either new or recurrent stage 3 or 4 events develop in a child on therapy as described in table ____

New or recurrent event on ART	Management options b,c,d
No New events or PLG (T1)	Do not switch to new regimen Maintain regular follow up
Stage 2 events (T2)	Treat and manage staging event Do not switch to new regimen Assess and offer adherence support Assess nutritional status and offer support Schedule earlier visit for clinical review and consider CD4

Stage 3 events (T3)	Treat and manage staging event and monitor response Check if on treatment 24 weeks or more Assess and offer adherence support Assess nutritional status and offer support Check CD4f – where available Institute more frequent follow-up Consider switching regimen
Stage 4 events (T4)	Treat and manage staging event Check if on treatment 24 weeks or more Assess and offer adherence support Assess nutritional status and offer support Check CD4f – where available Switch regimen

- a A clinical event refers to a new or recurrent condition as classified in the WHO clinical staging at the time of evaluating the infant or child on ART.
- b It needs to be ensured that the child has had at least 24 weeks of treatment and that adherence to therapy has been assessed and considered adequate before considering switching to the second-line regimen.
- c Differentiation of opportunistic infections from IRIS is important.
- d In considering changing treatment because of growth failure, it should be ensured that the child has adequate nutrition and that any intercurrent infections have been treated and resolved.
- e Pulmonary or lymph node TB, which are clinical stage 3 conditions, may not be an indication of treatment failure, and thus may not require consideration of second-line therapy. The response to tuberculosis therapy should be used to evaluate the need for switching therapy.
- F CD4 is best performed once acute phase of prescribing illness is resolved.

Immunological definition of treatment failure

Immunological treatment failure can be identified by examining baseline CD4 and the initial immunological response to ART.

Treatment failure is characterized by a drop in the CD4 to values at or below their age-related CD4 threshold for the initiation of treatment after initial immune recovery following the initiation of ART. Thus recognition of treatment failure on the basis of immunological values relies on comparison with previous CD4 values.

Switching a regimen should particularly be considered if CD4 values fall to below 15% (12–35 months of age), 10% (36–59 months of age), or 100 cells/mm³ (≥5 years of age). Immunological criteria for recognizing treatment failure are supplemental to clinical criteria.

Criteria to guide decision-making on switching to A second-line regimen

- Development of age-related severe immunodeficiency after initial immune recovery.
- New progressive age-related severe immunodeficiency, confirmed with at least one
- Subsequent CD4 measurement.
- Rapid rate of decline to below threshold of age-related severe

Ensure that the child has had at least 24 weeks of treatment trial and that adherence to therapy has been assessed and considered adequate prior to considering switching to second-line regimen.

Preferably at least two CD4 measurements should be available.

Age-related severe immunodeficiency values particularly be considered if percentage CD4+ values fall to:

- <15% (12–35 months of age),
- <10% (36–59 months of age),
- <100 cells/mm³ (≥5 years of age);

Use of percentage CD4+ in children aged under 5 years and absolute CD4 counts after 5 years of age is preferred; If serial CD4 values are available the rate of decline should be taken into consideration.

Use of other laboratory parameters for decision-making regarding switching ART should not be used for evaluation of response to ARV therapy. However, it should be noted that basing the recognition of treatment failure solely on clinical criteria may provide a greater opportunity for drug resistance mutations to appear before regimen change.

Second line: Recommended second-line regimens in infants and children in the event of treatment failure of first-line regimens.

Recommended second-line regimen: boosted PI component + two RTI components.

First-line regimen at failure	Preferred second-line regimen [A(II)]*		
	RTI components (NRTI/NNRTI) ^a	plus	PI components
2 NRTI + NNRTI AZT-or d4T-containing	ddlc + ABCd		LPV/rf or SQV/r9 or NFVh
ABC-containing	ddlc AZT		
Triple NRTI	ddlc + EFVa or NVP		

* Strength recommendation/level of evidence.
^a Strength recommendation/level of evidence.

- a Continuation of 3TC in second-line regimens may be considered.
- b PI components are listed in order of potency/acceptability.
- c ddI may not need to be taken on an empty stomach in children.
- d It is not recommended to introduce AZT after use of d4T or vice versa.
- e EFV is not currently recommended for children <3 years of age, should be avoided in post pubertal adolescent girls who are either in first trimester of pregnancy or are sexually active and not using adequate contraception.
- f LPV/r is available colormulated as solid and liquid.
- g SOV/r should not be used in children or adolescents weighing less than 25kg
- h Unboosted NFV may need to be used where no cold chain is in place for liquid LPV/r or SOV/r, it should be taken with food to improve bio availability and high doses are needed in young children (e.g. >150mg/kg per day).

3.10.5 Prevention of Mother-to-Child HIV Transmission (PMTCT)

Definition

Prevention of infant acquisition of HIV infection from their mothers during labor and delivery or after birth through breast-feeding

Table 9.2 depicts interventions to reduce the risk of MTCT and mitigate against infection.

Table 9.2 Risk factors and mitigating Intervention

Risk factor	Prevention/mitigating intervention
High viral load	Antiretroviral therapy in pregnancy
Low CD4 count	As above + PCP prophylaxis
Advanced Diseases (AIDS)	ART. PCP and TB prophylaxis OI treatment
Chorioamnionitis	Identify & treat STI and malaria
Malaria	Provide malaria prophylaxis during pregnancy, IPT & ITNs
Low Vit. A	Maternal Vit. A supplementation does not reduce MTCT
Pre-maturity	Comprehensive antenatal care, identify at risk mothers, provide PCP prophylaxis
Prolonged rupture of Membranes	Comprehensive ANC, safer delivery practices and modified obstetric care
Invasive delivery procedures	Discourage scalp vein monitoring, vacuum extraction, episiotomies and nasal suction
Cracked nipples	Counseling on optimal breast feeding practices & breast care
Breast-feeding	Counseling on infant feeding options: EBF, early and rapid cessation, replacement feeding etc

Prophylaxis Regimen

Triple Combination ART

Highly active antiretroviral therapy (HAART) in pregnancy is the most effective regimen for reducing MTCT. Women with CD4 absolute counts of less than 200cells/ml should receive HAART. CD4 measurement is critical to make decisions to use HAART or prophylactic AZT + NVP during pregnancy. Where the mother requires HAART to treat her HIV disease, guidelines for particular regimens do not differ when used during pregnancy, but you must consider the safety of particular drugs, such as efavirenz and abacavir, during the first 3 months of pregnancy. There is no additional benefit from prophylactic ART i.e. the single-dose NVP regimen when a pregnant woman is already well controlled on HAART because the viral load will be low or undetectable.

The first line recommended regimens are:

Short-Course AZT Regimen:

Mother: Give Oral AZT starting at 32 weeks gestation or soon thereafter, 300 mg every 12 hours during pregnancy and a loading dose of 600mg at inception of labour.

For the infant: Give 1 week of AZT syrup 4 mg/kg/day every 12 hours.

The aim is to provide at least 4 weeks of AZT to the mother and 1 week to the infant. Provide at least 4 weeks of maternal dosing during pregnancy (beginning at 32–34 weeks or as soon as possible thereafter).

Single-Dose NVP 200mg

Give to the mother at onset of labor and

Give 2 mg/kg single dose to the infant during the first 72 hours of life.

To be effective, the woman must receive maternal NVP dosing more than 2 hours before delivery. If the maternal dose is taken less than 1 hour prior to delivery or if the mother misses her dose, then the infant is dosed as soon as possible after birth. Infant dosing can be prior to discharge from the hospital, but if the baby is not born at the hospital, then the baby can receive a single-dose NVP within the first 3 days.

If for some reason the woman is not able to receive antenatal AZT, then give a single dose nevirapine, and the child receives single dose NVP and AZT syrup for 28 days.

Non-Mother-to-Child (horizontal) Transmission

Definition

HIV horizontal Transmission of HIV virus to children and adolescents through,

- Sexual transmission i.e.
 - . Rape
 - . Defilement,
 - . High-risk survival sex,
 - . Married adolescents, (Mentally, psychologically, physically immature).
- Use of contaminated needles
- Other skin piercing instruments,
- Exposure to infected body fluids and transfusion with contaminated blood and blood products.

The disease status of the rapist or defiler i.e. viral load, presence of STIs is an important factor. Any rapist should be assumed HIV positive unless proven otherwise.

Management of the sexually assaulted child:

- Admit the child where possible
- Take history to establish circumstances leading to the

sexual assault

- Examine the child under anesthesia if possible or sedation to determine the extent of injury and whether the assault is acute or habitual
 - . Ideally it should be done by a female health worker.
 - . In the presence of the mother or caregiver
- Collect blood for HIV test, HBV, and syphilis screening and plan to repeat them at 6 weeks, 3 months and 6 months after the assault.
- Collect specimen of genital secretions to be examined for sperm and seminal fluid
- Take swabs for bacterial STI

Post-Exposure Prophylaxis

Initiate post-exposure prophylaxis (PEP) after rape or sodomy as soon as possible because it is most effective if begun within 24 hours of the assault and is probably ineffective after 72 hours. Also consider prophylaxis in other situations, such as exposure to contaminated medical equipment, blood, or other bodily fluids and after human bites with disruption to the skin.

- **Prior to offering PEP**
 - Do a rapid HIV test & start PEP only if negative
 - If positive offer emotional support and supportive counselling, assess for ART eligibility and provide comprehensive care
 - Empirically treat for bacterial STI and vaccinate against HBV
- Offer emergency contraception to adolescents if they have evidence of sexual maturation.
- Offer trauma counselling to the child and caregivers
- Alert authority as appropriate
- Refer as appropriate to legal services
- Keep good record keeping in view that sexual assault is a criminal offence.

Treatment

- Administer AZT plus 3TC and NFV (three drug prophylaxis) for a period of 28 days. On discharge from facility, issue children enough medication to complete the 28-day course.
- Perform HIV testing at the time of initial contact (baseline test) after obtaining informed consent. Most sero-conversions occur within 6 to 8 weeks after exposure. Repeat HIV testing at intervals of 6 to 8 weeks, 3 months, and 6 months after the assault.
- In children who were sexually assaulted, give consideration to preventing pregnancy and STIs and to collecting forensic evidence, including appropriate perineal swabs.

Drug Dosage for Post Exposure Prophylaxis

Drug	Pediatric Dose	Adolescent Dose
AZT	180mg/m ² /12 hrs	300mg twice a day
3TC	4mg/kg/12hrs	³ 50kg 150mg 12 hourly <50kg 2mg/kg 12 hourly
Nelfinavir	55mg/kg/12hours	750mg 8 hourly

Other combinations shall be administered according to specific patient circumstances and physician recommendation.

3.10.6 Practical hints

- Patients who are anaemic Hb<8g/dl prior to treatment will require a blood transfusion to raise haemoglobin level.
- d4T is a better-tolerated choice than AZT in anaemic patients who might have added effect from bone marrow suppression with AZT.
- If using above regimens in TB patients, no treatment alteration is required. If using Nevirapine or protease inhibitors, drugs refer to specialist at level 3.
- AZT has 60 percent CNS penetration and leads to marked improvement of HIV/AIDs-related dementia.
- Drugs should be taken at the same time of the day to maintain constant drug level.
- Give written dosing instructions to patients.
- For those patients with CNS involvement, a relative must administer drugs for them.

Monitoring after initiating therapy

Where available, these tests should be conducted.

Frequency of tests	Hospital Level 1, Level 2	Level 3
2 weeks after of initiation	FBC, LFT, U&creat, blood sugar,	FBC, LFT, U&creat, blood sugar, lipids, CPK, amylase
3 months after initiation	FBC, LFT, U&creat, blood sugar	FBC, LFT, U&creat, blood sugar, CD4, Viral load
6 monthly	FBC, LFT, U&creat, blood sugar	FBC, LFT, U&creat, blood sugar, CD4, Viral load
Yearly in addition	RPR, PAP smear	RPR, PAP smear

INDICATIONS FOR CHANGING TREATMENT

Consideration be given to patient who has persistent fever.

Definition of Treatment Failure and clinical failure

Laboratory indications.

- Testing on two occasions using the same method there is still detection of plasma HIV RNA above lower limit of detection (50 Copies/ml)
 - An adherent patient who had achieved undetectable levels and had not experienced acute infection nor received any vaccinations.
 - A patient who is on triple therapy for 24 weeks.
- The viral load should increase by three-fold above the lower level of reading.
- Clinical failure, intolerance and adverse reaction, and persistence of the symptoms the patient came with.

Clinical indications

- Poor adherence to treatment
- Prior exposure to antiretroviral treatment
- Primary viral resistance
- Inadequate drug absorption
- Suboptimal dosing

Management of Treatment Failure (Salvage Therapy)

Reason for failure	Action	What to do
Poor compliance within 8-16 weeks of therapy	Review reasons for poor compliance and counsel accordingly.	Continue with same combination or simplify dosing.
Poor compliance > 16 weeks of therapy	Consider changing therapy. Review reasons for poor compliance.	Change two drugs.
Treatment failure	Change therapy.	Use drugs not used in previous regimen preferably new classes.
Adverse drug reaction	Check drug –drug interactions. Stop the drugs if continuation is of no benefit to the patient.	Change the offending drug.
Depression	Psychosocial support	Refer to appropriate care provider

Refer all suspected treatment failures to a higher-level treatment center if poor adherence has been excluded.
Post Exposure Prophylaxis (PEP)

3.11 Health workers in place of work

Accidental contamination

- Immediately clean the contaminated part of the body with soap and water.
- Determine the degree of exposure. There should be compulsory testing of source of exposure, if applicable by unanimous unlinked antibody testing.
- Caregivers and Health workers should undergo HIV testing.

3.12 Rape case

- Determine HIV status in the afflicted individuals
- In both situations (accidental and rape), the following measures should be undertaken:
- PEP recommendation based on risk and exposure category (please see table below).
- PEP is only offered to HIV sero-negative individuals.
- Ideally, drug therapy should commence within first 1-2 hours of exposure.

Guide for Prophylaxis

Risk Category	ARVT	Duration
No Risk: Intact skin	No recommendation	
Medium Risk: Invasive injury No blood visible on needle	AZT: 300mg po 12 hourly 3TC: 150mg po 12 hourly Plus LPV/r*	28 days
High risk: Large volume of blood/fluid, known HIV infected patient, hollow bore needle, deep extensive injury	AZT: 300mg po 12 hourly 3TC: 150mg po 12 hourly Plus LPV/r*	28 days
*for patients with hemoglobin less the 10gm/dl replace AZT/3tc with TDC/FTC		

NOTE: Monitoring and baseline investigations and changing treatment should be the same as for adults

Recommended drug dosages and side effects

Generic name (trade name)	Recommended dosage	Special Instructions	Adverse effects Minor & frequent	Adverse effects Serious dose limiting
Nucleoside Reverse Transcriptase Inhibitors				
Zidovudine	250mg bid	Caution in Liver or renal insufficiency Preexisting anaemia	Nausea Headache fatigue muscle pains	Anaemia Leucopaenia Lacticacidosis
ZDV.AZT (retrovir)				
Didanosine Ddl (videx)	200mg bid <60kg 100mg bid	To increase absorption take 1 hour before food Contains antacid so may affect absorption of other drug	Neuropathy Nausea diarrhea	Pancreatitis Lacticacidosis

Generic Name (trade name)	Recommended dosage	Special Instructions	Adverse effects Minor & frequent	Adverse effects Serious, dose limiting
Lamivudine 3TC (epivir)	150mg bid		Generally well tolerated	Lacticacidosis
Stavudine D4T (zerit)	40mg bid <60kg 30mg bid	Caution in liver insufficiency	Neuropathy	Lacticacidosis
Abacavir (ziagen)	300mg bid	Caution in: Liver or renal insufficiency DISCONTINUE if symptoms of hypersensitivity	Nausea Poor appetite Vomiting fatigue, sleep disturbance	Hypersensitivity reaction
Zalcitabine DdC (hivid_	0.75mg tid <40kg 0>375mg tid		Neuropathy Oral ulcers	Pancreatitis Lacticacidosis

Generic Name (trade name)	Recommended dosage	Special Instructions	Adverse effects Minor & frequent	Adverse effects Serious, dose limiting
Lamivudine + Zidovudine (Combivir)	1 tab bid	Caution in: Liver or renal insufficiency Pre-existing anaemia	Nauseas Headache Fatigue Muscle pains	Anaemia Leucopaenia Lacticacidosis
Non-Nucleoside reverse transcriptase inhibitors				
Efavirenz (sustiva, stocrin)	600mg nocte	Caution in liver disease	Skin rash neurological disturbance Abn LFTS	hepatitis
Nevirapine virimmune)	200mg od for 14 days followed by 200mg bid	Caution in liver disease	Skin rash Abn LFTS	hepatitis
Delavirdine rescriptor)	400mg tid	Caution in liver disease	Skin rash Headaches Abn LFTS	Hepatitis

Generic name (trade name)	Recommended dosage	Special Instructions	Adverse effects Minor & frequent	Adverse effects Serious dose limiting
Protease inhibitors				
Saquinavir Hard gel capsule (invirase) soft gel capsule (fortovase)	600mg tid 1600mg bid	Take with high fat meal Caution in liver disease	Diarrhoea Nausea Abn LFTS	Hyperglycaemia Lipodystrophy Abn. bleeding
Ritonavir (norvir)	600mg bd (start with 300mg bd then increase over 10/7)	Capsules require refrigeration Better tolerated with food	Nausea Diarrhoea Weakness Skin sensitivity Perioral tingling Change in taste	Hyperglycaemia Lipodystrophy Abn. bleeding
Indinavir (crixivan)	800mg tid	Take on empty stomach Drink 1.5 fluid per day	Nausea Abdo pain	Kidney stones Hypergly

Generic name (trade name)	Recommended dosage	Special Instructions	Adverse effects Minor & frequent	Adverse effects Serious dose limiting
Nelfinavir (viracept)	750mg tid	Report loin pain or haematuria Take with food	Headqache Diarrhoea Nausea Flatulence Skin rash	Caemia Lipodystrophy Abn bleeding Hyperglycaemia Lipodystrophy Abn. bleeding
Amprenavir (agenerase)	1200mg bid	Decreased absorption if taken with fatty meal	Nausea Vomiting Diarrhoea Altered taste Mood disorders Perioral numbness	Hypersensitivity rash

Prevention

- Health promotion and public education
- Advise safe sex e.g., condom use
- Encourage sticking to one sexual partner
- Promote abstinence
- Provide individual or group counseling
- Refer for Voluntary Counselling and Testing (VCT).
- Safe professional practices by health personnel.

4

DISEASES AND CONDITIONS AFFECTING ENDOCRINE SYSTEM

4.1 DIABETES MELLITUS

Definition

Diabetes is a chronic disease characterized by persistently elevated blood glucose due to either:

- i an absolute or relative deficiency of insulin
or
- ii a defect in the action of insulin (insulin resistance), in addition to a defect in the metabolism of fats, proteins, and electrolytes leading to short term and long term complications.

There are two main types:

- a) Type 1 diabetes mellitus (T1DM)
- b) Type 2 diabetes mellitus (T2DM)

Other types are neonatal diabetes, which occurs before the age of 6 months, Maturity Onset Diabetes of the Young (MODY), and diabetes secondary to other conditions like surgery, pregnancy, endocrine disorders, drugs and others.

Diagnosis

In most cases, the diagnosis of diabetes is not difficult. The classic symptoms of diabetes with a fasting plasma glucose of $> 7\text{mmol/L}$ or a random plasma glucose of $> 11.1\text{mmol/L}$ is adequate. The test must be repeated on at least one other occasion. This is a blood sample from venous blood
NOTE: Urine glucose can only be used as a preliminary screening tool in the absence of blood glucose. The patient should be sent to a level where blood glucose can be done.

If only a glucometer is available, then the fasting capillary glucose level used is $> 6.1\text{mmol/L}$, but the random capillary glucose remains at $> 11.1\text{mmol/L}$.

NB. Casual or random is defined as any time of the day without regard to time since last meal. Fasting is defined as no caloric intake for at least 8 hours.

Type 1 Diabetes mellitus (T1DM)

This was also previously referred to as Insulin Dependent Diabetes Mellitus (IDDM). It usually occurs in children and young adults. Occasionally, it can be found in adults.

Clinical features

Type 1 diabetes patients often present in an acute state.

Clinical characteristics at diagnosis

Symptoms

- Blurred vision
- Frequent urination (polyuria)
- Increased thirst (polydipsia)
- Increased hunger (polyphagia)
- Weight loss but can be normal/underweight
- Tiredness/weakness

Signs

- Weight loss
- Dehydration

Laboratory findings

- Elevated blood glucose
- Ketoacidosis

Treatment

All newly diagnosed patients need to be referred for initiation of treatment and stabilisation.

Drugs

Soluble insulin on its own or mixed with isophane insulin (0.6 - 1.5 units/kg) subcutaneously over 24 hours in 2 or 3 divided doses per day. Adjust dose to keep the blood sugar levels between 6 - 8 mmol/L.

Dietary control

- Avoid sugar and sugar containing foods and drinks.
- Take meals regularly.
- Consult nutritionist or dietician on diet modification

Supportive

Monitor the following:

- Blood pressure
- Renal function
- Blood glucose
- Hydration
- Serum electrolytes and minerals
- Urine sugar
- Urine ketones

Treat infections if any.

Teach patient and carers about disease and its management.

Encourage regular exercise

Regular review of patient at specialist clinic/hospital

4.2 TYPE 2 DIABETES MELLITUS (T2DM)

This was also previously known as Non-Insulin Dependent Diabetes Mellitus (NIDDM). It usually occurs in older people and its onset is insidious.

Clinical features

These may be mild and may not cause the patient to seek medical attention. This condition is often discovered when a complication arises. There is usually a delay of many months or years from onset to diagnosis.

The following are the common features:

Symptoms

- Obesity
- Blurred vision
- Frequent urination/polyuria
- Bedwetting
- Increased thirst/polydipsia
- Weight loss
- Infarct/angina
- Stroke
- Susceptibility to infections
eg genito tract/urinary tract infections (vulva itching in women)
- Claudication
- Paraesthesia / pain
- Foot ulcer

Signs

- Dehydration
- Weight loss

Investigation findings

- Elevated blood glucose
- Blood lipid abnormalities

Treatment

Diet and Exercise

Diet and exercise are the mainstay in treatment of T2DM. This should be tried first in all patients except those with very high glucose levels and those who are severely symptomatic. Those who fail to respond to diet and exercise can then move on to taking drugs.

Drugs

The two main classes of drugs used in Zambia are sulphonylureas and biguanides.

Sulphonyureas

- Glibenclamide. Initially can be given orally once a day or in two divided doses. Usual dose is 5mg orally daily taken before breakfast up to a maximum of 20mg in divided doses before food, depending on the patient's response. Doses above 20mg will not result in any improvement in glucose control.
- Chlorpropamide 250mg orally once a day taken with breakfast. Dosage may be adjusted to a maximum of 500mg depending on the patient's response.
- Sulphonylureas can be given together with biguanides.

Biguanides

Metformin.

This is the preferred drug in obese patients in addition to dietary control and exercise. It may also be added in patients who have reached the maximum dose of a sulphonylurea without achieving adequate control of blood sugar levels.

- Metformin 500mg orally 2-3 times daily or 850mg orally 2-3 daily with or after food. Maximum dose is 2.55g daily in divided doses.

NOTE:

Dosage increments in oral antidiabetic drugs should be gradual i.e. at 1 to 2 week intervals.

Insulin

Insulin may be used alone or added on if the combination of sulphonylurea and biguanide fails to achieve adequate control of blood sugar.

Insulin is available in two types of preparations:

- i. Short duration, soluble forms, for rapid onset of action
- ii. Intermediate duration

Most patients are best started on intermediate action insulin twice daily and a short-acting form may be added to control any hyperglycaemia which may follow breakfast, lunch or supper.

It is important to note that variability in absorption within the same individual and between two individuals can happen.

Insulin doses should be calculated and determined on an individual patient basis, gradually increasing the dosage until the patient stabilises. Care should be taken not to cause hypoglycaemia.

If diabetes control is poor on diet, exercise and oral drugs, do not delay starting insulin.

Withdrawal of oral (sulphonylureas & biguanides) drugs should be commenced only after the insulin therapy has been initiated. In some patients, metformin and insulin combination can be given.

Supportive

- Monitor blood glucose levels regularly
- Prescribe appropriate diet
- Careful weight reduction in obese patients
- Encourage regular exercise
- Regular review of patient at specialist clinic/hospital
- Educate patient and carers

Patient and carers education

Patients and carers should be educated on the following:

- Identification of symptoms of hypoglycaemia
- Principles of foot care
- Injection techniques and how to look after syringes and insulin
- Types of insulin preparations available

- Monitoring blood glucose or urine glucose
- Diet control i.e. meal intervals depending on type of insulin.

Notes

Weight reduction for obese patients and appropriate diet are key in the process of managing diabetes mellitus.

Dietary control and exercise should be continued alongside drug therapy.

4.3 HYPERGLYCAEMIC/KETOACIDOSIS COMA/PRECOMA

Definition

Severe uncontrolled diabetes with very high blood sugar requiring emergency treatment with insulin and intravenous fluids and with a blood ketone body concentration of greater than 5mol/L, the common precipitating causes are infection, management errors and new cases of diabetes, but there is no obvious cause in about 40% of episodes.

In Africa, DKA carries a high mortality – through delayed diagnosis, inadequate treatment and late presentation. It presents at any age although there is a well defined peak at puberty.

Clinical features of diabetic ketoacidosis

- Polyuria, nocturia, thirst
- Weight loss
- Weakness
- Visual disturbance
- Abdominal pain
- Leg cramps
- Confusion, drowsiness, coma

- Dehydration
- Hypotensions
- Tachycardia
- Rapid and deep respiration (kussmaul breathing)
- “Acetone” odour
- hypothermia

Management

Children

Establish and maintain cardiovascular and renal functions. Correct fluid and electrolyte deficiencies and imbalances. Give insulin to reduce blood sugar.

Determine the precipitating causes of the crises.

Look out for and prevent any complications.

Fluid and electrolyte replacement:

- Sodium chloride 0.9%, rapid infusion 20ml/kg in the first one hour then assess urine output. When blood sugar falls to between 10 – 16 mmol/L, change to dextrose 5% in order to prevent hypoglycaemia.
- If potassium level is low or normal, add potassium intravenously 20 – 40 mmol/L of intravenous fluid. This should be given after insulin therapy has been commenced.

Insulin

Soluble insulin 0.1 units/kg/hour, give intravenously, as a continuous infusion. When blood sugar levels reach 10 mmol/L reduce to 0.05 units/kg/hour.

Once the patient has stabilised, manage as for Type 1 diabetes mellitus

Adults

Conduct assessments and investigations as in children

Fluid and electrolyte replacement:

- Isotonic (normal) saline (sodium Chloride 0.9%) rapid infusion 1 – 2L in the first one hour then reassess

and repeat as needed. Normally 6-8 litres in the first 24 hours. When blood sugar falls to between below 14 mmol/L change to dextrose 5% in order to prevent hypoglycaemia. If sodium level more than 150 mmol/L give half strength (hypotonic) saline.

- ii. Sodium bicarbonate (600ml of 1.4%, or 100ml of 8.4% in a large cannulated vein) if pH>7.0

- iii. Potassium
 1. Add dosage below to each 1L of infused fluid:
 - (a) If plasma K<3.5mmol/L, add 40 mmol KCl
 - (b) If plasma K 3.5-5, 5mmol/L, add 20mmol KCl

Insulin

- i. Soluble insulin 5-10 units (0.1 units/kg/hour intravenously), as a continuous infusion NOTE: Soluble Insulin given as an intravenous bolus is rapidly destroyed within a few minutes. Intravenous insulin must always be given as a continuous infusion. When blood sugar levels reach 10 -14 mmol/L reduce to 2-4U/h (0.05 units/kg/hour) or titrate against blood glucose levels and when patient is able to take oral feeds give soluble insulin 2-3 times before meals.

OR

- ii Initially soluble insulin 20 units intramuscularly stat then 5-10 units intramuscularly hourly until blood sugar is 14mmol/L. When blood glucose is 10 - 14mmol/L give 8 units 4 hourly subcutaneously until patient is able to take oral feeds. When patient is taking food orally, change to soluble subcutaneously twice or three times before meals.

Hypoglycaemia in Diabetes Mellitus

Definition

This is a condition in which the blood sugar falls to lower than 3 mmol/L with the attendant signs and symptoms of disorder. The classical clinical features may however occur at higher levels than this in some patients, especially those with poorly controlled type 2 diabetes. The causative factors include inadequate or delayed food consumption, alcohol consumption, excess insulin dosage or wrong injection technique, exercise, inattention or combination of these factors.

Clinical features

Symptoms

- Weakness
- Fatigue
- Sweating
- Hunger
- Abdominal pain
- Headache
- Nausea

Signs

- Pallor
- Tremor
- Tachycardia
- Irritability
- Speech difficulty
- Inco-ordination
- Loss of concentration
- Drowsiness
- Abnormal behavior
- Disorientation
- Convulsions
- Coma

Treatment

In all diabetics in coma, with no means of ascertaining the blood glucose level, give oral or intravenous glucose. If patient is conscious and able to take orally give a sugar containing drink or food. If patient is unable to take orally give:

- i. 20 ml of 50% glucose as an intravenous bolus (OR 50 ml of 20% glucose)
- ii. Follow up if necessary with intravenous infusion of 10% or 20% glucose, 100ml/hour.

OR

- iii. Administer 0.5 mg to 1.0 mg glucagon intramuscularly or intravenously. IM or IV Glucagon must be followed by oral glucose
- iv. A continuous infusion of 10% or 20% glucose (dextrose) may be required for 24 to 72 hours if overdosage of long acting insulin or sulphonylureas (chlorpropamide or glibenclimide) is the cause of hypoglycaemia

Monitor blood glucose regularly and maintain between 6 and 8 mmol/L.

4.4 DIABETES MELLITUS IN PREGNANCY

Diabetes mellitus in pregnancy is usually seen in women who are already diabetic before pregnancy or have had a history of diabetes in the family. However, when this condition occurs in non-diabetics it usually presents in the second trimester.

All pregnant diabetic patients should be referred for specialist treatment. Known diabetic patients should be counselled before conception and the diabetes should be well controlled both before conception and throughout the pregnancy. Insulin use and proper diet should control

the blood sugar level effectively. (See also chapter 5).

5

OBSTETRIC AND GYNAECOLOGICAL CONDITIONS

5.1 ANTE-NATAL CARE

The goal of antenatal care is:

- To provide health promotion. e.g., health education, counselling and provide supplementation of iron, folic acid, iodine, calcium and vitamin.
- To prevent common diseases e.g. malaria, anaemia and neonatal tetanus
- To detect early signs of disease or complications in the mother and foetus e.g. proteinuria, hypertension, syphilis, foetal abnormality, malpresentation and intrauterine growth retardation.
- To provide a Birth Plan
- Place of delivery
- Complication readiness
- Transportation to delivery site

Four quality antenatal visits are recommended, the first of which should be before 16 weeks of gestation. During the first visit the following should be done:

- General, obstetric and gynaecological history
- Full physical examination
- Basic investigation i.e. confirmation of pregnancy, Hb, HIV, RPR, urinalysis and ultrasound where available
- Supplements i.e. haematinics (iron, folic acid, mebendazole)
- Malaria and tetanus prophylaxis
- Voluntary Counselling and Testing (VCT)

During the second and subsequent visits the following

should be done:

- Examine for growth of foetus
- Maternal well being
- Check on medications given previously
- Check presentation of the foetus
- Discuss place of delivery and mode of delivery
- Discuss warning signs / danger signs
- Malaria prophylaxis
- Iron and folic acid supplementation
- ART for PMTCT or HAART

5.2 NORMAL LABOUR

General care

- Encourage women to be with support person at all times.
- Encourage ambulation and frequent oral fluid intake
- At delivery woman must choose which position to take

Monitoring of labour

- Use a partogram on all patients
- Check for foetal and maternal well-being and progress of labour
- Maintain good infection prevention practices
- Provide active management of the 3rd stage:
 - After the baby has been delivered onto the mother's abdomen, palpate the abdomen to rule out the presence of an additional baby(s) and then give oxytocin 10 units intramuscularly within 1 minute of delivery

Oxytocin is preferred because it is effective 2 to 3 minutes after injection, has minimal side effects and can be used in all women. If oxytocin is not available, give ergometrine 0.2mg intramuscularly or prostaglandins e.g., Misoprostol 600mg sublingual. Make sure there is no additional

baby(s) before giving these medications.

- Clamp the cord close to the perineum using sponge forceps (Spencer wells) and deliver placenta using controlled cord traction. Allow sufficient flow of blood to the baby before clamping. Hold the clamped cord and the end of the forceps with one hand. Place the other hand just above the women's pubic bone and stabilize the uterus by gently pushing the uterus up. This helps prevent inversion of the uterus
- Keep slight tension on the cord and await a strong uterine contraction or rub a contraction. If necessary use sponge forceps (Spencer wells) to clamp the cord closer to the perineum as it lengthens. Do not wait for a gush of blood before applying traction on the cord
- When the uterus becomes rounded or the cord lengthens, very gently pull downward on the cord to deliver the placenta. Continue to stabilise the uterus with the other hand.

If the placenta does not descend during 20 - 30 seconds of controlled cord traction (i.e. there are no signs of placental separation), do not continue to pull on the cord:

- Gently hold the cord and wait until the uterus is well contracted again. If necessary use a sponge forceps to clamp the cord closer to the perineum as it lengthens
- With the next contraction, repeat controlled cord traction with counter traction.

Immediately following birth

- Gently perform uterine massage
- Provide oxytocics

- Estimate blood loss
- Examine for and repair lacerations
- Examine placenta and membrane for completeness
- Provide close surveillance of vaginal bleeding, uterine hardness and vital signs during the first 6 hours postpartum:
 - Every 15 minutes for the first two hours
 - Every 30 minutes for the next one hour
 - Every hour for the next three hours

Promote early and exclusive breastfeeding. In the event of mother being HIV positive, provide counselling on breastfeeding options

Social support

- Clarify and reposition to first paragraph
- Analgesia in labour
- Pethidine 100mg IM stat
- Naloxone 10 micrograms/kg may be given to a neonate to reverse Pethidine induced respiratory depression

5.3 ANTEPARTUM HAEMORRHAGE (APH)

Definition

APH is defined as per vaginal bleeding after 22 weeks of gestation to delivery of the baby.

The main causes of APH are

- Placenta previa
- Abruptio placentae
- Cervical lesions e.g cancer, ectopy, polyp
- Vasa previa

Clinical features

- Painful or painless PV bleeding
- Provoked or unprovoked

- High pulse rate
- Low blood pressure
- Air hunger depending on amount of bleeding
- Signs of shock

Investigation must distinguish between placenta previa and abruptio placentae. No vaginal examination is to be performed. Speculum examination should only be performed after placenta previa has been ruled out. Refer to a hospital

Emergency care

- Normal saline infusion
- Transfer to hospital for confirmation of diagnosis by clinician or examination by ultra sound scan, where available, for clinical examination
- Rh-negative patient may need anti D

Note that antepartum haemorrhage is a serious complication

5.3.1 Placenta previa

Definition

This is a condition in which the placenta is implanted in the lower segment of the uterus.

Clinical features

- Painless PV bleeding
- ± malpresentation, high presenting part
- Present foetal heart
- Recurrent vaginal bleeds
- Relaxed uterus

Specific management

If the baby is premature and bleeding has stopped, conservative management is recommended until 36 - 38 weeks:

- Keep woman in hospital until delivery
- Cross match 2 units of blood at all times
- Keep haemoglobin at more than 9g using haematinics or blood transfusion
- Give dexamethasone 25mg intravenously/intramuscularly in 2 divided doses
- If there is heavy bleeding proceed to caesarean section

Plan delivery if foetus is mature, dead, or has major anomalies

5.3.2 Abruptio placentae

Definition

This is a condition in which there is premature separation of a normally implanted placenta before delivery of baby. The patient must be referred to a hospital.

Clinical features

- May have been provoked by Artificial Rapture of Membrane (ARM), External Encephalic Version (ECV), hypertensive disorder
- Painful Per Vaginal (PV) bleeding
- Foetus may be dead, difficult to feel foetal parts
- Height of fundus may be higher than dates
- Tender tense abdomen
- Signs of shock
- Retro placental bleeding may be concealed

Specific management

- Nurse in high dependency ward
- Rapid infusion of normal saline or ringers lactate
- Cross match 4 units of blood and commence transfusion as soon as possible
- Catheterise patient
- Give morphine 15mg intramuscularly stat

- Perform artificial rupture of membranes to induce labour
- Active management of third stage
- After delivery give oxytocin 10 units in normal saline running at 20 drops per minute for 2 – 4 hours

Be aware of postpartum haemorrhage due to atonic uterus or coagulopathy.

5.3.3 Cervical lesion (Refer to chapter 8.4)

- Cancer of the cervix
- Cervical ectopy
- Cervical polyps

5.3.4 Vasa Previa

Definition

A condition in which the foetal blood vessels are unsupported by either the umbilical cord or placental tissue, traverse the foetal membranes of the lower segment of the uterus below the presenting part. Vasa previa occurs when foetal blood vessel(s) from the placenta or umbilical cord cross the entrance to the birth canal, beneath the baby. It can result in rapid foetal hemorrhage or lack of oxygen.

Symptoms

- Present with sudden onset of abnormally heavy or small amounts at rupture of membranes.
- Foetal bradycardia, then death.

Warning Signs

Very difficult to diagnose antenetically before rupture of membranes

- Low-lying placenta
- Painless birthing bleeding.

Investigations

- Ultrasound
- Check the placental cord connection for velamentous cord insertion .
- Sonography
- Color Doppler

Treatment

Supportive

- Initiate breastfeeding within an hour of birth
- Use of tocolytes to stop all uterine activity
- Bedrest
- No sexual intercourse
- No vaginal examinations
- No lifting
- No heavy straining during bowel movements (use of stool softeners)
- Hospitalization; (if suspected antenatally)
- Foetal monitoring
- Regular ultrasounds to monitor progression of vasa previa
- Steroid treatment to develop fetal lung maturity
- Elective cesarean delivery, most important

When not diagnosed antepartum, aggressive resuscitation complete with blood transfusion for the infant if necessary must be planned for and/or expected.

5.4 POST PARTUM HAEMORRHAGE (PPH)

Definition

This is per vaginal (PV) bleeding of 500ml or more or any amount resulting in cardiovascular collapse after delivery of the baby. It is called primary PPH when it occurs within the first 24 hours and secondary PPH

thereafter up to 6 weeks. PV bleeding of more than 500ml or any amount causing cardiovascular collapse or hypovolaemic shock

This is caused by:

- Atonic uterus
- Genital tract trauma, e.g., ruptured uterus, cervical vaginal tears and vulval haematoma
- Secondary coagulopathy
- Uterine sepsis

Clinical features

- Excessive vaginal bleeding
- May be in shock
- High pulse rate equal or more than 100/min
- Low BP less or equal to 90/60mm
- Air hunger (restlessness)
- Cold sweat

Emergency care

To provide a timely surgical plan such as hysterectomy, internal iliac artery ligation

This must be teamwork

- Call for help
- Rub up the uterus for a contraction and to expel clots
- Repeat oxytocin 10 units intramuscularly
- Give oxytocin 20 units in 1Litre normal saline running at 20 drops per minute
- Alternatively in the absence of oxytocin give Misoprostol 1000microgram rectally
- Blood and fluid replacement as required
- Monitor urine output/catheterise the bladder
- If PV bleeding persists yet uterus is well contracted, check genital tract for trauma and for coagulopathy
- Where available, central venous pressure (in the

- absence of coagulopathy) monitoring is valuable
- In uncontrollable PPH timely surgical intervention is important, e.g., hysterectomy
- Nurse in high dependency ward- Special Observation Unit (SOU) of the hospital

5.5 UNCONSCIOUS OBSTETRIC PATIENT

A pregnant woman may be brought into a health facility unconscious without much history. Management therefore will mainly depend on clinical examination and investigations. The obstetrician should work in collaboration with the physician.

Differential diagnosis

- Eclampsia
- Cerebral Malaria
- Meningitis
- Hypovolaemic shock
- Diabetic coma

The following should be done as the Airway, Breathing and Circulation (ABC) of resuscitation:

- Take history from carer and note patient's previous notes
- Quick examination should include; blood pressure (BP), pulse, temperature, jaundice, cyanosis, hydration, sweating, cold clammy extremities, respiration, heart sounds, PV bleeding, fundal height, foetal viability and neck stiffness
- Give intravenous fluids
- Investigation: Cerebral spinal fluid for bacteriology and biochemistry, blood for haemoglobin level, malaria slide, blood sugar and urea urinalysis

Treatment

- Intravenous line

- ABC of resuscitation
- Transfer to hospital
- Keep patient in high dependency ward (SOU)
- Nurse in left lateral position
- Keep airway patent
- Catheterise
- Treat the cause

5.6 PRE-ECLAMPSIA AND ECLAMPSIA

Definition

Pre-eclampsia is pregnancy-induced hypertension with proteinuria occurring after 20 weeks of gestation. There are 2 types; mild pre-eclampsia and severe pre-eclampsia. When convulsions appear in this syndrome it is then called eclampsia. This is an obstetric emergency requiring immediate referral to a hospital

Diagnosis

5.6.1 Mild pre-eclampsia

This is when two measurements of diastolic blood pressure taken 4 hours apart read 90-100mmHg with proteinuria up to 2 and above.

5.6.2 Severe Pre-eclampsia

This is when diastolic blood pressure is 110mmHg or more with increasing proteinuria of 3+ or more.

5.6.3 Eclampsia

This is when there is diastolic blood pressure of 90mmHg or more with proteinuria of 2+ or more and convulsions. The signs of impending eclampsia are:

- Epigastric tenderness
- Increased tendon reflexes
- Blurred vision

5.6.4 Pre-eclampsia management as an outpatient

The reduction of the blood pressure does not abort the progression of the disease process and its effect on the foetus. At present the only effective management of pre-eclampsia is delivery of the baby. The more severe the disease condition, the greater the risk to both the mother and the baby. If the risk to the mother's health is significant the baby should be delivered even if it is non-viable. If the disease is mild or moderate the baby can be kept in utero until it is viable provided close observation is kept on the mother, looking out for the complications of pre-eclampsia.

All patients with pre eclampsia should have a mid stream urine (MSU) specimen taken and be seen by a specialist. A check should be kept on the baby's growth with serial measurement of symphysio-fundal height. The woman should keep a kick chart. No antihypertensives are usually required for mild pre-eclampsia.

Complications

- Cerebral Vascular Accident (CVA)
- Renal failure
- Cardiac failure
- Foetal death
- Eclampsia

The definitive treatment is delivery.
Conservative management.

5.6.5 Mild pre-eclampsia and gestation less than 37 weeks

Management should include:

- Monitoring blood pressure
- Monitoring of foetal well being (kick chart, serial

- scans)
- Monitoring of urine output and urinalysis for proteinuria
- Renal function test
- Normal diet

Do not give anti-hypertensives, sedatives, tranquillisers or anticonvulsants.

Severe pre-eclampsia and eclampsia

Once the blood pressure is above 160/110mmHg the mother is at risk of stroke. The baby should be delivered.

There are four principles involved in the management:
Prevention or control of convulsions

- Control of hypertension
- Maintenance of fluid balance
- Delivery of the baby

General Management

- For patients with eclampsia maintain an airway.
- Monitoring of urine output (should not be less than 30ml/hour) Carry out urinalysis for proteinuria
- Renal function test
- Normal diet
- Maintain strict fluid balance chart
- Do bedside clotting test (failure of clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy)
- Avoid fluid overload

Management of hypertension

The drug of choice is Hydralazine. The drug should be titrated against the blood pressure with the aim of achieving a diastolic pressure of 90 – 100mmHg.

If diastolic BP 110mmHg reduce by giving

- Hydralazine IV 5mg bolus and repeated every 20 to 30 minutes OR
- Nifedipine 10mg sublingually

- Give methyldopa 250mg – 500mg every 6 – 8 hours orally for maintenance

Management of convulsions

The drug of choice is Magnesium Sulphate. Diazepam, despite its effects on the baby, may be used when magnesium sulphate is not available. Diazepam must be given intravenously, never orally or intramuscularly.

- Magnesium Sulphate (Mg SO₄)
Loading dose: 4g of 20% magnesium sulphate intravenously, slowly over 5 minutes, then 5g intramuscularly in each buttock. (Total loading dose 14g.)
Maintenance dose; 5g Magnesium Sulphate in alternate buttock every 4 hours. A total of six maintenance doses is recommended

Before repeating administration, ensure that:

- Respiratory rate is at least 16 per minute
- Patellar reflexes are present
- Urine output is at least 30ml per hour over 4 hrs

Withhold or delay MgSO₄ if:

- Respiration rate falls below 16 per minute
- Patellar reflexes are absent
- Urinary output falls below 30ml per hour over preceding 4 hrs

Keep antidote ready

In case of respiratory arrest

- Assist ventilation (mask and bag apparatus, intubation)
- Give an antidote, calcium gluconate 1g (10ml of 10% solution) intravenously slowly until respiration begins as an alternative to Magnesium Sulphate: Diazepam bolus 5-10mg IV over 2 minutes.

Repeat as required if the patient is convulsing

Fluid balance

Fluid input and output must be monitored. Fluid should be replaced as required. However, be aware of fluid overload. Do not give more than 2.5litres in 24hours

No matter how oedematous a woman is if the urine production goes below 30 ml/hour, the patient should be given a fluid challenge of 1 litre Normal Saline given over 30 minutes. If the response is an increase of urine more fluid should be given. If there is no response the patient may be developing renal failure and should be referred to a specialist physician.

5.6.6 Pre-eclampsia and eclampsia in labour

- The patient should be monitored as a high risk one with BP checked every 30 minutes or less, if necessary
- Listen for the foetal heart every 15 minutes and/or during and immediately after a contraction
- The patient must be catheterised and fluid input and output monitored
- The patient should be given adequate pain relief
- The second stage of labour should be kept short and an elective vacuum extraction or forceps delivery done as soon as the patient is fully dilated
- Fresh meconium in the liquor and heart rate abnormality signifies foetal distress and the baby should be delivered by caesarean section.
- Ergometrine should be avoided; instead oxytocin 5 units intramuscularly should be given with delivery of the anterior shoulder

5.6.7 Care for the neonate

The baby is likely to be in a poor condition and may

require resuscitation.

- Keep warm
- Give Oxygen ambu bag as required
- Suction

Post partum care

The patient must be closely monitored for at least 48 hours in a place where maximum care can be given. This usually means in the labour ward or a high dependency unit (SOU).

5.7 MEDICAL DISEASES IN PREGNANCY

5.7.1 Diabetic Mellitus

Pregnancy may turn otherwise well controlled diabetes into poorly controlled diabetes. Some women may develop diabetes during pregnancy. These cases must be referred to the hospital if attended at a health centre.

The following principles of care should apply:

- Pre-pregnancy counselling
- Pregnancy counselling
- Monitoring blood sugar with necessary adjustments to medication
- Monitoring foetal growth and looking out for macrosomia
- In labour monitor sugar and progress of labour
- If there is poor progress in labour, deliver by caesarean section
- Beware of shoulder dystocia
- Watch for hypoglycaemia in baby
- Care for the new born

Follow up mothers

Post Natal Care

- Patient may resort to pre-pregnancy doses of insulin or hypoglycaemics.

5.7.2 Cardiac diseases

The most common cardiac disease encountered in pregnancy is Rheumatic Heart Disease (RHD). The most prevalent of RHD is Mitral Stenosis (MS) and Mitral Incompetence (MI). (See chapter 7).

Management

- Pre pregnancy counseling

- If case found at booking clinical examination confirm diagnosis by echo cardiography
- During antenatal, all conditions that precipitate cardiac failure e.g. febrile illness, malaria, anaemia and increased physical activity must be properly managed
- Advise bed rest
- Give digoxin 0.25mg daily
- Frusemide should only be used in case of pulmonary oedema
- Admit to hospital in the 3rd trimester or in case of pulmonary oedema.

In labour

Keep in high dependency ward in propped up position for at least 24 hours.

Give:

- Pethidine 100mg IM as required
 - Cefotaxime 1g 12 hourly (2 doses)
 - Oxygen PRN
 - Oxytocin 5 – 10 units intramuscularly for the 3rd stage
 - Frusemide 40mg intravenously after the 3rd stage

Note: Avoid Ergometrine

Post natal

- Discharge after 3 –4 days after delivery
- Discuss contraception
- Discuss surgical treatment of heart disease

5.7.3 Malaria in Pregnancy

(Refer to chapter 3)

5.7.4 HIV in Pregnancy

(refer to Chapter 3)

5.8 ABORTION

Definition

This is expulsion of products of conception, usually before 22 weeks of gestation. The contents of conception may or may not be completely expelled. It may be spontaneous or induced.

Clinical features

- Vaginal bleeding
- Ruptured membranes
- Expulsion of foetus
- Static uterine size (missed abortion)
- Abdominal pain/tenderness
- May have fever

Management

This depends on the type of abortion:

- Missed, incomplete, septic abortions need evacuation of the uterus
- Septic abortion needs aggressive management with antibiotics.
- For inevitable abortion await expulsion of foetus or augment with oxytocin
- Infuse IV fluids as required

Emergency treatment

- Look out for signs of hypovolaemic shock and treat appropriately
- Provide pre-MVA counselling on procedure
- Monitor blood pressure, pulse and temperature
- Look for signs of anaemia
- Evacuate uterus, preferably by Manual Vacuum Aspiration (MVA)

- Give Oxytocin 5-10Units IV

Supportive

- Provide psychological support to patient and carer
- Treat infection with appropriate antibiotics
- Provide post-MVA counselling
- Provide family planning counselling
- Facilitate linkages to other reproductive health services

5.9 MENSTRUAL DISORDERS

It is important to decide whether the menstrual disorder is truly a menstrual disorder or not. The menstrual history, type of contraceptive used, history of previous pregnancies, kind of discharge and related issues must be noted. The abdomen must always be examined for tenderness or masses. The vagina should also be examined and the condition of the cervix and any discharge should be noted.

5.9.1 Dysmenorrhoea

Definition

This is severe pain associated with the menstrual cycle and is usually referred to as period pains. This may be due to gynaecological or non gynaecological reasons.

There are two types:

- Spasmodic
- Congestive

5.9.1.1 Spasmodic

This occurs primarily in teenagers and young multiparous women, but is not uncommon in elderly multiparous women.

Management

- Empathy and reassurance.
- Simple analgesics such as aspirin 600mg orally 3 - 4 times daily or paracetamol 1g orally 3 - 4 times daily.
- In severe pain, ibuprofen can be given 400mg twice daily throughout the menstrual period.
- If pain is very severe, contraceptive pills may be used for 6 months

Congestive

- In this condition the pain is due to organic cause such as pelvic infection, fibroids and endometriosis

Management

- Empathy and reassurance
- Simple analgesics such as aspirin 600mg orally 3 - 4 times daily or paracetamol 1g orally 3 - 4 times daily
- In severe pain, ibuprofen can be given 400mg twice daily throughout the menstrual period
- Treat the cause

5.9.2 Amenorrhoea

Definition

It is a condition characterised by absence of menstruation.

There are two types i.e.

- Primary
- Secondary

5.9.2.2 Primary amenorrhoea

This is when a girl has not menstruated by 16 years of age. The genitalia and secondary sexual development may be normal or abnormal

Management

- Reassure patient
- Refer to specialist if patient does not have menstrual periods by 18 years of age or absence of secondary sexual development

5.9.2.3 Secondary amenorrhoea

This is a condition where menstruation stops for more than 3 consecutive months. The most common cause of amenorrhoea is of course pregnancy. Some of the other causes include:

- Stress
- Anxiety
- **Significant loss of weight**
- Contraceptives e.g. Mini pill, Depo contraceptive injection

Other hormonal medicines such as Danazol (alternative: 17beta-hydroxy-2,4,17alpha-pregnadien-20-yno [2,3-D]isoxazole) LHRH Analogue

A vaginal examination and laboratory investigations may help give the diagnosis.

Management

If pregnancy is not present, and amenorrhoea persists for one year or more without obvious disease refer to a specialist.

5.9.3 Oligomenorrhoea

Definition

This is when the menstrual cycle is more than 35 days. Usually, it has no consequences unless the patient complains of infertility. If infertile for more than one year, refer to a specialist.

5.9.4 Polymenorrhoea

Definition

This is when the menstrual cycle is less than 21 days. Wrong calculation of menstruation dates could be mistaken for polymenorrhoea. It can also be caused by menometrorrhagia. When no abnormalities are detected, the pill may be helpful. Refer to specialist if the pill does not help.

5.9.5 Meno-metrorrhagia

Definition

This is when the menstrual period lasts more than 7 days. Often there is also excessive blood loss and irregular vaginal blood loss.

Diagnosis

A good history taking (i.e. family planning method used etc.) is very important.

The differential diagnosis includes:

- Abortion
- Carcinoma of the cervix
- Fibromyomata
- Dysfunctional Uterine Bleeding (DUB)
- Ectopic pregnancy

Treatment

- Progestogens treatment
- Fractionated Dilatation and Curettage (D & C) may be needed for older women or non response to hormone therapy.

5.9.7 Post menopausal bleeding

The most common cause is carcinoma of the cervix and

uterus. A vaginal examination, including speculum should be done to exclude carcinoma of the cervix and uterus. Hormones and antibiotics should not be given before this is done.

Refer patient to specialist.

6

RESPIRATORY TRACT DISEASES

Respiratory tract diseases include upper and lower respiratory tract infections or as well as obstructive airway diseases.

6.1 RESPIRATORY TRACT INFECTIONS

6.1.1 Upper Respiratory Tract Infections

Respiratory Tract Infections involve lower and upper or both respiratory tract systems. These include the common cold, bronchitis and pneumonia

6.1.1.1. Common Cold

Definition

This is a self-limiting disease caused by viruses and allergies. If it is viral, it is a highly infectious condition comprising mild systemic upset and prominent nasal symptoms

Clinical Features

Symptoms

- Running nose/nasal congestion
- Cough
- Irritation of the throat
- Fever
- Sneezing

Complications

Lower respiratory tract infection (see 6.1.2)

Treatment

- Analgesics;
Aspirin, 600mg 3 - 4 times daily or paracetamol, 500mg - 1g orally 3 - 4 times daily in adults, children; paracetamol, 10 - 20mg/kg 3 times daily
- Nasal decongestants
- Cough mixtures may offer symptomatic relief
- Take plenty of fluids

Note: (i) Aspirin is not recommended for children under 16 years.
(ii) Antibiotics are not indicated

Supportive

- Advise patient to take plenty of fluids

6.1.1.2 Laryngotracheobronchitis

Definition

This is an inflammation of the larynx, trachea and bronchus following an acute viral respiratory infection..

Clinical features

Symptoms

- Pain in the larynx
- Hoarseness of voice
- Irritating persistent cough
- Shortness of breath
- Fever

Signs

- Stridor
- Persistent or recurrent laryngitis

Treatment

Analgesics in early stages

- Paracetamol, 500mg – 1g orally 3 – 4 times daily in adults, 10 – 20mg/kg orally 3 – 4 times daily in children

Supportive

- Give more fluids and humidification

6.1.2 Lower Respiratory Infections

These conditions include Pneumonia and Bronchitis

6.1.2.1. Pneumonia

Definition

This is an inflammation of the lungs usually caused by *Streptococcus pneumoniae*, *Mycoplasma pneumoniae* and *Staphylococcus aureus* Hemophilus Influenzae type B and atypical organisms such as *Jiroveci pneumonia*.

Clinical features

These are usually of sudden onset.

Symptoms

- Fever
- Dry or productive cough
- Chest pain
- Chills
- Breathlessness
- Children may be unable to drink or breastfeed

Signs

- Bronchial breathing
- Drowsiness
- Increased respiration rate
- Cyanosis may be present
- Flaring of nostrils
- Chest indrawing
- Increased pulse rate

- Crepitations
- Breath sounds may be reduced
- Sputum may be "rusty"

Complications

- Septicaemia
- Lung abscess
- Emphysema
- Heart failure
- Meningitis

Diagnosis

This is based on clinical findings but may be supported by radiological examinations which show lobar and bronchial pneumonia.

Treatment

Some patients will need admission particularly if there is cyanosis or complications.

- Benzyl penicillin, 1-2MU intravenously 6 hourly for 5 days adults, children 25,000 -50,000 units/kg intravenously/intramuscularly in 4 divided doses for 7 days (as soon as the symptoms and respiratory rates are controlled change to oral medication i.e Amoxicillin 250mg for adults and 125 mg/5ml in children) or
- Ceftriaxone, 1g - 2g daily adults, children 20 - 50mg/kg daily intravenously/intramuscularly for 7 days. if allergic to penicillin or
- Erythromycin, 500mg adults, orally 6 hourly for 7 days, children 20-30mg/kg in 4 divided doses for 7 days
- Oxygen is indicated if respiratory distress or cyanosis is present
- Non-opiate analgesics; paracetamol 500mg - 1g orally 3 - 4 times daily adults, children 10-20mg/kg orally 3 - 4 times daily

Refer early to a specialist if the patient is not rapidly improving with antibiotic treatment.

6.1.2.2. Pneumonia in Children

If a child has cough or difficulty in breathing then he/she may have a respiratory tract infection.

Clinical features

May include:

- Fast breathing
- Chest in drawing
- Stridor in a calm child
- Wheezing

It is important to count the respiratory rate of the child.

If the child is :	Fast breathing is:
2 months up to 12 months	50 breaths per minute or more
12 months up to 5 years	40 breaths per minute or more

Classification

- No pneumonia cough or cold: child is classified as having no pneumonia cough or cold if there are no signs of pneumonia
- Pneumonia: a child is classified as having pneumonia if there is fast breathing accompanying wheeze or cough
- Sever pneumonia: a child is classified as having sever pneumonia if there is chest indrawing or stridor in a calm child

Treatment

No pneumonia cough or cold:

- If coughing for more than 21 days, refer for assessment,
- If wheezing give oral salbutamol,
- Follow up in 5 days if not improving.

Pneumonia

Give an Appropriate Oral Antibiotic

FOR PNEUMONIA, ACUTE EAR INFECTION OR VERY SEVERE DISEASE:

AMOXYCILLIN Give three times daily for 5 days Amoxicillin			ERYTHROMYCIN Give four times daily for 5 days 2nd-LINE ANTIBIOTIC - Erythromycin		
AGE or WEIGHT	TABLET	SYRUP	AGE or WEIGHT	TABLET	SYRUP
	250mg	125 mg per 5 ml		250 mg	125/5 mls
2 months up to 12 mnths (4-<10 kg)	1/2	5 ml	2 months up to 4 months 4-<6kg)	1/4	2.5 mls
12 mnths up to 5 years (10-19kg)	1	10 ml	4 mnths up to 12 mnths (6-<6kg)	1/2	5 mls
			12 mnths up to 5 years (10-19kg)	1	10 mls

FOR DYSENTRY:

1st -LINE ANTIBIOTIC:- Nalidixic Acid

2nd -LINE ANTIBIOTIC:- Cotrimoxazole

NALIDIXIC ACID Give four times daily for 5 days		COTRIMOXAZOLE (trimethoprim + sulphamethoxazole)			
AGE or WEIGHT	TABLET	AGE OR WEIGHT	ADULT TABLET	PEDIATRIC TABLET	SYRUP
	250 mg		80 mg trime- thoprim +400 mg sulpha- metho- xazole	20 mg trime- thoprim +100 mg sulpha- metho- xazole	40 mg trime- thoprim +200 mg sulpha- metho- xazole per 5 ml
2 mnths up to 4 mnths (4-<6 kg)	$\frac{1}{4}$	2 mnths up to 12 mnths (4-10 kg)	$\frac{1}{2}$	2	5 mls
4 mnths up to 12 mnths (6-<10 kg)	$\frac{1}{2}$	2 mnths up to 5 years (10-19 kg)	1	3	7.5 mls
12 mnths up to 5 years (10-19 kg)	1				

FOR CHOLERA: * 1st-LINE ANTIBIOTIC:- Erythromycin
 *Note: Remember that the most important life saving interventions for cholera patients is immediate and appropriate rehydration.

Give Salbutamol
 For wheezing with no respiratory distress (chest in-drawing)

SALBUTAMOL Give three times a day		
2 months up to 12 months (<10kg)	1/2	1/4
12 months up to 12 months (10-19kg)		

GIVE THESE TREATMENTS IN CLINIC ONLY

- Explain to the caretaker why the drug is given
- Determine the dose appropriate for the child's weight (or age)
- Use a sterile needle and syringe. Measure the dose accurately

Give an Intramuscular Antibiotic

- For severe pneumonia or severe disease or very severe febrile illness

FOR CHILDREN REFERRED URGENTLY WHO CANNOT TAKE AN	<ul style="list-style-type: none"> • Give first dose intra-muscular chloramphenicol and refer child urgently to hospital BEING • If chloramphenicol is not available, give a first dose of IM benzyl -penicillin and refer urgently
---	---

IF REFERRAL IS NOT POSSIBLE	<ul style="list-style-type: none"> • Repeat the chloramphenicol injection every 12 hours for 5 days • Then change to an appropriate oral antibiotic to complete 10 days of treatment • Do not attempt to treat with benzyl-penicillin alone.
-----------------------------	---

AGE or WEIGHT	CHLORAMPHENICOL Dose: 40 mg per kg Add 5.0 ml sterile water to vial containing 1000 mg=5.6 ml at 180 mg/ml	BENZYLPENICILLIN To a vial of 600 mg (1,000,000 units): Add 2.1 ml of sterile water=2.5 ml at 400,000
2 months up to 4 months (4-<6kg)	1.0 ml = 180 mg	0.8 ml
4 months up to 9 months (6-<8kg)	1.5 ml = 270 mg	1.0 ml
9 months up to 12 months (8-<10kg)	2.0 ml = 360 mg	1.2 ml
12 months up to 12 months(10-<14kg)	2.5 ml = 450 mg	1.5 ml
3 years up to 5 years (14-19kg)	3.5 ml = 630 mg	2.0 ml

6.1.2.3. Aspiration pneumonia

More common in newborn babies especially in premature, respiratory distress, chronically ill, chronic aspirators, post vascular operations

Treatment

- Gentamycin, 5mg/kg twice a day or I.M 10 mg once daily
- Ciprofloxacin, 10mg/Kg body weight 3 times daily, the benefit must outweigh the risk but may be used for 5 to 17 year olds.

6.1.2.4. Atypical Pneumonia

Signs and symptoms of pneumonia plus extrapulmonary signs such as arthritis, splenomegaly caused by Mycoplasma, Chlamydia, PCP.

Treatment

- Erythromycin 500mg orally QID for 14 days for Chlamydia
- Cotrimoxazole 960mg every 12 hours for 21 days in combination with a steroid i.e. Prednisolone for PCP starting with 40mg per day and reducing by 5mg every 3 days for adults
- For children above 4 weeks to adults 120mg/Kg body weight in 2 to 4 divided doses for 21 days

6.1.2.5. Obstructive Airway Disease

Obstructive Airway Disease can be upper or lower.

6.1.2.5.1. Upper airway obstruction

The condition is caused by viral infection or inhaled foreign body. The main symptom is stridor.

When it is caused by viral infection the condition is called Croup. Croup is fairly common and is frightening to parents. Usually admission is advisable. If the infection has caused epiglottitis, the obstruction may be so severe as to necessitate tracheal intubation and antibiotics may be required.

Treatment

- Chloramphenicol 50 - 100mg/kg intravenously in 4 divided doses daily for 5 days
- Humidified oxygen (30 - 40% concentration)
- Dexamethasone 0.3mg/kg intramuscularly stat, Repeat after 6 hours.
- Naso-tracheo intubation or tracheostomy if obstruction is severe

Stridor due to Diphtheria

In stridor due to diphtheria, examination of the throat will reveal a white membrane. Diphtheria infection is uncommon nowadays.

Treatment

- Benzyl Penicillin IM/IV 25,000 - 50,000 units/kg intravenously in 4 divided doses for 5 days

Prevention

- Diphtheria can be effectively prevented by active immunisation in childhood

Stridor due to inhaled foreign body

Stridor due to inhaled foreign body is usually preceded by sudden choke whilst eating a meal or playing with small objects.

Treatment

- Remove foreign body

Stridor due to inhaled

Symptoms

- Smell of paraffin
- Cyanosis
- High respiratory rate
- Tachycardia
- Tachypnoea

Treatment

DO NOT INDUCE VOMITING!

- Give milk
- Hydrate
- Give Oxygen
- Antibiotic prophylaxis with Amoxycillin 125mg/5ml 3 times a day

Advice to patients

- Do not put paraffin in soft drink containers
- Clearly label paraffin containers

6.2 LOWER OBSTRUCTIVE AIRWAY DISEASES

Obstructive airway diseases are a spectrum of diseases characterised by obstruction of the lower airway with asthma and emphysema on either end of the spectrum.

6.2.1 Asthma

Definition

This is an acute or recurrent reversible obstructive airway disease characterised by increased responsiveness of the tracheobronchial tree to a variety of stimuli resulting into obstruction of the lower airways. The attacks can be precipitated by allergy, (especially to cat, horse or other animal hair or pollens), infection or exercise. The

obstruction can be reversed by treating with beta adrenergic agents such as Salbutamol.

Clinical features

Symptoms

- Wheezing
- Difficulty in breathing
- Coughing
- Restlessness

Signs

- Prolonged expiration
- Cyanosis if severe
- Rapid pulse
- Dehydration
- Sticky, clear sputum
- Wheezing

If the pulse is over 120/min, the patient's condition must be regarded as serious and admission to hospital is urgent.

Chest X-ray is necessary to exclude cardiac problems, pneumothorax or foreign body in the upper airway.

Treatment

Early vigorous treatment is important. The longer treatment is delayed the more difficult it is to reverse the process.

Mild Cases

These cases are not in acute distress and the pulse rate is usually not above 100/min. They are not cyanosed or dehydrated.

- Salbutamol, 2-4mg orally three times daily
- Salbutamol inhaler 2 puffs stat. Followed by 1 puff 4-6 hourly

Note: Inhaled corticosteroids e.g. beclomethasone, 2 puffs given 10 minutes after salbutamol inhaler may be used.

The patient must be taught how to use the inhaler. Check that he can use it correctly. If he/she cannot learn, use oral Salbutamol 4mg 3 times daily though. it may cause extrapyramidal symptoms.

Severe cases

The features are:

- Difficulty in breathing
- Sitting up in distress
- Difficulty in talking and drinking
- Pulse over 120/minute
- Exhaustion
- Dehydration
- Cyanosis
- Silent chest on auscultation

The patient should be admitted to hospital urgently for close monitoring.

The patient should be nursed on a propped up bed and be given a sputum cup.

The pulse and blood pressure should be checked every hour.

If possible, Peak Expiratory Flow Rate (PEFR) should be measured hourly.

Treatment

- Intravenous fluids, 3 litres per day; (1 litre 0.9% sodium chloride and 2 litres 5% dextrose)
- 20mmol potassium chloride added to 1L of any of

- above fluids in 24 hrs
- Humidified oxygen through a mask, 3 litres/minute
- Nebulised salbutamol 5mg stat given through a nebuliser. Follow this first dose by nebulised salbutamol 2.5mg every 4 hours
- Hydrocortisone, 200mg intravenously 4 hourly
- Start oral prednisolone, 30mg once daily for 5 days
- Aminophylline 250mg i.v. over 5-10mins followed by a maintenance dose of 100mg (less than 500mg over 24hours) 8 hourly over 24 hours. If the patient has heart disease, liver disease or is taking betablockers reduce the dose of aminophylline. Always give oxygen with aminophylline. Patients who have taken oral aminophylline in the last 8 hours should not be given the loading dose.
- Antibiotics. If there is evidence of bacterial infection give appropriate antibiotic

Treatment

The asthmatic child

Important clinical signs to record

- Pulse rate
- Respiratory rate
- Degree of breathlessness
- Use of accessory muscles of respiration
- Amount of wheezing
- Degree of agitation
- Conscious level

Role of investigations

- Pulse oximetry ($\text{SaO}_2 < 92\%$)
- PEF ($< 33\%$)
- CXR (Complications, life-threatening asthma)
- Blood gases (Raised pCO_2)

Initial treatment of acute asthma

- In children > 2 years,
- Salbutamol 100 mcg inhaler
- 2-10 puffs every 10 to 20 minutes

- Salbutamol via nebuliser if SaO₂ < 92%
- 2.5 – 5 mg every 20-30 minutes
- Ipratropium bromide
- If symptoms are refractory to β₂ agonist treatment
- 250-500 mcg/dose mixed with salbutamol
- Steroid therapy
- Steroid tablets
- Give prednisolone early in the treatment of acute asthma attacks
- 20 mg in children 2-5 years
- 40 mg in children > 5 years
- Intravenous steroids
- For severe exacerbations or children who are vomiting.
- Hydrocortisone 4 mg/kg 4 hourly
- Inhaled steroids
- No evidence of additional benefit
- Can be maintained in children already on long term therapy

Second line treatment of acute asthma

- in children > 2 years,
- IV salbutamol
- Severe cases with no response to inhaler therapy
- 15 mcg/kg over 10 minutes
- 1-5 mcg/kg/min infusion
- ECG
- Potassium levels
- Second line treatment of acute asthma
- In children > 2 years, cont
- IV aminophylline
- No benefits for mild to moderate asthma

Common and troublesome side-effects

- 5 mg/kg over 20 minutes
- 1 mg/kg/hour infusion
- Monitor is possible
- ECG
- Potassium levels
- Aminophylline serum levels

See appendix A on page 504 and 505 (Controlling steps)

6.2.2 Emphysema

This is an irreversible obstruction of the airways characterised with destruction of the alveoli and bronchioles by fibrosis.

Clinical Features

Symptoms

- Severe shortness of breath with slight exertion
- Recurrent coughs
- Slight wheezing
- Barrel chest

Signs

- Barrel chest
- Clubbing of fingers
- Hyper inflated lungs on X-ray
- Air trapping on X-ray

Treatment

Treat causes of exacerbations of the conditions

- Hydrocortisone 200mg intravenously 4 hourly for 24 hours and maintain on oral Prednisolone 30mg on alternate days
- Suction of the fluid from the airway
- Give an appropriate antibiotic i.e. Erythromycin 500mg while awaiting sputum results

Supportive

- Give up the habit that caused the emphysema e.g. stop smoking,
- Give oxygen

Prevention

- Stop smoking
Reduce industrial exposure
- Wear gas masks

7

CARDIOVASCULAR DISORDERS

7.1 HYPERTENSION

Hypertension is one of the leading public health problems worldwide. It is often asymptomatic, easily detectable, and potentially easily amenable to treatment. Yet, if left untreated it often leads to fatal complications. Since hypertension tends to be asymptomatic, public education about the dangers of hypertension plays a significant role in the overall management of hypertension.

Definition

The World Health Organization defines grade 1 hypertension as office blood pressures ranging from 140–159 mm Hg systolic or 90–99 mm Hg diastolic, grade 2 hypertension as pressures of more than 100 mm Hg systolic or 100–109 mm Hg diastolic. The baseline figures do not apply to children, diabetic mellitus patients, renal patients and pregnant women (hypertension in pregnancy, refer to chapter 5.6). The frequency of hypertension increases with age.

Risk Factors with Adverse Prognosis:

- Black race
- Youth
- Male sex
- Persistent diastolic pressure greater than 115mmHg
- Smoking
- Excess alcohol intake
- Hypercholesterolemia
- Diabetes Mellitus
- Obesity

Classification of Hypertension

The National Heart, Lung, and Blood Institutes classify blood

pressure as normal, prehypertension, hypertension stage 1, and hypertension stage 2.

1. Normal (optimal)

Systolic (mmHg)	Diastolic (mmHg)
< 120	< 80

2. Hypertension

Stage	Severity	Systolic Range (mmHg)	Diastolic Range (mmHg)
I	mild	130-139	80 - 89
		140 - 159	90 - 99
II	(moderate-severe)	> or = 160	> or = 100

From the Seventh Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure

Aetiology of Hypertension

- Primary (essential) Hypertension
- Secondary Hypertension
- Systolic Hypertension
- Hypertensive Crises (acute hypertension)

7.1.1 Primary Hypertension

This is hypertension for which there is no specific identifiable cause. About 90% of hypertension cases fall under this category.

7.1.2 Secondary Hypertension

This is hypertension due to a specific underlying condition or conditions. Some of the causes include the following:

- Renal Parenchymal Diseases
e.g. glomerulonephritis
- Renovascular Diseases
e.g. atherosclerotic (mainly older men) and fibroplastic (mostly younger women) diseases.
- Endocrine Diseases
e.g. pheochromocytoma, Cushing's Syndrome.
- Cardiovascular Disease
e.g. coarctation of aorta
- Pregnancy (gestational hypertension)
- Drugs
e.g. oral contraceptives, erythropoietin, steroids

7.1.3 Systolic Hypertension

7.1.4 Hypertensive Crises

These are clinical situations associated with blood pressure rising to levels usually above 130 mmHg diastolic. There are two types: hypertensive emergency which is associated with acute end-organ dysfunction (brain, heart and kidneys). In this setting there is a high risk of causing irreversible damage to the brain, heart or kidneys if blood pressure is not controlled within an hour or so.

Hypertensive urgency is the other setting with equally markedly raised BP but without significant signs or symptoms suggestive of end organ damage. In this setting BP reduction may be gradual over 24 hours. Other terms used in this situation are accelerated-malignant hypertension depending on retinal findings during funduscopy examination. If there are haemorrhages and/or exudates on the retina then it is referred to as accelerated hypertension but if there is papilloedema

then it is called malignant hypertension. From a therapeutic point of view both forms are treated in practically the same way.

Clinical Features

Hypertension is usually asymptomatic until when it has caused complications and damage to target organs. At this point the symptoms are thus associated with the affected organ.

Symptoms

- Palpitations
- Dizziness
- Shortness of breath
- Blurred vision

Signs

- Tachycardia
- Cerebral vascular insufficiency
- Lung crepitations
- Hypertensive retinopathy

Complications

- Atherosclerosis
- Cerebral vascular insufficiency
- Cerebral vascular accident
- Congestive heart failure
- Coronary artery disease
- Peripheral vascular insufficiency
- Dissecting aortic aneurysm
- Hypertensive retinopathy
- Hypertensive nephropathy and renal failure

Management

- To document presence or absence of end organ damage
- To exclude possibility of a secondary cause of hypertension and other co-morbidities.

Investigations

- Urinalysis
- Fundoscopy
- Electrocardiogram
- Chest x-ray
- Echocardiogram
- Urea, creatinine and electrolytes
- Random blood sugar
- Lipid profile
- Abdominal ultrasound

Treatment

The objective of treating high blood pressure is both to prevent and lower related complications such as strokes, renal failure and heart failure.

Hypertension not responding to treatment should be referred to a specialist for further investigations.

Prevention

- The initial approach to treatment is that of lifestyle modification. i.e. smoking cessation, weight reduction to optimal weight, BMI less than 25, regular exercise, reduction in alcohol intake, dietary modifications (e.g. salt reduction, fat free diet.)

Drugs

Goals of therapy –blood pressure less than 140/90 mm HG and less than 130/80 mm Hg for those with diabetes and chronic kidney disease.

Stepwise approach, use of combination of drugs for better effect.

Step 1.

Start with Diuretics (e.g. Amiloride + Hydrochlorothizade (5/50mg) orally daily)

or

Calcium channel blockers (Nifedipine retard 20 mg two times daily orally or Amlodipine 5 -10 mg once daily

orally)

or

Angiotensin converting enzyme inhibitors (Captopril 25-50 mg two or three times daily orally, Enalapril 5-20 mg once daily orally) . Those who cannot tolerate ACE-I may be given Losartan potassium 50-100 mg once daily orally.

Step 2.

Use a combination of drugs from different groups (e.g. Diuretic + ACE I, or Ca channel blocker + ACE I), Diuretic Calcium channel blocker).

Step 3.

Use a combination of Diuretic + ACE I + Ca channel blocker

Step 4.

If not controlled as above, optimize the dose, add further diuretic therapy

or

Alpha blocker (Prazosin 0.5mg two to three times daily orally – initial should be at bed time to avoid postural hypotension – then increase to 1-3 mg two to three times daily after three to seven days, maximum daily dose 20 mg)

or

Add beta blocker – Atenolol 50-100 mg once daily orally, Propranolol 40-80 mg two or three times daily orally

or

Hydralazine 25-50 mg two or three times daily orally
Beta blockers are no longer preferred as a routine initial therapy for hypertension, however can be used in younger people, patients with cardiovascular risk or existing ischemic heart disease, those with contraindications or intolerance to ACE I, ARB as adjunctive drugs to other antihypertensive.

Emergency – very severe to malignant hypertension:

- Start with Labetalol 50 mg IV over at least a minute, repeated after five minutes if necessary, maximum dose is 200 mg
- Or
- Hydralazine 10 mg IV stat followed by 5 mg IV every 30 minutes until diastolic BP is 110 mm Hg or less
- Frusemide 40-80mg IV may be used as adjunctive therapy as a stat dose.

7.2 CONGESTIVE HEART FAILURE

Definition

This is a condition in which an abnormality of cardiac function is responsible for the inability of the heart to meet the requirement of the metabolising tissues

Causes

Some underlying causes of heart failure:

- Valvular Heart Disease e.g. mitral valve disease
- Viral Myocarditis
- Congenital Heart Disease
- Hypertension
- Cardiomyopathies
- Pericardial diseases
- Ischaemic heart disease
- Arrhythmias
- Thyroid dysfunctions
- Anaemia

Precipitating Causes

- infection including endocarditis
- anaemia
- thyrotoxicosis
- arrhythmias
- systemic hypertension
- pulmonary embolism
- pregnancy

Forms of Heart Failure

- Diastolic
- Systolic
- High output
- Low output
- Right sided
- Left sided

Clinical Features

Symptoms

- Fatigue
- Shortness of breath at rest or on exertion
- Orthopnoea
- Paroxysmal Nocturnal Dyspnoea
- Cough
- Anorexia
- Swollen legs
- Abdomen distension

Signs

- Neck vein distension or raised JVP
- Basal crepitations (rales)
- cardiomegaly
- S3 gallop
- Hepatomegaly
- Hepatojugular reflux
- Pulmonary oedema
- Tachycardia
- Oedema
- Pleural effusion
- Ascites

Management

Investigations

- Chest x-ray
- ECG
- Echocardiogram

- Full Blood Count
- Liver function test
- Urea, creatinine, electrolytes
- Urinalysis routine and microscopic
- HIV test

The following tests are not routinely ordered unless there is a clinical indication:

- cardiac enzymes
- Thyroid function tests
- Cardiac catheterisation

Treatment

This is divided in 3 parts:

- Treat precipitating cause
- Correct underlying cause e.g. valve replacement in

Mitral valve disease

- Control congestive heart failure state

General Measures

- Restrict physical activities
- Restrict salt and water
- Lifestyle modification (no smoking, no alcohol, nutrition)

New York Heart Association functional class. (NYHA)

1. Class I Asymptomatic
2. Class II Symptomatic on moderate exertion
3. Class III Symptomatic on mild exertion
4. Class IV Symptomatic at rest

Drugs

1. Class I

Asymptomatic

- Most patients do not require medicine but will require lifestyle modifications.

2. Class II

- Captopril 12.5mg to 25mg twice a day orally

OR

- Lisinopril 5 - 10mg daily orally

OR

- Enalapril 5mg to 20mg daily orally (if patient develops a persistent dry cough replace with Losartan 50mg daily orally).
- Hydrochlorothiazide 25mg daily or oral Frusemide 20 - 40mg daily
- Beta blockers (Carvedilol 3.125mg twice daily orally, increase dose at least every two weeks to 25mg twice daily, if patient is over 85Kg then maximum dose 50mg twice daily or use Metoprolol 50 - 100mg daily orally)

3. Class III

- Captopril 25mg 2 to 3 times daily

OR

- Lisinopril 10mg to 20mg daily

OR

- Enalapril 5mg to 20mg daily orally (if patient develops a persistent dry cough)
- Frusemide 40mg - 80mg twice a day orally (monitor potassium levels)
- Digoxin 0.125mg - 0.25mg daily
- Isosorbide dinitrate 5mg to 10mg twice a day + Hydralazine 25 - 50mg twice daily orally if patient cannot tolerate ACE inhibitors
- Acetylsalicylic Acid (ASA) 75mg once daily

4. Class IV

- Captopril 25mg 2 to 3 times daily

OR

- Lisinopril 10mg to 20mg daily

OR

- Enalapril 5mg to 20mg daily orally (if patient develops

a persistent dry cough replace with Losartan 50mg daily orally.

- Frusemide I.V. 40mg – 80mg once or twice a day (monitor potassium levels)
- Digoxin 0.125mg – 0.25mg daily
- Isosorbide dinitrate 5mg to 10mg twice a day + Hydralazine 25 – 50mg twice daily orally if patient cannot tolerate Ace inhibitors
- Spironolactone 25 – 50 mg once or twice daily orally
- Acetylsalicylic Acid (ASA) 75mg once daily
- B-blockers should not be used in Class IV CHF.

7.2.1 Cardiogenic shock

This is advanced cardiac failure with inadequate peripheral perfusion

Clinical Features

Symptoms

- As above but severe

Signs

- BP less than 90mmHg systolic
- Pulse feeble or non detectable
- Cold extremities
- Peripheral cyanosis
- Poor urine output
- Comatose

Treatment

- ICU care
- Oxygen
- Dopamine 5-10 micrograms per Kg/bwt per minute I.V. infusion (dilute 400mg in 500ml of 5% Dextrose infusion rate to be calculated according to body weight)
- Dobutamine 5-10 microgram/kg/min IV infusion
- Acetylsalicylic Acid (ASA) 75mg once daily

- If BP goes above 90mmHg treat as class IV

7.2.2 Dilated Cardiomyopathy

Definition

This is characterised by dilatation of both left and right ventricles and poor contractility.

Some identifiable causes: pregnancy, radiotherapy, chemotherapy, alcohol, association with HIV infection.
Clinical features: Fatigue, signs of left sided or biventricular failure, murmurs, arrhythmias.

Diagnosis

CXR, ECG, Echocardiography.

Treatment

Treat as in heart failure, see above

7.2.2.1 Hypertrophic

Definition

This is characterised by marked asymmetric hypertrophy of left ventricle without obvious cause. It is usually inherited in an autosomal dominant manner.

Clinical Features

Symptoms

- Chest pains
- Fatigue
- Syncope attack
- Palpitations

Signs

- Arrhythmias
- Systolic murmur on left sternal border

- Sudden death

Diagnosis

- Echocardiography
- ECG
- Holter Monitor

Treatment

- Propranolol, 10-40mg 3-4 times a day,
- Atenolol, 25-50mg daily, (use with care in people who have asthma. Occasionally, beta-blockers may make you feel tired or lethargic, cause sleep disturbance, and pain in the hands and feet during cold weather).
- Acetylsalicylic Acid, (ASA) 75mg once daily

7.2.2.2 Restrictive cardiomyopathy

Definition

This is a condition of restricted ventricular filling resulting in diastolic heart failure.

Clinical Features

Symptoms

- Fatigue
- Abdominal distension/discomfort
- Oedema
- Shortness of breath

Signs

- Elevation of jugular venous pressure with inspiration
- Hepatic enlargement
- Ascites
- Fourth heart sound

Management

- ECG
- Echocardiogram

- Transvenous endocardial biopsy

Treatment

- There is no specific treatment.
- Cardiac failure (refer to chapter 7.2) and embolic problems should be treated.
- Cardiac transplantation should be considered in severe cases.

7.3 MYOCARDIAL INFARCTION

Definition

This is a necrosis of part of the cardiac muscle due to sustained myocardial ischemia of more than 30 minutes and formation of thrombus within the affected coronary artery.

Clinical Features

Symptoms

- Chest pain of greater severity and duration (>30 minutes) than in angina but similar in nature
- Shortness of breath
- Sweating
- Extreme distress
- Abdominal pain

Some infarcts may be painless e.g. in the elderly and diabetics

Signs

- Distress
- Coldness and clamminess of extremities
- Tachycardia
- Raised or lowered blood pressure
- Cyanosis
- Arrhythmias

Complications

- Arrhythmias
- Heart Failure
- Hypotension
- Pericardial effusion
- Systemic embolisation
- Dressler's syndrome (autoimmune syndrome-pericarditis, pneumonia, pleurisy)
- Papillary muscle rupture
- Cardiogenic shock
- Rupture of ventricular septum or ventricular wall
- Left ventricular aneurysm with Left Ventricular Failure

Management

- Investigations
- ECG
- Cardiac enzymes (troponin T and I, CPK) – MB fraction
- Echocardiography
- Chest X-Ray
- Urea and Electrolytes (U + E)
- Full Blood Count
- Erythrocyte Sedimentation Rate
- Lipid profile
- Myocardial perfusion scan

Diagnosis requires at least two of the following:

- History of ischaemic-type chest pain
- Evolving ECG changes
- A rise and fall in cardiac enzymes

Treatment

Keep under close observation and refer for management in intensive care unit.

Drugs

- Oxygen by mask or nasal catheter
- Access to IV line

- Morphine 5-10mg intravenously at about 1mg per minute
- Glycerol trinitrate 0.5mg sublingually
- Aspirin 300mg orally to chew stat
- Streptokinase, 1,500,000 units in 100ml of 0.9% saline intravenously over 1 hour (If presentation is less than 12 hours after onset of pain) (Do not give if there is stroke or active bleeding in the last 2 months, blood pressure > 200mmHg, surgery or trauma in last 10 days, bleeding disorder, pregnancy, diabetic retinopathy, previous streptokinase or any thrombolytic treatment in the last 5 days to 1 year).
- Heparin, 5000 I.U intravenously stat, then 1000 I.U hourly intravenously for 24hrs for 3-5 days.
- Low Molecular weight heparin Clexane (Enoxaparin) 1mg/kg SC twice daily.
- ACE inhibitors i.e. Enalapril 5- 10mg daily.
- Beta blockers e.g. Atenolol 50mg daily.
- Antacids e.g. IV Ranitidine 50mg three times daily.
- Laxatives, e.g. Lactulose 15 – 30ml two – three times daily orally.
- Diazepam, 5mg orally daily.
- Aspirin, 75-150mg daily.
- Statins e.g. Simvastatin 10 – 20mg daily orally
- Isosorbide dinitrate, 10mg three times a day

If pain continues;

- Nitroglycerine I.V. infusion 10 – 200 micrograms/minute
- Refer for PCI (coronary intervention).

Supportive

- Reassure the patient and carers
- Continuous ECG monitoring
- 24 hour bed rest
- 24 hour Temperature, Pulse and Respiratory rates
- 24 hour blood pressure readings
- Daily 12 lead ECG, Chest X-Ray, cardiac enzymes,

- and U&E for 2-3 days
- Refer patient for coronary angiography, refer to specialist as soon as possible.

Prevention

- Low lipid diet
- Stop smoking
- Regular exercise

7.4 ANGINA PECTORIS

Definition

This is chest pain due to myocardial ischemia

Clinical features

Symptoms

- Chest pain: The pain is central/retrosternal and may radiate to the jaw/or arms.
- Breathlessness

Signs

- Fourth heart sound
- Anxiety
- There may be no signs

Management

- ECG
- Exercise ECG
- Echocardiogram
- Lipid profile
- Myocardial perfusion scan
- Coronary angiography

Treatment

Drugs

- Aspirin, 75 - 300mg orally once daily
- Glyceryl trinitrate, 0.3 - 1mg sublingually, repeated

- as required or
- Isosorbide dinitrate, 5 - 10mg sublingually, 30 - 120mg orally in 2 divided doses daily.
 - Atenolol, 50 - 100mg orally daily
 - Nifedipine, 10 - 20mg orally once or twice daily
 - Statins e.g. Simvastatin, 10 - 20mg daily orally

Coronary angioplasty

Surgery

- Coronary by-pass

Supportive

- Manage co-existing conditions
- Stop smoking
- Weight loss
- Encourage regular exercise

7.5 PULMONARY OEDEMA

Definition

Acute left ventricular failure due to various cardiac conditions or due to severe mitral stenosis with pulmonary hypertension

Clinical features

Symptoms

- Breathlessness
- Wheezing
- Profuse sweating
- Productive cough
- Bloodstained sputum

Signs

- Paroxysmal dyspnoea
- Anxiety
- Blood stained sputum

- Tachypnoea
- Peripheral circulatory shut down
- Crackles
- Wheezing

Diagnosis

Investigations

- Arterial gases
- Pulse oximetry
- Chest X-Ray
- Central venous pressure
- ECG
- Echo
- Cardiac enzymes

Treatment

The patient should be placed in a sitting position.

Drugs

- Frusemide, adults: initially 40mg to 120mg I.V. Stat, thereafter continue Frusemide 20mg-daily orally or 40mg on alternate days
- Morphine 5mg to 10mg I.V. slowly
- Oxygen 60% via mask
- Glyceral trinitrate, 0.3 - 1mg sublingually, repeated as required

Underlying conditions should be treated

7.6 RHEUMATIC FEVER

Definition

This is an inflammatory disease that occurs in children and young adults (5 - 15 years) as a result of infection with group A streptococci. It affects the heart, skin, joints and central nervous system. Pharyngeal infection with group A streptococcus may be followed by the clinical syndrome of rheumatic fever. This is thought to develop

because of an autoimmune reaction triggered by the infective streptococcus and not due to direct infection of the heart or the production of a toxin.

Clinical features

Revised Jones criteria for the diagnosis of rheumatic fever

Major

- Carditis
- Polyarthritits
- Sydenham's chorea
- Erythema marginatum
- Subcutaneous nodules

Minor

- Arthralgia
- History of rheumatic fever
- Fever
- Increased P-R interval on ECG
- Raised ESR
- Increased C-reactive protein

Evidence of streptococcal infection

Raised ASO titre (or increased titre of other specific antistreptococcal antibodies)

Positive throat culture

Diagnosis

Investigations

- Throat swab
- Serology
- ESR
- ECG
- Echocardiography

Diagnosis is made on the basis of two or more major criteria or one major plus two or more minor criteria plus

evidence of antecedent streptococcal infection.

Treatment

Drugs

- Benzathine penicillin 0.6 – 1.2 mega units intramuscularly stat or
- Phenoxymethyl penicillin 500mg orally 4 times daily for 7 days. For recurrences 250mg daily until the age of twenty or for 5 years after the latest attack or
- Erythromycin, 250 – 500mg orally 4times daily for 7 days. For recurrences 125 – 250mg once daily until the age of twenty or for 5 years after the latest attack
- Prednisolone 1 – 2mg/kg per day divided into 4 equal doses for 10 days (in severe carditis)

Chronic rheumatic heart disease

More than 50% of those who suffer acute rheumatic fever with carditis will later develop chronic rheumatic valvular disease predominantly affecting the mitral and aortic valves.

Complications

- Congestive cardiac failure
- Pulmonary oedema

Management

Investigations

- Chest X-Ray
- ECG
- Echo

Treatment

- Treat underlying complications.
- Give prophylaxis against recurrent rheumatic fever with Benzathine-Penicillin 1.2 – 2.4 MU monthly for

life

- Give prophylaxis against infective endocarditis

Refer

- For further evaluation if patient has significant heart murmurs
- All patients with increasing cardiac symptoms.

7.7 CARDIAC ARRHYTHMIAS

Definition

This involves the disorders of cardiac impulse formation, automaticity, impulse conduction, heart rate and abnormal ectopic activity.

Clinical features

Symptoms

- palpitation
- missing heart beats
- Dizziness and syncope
- Difficulty in breathing

Signs

- increased or decreased pulse and heart rate (more than 100 or less than 60/min)
- Irregular pulse and heart rate
- Features of heart failure
- Bradyarrhythmias (sinus bradycardia, sinus node dysfunction, atrioventricular blocks), heart rate <55/min
- Tachyarrhythmias (atrial fibrillation and flutter, supraventricular and ventricular tachycardias). Premature atrial and ventricular contractions.

Investigations

- ECG
- Ambulatory ECG monitoring (Holter)

- Serum electrolytes level
- Echocardiography
- Stress ECG test, TFTs

Management

Bradyarrhythmias:

- Sinus bradycardia – no treatment required unless symptomatic, remove offensive drugs (e.g. B-blockers, digoxin), if symptomatic – Atropine 0.6mg IV or cardiac pacing
- Sinus arrhythmia – no treatment needed
- Atrioventricular block 1st degree – treat underlying causes (carditis, drug toxicity).
- Atrioventricular block 2nd degree – may require cardiac pacing, refer to specialist
- Atrioventricular block 3d degree – cardiac pacing, refer to specialist.

Tachyarrhythmias:

- **Supraventricular tachycardia**
Heart rate 150–220/min on ECG narrow QRS complex strictly regular tachycardia – start with vagal stimulation (unilateral carotid massage, Valsalva maneuver), drug of choice Adenosine 6mg IV push, if no response give 12mg IV push. Other drugs – Verapamil 2.5-5.0mg IV slowly. Diltiazem 15-20mg IV over 2 min. Propranolol 1-2 mg IV bolus. Refer to specialist.
- **Ventricular tachycardia**
Heart rate 130-180/min, on ECG wide QRS complex not strictly regular tachycardia- if the patient's condition is unstable – defibrillate at 50-100 + 200.
- If patient is stable, pharmacological treatment:
Amiodarone 300mg IV over 10 min, followed by infusion at 1mg/min for 6 hours; Lignocaine 100mg IV bolus, followed by infusion of 4 mg/min for 30 min, 2 mg/min for 2 hours, then 1 mg/min.

In case of multifocal Ventricular tachycardia use Magnesium sulfate 1-2 g IV.

Correct reversible causes hypokalemia, digoxin toxicity.

Atrial fibrillation:

- Rate control can be achieved by Digoxin 0.125-0.25 mg once or two times daily orally, Verapamil 40 to 80mg three times daily orally, Diltiazem 60mg three times daily orally
- Amiodarone 200mg three times daily orally 1st week, then reduce to 200mg two times daily (maintenance dose 200 to 400mg daily)
- Electrical cardioversion (refer to specialist)
- Anticoagulation therapy (to reduce the risk of systemic embolization) – Aspirin 75-150mg once daily orally, Warfarin 2.5-10mg once daily orally (to maintain INR 2,5 to 3,5).
- Use warfarin, if no INR available, aspirin 75-150mg orally once daily.

Premature atrial contractions

No treatment required. If symptomatic: B-blockers (e.g. Propranolol 20-40mg orally 2-3 times daily, Verapamil 40-80mg orally 2-3 times daily).

Premature ventricular contractions

No treatment if asymptomatic, if symptomatic or frequent – B-blockers (Propranolol 40-80mg three times daily orally), Amiodarone 200mg three times daily orally for 5-7 days, then reduce to 200mg two times daily (maintenance dose 100-200mg daily).

Monitor for possible side effects: Thyroid function test, LFTs, consult ophthalmologist and CXR once a year.

7.8 CARDIOPULMONARY RESUSCITATION AND ADVANCED CARDIAC LIFE SUPPORT

Basic life support (BLS)

Goals of resuscitation – to maintain cerebral perfusion until cardiopulmonary function is restored.

Important change: A-B-C changed to C-A-B (circulation first).

1. Check responsiveness by gently shaking the patient.
2. Call for help, fetch defibrillator and oxygen and airway adjuncts, resuscitation kit.
3. Position the patient on a firm flat surface.
4. Open the patient's airway and assess for the presence of respiration.
5. Check circulation (palpate for carotid pulse), if not present start CPR.
6. Initiate chest compressions (position both hands over the lower part of the sternum and compress at the rate of 30 compressions/ 2 breaths). At the rate 100 chest compressions/min, depth in adults 2 inches, infants 4 inches.
7. Once the patient is intubated, ventilation can be at a rate of 12-15 per minute without pausing for compressions.

Advanced cardiac life support

Advanced cardiac life support (ACLS) is an extension of BLS and usually is implemented by a team leader with the use of necessary facilities.

1. IV access with IV fluid e.g. before NS
2. Attach defibrillator-monitor.
3. Assess cardiac rhythm.

If Ventricular tachycardia or ventricular fibrillation:

- Defibrillate
- Epinephrine 1mg IV push, repeat every 3-5 minutes
- Consider antiarrhythmic drugs – Amiodarone 300mg IV push or Lignocaine 1.0-1.5mg/kg IV push or Magnesium sulfate 1-2g IV push

Identify and treat reversible causes 4-“T: Tension pneumothorax, Thrombosis (coronary and pulmonary), Tamponade cardiac, toxins, 4 “H” hypovolemia, hypoxia, hypothermia, hypo and hyperkalemia, acidosis.

If asystole:

- Continue CPR
- Epinephrine 1 mg IV push every 3-5 minutes until there is a cardiac rhythm or CPR is stopped
- Treat reversible causes (see above)
- Atropine is no longer recommended for asystole and PEA (Pulseless Electrical Activity).
- Termination of resuscitation: terminate resuscitation after 5 cycles of CPR and defibrillation, also if prognosis of underlying condition is poor.

8

MALIGNANCIES

8.1 LEUKAEMIAS

Definition

These are diseases characterised by the proliferation of a single malignantly transformed progenitor cell in the haemopoietic system. Acute leukaemia if untreated has a rapidly fatal course. Chronic leukaemia has a more prolonged course but patients invariably die from it. Leukaemia is classified according to the morphological cell type involved and the speed of evolution of the disease.

Acute Lymphoblastic Leukaemia (ALL)

Acute Myelogenous leukaemia (AML)

Chronic Lymphatic Leukaemia (CLL)

Chronic Myeloid Leukaemia (CML)

Acute Lymphoblastic Leukaemia (ALL)

Definition

Proliferation of lymphoid cells in the bone marrow

Clinical features

Any age may be affected but commonly 4-8 year olds. Male to female ratio is 1:1

Symptoms

Fatigue, headache, palpitations, bleeding into skin, nose mucous membrane, infections such as sore throat pneumonia and bone pain.

Signs

Bone tenderness, splenomegaly, lymphadenopathy, pallor and bruises.

Signs include pallor, bruising, petechial haemorrhages, bleeding gums and gum hypertrophy, lymphadenopathy, splenomegaly and/or hepatomegaly, haemorrhages in the optic fundi. Hard enlarged testicles indicate that the testes have become infiltrated with leukaemic tissue.

Opportunistic infections do occur.

Management

Diagnosis

- a) Full blood count which shows a normocytic/normochromic anaemia
- b) The white cell count maybe normal or raised (normal $4 - 11 \times 10^9/L$ 50,000 or more)
- c) The platelet count is usually reduced (normal $150 - 4000 \times 10^9/L$) below $150 /9/L$
- d) Characteristic leukaemic cells in blood and bone marrow
- e) The CSF prepared sediment may show blast cells if meningeal leukaemia is present.
- f) The periferal smear show lymphoblast.

Treatment

Supportive care

- i) Blood and platelet transfusion, I.V.
- ii) Appropriate antibiotics at the first sign of infection
- iii) Correction of dehydration, treatment of hyperuricaemia arising from chemotherapy with allopurinol and I.V. fluids
- iv) Barrier nursing, prophylactic antibiotics e.g. cotrimoxazole to prevent *pneumocystis carinni (jerevici)*
- v) Emotional support

Chemotherapy

This is done in 3 steps

- i) Remission induction:
Vincristine $2\text{mg}/\text{m}^2$ I/V every 1-2 weeks
Prednisolone $60\text{mg}/\text{m}^2$ daily
Daunorubicin $40\text{mg}-75\text{mg}/\text{m}^2$ daily

- ii) CNS prophylaxis:
Intrathecal methotrexate $5\text{mg}/\text{kg}$ weekly
Cranial irradiation

- iii) Maintenance chemotherapy:
Mercaptopurine (daily) $100-200\text{mg}$ daily
Children $2.55/\text{kg}$ body weight per day.
Methotrexate *Children* $12.5\text{mg}/\text{Methotrexate}$
(weekly)
Vincristine and prednisolone (monthly)
For 2 –3 years.

Prophylaxis

Methotrexate	Danorubicin	Ara-c
10mg	10mg	20mg
12.5mg	12.5mg	25mg
15mg	16mg	30mg

Bone marrow should be performed in all suspected cases and will show more than 5% lymphoblasts

Lumbar puncture may be done. If meningeal leukemia is suspected this will show blasts in the CSF.

Relapse is common in blood, CNS or testis

Prognosis

Is better in children where the cure rates for children are 70 – 90%; it is very poor in adults where 20% cure rates have been recorded. Worse prognosis in blacks.

Acute Myelogenous Leukaemia

Definition

Proriferation of myeloid cells in the bone marrow and blood. This has got unfavorable prognosis and increases with age.

Clinical features

1. Marrow failure causes
 - a. Anaemia
 - b. infection often positive
bleeding from the gums
 - c. disseminated intravascular coagulation

2. Leukaemic infiltration
 - a. bone pain, tender sternum
 - b. CNS signs (cord compression, cranial nerve lesions)
 - c. Gums hypertrophy, testes, orbit ((proptosis)
 - d. Hepatosplenomegaly
 - e. Lymphadenopathy
 - f. Skin and peri-anal involvement

3. Constitutional features
 - a. malaise
 - b. weakness
 - c. fever
 - d. polyarthritis

Management

Diagnosis

- i) The white cell count is variable
- ii) Bone marrow biopsy – diagnosis depends on this.

Treatment

Chemotherapy

1. Very intensive. The main drugs used include daunorubicin, cytosine 100-200mg per square

meter for 5 days I/V or subcutaneous. arabinoside and thioguanine 2mg/kg body weight daily.

Long term maintenance is generally considered to be less effective

2. Bone marrow transplant (BMT) – allogeneic transplants is possible in acute conditions.

Intrathecal prophylaxis as on page247.

Supportive care

- i) Blood and platelet transfusion
- ii) Barrier nursing
- iii) I.V. antibiotics

Chronic Lymphatic Leukaemia (CLL)

Definition

This is the infiltration of the bone marrow and blood relatively mature lymphocytes common in people above 60 years of age.

Clinical features

Symptoms include:

- i) Bleeding
- ii) Weight loss
- iii) Infection
- iv) Anorexia
- v) Lethargy
- vi) Fever and sweating

Signs include:

- i) Enlarged, rubbery, non tender nodes
- ii) Hepatosplenomegaly
- iii) Pallor

Complications

- i) Auto-immune haemolysis
- ii) Infection - bacterial or viral (mostly of the respiratory tract).
- iii) Bone marrow failure

Diagnosis

- i) FBC Mild anemia – normocytic/normochromic type.
- ii) The white cell count is $> 15 \times 10^9/L$ of which more than 60% are lymphocytes
- iii) The platelet count is usually normal in the early stages
- iv) Bone marrow shows mainly more mature lymphocytes

Treatment

Chemotherapy

This is not always needed but may postpone marrow failure. Chlorambucil 0.1–0.2mg/Kg body weight orally daily is used to decrease the lymphocyte count. Prednisolone 60mg/m²

Steroids are used if there is auto-immune haemolysis.

- i) Transfusions
- ii) Prophylactic antibiotics

Chronic Myeloid Leukaemia (CML)

Clinical features

Definition

This is the infiltration of the bone marrow and blood with relative mature myeloblasts.

It accounts for 15% of leukaemias and often occurs in middle age of 45 - 55 with a slight male predominance.

Symptoms

- a) Symptoms of anaemia
- b) A large spleen (swelling of the abdomen)
- c) Priapism
- d) Gout
- e) Sweating, fever and loss of weight
- f) Bruising

Signs

Pallor, splenomegaly, hepatomegaly, bleeding into the mucous membrane and there may be evidence of infection.

Management

Diagnosis

- i) FBC which shows raised WBC (often $100 \times 10^9/L$)
- ii) Low Hb
- iii) Platelets may be raised normal or reduced.
- v) Abundance of neutrophils in the blood film but whole spectrum of myeloid precursors including a few blast cells
- vi) Bone marrow may present with the whole spectrum of myeloid precursors including a few blast cells. Mega karyocyte may be abundant.
- vii) Philadelphia chromosome on chromosome preparation
- viii) Levels of Vitamin B12 and B12 binding proteins are elevated

Treatment

- i) Treatment of choice is hydroxyurea 30- 50mg/kg body weight in two divided doses or busulfan 2- 4mg daily
- ii) Allogeneic bone marrow transplant
- iii) Splenectomy can reduce discomfort, radiation to spleen may reduce discomfort.

Prevention

Avoid predisposing factors such as radiation chemicals e.g. benzene and other drugs like phenylbutazone.

8.2 LYMPHOMAS

Definition

Lymphomas are malignant tumors of the lymphoreticular system and are classified into Hodgkin's disease and non-Hodgkin's lymphoma.

8.2.1. Hodgkin's Disease (HD)

The lymphoid tissue on biopsy shows malignant lymphoid cells with Dorothy Reed Sternberg cell.

Classification

- Nodular Lymphocyte predominant HD
- Classic HD
 1. Nodular Sclerosing
 2. Mixed Cellularity
 3. Lymphocyte depleted
 4. Lymphocyte rich

Symptoms and Signs

- Fever, weight loss, and night sweats
- Loss of appetite
- Pruritis
- Pallor
- Pain in the infiltrated tissue (Alcohol induced)
- Enlarged lymph nodes
- Hepatosplenomegaly
- Weight loss.

Diagnosis

- History and physical examination

- Excision biopsy
- FBC, ESR, LDH, LFTs, U/Es
- CXR
- Abdominal Ultrasound
- CT chest abdomen and Pelvis
- HIV and CD4 count

For advanced stage disease bone marrow aspiration and trephine

Treatment

The choice of treatment is determined by the stage of the disease. It consists a combination of radiotherapy and chemotherapy.

Stage I & II – 4 cycles of chemotherapy plus involved field radiation therapy.

Stage III & IV – 6 – 8 cycles of combination chemotherapy plus radiotherapy for residual localized disease.

Chemotherapy

ABVD regimen:

- Doxorubicin 25mg/m² D1 & 15 IV
- Bleomycin 10 units/m² D1 & 15 IV
- Vinblastine 6mg/m² D1 & 15 IV
- Darcabazine 375mg/m² D1 & 15 IV

Repeat every 28 days

MOPP regimen:

- Mechlorethamine 6mg/m² IV
- Vincristine 1 – 1.4mg/m² IV D1 & 8
- Procarbazine 100mg/m² orally from D1 – 14
- Prednisolone 40mg/m² orally from D1 – 14

Repeat cycle every 28 days.

8.2.2 Non-Hodgkin's Lymphoma

This is heterogeneous group of lymphoreticular malignancies. These lymphomas may be associated with HIV/AIDS.

Symptoms and signs

See under Hodgkin's disease.

Classification

- Low grade
- Aggressive
- Highly Aggressive

Diagnosis

- As for Hodgkin's Lymphoma
- HIV and CD4 count
- Do immunohistochemistry and flow cytometry where possible
- Lumbar puncture for the highly aggressive

Treatment

Low grade Stage I & II – curative radiotherapy or watchful waiting, if they are HIV negative.

Low grade Stage III & IV – watchful waiting or with single or combination chemotherapy and radiotherapy

Single agents

- Fludarabine 25mg/m² IV D1-5 for every 28 days OR
- Chlorambucil 2-4mg orally daily or 30-60mg orally every 2 weeks

Combination chemotherapy

- CVP
- CHOP

Aggressive Disease
Stage I & II – 3 cycles CHOP, Chemotherapy, Chemotherapy
plus consolidation radiotherapy to 30 – 36Gy
Stage III & IV – CHOP chemotherapy 6 –8 cycles and
radiotherapy to local residual disease

Regimens

CHOP

- Cyclophosphamide 750mg/m² D1 IV
- Doxorubicin 50mg/m² D1 IV
- Vincristine 1.4mg/m² D1 IV (maximum of 2mg)
- Prednisolone 100mg PO D1 – 5

Repeat every 21 days

CVP

- Cyclophosphamide 400 – 600mg/m² D1 IV
- Vincristine 1.4mg/m² D1 IV (maximum of 2mg)
- Prednisolone 100mg PO D1 – 5

Repeat every 21 days

8.2.3 Highly Aggressive NHL

Burkitts Lymphoma

Definition

This is a highly aggressive NHL, which presents mainly in children, with a jaw swelling, abdominal mass, ovarian mass and CNS involvement.

Diagnosis

- i) History and physical examination
- ii) Biopsy of the tumour plus of Lymph node
- iii) FBC, ESR, LFTs, U/Es, LDH
- iv) Bone Marrow Aspiration and/or Trepine biopsy
- v) CXR
- vi) CT scan of the abdomen and pelvis
- vii) HIV testing and CD4 especially in adults

viii) CSF examination done at the first intrathecal treatment

Treatment

This is associated with tumour lysis syndrome, so IV pre-hydration and allopurinol must be given before starting chemotherapy

Regimen

Patients with localised disease receive 3 cycles of CODOX-M.

Patients with multiple site involvement are treated with CODOX-M alternating with IVAC and intrathecal therapy for 4 cycles each.

CODOX-M and CODOX-M alternating with IVAC

CODOX-M

- Cyclophosphamide 800mg/m² D1 and 200mg/m² D2-5 IV
- Vincristine 1.5mg/m² D1 IV (max 2mg)
- Doxorubicin 40mg/m² D1 & 8 IV
- Methotrexate 1.2g/m² continuous IV infusion on D10, then 240mg/m² IV each hour over 23hrs
- Folinic Acid 192mg/m² IV D11 starting from the 12th hour of methotrexate infusion, then 12mg/m² IV every 6hrs for next 48hrs
- granulocyte count is (Filgrastim) above 1X10⁹/L

CNS prophylaxis

- Cytarabine 30mg/m² IT D1 & 3
- Methotrxate 12mg/m² IT D15 (Not more than 20mg total dose)
- Hydrocortisone 20mg/m² D1, 3 and 15
- Folinic Acid

IVAC

- Ifosphamide 1.5g/m² IV D1 – 5
- Etoposide 60mg/m² IV D1 – 5
- Cytarabine 2g/m² IV every 12hrs for D1 and 2
- Filgastrim start on D7 till absolute granulocyte count is over 1X10⁹/L

CNS prophylaxis

- Methotrexate 12mg/m² IT D5
- Folinic Acid 15mg orally stat on D6

Carcinoma of the breast

This is a malignancy of the breast and there are various types.

Clinical features

Symptoms and Signs

1. Lump in the breast
2. Nipple discharge
3. Change in breast size
4. Nipple inversion
5. Skin changes – orange like appearance (peau d'orange)
6. Axillary, Infraclavicular and supraclavicular lymphadenopathy

Diagnosis

- i) History and physical examination
- ii) Bilateral Mammography
- i) Core biopsy or excision biopsy do oestrogen and progesterone receptor status and if possible Her 2 neu status
- ii) CXR
- iii) FBC and ESR, LFTs, U/Es, LDH
- iv) For patients with raised ALP, LDH S/S of bone or liver involvement do Ultrasound of Abdomen and

bone scan.

Treatment

This depends on the stage of the disease.

- i) Early Breast cancer
 - Breast Conserving Treatment: wide local excision with axillary dissection, then Adjuvant Radiation therapy and/or chemotherapy
 - Modified Radical Mastectomy with an axillary dissection. Adjuvant Chemotherapy and radiotherapy will depend on the histopathological findings (stage).
- ii) Locally Advanced Breast Cancer – must be treated with all modalities (Surgery, Chemotherapy and Radiation therapy)
- iii) Metastatic Breast Cancer – Chemotherapy and where indicated hormonal therapy

Treatment Regimens

1. Chemotherapy
 - AC – Doxorubicin $60\text{mg}/\text{m}^2$ IV D1 and Cyclophosphamide $600\text{mg}/\text{m}^2$ IV D1 repeat every 21 days for 4 cycles OR
 - CAF – Oral cyclophosphamide $100\text{mg}/\text{m}^2$ D1 – 14, Doxorubicin $30\text{mg}/\text{m}^2$ IV D1 and D8, and 5 Fluorouracil $500\text{mg}/\text{m}^2$ IV D1 and D8. Repeat every 28 days for 6 cycles OR
 - FAC – 5 Fluorouracil $500\text{mg}/\text{m}^2$ IV D1 & 8, Doxorubicin $50\text{mg}/\text{m}^2$ IV D1, and cyclophosphamide $500\text{mg}/\text{m}^2$ IV D1. Repeat every 21 days for 6 cycles OR
 - CMF Cyclophosphamide $100\text{mg}/\text{m}^2$ PO D1 – 14, Methotrexate $40\text{mg}/\text{m}^2$ IV D1 & 8, and 5 Fluorouracil $600\text{mg}/\text{m}^2$ IV D1 & 8 every 28 days for 6 cycles
 - TAC – Docetaxel $75\text{mg}/\text{m}^2$ D1 IV, Doxorubicin $50\text{mg}/\text{m}^2$ IV D1, and Cyclophosphamide

500mg/m² D1 IV every 21 days for 6 cycles.

2. Radiotherapy – usual dose in the curative setting is 2Gy per fraction to 50Gy with a boost of 2Gy per fraction to 12 – 16Gy. Radiotherapy can also be used in treatment of painful local bone metastasis, spinal cord compression, Brain metastasis and for local disease on the chest wall etc.

Cervical cancer

Definition

This is a cancer of the cervix.

Clinical features

Symptoms and Signs

- i) irregular PV bleeding
- ii) Per vaginal discharge
- iii) Lower abdominal pain
- v) Backache
- vi) Dyspareunia
- v) nodule, ulcer, or fungating growth

Complications

- i) Anaemia
- ii) Sciatic pain
- iii) Backache
- iv) Incontinence of urine or faeces
- v) Sepsis
- vi) Uraemia

Diagnosis

1. History and physical examination
2. Cervical biopsy must be taken
3. CXR
4. FBC, U/Es, LFTs HIV and CD4 count
5. IVP

6. Abdominal Ultrasound (to rule out hydronephrosis and metastases in the abdomen)
7. EUA, cystoscopy and proctoscopy optional

Treatment

This depends on the stage of the cancer

1. Surgery for stage IB1 or less. Note surgery should not be done in cases with stage IB2 and above.
2. Chemoradiation for stages IB2 - IVA
There is no role of chemotherapy alone in stage IB2 - IVA and therefore all these patients need to be referred to the Cancer Diseases Hospital via UTH. Radiotherapy - 2Gy per fraction to 46 - 50Gy of External beam radiation therapy (EBRT) with Brachytherapy to a total of 75 - 85GY to point A. chemotherapy is given concurrent with the radiation using Cisplatinum 80mg/m² iv 3 weekly.

Ovarian Cancer

These are malignancies of the ovaries.

Classification

1. Epithelial Ovarian Cancer
2. Germ Cell Ovarian Cancers
3. Stromal Tumours

The most common of these are the epithelial ovarian cancers. The prognosis depends on the stage at diagnosis and the histologic type.

Clinical Features

70 - 80% are diagnosed at an advanced stage. Early stage disease is difficult to diagnose due to lack of specific signs and symptoms. Have a high index of suspicion. Symptoms and signs: pelvic mass, lower abdominal pain, abdominal distension, and Ascites.

Diagnosis

- History and physical examination
- Ultrasound of abdomen and pelvis
- CT Scan abdomen and pelvis
- CXR
- FBC, U/Es, CA 125
- Definitive diagnosis confirmed by Histology

Treatment

1. Primary treatment is surgery maximal debulking aiming for less than 2cm residual disease.
2. Adjuvant Treatments: This requires a thorough pathologic staging and selection of adjuvant therapies is dependant on stage and grade of the cancer (For staging readers are referred to the latest FIGO and AJCC cancer staging manual).
 - i. Early Stage low risk – stage IA and IB grade 1 &2
No further treatment after maximal surgery
 - ii. Early Stage High Risk – Stage IA and IB with grade 3 or clear cell histology, stage IC and Stage II disease; these require
 - Carboplatin AUC 5 – 7 iv and Paclitaxel 175mg/m² iv 21 day cycles for 3 – 6 cycles,
OR
 - Cisplatin 75mg/m² iv and Paclitaxel 135mg/m² iv infusion over 24 hrs (Neurotoxic)
OR
 - Carboplatin and Cyclophosphamide 750mg/m² iv
 - iii. Advanced Disease stage
 - As for early stage but for 6 – 8 cycles.
 - Interval debulking as indicated

Endometrial Cancer

Definition

These are cancers that arise from the Uterus

Classification

1. Epithelial – Adenocarcinoma, adenosquamous, papillary serous
2. Stromal tumours – Sarcomas of the uterus

Prognosis and adjuvant treatment are dependent on the grade, histology and stage of the cancer.

Clinical Features

- Postmenopausal bleeding

Diagnosis

- History and physical examination
- Endometrial biopsy
- CXR
- Abdominal and pelvic ultrasound
- FBC, U/Es, LFTs

Treatment

1. Primary treatment is surgery TAH and BSO plus minus pelvic lymphadenectomy. For patients who refuse surgery or are medically inoperable curative radiotherapy is indicated.
2. Adjuvant treatments depend on stage, grade, and histology; Radiotherapy with either vaginal brachytherapy alone or in combination with external beam radiation therapy at 2Gy to 50Gy.
3. Systemic therapy include
 - a. Hormonal Therapies with medroxyprogesterone actate 400 – 800mg po twice weekly, Tamoxifen 20mg daily
 - b. Chemotherapy TAP ie Cisplatinum 50mg/m² iv, Adriamycin 45mg/m² iv D1 followed by Paclitaxel 160mg/m² repeat every 21 days OR carboplatin and Paclitaxel as for Ovarian cancer

Vulval Cancer

These are cancers that arise from the vulva and are mostly Squamous Cell Carcinomas

Clinical Features

Pruritus, watery discharge, bleeding, mass, pain and ulceration

Diagnosis

- History and physical examination
- Biopsy including pap smear and colposcopy
- CXR
- FBC, U/Es and LFTs
- HIV and CD4

Treatment

All patients must be seen and assessed at the combined Gynaecology and Oncology meeting to plan treatment

1. Primary treatment
 - a. surgery with 1cm margin of resection of the vulval lesion and inguinal lymphadenectomy
 - b. Definitive chemoradiation for inoperable patients, refused or medically inoperable patients.
Radiotherapy 1.8Gy per fraction to 66- 70Gy concurrent with chemotherapy
2. Adjuvant treatment
 - a. Post operative chemoradiation is indicated for patients with the following; positive or close <8mm, 2 or more positive lymphnodes.
Radiotherapy 1.8Gy per fraction to a total of 60 - 65Gy
 - b. Preoperative chemoradiation is indicated for patients with central disease within 1cm of vital structures, fixed bulky positive or ulcerating nodes or inoperable primaries to downsize them for operability. Radiotherapy **50Gy split course with**

surgical assessment after 30Gy followed with 20Gy boost concurrent with chemotherapy

Regimens

1. Chemotherapy ONLY in combination with Radiation therapy
 - a. 5 Fluorouracil 400mg/m² iv D1 – 4 and D28 – 32 plus Cisplatinum 25mg/m² iv D1 – 4 and D28 – 32
 - b. Radiotherapy

Prostate cancer

Definition

This is malignancy of the prostate gland. The patient is usually elderly but condition may occur in young men.

Clinical features

- i) Prostatism - hesistancy, poor stream, frequency in passing urine, dribbling of urine, and urinary retention
- ii) Bone pain due to metastases

Diagnosis

- i) History and physical examination including a DRE
- ii) PSA any **value above 4mg/mL** require core biopsy
- iii) Core biopsy i.e. 6 cores from each side and well labeled. The pathologist must give a Gleason Score
- iv) FBC, U/Es and creatinine, CMP, LDH, LFTs, and ESR
- v) CXR
- vi) Trans-rectal ultrasound morphology
- vii) Bone Scan
- ii) Outflow obstruction tests; bladder ultrasound, urine flow rates, Intra Venous Urogram (IVU)

Treatment

Depends on prognostic grouping, i.e.

- Favourable risk:

there are four options of treatment in this group a) Curative Radiotherapy, Brachytherapy, Radical Prostatectomy, and Active Surveillance. No adjuvant Androgen deprivation.

- Intermediate risk:
Curative Radiotherapy with neoadjuvant androgen deprivation for 3 months prior to radiotherapy. Some patients may require a transurethral resection of the prostate to relieve symptoms of urinary retention
- High risk but still organ confined:
Radiotherapy to whole pelvis plus adjuvant androgen deprivation for a period of 2 – 3 years. Some patients may require a transurethral resection of the prostate
- Metastatic disease:
options include:
 - 1) Surgical castration (Bilateral Subcapsular Orchiectomy) and Some patients may require a transurethral resection of the prostate
 - 2) Medical castration with LHRH agonists Goseriline plus antiandrogen given two weeks before Goseriline is commenced
 - 3) Antiandrogens: Cyproterone acetate 50 –100mg TDS po daily for 2 – 3 years
 - 4) Chemotherapy with Docetaxel 75mg/m² IV repeat 21 days for 6 cycles with or without estramustine or prednisolone, in those patients who have failed after adequate androgen deprivation therapy
Radiotherapy to treat painful bony metastasis including spinal cord compression.

Testicular Tumours

Definition

These are malignant growths that arise from the testis.

It is a common malignancy in males aged between 15 – 34 years.

Classification

- i) Seminomas
- ii) Non-seminomas

Clinical Features

Testicular mass, that is either painful

Diagnosis

- History and physical examination
- Testicular ultrasound
- HCG, Fetoprotein, LDH
- FBC, U/E's, LFT's,
- CXR

Treatment

High Inguinal orchidectomy

Further treatment depends on stage and histological type

Seminomas

Stage I disease: after surgery options include

- Radiotherapy 2Gy to 20Gy total to paraarotic area
- Single agent, single dose Carboplatin dose in mg = 5 – 7 AUC (see formula) or 400mg/m² IV
- Active surveillance (only in expert hands)

Stage II : Surgery followed by 2 – 3 cycles of BEP i.e.

Bleomycin 30Units IV D1,8 & 15, Etoposide 100mg/m² D1 –5 IV, Cisplatinum 20mg/m² D1 – 5 IV every 21 days.

Stage III: Surgery followed by 4 cycles BEP as above

Non-Seminomas

Stage I :

Surgery followed by BEP chemotherapy 2 –4 cycles every 21 days

Stage II and III:

Surgery followed by BEP chemotherapy 4 cycles every 21 days

Penile Cancer

Definition

This is a cancer that arises from the penis

Classification

Most of these are squamous cell carcinomas

Clinical Features

Penile nodule, mass, or ulcer which is non healing.

Diagnosis

- History and physical examination
- Biopsy of ulcer or mass
- CXR
- FBC, U/Es
- HIV and CD4 count

Treatment

1. Surgery:
in the form of circumcision, excision, partial or total penectomy followed by bilateral inguinal node dissection in clinically involved nodes.
2. Radiotherapy:
curative radiotherapy is used in young patients who still want to preserve penile function.
3. Chemotherapy is given concurrent with radiotherapy using cisplatin $25\text{mg}/\text{m}^2$ D1 – 4 IV and D28 – 32 and 5 Fluorouracil $400\text{mg}/\text{m}^2$ D1 – 4 and D28 – 32 IV.

8.3 NON-MELANOMA SKIN CANCER

8.3.1 Squamous Cell Carcinoma of the skin

Definition

This is cancer of the squamous cells of the skin

Symptoms and signs

- Plaque or nodule on the skin
- Non healing ulcer

Diagnosis

- History and physical examination
- Biopsy
- Imaging studies as indicated especially for extensive disease

Treatment

Surgery:

Excision with adequate margins

Radiotherapy:

with or without concurrent chemotherapy

8.3.2 Basal cell carcinoma

Definition

This is cancer derived from the epidermal basal cell layer. It is more common in elderly people and Caucasians.

Symptoms and Signs

- Nodule
- Skin thickening
- Ulcer with rolled up margins

Diagnosis

- History and physical examination
- Biopsy

Treatment

- i) Early removal by curettage
- ii) Cryotherapy
- iii) Surgery: excision with adequate margins
- iv) Radiotherapy.

For patients in whom surgery would result in poor cosmesis and function, radiotherapy is the treatment of choice.

8.3.3 Melanoma

Definition

This is a neoplasm arising from melanocytes. It is the commonest fatal skin cancer. Some melanomas arise in pre-existing moles.

Symptoms and signs

- i) Rapid enlargement of a pigmented lesion
- ii) Bleeding
- iii) Increasing variegated pigmentation
- iv) Ulceration
- v) Persistent itching
- vi) Small satellite lesions around the principal lesion
- vii) Local regional lymph node involvement

ABCD are suspicious symptoms of lesions that are progressing to melanomas

- Asymmetry
- Borders that are irregular
- Colour variegation
- Diameter greater than 6mm

Diagnosis

- History and physical examination
- Excisional biopsy or full thickness wedge/punch biopsy

CXR stage IB and above

- FBC, U/Es, LFTs, LDH
- CT Scan depending on the site of primary disease

Treatment

Prompt excision with wide margins with local regional lymph node dissection

Metastatic disease

Radiotherapy for palliation

Chemotherapy with either single agent Darcabazine 200mg/m² D1 –5 or 750 – 800mg/m² IV D1 every 3 weeks

8.3.4 Kaposi's sarcoma

Definition

This is a cancer arising from capillary endothelial cells associated with HHV8.

Classification

In Zambia we commonly see

1. Endemic type
2. Epidemic type KS. This is associated with HIV infection

Clinical features

Signs and symptoms

- i) Purple (dark) papules, nodules, patches and plaques on the skin and mucosa
- ii) Lymphadenopathy
- iii) Woody oedema of the legs
- iv) Visceral involvement

Diagnosis

- i) History and physical examination

- ii) Biopsy of Lesion (skin, mucosal or lymph nodes)
- iii) HIV and CD4
- iv) FBC, U/Es, LFTs
- v) CXR

Treatment

Depends on the type of the KS

1. Endemic KS: Local radiotherapy
2. Epidemic KS: **Start antiretroviral therapy.**
 - Chemotherapy
 - Radiation therapy for localized disease

Chemotherapy regimens

ABV:

Adriamycin 20mg/m² IV D1

Bleomycin 15 Units IV D1

Vinblastine 6mg/m² IV D1

Repeat cycle every 14 – 21 days tapered to the best response (response is therefore individualized).

NB: Do not exceed 450mg/m² doxorubicin (adriamycin) total / absolute dose. Use BV only after 6 cycles of ABV.

Liposomal Doxorubicin 20mg/m² IV every 14 days or danaurubicin 40mg/m² IV every 14 days to the best response.

Paclitaxel 100mg/m² every 14 days OR 135mg/m² every 21 days to the best response.

8.3.5 Oesophageal Carcinoma

Definition

This is a malignancy that arises from the oesophagus

Classification

Majority are Squamous cell carcinomas

Adenocarcinomas arise commonly from the lower third (gastro-oesophageal junction)

Symptoms and Signs

- Progressive dysphagia
- Pain
- Odynophagia (painful swallowing)
- Weight loss
- Regurgitation
- Vomiting

Diagnosis

- History and physical examination
- Barium swallow
- Oesophagoscopy and biopsy
- CXR
- FBC, U/Es, LFTs
- For lesions less than 5cm do CT chest and Abdominal ultrasound
- Endoscopic ultrasound

Treatment

For lesions less than 5cm

- Surgery – oesophagectomy for primarily operable tumours
- Preoperative chemo-radiation followed by surgery for those requiring downsizing

Lesions 6 – 7cm

- Curative chemo-radiation

Chemotherapy

- Cisplatinum $40\text{mg}/\text{m}^2$ IV weekly concurrent with radiotherapy at 1.8Gy per fraction to 50.4Gy

OR

- 5 Fluorouracil 400mg/m² IV D1-4 with cisplatinum 75mg/m² IV D1 repeated every 21 days concurrent with radiation therapy

Lesions more than 7cm and all patients who have lost more than 10% of their body weight will require

- Palliative treatments
 - Surgery i.e. dilatation, stenting, by pass
 - Radiation therapy with external beam alone, brachytherapy alone or a combination of these

8.3.6 Colorectal Carcinoma

Definition

Cancer of the large bowel

Symptoms and signs

- Rectal bleeding
- Mucoïd rectal discharge
- Alternating constipation with diarrhoea
- Intestinal obstruction
- Anaemia
- Weight loss

Diagnosis

- History and physical examination including a digital rectal examination
- Double contrast barium enema
- Proctosigmoidoscopy and colonoscopy with BIOPSY
- FBC, U/Es, LFTs, CEA
- CXR
- Ultrasound of abdomen and pelvis
- Transrectal Ultrasound
- CT Scan abdomen and pelvis

Treatment

The main stay of treatment is surgery.

Adjuvant treatment for colon cancer

- Stage I and II no further treatment after surgery but require follow up with yearly colonoscopy
- Stage III and IV will require adjuvant chemotherapy

Adjuvant treatment for rectal carcinoma

- Preoperative short course radiotherapy: 5Gy daily for 5 days followed by surgery one week later.
- Preoperative long course chemo-radiation
- Post-operative chemo-radiation

Chemotherapy

FL

- 5 Fluorouracil 425mg/m² D1 – 5 IV
- Leucovorin 20mg/m² D1 – 5 IV 30 minutes before 5 FU

Repeat every 28 days for 6 cycles

OR

FOLFOX

- 5 Fluorouracil as above
- Leucovorin as above
- Oxaliplatin 85mg/m² D1 only IV

8.3.7 Gastric Cancer

Definition

This is cancer of the stomach.

Classification

Most are adenocarcinomas

Symptoms and Signs

Initially symptoms are vague and non-specific.

- Dysphagia
- Post prandial fullness
- Heart burn
- Indigestion
- Loss of appetite
- Weight loss
- Abdominal discomfort and fullness
- Haematemesis and malaena
- Anaemia

Diagnosis

- History and physical examination
- Endoscopy with biopsy
- FBC, U&Es, LFTs, CEA
- Barium meal
- CXR
- Abdominal ultrasound
- CT scan of the abdomen
- Endoscopic ultrasound

Treatment

- Surgery
 - Is the primary treatment. Subtotal or total gastrectomy with adequate lymphadenectomy and negative margins.

- Radiotherapy
 - Adjuvant Chemoradiation for stage IB and above
 - Definitive chemoradiotherapy for medically unfit or unresectable patients
 - Palliative radiotherapy
- Chemotherapy
 - Leucovorin 20mg/m² IV bolus, 5 fluorouracil 425mg/m² IV bolus D1-D5(cycle 1,4,5)
 - Leucovorin 20mg/m² IV bolus, 5 fluorouracil 400mg/m² IV bolus first 4 and last 3days of radiotherapy (cycle 2 &3)
 - Metastatic cancer – Leucovorin 20mg/m² IV bolus, 5 fluorouracil 425mg/m² IV bolus D1-D5 28 day cycle, 6 cycles

8.3.8 Pancreatic Cancer

Definition

This is cancer of the pancreas

Classification

Adenocarcinomas

Symptoms and signs

- Upper abdominal pain
- Vomiting
- Obstructive jaundice
- Pruritis
- Weight loss
- Symptoms of diabetes mellitus
- Migratory thrombophlebitis
- Upper abdominal mass
- Palpable gall bladder

Diagnosis

- History & physical examination

- Endoscopic ultrasound and/ERCP/biopsy
- FBC, LFTs, U&Es, CEA, blood glucose
- CXR
- CT scan

Treatment

Surgery

1. Definitive – Mainstay of treatment (Whipple’s procedure)
2. Palliative surgery for advanced cases – Endoscopic or Percutaneous biliary stent, Open biliary enteric bypass.

Radiotherapy

1. Post-operative 5-FU based chemoradiation (45-54Gy@1.8-2Gy/day) followed by systemic Gemcitabine
2. Localised unresectable disease and good performance status – Concurrent 5-FU based chemoradiation (50-60Gy @1.8-2Gy/day)
3. Palliation of pain and metastases.

Chemotherapy

1. With Chemoradiation- 5 FU 500mg/m² IV bolus on first and last 3 days of radiotherapy
2. Gemcitabine 1000mg/m² over 30minutes IV D1, 8 &15 every 28 days for 6 cycles as adjuvant therapy and for locally unresectable or metastatic disease

8.3.9 Anal Cancer

Definition

This is cancer of the anal canal

Classification

- Squamous

- Cloacogenic (transitional)
- Adenocarcinoma
- Others – pagets disease, basal cell, melanoma, lymphoma

Symptoms and signs

- Bleeding
- Anal pain
- Pruritis
- Palpable mass
- Change in bowel habit
- Chronic anal condition- Haemorrhoids, fistula, fissure

Diagnosis

- History and physical examination including DRE, gynaecologic exam in women
- EUA, Proctoscopy, Biopsy of primary tumour
- FNA/biopsy of clinically suspicious inguinal nodes
- CXR
- Abdominal pelvic CT scan
- Ultrasound abdomen and pelvis if unable to do CT scan
- FBC, U&Es, LFTs, HIV, CD4

Treatment

Surgery

- Wide local excision – Only in tumours <2cm which are well differentiated, and preservation of anal function assured
- Abdominal perineal resection – is reserved only for salvage of patients who have failed chemoradiotherapy

Combined modality therapy

- Chemoradiation is the standard primary treatment option with doses of 45-60Gy
- 5 fluorouracil 400mg/m² Day1-4 and Day 22-25

- of radiotherapy
- Mitomycin C 10mg/m² Day 1 only.

Mitomycin may be substituted by cisplatin especially in HIV positive patients

8.3.10 Astrocytomas

Definition

These are glial tumours (astrocytomas and oligodendrogliomas) that arise from supportive tissues in the CNS and represent over 40% all CNS tumours in adults. In childhood astrocytomas predominate.

Classification

- Low-grade astrocytomas include WHO grade I (fibrillary, pilocytic) and II (astrocytoma)
- High-grade astrocytomas include WHO Grade III (anaplastic) and IV (glioblastoma multiforme)

Symptoms and signs

- Headache (usually persistent)
- Nausea, vomiting
- Poor balance and coordination
- Seizures
- Hemi- or paraparesis
- Visual disturbances
- Impairment of mental function

Diagnosis

- History and physical + neurological examination
- Skull X-ray
- Brain CT or MRI scan
- Radionuclide brain scan

Treatment

Mainstay of treatment is complete surgical resection

- where possible for both low or high grade
- Low-grade astrocytomas
 - Complete resection followed by observation
 - In incomplete resection observation or adjuvant chemotherapy and/or radiation therapy is considered
 - High-grade astrocytomas (anaplastic or glioblastoma multiforme)
 - complete surgical resection followed by radiotherapy alone or concurrent with temozolomide

Chemotherapy:

- Single agent regimens
 - Carmustine (BCNU) 80 mg/m² I.V. D1-3 every 6-8 weeks
 - Lomustine (CCNU) 130 mg/m² P.O D1 every 6-8 weeks

Combination chemotherapeutic regimens

1. PCV

Procarbazine 60mg/m² P.O D 8-21

Lomustine 110 mg/m² P.O D1

Vincristine 1.4 mg/m² I.V. D8 & D29

Repeat every 6-8 weeks (max 10 courses)

2. P E

Cisplatin 30 mg/m² I.V. D 1-3

Etoposide 150 mg/m² I.V. D 1-3

Repeat every 3 weeks 6-8 courses

Radiotherapy using 3D conformal radiation therapy technique

Low-grade gliomas 1.8Gy per fraction to 50.4Gy

High grade gliomas 1.8Gy per fraction to a total of 54 – 59.9Gy

8.3.11 Lung Cancer

Definition

This is a malignancy that arises from lung parenchyma.

Classification

Small Cell Lung Cancer (SCLC)

Non Small Cell Lung Cancer (NSCLC) this includes squamous cell, adenocarcinoma and large cell carcinoma.

Symptoms and signs

- Cough
- Blood stained sputum
- Breathlessness
- Chest pain
- Difficulty breathing
- Weight loss
- Horse voice
- Unresolving pneumonia
- Paraneoplastic syndromes
 1. SIADH secretion
 2. Hypercalcaemia
 3. Myopathy
 4. Cerebellar degeneration
 5. Myasthenic syndrome

Diagnosis

- History and physical examination
- CXR
- Histology
 1. Sputum
 2. Lung Biopsy FNAB or open lung biopsy
 3. Pleural cytology or pleural biopsy
 4. Lymph node biopsy via a Mediastinoscopy or mediastinotomy
- FBC, U/Es LFTs LDH, CMP
- CT chest and upper abdomen

- PET scan

Treatment

- SCLC
 1. Limited Stage disease:- concurrent chemoradiation with Cisplatin and Etoposide and Radiation therapy at 1.5Gy BD to 45Gy. This is followed by prophylactic cranial irradiation for complete responders
 2. Extensive Stage disease: chemotherapy with Cisplatin and Etoposide followed with consolidation radiotherapy for patients with a near total or a partial response.
- NSCLC

The treatment depends on the stage

1. Stage I, II and IIIA:- Surgery is mandatory followed with 4 cycles of adjuvant chemotherapy with cisplatin + etoposide or carboplatin + vinorelbine, or cisplatin + gemcitabine. In completely resected NSCLC radiation therapy to 60Gy is reserved for those with positive lymph nodes or resection margins.
2. Locally advanced is treated with chemoradiation to 66Gy concurrent with cisplatin based chemotherapy
3. Metastatic disease is treated with chemotherapy and radiotherapy is used in this situation for palliation.

8.3.12 Nasopharyngeal Carcinoma

Definition

This is a carcinoma that arises from the nasopharynx commonly the fossa of Rosenmüller

Classification

- Keratinising squamous cell carcinoma WHO type I
- Non keratinizing squamous cell carcinoma WHO type II
- Undifferentiated squamous carcinoma or lymphoepithelial carcinoma WHO type III

Symptoms and signs

- Nasal voice
- Nasal congestion and obstruction
- Nasal bleeding
- Neck swellings / lymphadenopathy
- Cranial nerve palsies
- Other CNS signs
- Bone pain and/or tenderness

Diagnosis

- History and physical examination
- CXR
- FBC, U/Es, LFTs
- CT Scan whole brain and Base of skull to clavicle
- Biopsy of nasopharynx

Treatment

The main stay of treatment of NPC is radiotherapy.

Stage I & II:

Curative radiation therapy to 70Gy at 1.8 – 2GY per fraction

Stage III:

Chemoradiation to 70Gy with cisplatin 75–100mg/kg IV 3 weekly starting with day 1 of radiation treatment and currently this is followed with 4 cycles of cisplatin and 5 fluorouracil

Other Head and Neck Cancer

Sites

- Larynx
- Oral cavity
- Oropharynx
- Nasal cavity and paranasal sinuses
- Salivary gland tumours

All these sites have unique symptoms and signs

Treatment

Depends on the stage

Stage I & II:

Surgery or curative radiation therapy produce equivalent results but differ in the side effect profile.

Stage III:

has three options of treatment

1. Surgery followed with post operative radiation therapy plus or minus chemotherapy
2. Curative chemoradiation for organ sparing
3. Radical radiotherapy for medically challenged patients who can not stand chemotherapy

8.3.13 Thyroid Cancer

Definition

These are malignancies that arise from the thyroid gland

Classification

There are four categories based on WHO classification.

- Two differentiated Thyroid Cancer
 - papillary Adenocarcinoma
 - follicular Adenocarcinoma
- Medullary thyroid carcinoma
- Anaplastic thyroid carcinoma
- Malignant lymphomas of the thyroid are not uncommon

Symptoms and signs

- Thyroid nodule – found incidentally or during routine physical examination
- Lump in the neck
- hoarseness of voice if recurrent laryngeal nerve involved or extension to larynx,
- Dysphagia if oesophageal extension is present.
- Neck nodes
- Haemoptysis
- Cough
- Chest pain
- Bone pain
- Diarrhoea due to calcitonin, serotonin or prostaglandin production in those with MTC

Diagnosis

- History and examination
- ENT exam
- Ultrasound of the neck FNAB is recommended at this stage
- CXR
- FBC, CMP, U/E's and LFT's
- Preoperatively
 - Routine use of CT scan, MRI and PET scan is not recommended.
 - Thyroglobulin level not recommended
- Postoperatively
 - All patients with papillary and follicular cell carcinoma must have an initial ¹³¹Iodine diagnostic scan within 6 weeks post surgery
 - Ultrasound of the neck with Tg levels
 - CT scan with contrast is contraindicated.
 - Non contrast CT chest can detect pulmonary metastasis
 - PET scan is useful in patients with:
 - increased Tg levels and a negative ¹³¹Iodine uptake scan

- MRI – useful post op in all forms of thyroid cancer to detect local recurrence

Treatment

Surgery is the definitive treatment for all the histological types mentioned previously. This must be a near or total resection with a central neck dissection done plus posterior lateral neck dissection if these nodes are involved. For DTC surgery is followed by radioactive iodine therapy in selected cases. ATC require adjuvant radiotherapy and or chemotherapy after surgery. MTC a thyroidectomy is followed by genetic testing of the individual and family members.

Radio Active Iodine 131 Therapy:

this is indicated in all DTC patients with a positive RAI uptake scan at 6 weeks post operatively, in which case 100 – 150mCi is given orally. This achieves 85 – 95% complete ablation of residual thyroid tissue. A repeat whole body scan is done at 5 – 10 days post 131Iodine therapy. Start thyroid replacement and at 3 months do TSH and Thyroglobulin and at 6 months repeat 131Iodine uptake scan. This is repeated every 6 months until all thyroid tissue is ablated including metastatic areas.

Radiation therapy:

is used for inoperable tumours, and in palliation of symptomatic metastatic areas.

Chemotherapy:

the preferred agent is doxorubicin and is indicated in ATC only post operatively.

8.3.14 Paediatric Cancer

Medulloblastoma

Definition

Medulloblastoma is a primitive cerebellar tumour of neuroectodermal origin that is the most common posterior fossa malignant tumour in children. It accounts for 20% of paediatric brain tumours.

Symptoms and Signs

- Headache
- Vomiting
- Convulsions
- Ataxia
- Cranial nerve palsies
- Coma and unconsciousness
- BP and pulse

Diagnosis

- History and physical examination
- CSF cytology
- MRI or CT scan of the brain and whole spine
- FBC, U/Es
- Audiometry
- Histological confirmation is done after craniotomy and complete resection of the tumour

Treatment

Depends on the risk category

- Average Risk:
children older than 3 years, no metastasis, near to total resection, with less than 1.5cm² residual disease on early post operative imaging (24-48hrs)
- High Risk:
overt metastatic disease based on CSF cytology or imaging > 1.5cm² residual disease, and all children < 3 years of age.

1. Surgery:

maximal judicious surgical resection is the most important step. However, the aggressiveness of surgery is sometimes associated with the posterior fossa syndrome in up to 15% of children post op. (difficulty swallowing, truncal ataxia, mutism and less often respiratory failure)

2. Radiation Therapy

- Average Risk Medulloblastoma:
The standard of care for average risk medulloblastoma is either Cranial Spinal Irradiation (CSI) to 23.4Gy with platinum based chemotherapy, OR CSI to 35Gy without chemotherapy with a boost in both situations of the posterior fossa to a total dose of 54 – 55Gy in both situations
- High Risk Medulloblastoma:
post operative irradiation is given first followed by chemotherapy as a preferred sequence. However pre-irradiation chemotherapy is sometimes utilised in some centres with a risk of disease progression.

Chemotherapy regimens

- Vincristine 1.5mg/m² D1 weekly for 3 consecutive weeks
 - Lomustine (CCNU) 75mg/m² orally D1
 - Cisplatin 75mg/m² iv D1
- Repeat every 6 weeks for 8 cycles.

8.3.15 Retinoblastoma

Definition

A malignant tumour of the embryonic neural retina that may arise from a single or multiple foci in one or both eyes

Clinical features

Symptoms

- i) White papillary reflex
- ii) (Leucokoria)
- iii) Red painful eye
- iv) Strabismus
- v) Eye tumor

Signs

- i) Creamy-pink mass projecting into vitreous
- ii) A white avascular tumor
- ii) Retinal detachment
- iii) Vitreous haemorrhage
- iv) Clouding of anterior chamber

Complications

- I. Loss of vision
- II. Local Pain
- III. CNS disease
- IV. Anaemia

Diagnosis

- History and Clinical Examination findings
- Investigations for Staging of Retinoblastoma
 - I. Intraocular extent of disease
 - Indirect ophthalmoscopy
 - Ultrasonography of globe
 - II. Orbital extent of disease

- A. Plain X-ray of optic foramen, orbit, and skull
- B. CT of orbit
- III. Metastatic evaluation
 - A. LP: CSF for cytology
 - B. FBC
 - C. LFTs include ferritin and NSE
 - D. BM aspiration for histology and cytogenetics; BM

- biopsy
- E. Abdominal US (Liver/Spleen)
- F. CT of brain, head and Abdomen
- G. Bone Scan
- H. Biopsy of extraocular masses
- I. Globe and optic nerve stump histopathology (if enucleation done)

Added investigations to include ECG and as patient's condition dictates.

Reese-Ellsworth Intraocular staging:

Group I. *Very favorable*

- A. Solitary tumor, less than 4 disc diameters in size at or behind the equator
- B. Multiple tumors, none over 4 disc diameters in size at or behind the equator

Group II. *Favorable*

- A. Solitary tumor, 4-10 disc diameters in size at or behind the equator
- B. Multiple tumors, 4-10 disc diameters in size behind the equator

Group III. *Doubtful*

- A. Any lesion anterior to the equator
- B. Solitary tumors larger than 10 disc diameters in size behind the equator

Group IV. *Unfavorable*

- A. Multiple tumors larger than 10 disc diameters
- B. Any lesion extending anterior to the ora serrata

Group V. *Very unfavorable*

- A. Massive tumors involving more than one-half the retina
- B. Vitreous seeding

*Staging for probability of retaining useful vision rather than survival.

Grabowski-Abramson Clinico-pathologic Staging of Retinoblastoma

Stage Description

- I. Intraocular disease
 - a. Retinal tumor, single or multiple
 - b. Extension to lamina cribrosa
 - c. Uveal extension
- II. Orbital disease
 - a. Orbital tumor
 1. Scattered episcleral cells
 2. Tumor mass
 - b. Optic nerve
 1. Distal nerve; line of resection and meninges clear
 2. Tumor at line of resection or in meninges
- III. Intracranial metastasis
 - a. Positive CSF alone
 - b. Mass lesion in CNS
- IV. Haematogenous metastasis
 - a. Positive BM alone
 - b. Focal bone lesions with or without positive marrow
 - c. Other organ involvement

Treatment

Stage/extent of disease determines choice of treatment modality.

Treatment modalities for intraocular disease include:

1. External beam radiotherapy
2. Episcleral plaque therapy
3. Photocoagulation
4. Cryotherapy
5. Enucleation

6. A combination of the above modalities

Treatment modalities of extraocular disease:

Adjuvant chemotherapy improves survival in patients with extraocular disease following enucleation. Patients with overt CNS disease or with a high probability of meningeal spread should receive intrathecal methotrexate and cytosine arabinoside, and if possible cranial irradiation. Stage II, III and IV all require multimodality therapy of Enucleation, Radiation and Chemotherapy (plus intrathecal chemotherapy).

Drugs Stage II and III

Phase	Week	Drug	Dose
	0	Cyclophosphamide Doxorubicin Vincristine	40 mg/kg IV, Day 1 0.67 mg/kg IV, Days 1, 2, 3 0.05 mg/kg IV, Day 1
	3-21 (Repeat every 3rd week)	Cyclophosphamide Doxorubicin Vincristine	20 mg/kg IV, Day 1 0.67 mg/kg IV, Days 1, 2, 3 0.05 mg/kg IV, Day 1
	24-57 (Repeat every 3rd week)	Cyclophosphamide Vincristine	30 mg/kg IV, Day 1 0.05 mg/kg IV, Day 1
	0, 1, 2, 3, 4, 5	Methotrexate Cytarabine	IT IT

Drugs Stage IV

Phase	Week	Drug	Dose
	0	Cyclophosphamide Doxorubicin Vincristine	40 mg/kg IV, Day 1 0.67 mg/kg IV, Days 1, 2, 3 0.05 mg/kg IV, Day 1
	3, 9, 15, 21	Cisplatin Etoposide	3 mg/kg IV, Day 1 3.3 mg/kg IV, Days 1, 2, 3
	6, 12, 18, 24, 27, 30, 33	Cyclophosphamide Doxorubicin Vincristine	30 mg/kg IV, Day 1 0.67 mg/kg IV, Days 1, 2, 3 0.05 mg/kg IV, Day 1

Phase	Week	Drug	Dose
	36 – 105 (Repeat every 3rd week)	Cyclophosphamide Vincristine	30 mg/kg IV, Day 1 0.05 mg/kg IV, Day 1
	0, 1, 2, 4, 5, 6	Methotrexate Cytarabine	IT IT

8.3.16 Nephroblastoma (Wilms' Tumour)

Definition

A primary malignant renal tumor of childhood that is derived from primitive **metanephric blastoma** and may arise in one or both kidneys occurring with equal frequency in both girls and boys and may be associated with congenital anomalies.

Clinical features

Signs and Symptoms

Commonly presents as a Palpable mass in abdomen. Other symptoms and signs include any of the following:

- Hypertension
- Hematuria
- Obstipation
- Weight loss
- Dysuria
- Diarrhea
- Others: nausea, vomiting, abdominal pain, cardiac insufficiency, pleural effusion, polycythemia, hydrocephalus

Wilms tumor may occur in association with congenital anomalies in some patients.

The most frequent congenital anomalies are:

- Congenital aniridia
- Hemi-hypertrophy
- Beckwith-Wiedemann syndrome
 - Hyperplastic fetal visceromegaly involving the kidney, adrenal cortex, pancreas, gonads and liver
 - Macroglossia, omphalocele, hemihypertrophy, microcephaly, mental retardation, hypoglycemia and postnatal somatic gigantism
 - Associated with an increased incidence of WT,

adrenal carcinoma, hepatoblastoma, and gonadoblastoma

- Genitourinary tract anomalies

Diagnosis

History and physical examination

Investigations

- FBC, U/E, LFT, Coagulation profile
- ECG and echocardiogram
- Abdominal US
- IVU
- CXR
- Abdominal and Chest CT scan

Staging

International Society for Paediatric Oncology (SIOP)

Nephroblastoma staging

Stage	Description
I	Tumour limited to the kidney, complete excision
II	tumour extending outside the kidney, complete excision a) invasion beyond the capsule, perirenal/perihilar b) invasion of the regional lymph nodes (hilar nodes and/or periaortic nodes at the origin of the renal artery) c) invasion of the extrarenal vessels d) invasion of ureter
III	Invasion beyond the capsule, incomplete excision a) preoperative or perioperative biopsy b) preoperative/perioperative rupture c) peritoneal metastasis d) invasion of paraaortic lymph nodes

IV		e) incomplete excision
V		Distant metastasis
		Bilateral renal tumours

Treatment
Multiple modality approach that is dependant on stage and risk combining surgery, chemotherapy and radiation

Pre- nephrectomy Therapy

Phase	Week	Drug	Dose
Pre OP	1, 2, 3, 4	Vincristine	1.5 mg/m ² IV, Day 1
	1, 3	Actinomycin D	0.015 mg/m ² IV, Day 1, 2, 3

Post-operative Therapy

Stage I, Favourable histology: No therapy

Stage I, Standard histology and anaplastic WT

Drugs

Actinomycin D

Vincristine

Phase	Week	Drug	Dose
Post OP	1, 2, 3, 4, 10, 11, 17, 18	Vincristine	1.5 mg/m ² IV, Day 1
	1, 10	Actinomycin D	0.015 mg/m ² IV, Day 1, 2, 3, 4, 5

Stage II Standard histology

Drugs

Actinomycin D

Vincristine

Doxorubicin

Radiation

Phase	Week	Drug	Dose
Post OP	1, 2, 3, 4, 5, 6, 7, 8 11, 12, & 14, 15 17, 18, & 20, 21 23, 24, & 26, 27	Vincristine	1.5 mg/m ² IV, Day 1
	1, 11	Actinomycin D	0.015 mg/m ² IV, Day 1, 2, 3, 4, 5
	4, 8, 14	Doxorubicin	50 mg/m ² IV, Day 1
	2 – 3	Radiation	

Stage II and III anaplastic WT, I to III clear cell sarcoma

Drugs

Actinomycin D

Vincristine

Doxorubicin

Radiation

Phase	Week	Drug	Dose
Post OP	1, 2, 3, 5, 7 10, 11, 12, and 14, 15 17, 18, 19, and 21, 22 24, 25, 26, and 28, 29 31, 32, 33, and 35, 36	Vincristine	1.5 mg/m ² IV, Day 1
	5, 14, 21, 28, 35	Actinomycin D	0.030 mg/m ² IV, Day 1
	1, 10	Doxorubicin	50 mg/m ² IV, Day 1
	3, 12	Ifosfamide	3000 mg/m ² IV, Day 1
	5 - 8	Radiation	

8.3.17 Rhabdomyosarcoma

Definition

A malignant tumour of striated muscle that may occur in any anatomical location of the body, but commonly occur in the head and neck region, genital urinary tract and extremities.

Clinical features

Symptoms and Signs

Commonly presents as a mass with specific clinical manifestations varying with site of origin

Head and Neck

Neck

Soft tissue mass

Hoarseness

Difficulties swallowing

Orbit

Conjunctival mass

Proptosis

Ocular palsies

Nasopharynx & Paranasal sinus

Swelling

Local pain

Epistaxis

Difficulties swallowing

Sinusitis

Unilateral nasal discharge

Genitourinary

Vaginal bleeding

Vaginal mass

Dysuria

Haematuria

Urinary obstruction

Painless paratesticular

mass

Diagnosis

History and Clinical Examination findings

Investigations for Staging of Retinoblastoma

- Urinalysis
- FBC
- U/E
- LFTs
- Skeletal Xrays
- CT Scan
- Bone Scan
- BM aspiration and Biopsy
- Biopsy of tumor

Other special examinations and Investigations

- Head and Neck Tumor
- Ear, nose & throat examination under anaesthesia
- Ophthalmologic examination
- LP and CSF cytology
- Abdominal Pelvic tumour
- Abdominal US
- Cystoscopy

Grouping

- Group I. Definition
- A. Localized, completely resected, confined to site of origin
 - B. Localized, completely resected, infiltrated beyond site of origin
- Group II.
- A. Solitary tumor, 4-10 disc diameters in size at or behind the equator
 - B. Regional disease, involved lymph nodes, completely resected
 - C. Regional disease, involved lymph nodes, completely resected with microscopic residual

- Group III. A. Local or regional grossly visible disease after biopsy only
 B. Grossly visible disease after >50% resection of primary tumour

Group IV. Distant metastasis present at diagnosis

Staging

TNM staging system

Stages 1 to IV

Treatment

Multiple modality approach that is dependant on stage combining surgery, chemotherapy and radiation

9

EYE DISEASES

9.1 THE RED EYE

This is characterised with the redning of the eye caused by:

With Pain

Iritis

Corneal Foreign Body

Acute Glaucoma

Chemical Conjunctivitis

Without Pain

Conjunctivitis

– Allergic

– Viral epidemic Haemorrhagic

– Bacterial Conj. (ophthalmia Neonatorum)

Corneal Ulcers

Penetrating and Perforating Eye Injuries

9.1.1 With Pain

9.1.1.1 Iritis

Definition

It is the inflammation of the Iris.

Clinical Features

Symptoms

- Deep seated eye pain
- Decreased vision
- Redness of the eye
- Light intolerance
- Watery eye

Signs

- Pink ring of blood vessels around the cornea – ciliary

- flush
- Small white spots on the back of the cornea – keratic precipitates
- Iris may be stuck to the lens – posterior synechiae

Treatment

- Atropine 1% Eye ointment twice daily
- Bethamethasone 1% eye drops, or
- Hydrocortisone 1% eye drops, or
- Dexamethosone 0.1% eye drops, or
Prednisolone 1% eye drops 1-2 times a day

9.1.1.2 Corneal Foreign Body

Definition

This is the presence of a foreign body on the cornea.

Clinical Features

Symptoms

- Red eye
- Watering eye discharge
- Difficulty to keep the eye open
- Pain
- Distorted vision

Sign

Foreign object may be seen on the cornea

Treatment

- Apply a drop of 2% Lignocaine onto the affected eye
- Wipe away the foreign body with a wisp of sterile cotton wool on an orange stick
- If foreign body does not come out easily refer to nearest eye clinic where it may need surgical removal (with a hypodermic needle)
- 0.5% eye drops 1 drop every 2

hours, then reduce frequency as infection is controlled.

Pad the eye for 24 hours

9.1.1.3 Acute Angle Closure Glaucoma

Definition

This is an acute increase in the intra ocular pressure brought about solely by closure of the anterior chamber angle by the peripheral Iris.

Predisposing Factor

- Small long sighted eye
- Anatomical shallow anterior chamber

Clinical features

Symptoms

- Impaired vision
- Red eye
- Severe Periocular pain
- Nausea
- Vomiting
- Severe headache

Signs

- Ciliary flush
- Very, very high Intraocular pressure (50 – 100mmHg)
- Hazy Cornea Bathroom window glass type of cornea (mildly dilated pupil)
- Bombe iris
- Flare
- Dilated Iris vessels
- Painful hard eye

Investigation

Tonometry with a schiötz or perkins tonometer will show very high intraocular pressure

Treatment

The definitive treatment is surgical

Drugs

- Acetazolamide 500mg intravenously start, then 250mg 6 hourly
- Pilocarpine 4% 6 hourly
- Paracetamol 500 – 1gm orally 6 hourly

This is the initial treatment to relieve the angle closure

Definitive Treatment

Permanently keep the angle open surgically by:

- (i) Peripheral laser iridotomy
- (ii) Peripheral Iridectomy
- (iii) The surgery must be done to both eyes as the predisposing condition affects both eyes

Other Hyperosmotic agents

Because of their speed of action and effectiveness, hyperosmolar agents are of great value during the acute crisis of acute glaucoma to reduce the intraocular pressure.

- Mannitol (1-2g/kg body wt of 20% solution in water, given over 30 – 40 minutes, (60 drops per minute as slow intravenous infusion) until intra-ocular pressure has been satisfactory reduced
- Urea 1-2kg body wt of a 30% solution in 10% invert sugar

9.1.1.4 Chemical Conjunctivitis

Definition

It is an inflammation of the eye caused by a chemical substance.

Common Chemicals

- Car battery acid
- Snake venom

- Fluid from plants
- Household cleaning chemicals
- Alkali chemicals are more damaging to the eye than acids

Clinical Features

Symptoms

- Pain
- Redness
- Watering
- Pus discharge if secondarily infected.

Emergency management

- Apply local anaesthetic – lignocaine 2% eye drops
- Wash the eye copiously with normal saline or tap water for about 30 minutes

Investigation

Fluorescein staining will reveal area of conjunctival corneal chemical erosion

Treatment

- Hydrocortisone 1% Eye Ointment. Apply 3-4 times daily
- Atropine eye drops 1% 2 times a day
- Tetracycline 1% eye ointment three times daily if infected

Note that the first line drug of choice is Hydrocortisone.

Use Tetracycline as second line, only if steroid is not available.

Other Drugs Used In Chemical Burns

- Vitamin C (Sodium ascerbate) 10% drops and a daily oral dose of ascorbic acid 1gm (assist in laying down of the corneal collagen)

- Collagenase inhibitors – L-cysteine and or cenicillamine applied topically helpful in preventing corneal perforation
- Artificial tears. Prevents effects of corneal drought. SNO tears, or Hypromellose 0.3%
- Bandage soft contact lenses prevent formation of adhesions between eyelid and eyeball
- Sodium EDTA – Chelates calcium, a co factor for the collagenase enzyme, thereby rendering the enzyme unavailable for corneal melting

Late Treatment

- Division of adhesions between conjunctiva of eye and of eyelid. Place an eye shell between the divided bands during ball synechiealasis
- Conjunctival grafting
- Eyelid surgery to correct deformity
- Corneal grating after 6 – 12 months to allow for maximum resolution

9.1.1.5 CORNEAL ULCERS

Definition

This is ulceration of the cornea

Common causes

- Injuries
- Infections
- Bacteria
- Fungal
- Viral

Other causes

Clinical Features

Symptoms

- Red eye
- Severe pain

- Difficult to open eye in light (photophobia)
- Discharge, water or pus
- Disturbed vision

Signs

- Poor vision on snellen testing a white spot of the eye may be seen
 - On retinoscopy – irregular light refraction
- Investigation
- Fluoresce in staining of the cornea, the wound stains green
 - Corneal swab for microscopy, culture and sensitivity

Treatment

Depends on the cause

For all types of ulcers, prevent ocular pain with atropine 1% once daily in the affected eye

Infections

- Bacteria Corneal Ulcers use tetracycline 1% eye ointment, or chloramphenicol 1% eye ointment 3-4 times a day
- If not resolving within 2 weeks, then refer

Fungal Ulcers

Typically see main ulcer, with riders, and satellite ulcers around the main one. (This is seen occasionally. It may not be seen at all)

Treatment

- Povidone Iodine, 2%, four times daily in the affected eye
- Natamycin, 5% eye suspension given hourly for 7 days
- Econazole, 1% suspension for topical use
- Miconazole, 10mg/ml given subconjunctival or

- intravitreal given as 10microgram per ml
- Amphotericin, B 0.05-0.2% can be made from IV injection and instill every 5 minutes first hour and 30-60minutes until clinical picture changes. (protect from light- use amber coloured bottle)

Viral ulcers, Herpes simplex

Typical characteristic - on Fluorescein, 1 or 2% staining a dendritic corneal ulcer (branching)

Treatment

- Acyclovir eye ointment (suspension) five times daily in the affected eye for about 21 days.
Note: If has a very high association with HIV/AIDS steroids are contra indicated

Ophthalmia neonatorum

Presents 2 – 4 days post partum

Clinical reactive

Hyperacute conjunctivitis with pus, with or without a membrane

Severe swelling of both eyes

Treatment

- Penicillin G 50,000 IU in 2 divided doses for 7 days
– systemic
- Penicillin eye drops 1 hourly both eyes – Topical

9.1.1.6 Penetrating and Perforating Eye Injuries

Definitions

Penetrating wounds are injuries of the eye ball that result from a sharp object. They typically have a wound of entry, and a wound of exit. There may or may not have a

retained foreign body.

Perforating wounds are injuries of eye ball that have only one wound of entry,. There also may have a retained foreign body.

Clinical Features

Symptoms

- History injury present
- Red eye
- Painful eye
- Soft eye

Signs

- Eye maybe shrunken due to loss of volume
- There may be subconjunctival haemorrhage.
- Pigment discoloration of the conjunctiva in the area of the wound
- Foreign Body may be seen.

Investigation

- X-ray orbit – to rule out intraocular foreign body.
- Ocular ultrasound
- Cranial CT scan

Treatment

- Tetanus toxoid
- I/V antibiotic preferably cefotaxime 1gm start
Or
- Gentamycin 80m IV start
Refer to the nearest eye unit promptly

9.1.2 Without Pain

The main cause of red eye without pain is conjunctivitis of different types.

- a) Infective
 - Bacterial
 - Viral
- b) Allergic
- c) Chemical

9.1.2.1 Bacterial Conjunctivitis

Definition

This is a bacterial infection of the conjunctiva

Clinical Features

Symptoms

- Ocular discomfort – gritty sensation in the eye
- Eye discharge (pus)
- Diffuse conjunctival redness

Signs

- Red conjunctiva with discharge
- Normal vision (clear cornea)

Investigation

Fluorescein staining is negative

Treatment

Tetracycline 1% eye ointment 3 – 6 times daily

Supportive

Good personal hygiene to prevent re-infection
Facial washing

9.1.2.2 Viral Epidermic heamorrhagic conjunctivitis

Definition

This is a viral infection of the conjunctiva and is associated with bleeding. The condition is very infectious and difficult to treat. It is often seen in families and epidemics.

Clinical Features

Symptoms

- Pain
- Watery discharge
- Ocular discomfort
- Photophobia

Signs

- Sub conjunctiva haemorrhage (severe redness).
- Tender cervical lymphnodes, preauricular,submental groups
- Swollen conjunctiva
- Water discharge
- Normal vision

Complication

- Secondary bacterial infection

Treatment

- Tetracycline 1% eye ointment 3 times daily for 7 days

Supportive

Patient hygiene – do not share face cloth

Wash face and eyes

9.1.2.3 Allergic conjunctivitis

Definition

An allergic inflammation of the conjunctiva. This condition

is common but very difficult to treat. A positive family history of atopic disease may be present

Clinical Features

Symptoms

Itchy eyes

Signs

Ring of pale, fleshy, pink-grey tissue around the cornea
Follicles on the tarsal conjunctiva (cobblestone type)

Treatment

Hydrocortisone 1% eye drops 3-4 times a day

Sodium chromoglycate 2% eye drops 5 times daily

9.2 TRACHOMA

Definition

This is an infection of the eye caused by Chlamydia Trachomatis. It is a disease of the under privileged communities, with poor hygienic conditions. The common fly is the major vector in the infection and re-infection cycle. It is one of the leading causes of preventable blindness in the world.

Characterized by an acute inflammation which appears in the first decade of life, slowly progressing until the disease becomes inactive during the 2nd decade of life. Last sequelae may not appear for many years.

Stages

- Trachoma Follicular (TF): characterized by follicles on the upper lid conjunctiva
- Trachoma intense (TI): characterized by acute red tarsal conjunctiva with obliteration of blood vessel
- Trachoma Scarring (TS): Tarsal conjunctiva starts showing lines of scarring

- Trachoma Triachiasis (TT): – upper eye lid turns in, because of extreme scarring and shortening of lid conjunctiva causing corneal damage and ulceration
- Ulcerated Cornea (CO): starts scarring forming corneal opacification

Clinical features

Symptoms

- None
- Red eyes
- Ocular discomfort

Signs

- Follicles on tarsal conjunctiva
- Eye lid conjunctival scarring
- In-turning of eyelids (entropion)
- Eye lashes rubbing on cornea (Trichiasis) heading to corneal ulceration
- Corneal scars

Treatment

WHO recommends adopting the SAFE strategy in proven endemic areas (after conducting survey).

S Surgery for stage 5

A **M**ass Antibiotic treatment. A single dose of Azithromycin 500mg. In children 10mg/kg/bd/wt as start dose (Donated by Pfizer free of charge once results of the survey are made available proving endemicity of the problem.

F **F**ace washing (provision of clean and safe water – multi-disciplinary approach where MOH partners with other line Ministries responsible for safe water as well as the some international NGOs that fund this expensive aspect of Trachoma control.

E **E**nvironmental sanitation – Its a public health aspect of management

9.3 LUMPS AND BUMPS ON AND AROUND THE EYE BALL

These are lumps and bumps on and around the eye ball and are divided into:

- Benign
- Malignant

Common ones

- Stye – KS (Kaposi Sarcoma)
- Chalazion (eye lid cyst)
 - Squamous cell carcinoma of the
- Orbital dermoid cyst
 - conjunctiva
- Pinguiculae
- Retinoblastoma
- Pterygia

9.3.1 Stye

Definition

This is a small abscess caused by an acute staphylococcus infection of a lash follicle

Clinical Features

Symptom

Painful lump on the lid margin

Sign

Tender inflamed nodule or lump on lid margin

Treatment

- None – usually undergoes spontaneous resolution
- Hot compresses
- Removal of associated eye lash and drain the pus
- Tetracycline eye ointment may be applied to prevent eye ball infection

9.3.2 Tarsal Cyst (Chalazion)

Definition:

This is a cyst on the eyelid that results from blockage of the duct of tarsal glands. It is usually formed away from the lid margin.

Treatment

Incision and curettage (I & C)

9.3.3 Orbital dermoid Cyst

Definition

These are round, localized nodules or lumps in the upper temporal or upper nasal aspect of the orbit. They arise from a displacement of epidermis to a subcutaneous location.

Types

- (a) Simple type – not associated with body defect, these are superficially located
- (b) Complicated – deeply seated, with deep intra-ocular extension. Present later in life with displacement of the eye ball

Investigation

- X-ray skull
- CT Scan to rule out intra orbital extension

Treatment

Surgery, total excision.

9.3.4 Pinguicula

Definition

This is a yellowish white growth on the bulbar conjunctiva adjacent to the nasal or temporal aspect of the limbus.

This type does not involve the cornea.

Treatment

- Leave alone, if asymptomatic
- If inflamed – red – Tetracycline 1% eye ointment 2 times a day for 7 days.

9.3.5 Pterygium

Definition

These are conjunctival growths on the nasal or temporal conjunctiva that enlarge and encroach on the cornea. May cause a skin-like band over the cornea that may cover the pupil.

Clinical features

Symptom

May not cause any problem

May be a discomfort of the eye ball if the pterygium is inflamed.

Sign

Redness of the conjunctiva growth that lies within the palpebral fissure.

Treatment

Local Excision in case of progression towards visual axis.
Tetracycline 1% eye ointment if inflamed, post excision

9.3.2. Malignant

9.3.2.1 Kaposi Sarcoma of the Conjunctiva and Eyelid
(See section on malignancies Page -----)

Definition

These are cancers arising from capillary endothelial cells. In the eye, they present clinically as a patchy or patches of elevated “haemorrhage” that do not resolve with

time. It may be the first manifestation of AIDS. It may present on the conjunctiva or the eye lid

Treatment

Referral to the nearest hospital (see section on management of KS)

Squamous cell carcinoma of the conjunctiva

Definition

This is cancer of the eye arising from epithelial cells of the conjunctiva.

Clinical Features

- It appears as a sessile or papillary growth on the intrapalpebral area of the perilimbal conjunctiva
- In immuno-compromised patients, the tumour is aggressive, with deep infiltration in the orbit and eyeball. Metastases occur to the preauricular and submandibular lymph nodes
- The predisposing factor is the immunocompromised host

Signs

- Early:
Usually, nasal limbal fungating growth in the region of an underlying pinguicula or pterygium

Late:

Huge fungating tumour of the orbit with metastases to local lymphnodes

Treatment

- Refer to the nearest eye specialist unit.
- Early:
Local excision with 2mm margin of normal limbus
- May use local mitomicin C (antimitotic)

- Late: If the whole eye ball is involved with extension into the orbit, and vision is lost – total exenteration
- Chemotherapy – if systemically spread
- Poor response to radiotherapy

Retinoblastoma

(see page oncology chapter)

9.4 COMMON EYE DISEASES ASSOCIATED WITH HIV AND AIDS

Skin:

Molluscum contagiosum of eyelid

Kaposi Sarcoma of the eyelid skin or conjunctiva

Herpes zoster ophthalmicus

Herpes simplex the eyelid skin

Cornea Dendritic (Herpes simplex) corneal ulcers

Fungal corneal ulcers

Uvea Anterior uveitis – iritis

Posterior uveitis – choroiditis or retinochoroiditis

Pan uveitis

Vitreous Candida vitritis

Retinal Retinal vasculitis

Cytomegallovirus Retinitis

Neoplasia Kaposi Sarcoma

Squamous cell carcinoma

Neuro-ophthalmic

Intracranial infections by pathogens such as Cryptococcus neoformans and Toxoplasma gondii may cause ocular motor nerve palsies, papillary abnormalities, visual field defects and optic neuropathy

9.4.1 Moluscum Contangiosum

Definition

This is a viral infection caused by the cytomegallovirus

commonly affecting children. The typical lesion is a pale, waxy elevated nodule on the eyelids.

Clinical Features

Complications

The shedding of cell laden with viral particles can produce a chronic follicular conjunctivitis and superficial keratitis.

Treatment

Expression of the contents of the nodule

Heat cauterisation of the lesions

9.4.2 Herpes Zoster Ophthalmicus

Definition

This is infection caused by the varicella zoster affecting the ophthalmic division of the trigeminal vein. It is more common and more severe in patients with lymphomas and in those being treated by radiotherapy or immuno-suppressed individuals.

Clinical Features

Symptoms

- Severe pain along the ophthalmic division of the trigeminal nerve (VI)
- Maculo papular rash along the VI that obeys mid facial line.
- Swelling of the affected part of the face

Signs

- Typical Herpes Zoster rash

Complications

- Anterior uveitis
- Neurological : cranial nerve palsies
- Optic neuritis

- Encephalitis
- Contra-lateral hemiplegia
- Severe facial skin scarring
- Corneal opacification
- Neuropathic keratopathy
- Disciform keratopathy

Diagnosis

Clinical – the typical distribution of the Herpes Zoster rash

Treatment

- Oral acyclovir 800mg 5 times daily
- Oxytetracycline 3%/hydrocortisone 1% eye drops or
- Betamethasone 0.1% neomycin 0.5% eye drops. or
- Dexamethasone 0.1% chloramphenical 1% eye drops 4-6 times daily
- Calamine lotion to the skin or acyclovir 3% skin ointment
- ± systemic steroids (x-ray to rule out PTB) may activate TB in AIDS patients
- Acyclovir 3% eye ointment 5 times daily

9.4.3 Cytomegalovirus Retinitis (CMV)

Definition

This is a rare chronic diffuse exudative infection of the retina caused by the CMV virus which occurs with rare exception, in patients with an impaired immune system caused by either AIDS, cytotoxic chemotherapy or long term immuno suppression following organ transplantation

Clinical Features

Symptoms

- Poor vision
- Floaters

Signs

- Cotton wool spots
- Full thickness retinal necrosis and oedema which starts peripherally or at the posterior pole
- Retinal bleeding
- Retinal vasculitis
- retina eventually involved
- Total retinal atrophy
- Retinal detachment

Treatment

- Dihydroxypropoxymethyl guanine i/v causes regression
- (induction) 5mg/kg 2 times a day for 12-21 days maintenance dose 5 mg/kwbtwt daily until adequate recovery of immunity
- Forscarnet IV infusion, induction 60mg/kg every 8 hours for 2-3 weeks, then maintenance dose 60mg/kg daily increased to 90-120mg/kg if tolerated. If CMW progresses while on maintenance dose repeat the induction dose. Treatment is needed for life

9.5 OPTICS & REFRACTION (REFRACTIVE ERRORS AND LOW VISION)

Definition

This is deficiency in the refracting mechanism of the eye resulting into poor vision. The eye is designed to be able to perceive light that falls within the visible part of the electromagnetic spectrum. The two parts of the eye that are responsible for image formation are:

- a) The Cornea – accounts for 2/3 of the refractive power of the eye.
- b) The Crystalline Lens which accounts for 1/3 of the

refractive power of the eye as well as for the accommodative capacity.

1

9.5.1 Refractive Errors

Types of refractive error:

- Myopia:- “short sightedness”
- Hyperopia:- (Hypermetropia) : Long sightedness
- Aphakia:- Poor vision that results from absence of the crystalline lens
- Presbyopia:-Difficult in reading in the elderly (above 40 years) that results from loss of the accommodative power of the lens
- Astigmatism:- In this condition of the eye, the meridians of the eye are not equal, resulting in unequal refraction

Clinical Features

Symptom

Poor vision

Sign

Specific retinal reflex in line with the types of refractive error mentioned above on retinoscopy.

Refractive errors should be managed by optometrists, refractionists and opticians and sometimes ophthalmic clinical officers, ophthalmic nurses and ophthalmologists. After carrying out a visual acuity examination on a patient complaining of poor vision, if the VA is found below 6/12 in the better eye with maximum correction, the patient should be referred to the nearest eye specialist where further assessment and management of such a patient can be completed.

Treatment

- Glasses, contact lenses, or

- reflective surgery sometimes

9.5.2 Low Vision (VA range of 6/18 – 6/60)

Definition

This is failure to attain a visual improvement of more than 6/18 in the better eye after being given the maximum conventional treatment for poor vision. In such a patient further improvement of vision can be achieved by using low visual aids.

Treatment

The types of low visual aids available are:

- Optical – High power reading glasses, magnifies (illuminating and non-illuminating), telescopes, closed circuit television sets.
- Non-optical – Environmental modification aimed at further enhancing the corrected residue vision such as:
 - improving lighting
 - special reading stands
 - painting of the stair cases to improve contrast
 - painting kitchen utensils for ease of identification
 - special cheque signing cards
 - talking watches etc.

Refer such a patient to higher centers where appropriate aid can be provided.

9.6 STRABISMUS (SQUINT)

Definition

This is ocular misalignment resulting from either an abnormality in binocular vision or anomalies of neuromuscular control of ocular motor motility. When eyes become dissociated (not aligned) then strabismus (squint) is present.

Orthophoria:

This is when the ocular motor apparatus is in perfect equilibrium, so that both eyes remain aligned (i.e. directed on the fixation point) in all positions of gaze and at all distances of the fixation point even when the fusion mechanism is disrupted such as when one eye is occluded. Orthophoria – describes “essentially straight eyes.

Phorias:

These are latent deviations (latent strabismus or squint) or is a deviation kept latent by the fusion mechanisms.

Tropias:

Are manifest deviations. A deviation (squint) that is manifest at all times and is not kept under control by the fusion mechanisms

Types of Strabismus (squint)

- Esotropia:
eye is rotated so that the cornea is rotated nasally. This is also known as convergent horizontal strabismus
- Exotropia:
Eye is rotated so that the cornea is rotated temporally (i.e. on the temporal side). This is also known as divergent horizontal strabismus
- Hypotropia:
Eye is rotated about a transverse X axis so that the cornea is rotated inferiorly (down wards). This is also known as vertical strabismus
- Hypertropia:
Eye is rotated about the transverse X axis so that the cornea is rotated superiorly (upwards). This is also known as vertical strabismus

- **Incyclotropia:**
Eye is rotated about the sagittal Y axis so that the superior portion of the vertical meridian is rotated nasally and the inferior portion of the vertical meridian is rotated temporally. This is also known as torsional strabismus
- **Excyclotropia:**
Eye is rotated about the sagittal Y axis so that the superior portion of the vertical meridian is rotated temporally (on the temporal side of the face) and the inferior portion of the vertical meridian is rotated nasally (This one is also a torsional strabismus)

Classification

Several methods of classifying eye alignments and motility disorders are used:

- (1) Classification according to fusional status
 - Phoria – a latent deviation in which fusion control is always present.
 - Tropia – a manifest deviation in which fusion control is not present
 - Intermittent – Fusion control is present at times
- (2) Classification according to variation of the deviation with gaze position, or fixating eye.
 - Comitant – a deviation does not vary with direction of gaze or fixating gaze
 - Incomitant – The deviation does vary with direction of gaze or fixating eye. Most incomitant strabismus is paralytic, indicating either neurological or orbital disease.
- (3) According to fixation :
 - Alternating:
There is spontaneous alteration of fixation from one eye to the other.

- Monocular – There is definite preference of fixation with one eye.
- (4) According to age of onset
- Congenital – a deviation noted (documented) prior to age of 6 months
 - Acquired – an ocular deviation noted and documented after the age of 6 months.
- (5) According to type of deviation
- Horizontal – Exo deviation or Eso deviation
 - Vertical – hyper deviation or hypo deviation
 - Torsional – Incyclo deviation or excyclo deviation
- or
- Combined

Treatment

This requires specialized assessment that starts with a careful history, clinical examination and treatment. Management requires the expertise of orthoptists working hand in hand and under an ophthalmologists in order to treat these unsightly ocular deviations.

A squinting child or an adult has an underlying problem that is responsible for deviation. It could be an abnormality of binocular vision, or anomalies of neuromuscular control of ocular motility. Some, if not all are treatable provided these patients are referred and corrected early in life.

All squinting children should be referred to the preferably centers that have ophthalmologists.

9.7 SYSTEMIC EYE DISEASES AND THE EYE

9.7.1 Eye Diseases associated with Hypertension

- Hypertensive retinopathy
- Retinal vein occlusion

- Retinal artery occlusion
- Ocular motor palsies

9.7.1.1 Hypertensive Retinopathy

Definition

The primary response of retinal arterioles to hypertension is narrowing. In sustained hypertension, there is a disruption of the blood-retinal barrier resulting in increased vascular permeability. The fundus picture of hypertensive retinopathy is characterized by: Vasoconstriction, leakage and arteriosclerosis.

Severe hypertension may lead to obstruction of the precapillary arterioles leading to development of cotton wool spots. Abnormal vascular permeability leads to development of flame-shaped hemorrhage, retinal oedema and hard exudates. The deposition of hard exudates in the macular area may lead to their radial distribution in form of a macular star. Swelling of the optic nerve head is the hall mark of malignant hypertension. Arteriolar sclerotic features are due to thickening of the blood vessel wall. The single most important clinical sign is presence of marked changes at the arteriolar venous crossings.

Grading of Hypertensive retinopathy

- Grade I: Mild generalized arteriolar constriction.
Broadening of the arteriolar light reflex and vein concealment.
- Grade II: More severe generalized as well as focal arteriolar constriction and deflection of veins at arteriolar/venous crossings.
- Grade III: Flame-shaped hemorrhages, cotton wool spots, hard exudates, copper-wiring of arterioles, banking of veins distal to the arteriolar/venous crossings and right-angled deflections of veins.

Grade VI: Disc swelling and silver wiring of arterioles.

Treatment

Medical, Control of hypertension

9.7.1.2. Retinal Vein Occlusion

Systemic hypertension is associated with an increased risk of both branch retinal vein occlusion and central retinal artery occlusion.

Treatment

- No effective treatment
- Control the hypertension
- refer to an ophthalmologists
- Some patients develop secondary retinal neo vascularization which requires pan retinal laser photocoagulation (Ischaemic type of central retinal vein occlusion)

9.7.1.3 Retinal Artery Occlusions

Patient may suffer attacks of amourosis fugax (transient absences of vision) or frank retinal artery occlusion as a result of the associated arteriosclerosis

Treatment

Requires urgent management

- patient should lie flat
- Firm Ocular massage – to lower intraocular pressure, and increase retinal blood flow
- Intravenous Acetazolamide 500mg start to further lower the intraocular pressure
- Inhalation of a mixture of 5% Carbon dioxide and 95% Oxygen and anterior chamber paracentesis.

Unfortunately, the results of the treatment are usually

disappointing.

9.7.1.4. Ocular motor palsies

Ocular muscle palsies may be found in patients with hypertension, even though hypertension is not the only cause of ocular muscle palsies. There are other causes like diabetes mellitus.

Treatment

Medical, control of hypertension

May undergo spontaneous resolution

9.7.2 Dysthroid Eye disease

Definition

Dysthyroid eye disease is a syndrome of clinical and orbital imaging abnormalities caused by deposition of mucopolysaccharides and infiltration with chronic inflammatory cells of the orbital tissues, particularly the extraocular muscles.

Clinical Features

In general, the ocular features of Grave' disease and ophthalmic euthyroid graves' disease are similar, although they tend to be more asymmetrical in the latter stages.

Signs

Eyelid signs:

- Lid retraction
- Lid lag

Signs resulting from infiltrative ophthalmopathy

- Conjunctival injection (redness)
- Chemosis (swelling)
- Superior limbic conjunctivitis
- Proptosis
- Optic neuropathy whose early sign is colour

desaturation

- Restrictive myopathy

Treatment

- Non-specific (reassurance, head elevation to reduce the severity of peri orbital oedema, taping of eyelids at night to protect the cornea, prismatic glasses to reduce diplopia, diuretics such as cyclopenthiiazide .5mg at night to reduce morning periorbital oedema.
- Hypromellose 0.3mg (artificial tears) or SNO tears
- In severe cases, Prednisolone 80-100mg/day, enteric coated and after 48hrs taper by 5mg every 5th day. Treat for a maximum of 2-8 weeks and stop at 3 months
- Radiotherapy – used for patients who have systemic contraindications to steroids, refuse steroids develop serious steroids side effect or a steroid resistance.
- Dose – 20gy to the posterior orbit given for over a 10 day period
Response is usually evident within 6 weeks and maximum improvement evident by 4 months.
- Orbital decompression; if patient develops severe exposure keratopathy, optic neuropathy or cosmetically unacceptable proptosis
- Surgery on Eyelids
 - Tarsorrhaphy in uncontrolled exposure keratopathy
 - To weaken muller’s muscle for patient with severe lid retraction.
 - Blepharoplasty

9.7.3 Diabetes Mellitus

Ocular complications

Diabetic Retinopathy

Background

- Maculopathy
- Proliferative
- Proliferative

Advanced diabetic eye disease

- Cataract
- Accelerated senile
- True diabetic
- Ocular Motor nerve palsies
- Abnormal pupillary reactions
- Changes in refraction

a) Diabetic Retinopathy (DR)

The overall prevalence of retinopathy in diabetic patients is about 25%. In none insulin depended diabetics (NIDDs) the prevalence is 20% and in insulin dependent diabetics it is about 40%.

Predisposing factors (risk factors)

- The incidence of diabetic retinopathy is closely related to the duration of diabetes. (generally more likely after 5 years onset of diabetes mellitus.
- Control of diabetes – poorly-controlled patients

- Pregnancy
- Hypertension
- Renal disease
- Anemia

b) Background diabetic retinopathy (BDR)

Clinical Features

Signs

Microaneurysms at the posterior pole, temporal to the macula.

- Dot and blot hemorrhage
- Hard exudates
- Diffuse retinal oedema

Treatment

- Treat associated high Blood pressure, anaemia, renal failure
- Monitor patients annually by retinal examinations. In some patients, spontaneous regression occurs when diabetes is well controlled

c) Diabetic Maculopathy – results from macular oedema and hard exudates

Clinical Features

Symptoms

Gradual impairment of central vision

Difficult in reading small print

Signs

Features of
exudates

or foveal hard

Treatment

Refer to Ophthalmologist

Laser macular grid

d) Proliferative diabetic retinopathy (PPDR)

Clinical Features

Signs

- cotton wool spots
- Intra retinal microvascular angiopathies and segmentation
- Arteriolar narrowing
- Large blot and dot hemorrhages

Treatment

Refer to specialist

e) Proliferative diabetic retinopathy (PDR)

Clinical features

Signs

- Early neovascularization is seen on the disc, or elsewhere on retina
- Late elevated new vessels, associated with a white fibrosis component.

Treatment

- Urgent referral to Ophthalmologist because they require Pan retinal photocoagulation

f) Advanced Diabetic eye disease

Clinical Features

Symptoms

- Sudden onset of floaters
- Blurred vision from vitreous hemorrhage

Signs

- Dense vitreous Hemorrhage
- Tractional retinal detachment
- Neovascular glaucoma

Treatment

Surgery

- Vitrectomy with endolaser photocoagulation

9.8 OCULAR EMERGENCIES

9.8.1 Absolute

- Chemical injury to the eye
- Cornea Laceration
- Hyphaema (Traumatic) absolute

9.8.2 Relative

- Peadiatric cataract
- Retinal detachment

9.8.1.1. Chemical Injury to the Eye

Already discussed under Red eye with pain.

9.8.1.2 Cornea Laceration

Definition

Laceration if the Cornea

Clinical Features

Symptoms

- History of injury, Always ascertain mode of injury
- Loss of vision following trauma
- Bleeding from the eye

Signs

- Obvious corneal laceration visible on direct light examination of the eye
- Prolapsed iris is seen plugging the laceration
- Anterior chamber is flat with blood
- Eye ball is soft

Diagnosis

- Examine under local anaesthesia lignocaine 2% eye drops, gently examine the eye under full aseptic condition. The laceration will be visible.

Treatment

Early Management

- Tetanus Toxoid
- IM or IV Gentamycin 80mg stat, or cefotaxime 1gm stat.
- Chloramphenicol 1% eye drops or Gentamycin 0.3% eye drops to affected eye stat
- Light dressing (padding) of the affected eye
- Refer to specialist.

Specialist Management

- Under lignocaine 2% , examine the eye gently to ascertain the wound shape.
- Exclude retained intraocular foreign body (x-ray or ultra-sound)
- Arrange for emergency repair, preferably under general anaesthesia.
- Suture the laceration under microscope
- Re-form the anterior chamber
- Sub-conjunctival injection of gentamycin 0.3ml + atropine 0.3ml + dexamethasone, 0.3ml
- Gentamycin, 0.3% eye drops 2 drops 4 times a day, or Chloramphenicol 1% eye drops 2 drops 4 times a day and
- Keep eye padded

9.8.1. 3 Traumatic Hyphaema

Definition

This is blood in the anterior chamber as a result of trauma, or very rarely spontaneous. If spontaneous, rule out intraocular malignancy or juvenile xanthogranuloma.

Clinical Features

Symptoms

- History of injury, usually blunt type of trauma
- Poor vision

Signs

Blood clots visible in the anterior chamber.

Treatment

- If the patient is a child admit in hospital and keep under observation. If left unattended, chances of a re-bleed are high resulting in intraocular pressure elevation and corneal staining
- If anterior chamber is 1/3 full in an adult, can treat as an out patient
- If anterior chamber is full or 2/3 of it full, admit the patient
- Bed rest
- Betamethasone, or Dexamethasone, 0.1% eye drops four times a day
- Induce cycloplegia, with Tropicamide, 1% eye drop twice daily or Atropine, 1% eye drop once daily
- If intraocular pressure is elevated, use antiglaucoma drops, preferably Timolol 0.5% two drops or oral Acetazolamide, 250mg tablets 4 times daily
- Use topical antibiotic to prevent or treat associated infection
- Chloramphenicol, 1% or Gentamycin, 0.3% eye drops

Relative Emergencies

- Congenital cataract
- Retinal detachment

Refer to the specialists early.

9.9 GLAUCOMA

Definition

This is a group of diseases in which the intraocular pressure is sufficiently elevated to damage vision

Types

- (i) Primary
- (ii) Secondary
- (iii) Congenital

1.9.1 Primary angle closure (congestive) Glaucoma

(see section on red eye with pain page)

1.9.2 Primary open angle glaucoma

(chronic simple glaucoma)

Definition

This is prolonged increase in the ocular pressure. The result is complete damage of the optic nerve.

Clinical Features

Symptoms

- Usually asymptomatic

Signs

- Gonioscopy – normal angle
- on Tonometry, Intra-ocular-pressure (IOP) will be raised, above 25mmHg
- Optic nerve cupping
- Visual field – trachoma type of visual field loss
- Late - When blind – Optic atrophy

Investigations

- Perimetry – Peripheral visual field analysis, either by confrontation, or using Peripheral visual field analyzer
- Tonometry – Perkins or Goldman

- Gonioscopy – Normal angle
- Fundoscopy – optic disc cupping

Treatment

1st Line

Timolol maleate 0.25% or 0.5% twice daily

Rule out underlying cardiac or pulmonary malfunction

2nd Line

Pilocarpine 2% or 4% eye drops 4 times daily

Dipivefrine 0.1% eye drops twice daily

3rd line

Latanoprost 50 micrograms/ml once or twice daily

Acetazdamide 250mg actazolamine sustate (slow release)

250mg once daily. use only for a short while

Treatment is for life as long as the compliance stays good and as long as intra-ocular pressure is controlled.

Ocular association of Primary open angle glaucoma (POAG) (recommend to rule out glaucoma in any of these conditions:)

- High myopia
- Retinal vein occlusion
- Retinal detachment
- Pigmentary Retinopathy of retinitis pigmentosa type

Systemic associations

- Diabetes Mellitus
- Dysthyroid ophthalmopathy

Current practice recommend surgery as 1st line management because of poor compliance of treatment for life. Trabeculectomy (Filtration surgery) ± use mitomycin C.

DO NOT DISCHARGE PATIENT. SEE AT LEAST TWICE YEARLY TO SAFEGUARD AGAINST SECONDARY CLOSURE OF THE FILTRATION BLEP

9.9.3 Primary Congenital Glaucoma

Definition

This is intraocular pressure elevation in a child, that manifest either at birth or a few years after birth due to a developmental anomaly of the formation of the eye anterior chamber angle.

Clinical Features

Symptoms

- Lacrimation (usually mistaken for lacrimal duct closure)
- Light intolerance

Signs

- Large eye – Buphthalmos
- Misty looking cornea
- Haabs striae on the cornea (on slit lamp microscopy)
- Cuped disc

Investigation

- Corneal diameters (7 – 11mm) 16 over 11mm, reason to be suspicious
- Refraction: myopic
- Tonometry – Intra ocular pressure will be high
- Fundoscopy – varying degrees of cupping

Treatment

- Surgical – Traberculectomy
- Goniotomy

1.9.1 Secondary glaucomas

Definition

These are glaucomas that are secondary to an underlying cause.

Treatment

Refer to eye specialist services

References

Jack Kanski; Clinical Ophthalmology

Jack Kanski; Dafydd T. Thomas; The Eye in Systemic Diseases

The American Academy of Ophthalmology; Basic and Clinical Science Course

Pediatric Ophthalmology and Strabismus

10 ANAEMIA AND NUTRITIONAL CONDITIONS

10.1 ANAEMIA

Definition

This is a reduction in the haemoglobin concentration in an individual to below the normal range for that individual's age and sex.

The normal haemoglobin concentration ranges are as follows:

Male adults 130 – 180g/L

Female adults

(Non pregnant) 120 – 160g/L

Children

Birth (full term) 135 – 195g/L +/- 30

6 weeks 110 – 170g/L

2 - 6 months 115 – 155g/L

2 - 6 years 110 – 140g/L

7-12 years 110 – 150g/L

Anaemia is not a diagnosis in itself as there is always an underlying cause, which must be determined before the anaemia can be properly treated. Anaemia is most often detected by measuring the haemoglobin (Hb) concentration of the blood.

In the management of anaemia, one must obtain a detailed history from the patient or care givers, examine the anaemic patient carefully and perform the appropriate investigations with a view of:

1. Establishing that the patient is anaemic

2. Establishing the type of anaemia the patient has
3. Determining the cause of the anaemia
4. Determining whether or not there are complications arising from the anaemia, the cause of the anaemia or both.

The history obtained from the patient or care givers often gives very important information for making an appropriate diagnosis.

Once the type of anaemia and its cause have been established, appropriate treatment can be given and, where possible, the underlying cause corrected or removed.

One principle function of the red blood cells is to carry oxygen from the lungs to all other areas of the body and this function is performed by the haemoglobin. The haemoglobin, found in the red blood cells, binds to oxygen in the lungs and the haemoglobin bound oxygen is transported to other organs where it is released. When the haemoglobin concentration is low, the oxygen carrying capacity of the blood is reduced and thus the amount of oxygen reaching other organs is also reduced. In anaemic states, the body will thus react in such a way as to try to maintain the levels of oxygen reaching the organs.

Clinical features

The clinical features of anaemia are directly due to the lowered haemoglobin concentration and are therefore common to all types of anaemia irrespective of the cause.

Symptoms

- Tiredness, weakness, dizziness, shortness of breath and headache, palpitations visual disturbances

Signs

- One general sign of anaemia is pallor of the mucous

membranes, and nail beds, However, this sign is unreliable as it can be masked by other conditions such as jaundice and conjunctivitis.

- Other signs will be of either the underlying cause e.g., bruising of the skin in aplastic anaemia or the effects of anaemia such as heart failure.

Classification of Anaemia

There are several methods of classifying anaemia but the most common is based upon the cause of the anaemia. Anaemia can result from:

1. Poor production of red blood cells
2. Increased destruction of the red blood cells
3. Increased loss of red blood cells from the body

Anaemias that arise from poor production of red blood cells include:

- Nutritional deficiency anaemias such as iron, folic acid and vitamin B12 deficiency anaemias, anaemia of chronic illness and bone marrow failure syndromes such as aplastic anaemia, invasion of the bone marrow by cancer, infection in the bone marrow
- Anaemias arising from increased red blood cell destruction include sickle cell anaemia, infections such as malaria, auto-immune haemolytic anaemia, G-6-PD deficiency. Increased blood loss may result from parasitic infestations such as hookworm, and schistosomiasis, heavy menstrual loss and surgical conditions such as bleeding peptic ulcers.

Nutritional anaemia

Iron deficiency anaemia

Iron deficiency anaemia is by far the most common type of anaemia in the world. Hookworm infestation and schistosomiasis not only cause anaemia by whole blood loss but they are also leading causes iron deficiency in

developing countries. Iron deficiency may also arise from poor dietary intake, malabsorption or increased demands as in pregnancy

Folic acid and Vitamin B12 deficiency

Deficiency of either or both of these micronutrients results in anaemias characterised by larger than normal red blood cells (megaloblastic anaemias). Megaloblastic anaemias may arise from increased demands for the micronutrients as may occur in pregnancy and lactation, haemolysis, poor dietary intake particularly in absolute vegetarians (Vit B 12) and malabsorption

Diagnosis

- FBC, peripheral smear
- Urinalysis + Microscopy
- Stool for occult blood, ova and parasites
- Other investigations will be dependent on the clinical evaluation of the patient

10.1.1 Treatment of nutrititional anaemias

Drugs

Ferrous Sulphate, Adults 200mg 3 times a day after meals until the Hb has reached the normal range. Continue with 200mg daily for 6 months to build up iron stores.

Children up to 1 year:

Ferrous Sulphate 9-18mg of iron daily (0.75ml-1.5 ml mixture).

1-5 years:

100-150mg daily (10-15ml mixture daily) in divided doses. 6-12 years: 200mg 3 times a day.

For prophylaxis 200mg 3 times daily

Iron Dextran injection to be used in a hospital under the direct supervision of a doctor. It is not superior to oral

iron and is used only when patients cannot tolerate oral therapy.

Folic Acid 5-10mg daily for as long as required.

Vitamin B12 (Hydroxycobalamin) injection, Initially 1mg i.v. repeated 5 times at intervals of 2-3 days. Maintenance dose 1mg every 2-3 months. Life long treatment may be required.

10.2 MALNUTRITION

Definition

Malnutrition is a term that covers a wide range of clinical conditions in children and adults causing an impairment of health. It results from a deficiency or an excess of one or more essential nutrients. Malnourished individuals are prone to infections and in children it causes poor growth.

In pregnancy, poor nutrition results in the birth of low weight babies.

Protein Energy Malnutrition (PEM)

This is the commonest form of malnutrition in children below 5 years of age. It is a result of deficiencies in any or all nutrients (macro and micronutrients) The first sign is loss of weight or failure to gain weight. The children's under five card helps us to detect this form of malnutrition at the clinic through growth monitoring.

There are three main clinical syndromes:

1. Kwashiorkor
2. Marasmic-kwashiorkor
3. Marasmus

Underweight represent the mildest form of malnutrition while kwashiorkor, marasmus and marasmus-kwashiorkor represent the severe forms and require admission in health centre or hospital for treatment.

80-60% of normal Below 60% of normal without oedema.

Underweight Marasmus

Kwashiorkor 70-60% Marasmic-Kwashiorkor with oedema
Marasmus Below 60% without oedema

The child has gross muscle wasting, no subcutaneous fat, has a hungry and anxious look.

Kwashiorkor 80-60%

The child shows oedema, flaky paint rash; thin, pale sparse easily pluckable hair, apathetic, anorexic, moon-faced. Big fatty liver on palpitation

Marasmic-kwashiorkor 60-70%

Wasted body but also has oedema. This is severe malnutrition and usually requires admission in health centre or hospital for treatment.

Treatment

For patients with very severe malnutrition, including its complications, admit to hospital and treat with F75 and F100 as nutritional replacement feeds. Patients with mild or moderate disease can be treated at community level using RUFT (plumpy nut).

Procedures on admission

1. Weigh the child
2. Record temperature (rectal), pulse, respiration rate
3. Check blood sugar (Dextrostix)
4. FBC/ESR, electrolytes, urea, serum protein/albumin, sugar and MP
5. Stool and urine
6. Mantoux, CXR

Resuscitation

- a) Resuscitation first 4-7 days. Most deaths occur in this period.
- b) Generally keep warm with heater and hot water bottles.
 - Do not give bath
 - Nurse away from windows
 - Adequate covering during the night (most kwashiorkor babies die at night).
- c) Start feeding immediately after admission with F75.

Oral:

Use a cup and spoon. For a very sick and anorexic child, careful continuous nasogastric tube feeding can be used.

Milk Diet:

100ml/kg increasing to 150ml/kg in 7 divided doses.

The milk diet is made from:

Dried skimmed milk	120g
Sugar	30g
Oil	35g
Electrolyte sol.	30 ml

Add cooled boiled water slowly up to 1 litre. Stir well.

Electrolyte Solution made up of:

Potassium chloride	90g
Magnesium hydroxide	9g
Cooled boiled water	100ml

Only 30ml of the Electrolyte solution is used for each litre of milk diet made.

- d) Rehydration, severe dehydration can be present despite oedema!

Give half strength darrows with dextrose, 20ml/kg in the first hour. 20ml/kg over the next 2 hours, followed by 5 – 10ml/kg per hour depending on severity of the dehydration.

In less severe dehydration and when an IV line is not possible, give ORS, 50-80ml/kg over 4-6 hours followed by milk diet.

f) Drugs

Potassium:

6 mEq/kg per day for 2 weeks or more, particularly in a child with chronic diarrhoea. Give potassium as potassium citrate, or potassium chloride.

Magnesium sulphate 25% IM 0.2g for 3-5 days,
Vitamin A 6 drops (30.000 IU) stat followed by one drop (5.000 IU) daily given with water or milk. If there are signs of keratomalacia give 1ml or 30 drops (150.000 IU) orally stat.

Folic Acid 5 mg daily

Vitamin K injection 5mg stat on admission

Antibiotics:

These should be all the time. Gentamycin

Multivitamin syrup

Note: Iron containing syrup should be avoided in the acute phase of malnutrition.

Complications

1. Hypothermia:

With temperature below 35.50C, mortality doubles.

Warm up the child. Temperature monitor every hour until the temperature reaches 370C, then take every 4 hours.

2. Hypoglycaemia:
If blood sugar is below 2.2mmol/l (or below 2.5mmol/l by dextrostix) mortality increases by about 4 times. May be asymptomatic.

Treatment

- IV dextrose 25% 2ml/kg or dextrose 50% 1ml/kg followed by IV drip of 10% dextrose 75ml/kg/day. Reduce gradually as the blood sugar stabilises.
- Monitor blood sugar with dextrostix 4 hourly until normal and stable.
- Heart failure: May be precipitated by severe anaemia or excessive fluids given IV or orally. This condition is common in the second week of treatment.

Complications

3. Suspect heart failure if oedema disappears but weight is constant, or sudden rapid weight gain, or increase of pulse. Check size of liver.

10.2.1 Treatment (heart failure)

- Diuretic (Furosemide 1mg/kg).
- Blood transfusion to anaemic children (4-6 g%), 20ml/kg slowly. If CCF present, Hb below 4 g/dl give 10ml/kg or packed cells slowly.
- 4. Convulsions: Diazepam to stop convulsions. Do Lumbar Puncture, dextrostix, electrolytes and Blood Slide.
- 5. Diarrhoea: Check stool for reducing sugars. If positive change to lactose-free milk.

If there is no evidence of reducing sugars in stool continue with milk diet.

Treat any parasites, e.g. giardiasis.

- Metronidazole 100mg 3 times daily for 5 days
- Bebandazole 100mg 2 times daily

Rehabilitation

2-6 weeks of gradually increasing the energy and protein intake to 200-300 kcals/kg per day (normal requirement 100-110 kcals per day) and protein 4-5 g/kg per day (normal requirement 2g/kg per day).

As soon as the child wants food put on normal diet in addition to his full requirement of milk diet.

10.3 VITAMIN DEFICIENCIES

Vitamins are compounds needed in small quantities for operation of normal bodily metabolism. The vitamin requirements may be increased during disease and fevers. Vitamin deficiency may appear as single or combined conditions. Multivitamin preparations will cover mild deficiencies of a combined nature. Vitamin B complex preparations will often cover most of the vitamin B deficiencies.

Note that a diet with sufficient fruit and vegetables will prevent most vitamin deficiencies.

10.3.1 Vitamin A

Sources of Vitamin A: Mangoes, pawpaw, carrots, spinach, cod liver oil. Deficiency leads to:

- Dryness of conjunctiva (Xerosis)
- Scaliness of the skin and sometimes acne
- Keratisation of the cornea, cortical opacity and blindness
- Inability to see easily in the dark (night blindness),
- Softening of cornea (keratomalacia) often followed by cortical perforation and panophthalmitis.

Treatment

- Children with severe malnutrition, give one age specific dose (see under malnutrition above)

- Children with diarrhoea for more than 3 days and children with measles give one dose

Prevention

- 6 - 11 months give 100,000 i.u. once
- 12 - 72 months give 200,000 i.u. once every six months

10.3.2 Vitamin B group

- a) Vitamin B1.
May cause neuropathy in adults and cardiac failure in babies (Beriberi)
- b) Vitamin B2 (Riboflavin).
Deficiency causes mucocutaneous lesions such as angular stomatitis, sore cracked lips, and glossitis
- c) Nicotinic Acid.
Deficiency leads to pellagra, a disease common in adults and recognisable by the so called 3 Ds:
Dermatitis:
Skin developing a cracked, pigmented scaldiness in the areas exposed to sun or mechanical irritation.
Diarrhoea:
Gastrointestinal symptoms of loose watery stools.
Dementia:
Neurological symptoms, usually severe in adults but showing as apathy and irritability in children.

Treatment

- Vitamin B1 25 – 100mg i.m. or orally
- Vitamin B2: 5 – 10mg daily
- Nicotinamide 100-300mg daily
- Until symptoms disappear

10.3.3 Vitamin C (Ascorbic acid)

Sources of ascorbic acid: Oranges, lemons, green

vegetables. Deficiency leads to scurvy, a disease recognised by:

Clinical features

Signs and Symptoms

- Periodontal haemorrhage
- Swelling and pain of long bones due to sub-periodontal haemorrhage
- Loosening of teeth and lesions of the gums
- Leading to infections in the mouth.

Treatment

- Vitamin C tablets (Ascorbic acid) 200mg 4 times daily.
- Until symptoms disappear .

10.3.4 Vitamin D

Sources of vitamin D: Milk, butter, eggs, cod liver oil. It is normally formed in the skin from sunlight.

Clinical Features

Signs and Symptoms

Deficiency leads to rickets, recognised by:

- Softening of bones resulting in bowing of legs or knock-knees.
- Thickening of the ends of bones.

Treatment

- Vitamin D, 1000-5000 units/day orally for a period of 6 weeks to 3 months.
- Exposure to sunlight

Prevention

- Prevention of malnutrition requires the administration of a variety of foods providing a balanced or mixed diet to satisfy the individual nutritional needs.

Guidance concerning locally produced foods of the different food groups is important. People should be educated on the importance of eating regular nutritious meals including fruits and vegetables.

Pregnant women

Encouraged to:

- Eat a well balanced diet. (enough quantity of foods daily to meet her daily energy and enough critical nutrients needs, comply to the micronutrient supplement – Essential nutrition)
- Have extra rest especially during third trimester.
- Space their pregnancies (child-spacing 3yrs) adequately through the use of family planning methods. And must know their HIV status to safely breast feed her child

Infant and young Children

- Initiate breastfeeding within an hour of birth
- Exclusively breastfeed for the first 6 months

Timely introduction to Complementary feeding (from 6 months with continued breastfeeding up to 24 months and beyond) and follow complementary feeding guidelines (Frequency of feeds according to the age group, density, utilization of food by vitamins and active feeding) after 6 months with continued breastfeed until 18-24 months. To the porridge should be added protein foods e.g. legumes (beans, peas, groundnuts), fish, meat.

- Pre-school children should be fed 4-5 times a day
- Children should be fed even when they are sick
- Children should be given fruits and vegetables regularly
- Encourage immunisation

For episodes of diarrhoea in breast fed young children intensify breast feeding for and promote use of ORS

according to the severity of the diarrhoea. Early detection of children developing malnutrition (not gaining weight or loss of weight) and institutional high protein and high calorie diet.

10.4 VULNERABLE GROUP FEEDING

The supplementary rations given to selected vulnerable or at risk groups to make up for deficiencies in the diet should be instituted on a temporary basis. Meanwhile permanent home-based ways to make the diet adequate should be sought.

11

SKIN CONDITIONS

These are classified according to the cause of infection or infestation:

- Bacterial infections
- Fungal infections
- Viral infections
- Parasitic infestations

11.1 BACTERIAL INFECTIONS

Definition

This is a condition caused by blocked sebaceous glands. It usually begins at or after puberty. The most affected parts are the face, neck, back and chest.

Clinical features

Occurs in mild form as blackheads and whiteheads (closed comedones and open comedones) and in more severe form as nodular lesions, with or without infection

Treatment

Drugs

- Benzoyl peroxide gel 2.5-10%, topically 1- 2 times daily
- Doxycycline, 50-100mg orally daily for 6 weeks in severe cases

Supportive

- Wash the affected parts with carbolic soap and water 2 to 3 times daily
- Avoid use of cosmetics
- Diet should include plenty of fruits and vegetables
- Avoid fatty foods

11.1.2 Abscess

Definition

This is a collection of pus in the dermis and subcutaneous fat layer of the skin. It occurs as a result of infection of the hair follicles commonly caused by *Staphylococcus aureus*.

Clinical features

The skin surrounding the affected hair follicle becomes red, hot, swollen and tender to touch. In severe cases there will be fever and involvement of the local lymph nodes

Treatment

Drugs

- Cloxacillin, adults; 250 - 500mg orally. 6 hourly for 5 days, children; 125 - 250mg orally 6 hourly five days or
- Erythromycin, adults; 250 - 500mg orally 6 hourly for 5 days, children; 125-250mg orally 6 hourly for 5 days

Surgery

- Incision and drainage
- In cases of multiple abscesses, non response to antibiotic therapy or an abscess in a diabetic, refer to specialist

Supportive

- Encourage patient to maintain good general hygiene
- Apply hot compression 3-4 times daily until abscess is ready for draining

11.1.3 Impetigo

Definition

This is a superficial infection of the epidermal layer of the skin by aureus commonly but Streptococcus species may also be involved. Painful vesicles and pustules break down to form scabs or crusts. Impetigo starts on the face and may spread to the neck, hands and legs. It usually occurs in children.

Treatment

Drugs

- Cloxacillin, orally, adults; 250 - 500mg 6 hourly for 5 days, children; 125 -250mg 6 hourly for 5 days or
- Erythromycin, orally, adults; 250 - 500mg 6 hourly for 5 days, children; 125 -250mg 6 hourly for 5 days

Supportive

- Keep finger nails short
- Soak and clean pustules with water and soap
- Patient should be referred to the next level if there is no improvement after 2 weeks

11.1.4 Eczema

Definition

Eczema is an inflammatory rash which may be due to endogenous or exogenous factors.

Classification of Eczema:

- Endogenous
 - Atopic (inherited disposition)
 - Seborrhoeic
 - asteatotic
 - discoid(nummular)
 - unclassified
- Exogenous
 - allergic contact dermatitis

- primary irritant dermatitis
- photodermatitis

11.1.4.1 Atopic eczema

Definition

This is a condition characterised by an itchy, rough, dry skin. In babies it occurs mainly in the areas surrounding the knees, elbows and neck whereas in older children and adults it can occur on any part of the body. The itching is intense at night and could become chronic and infected. Where possible the causative factor should be determined before commencing treatment.

Treatment

Drugs

- Aqueous cream, topically 1-3 times daily after bathing or
- Zinc oxide cream, topically 1-3 times daily after bathing
- Bethamethasone 1%, topically twice daily for 7 days (for severe or non-responsive cases) or
- Hydrocortisone in, topically twice daily for 7 days
- Zinc and Coal Tar Paste, topically 1-2 times daily (in chronic cases)
- Chlorpheniramine 4mg 2 times a day
- Erythromycin 500mg 4 times a day for 7 days

Supportive

- Keep fingernails short
- Keep skin hydrated with Oil bath
- Patient should avoid scratching
- Avoid exposure of affected parts to sunlight
- Avoid known irritants e.g. soap, woolen clothing

If there is no improvement of acute condition after 2 weeks refer to specialist.

11.1.4.2 Seborrhoeic eczema

Definition

This is a condition characterized by thick adherent scales presenting as a diffuse scaly scalp (dandruff). It may also affect other parts of the body which tend to be oily e.g. facial skin nasolabial folds, eyebrows, eyelashes, external ears, and centre of back. Variable pruritis and vesicular or scaly lesions may be present.

Infantile seborrhoeic eczema occurs in early infancy 2-4 weeks after birth. Begins with cradle cap (scaly scalp surrounding the anterior fontanelle), spreads to face, axilla, neck and nappy area. The rash is non itchy and gets better without leaving marks.

Treatment

Drugs

- Hydrocortisone 1% cream, topically twice daily
- Maintenance; once or twice a week as required
- Zinc oxide cream, topically 1-3 times daily after
- bathing specially in the nappy area or
- Aqueous cream, topically 1-3 times daily after bathing

To reduce scaling and itching of the scalp use keratolytic or antifungal containing shampoos once or twice weekly. Refer patients who do not respond to treatment or have acute oozing eczema to a specialist.

11.2 FUNGAL INFECTIONS

Superficial fungi live in the stratum corneum and feed on the keratin. They are called dermatophytes and belong to 3; genera *microsporum*, *trichophyton*, and *epidermophyton*. More than 40 species are currently recognized with 10 causing human infection. They are

transmitted from person to person by direct body contact or by fomites e.g. combs. They can also be transmitted from animals such as cats and dogs(zoophilic) or from the soil and plants (geophilic) The infections are named according to the body parts affected

- Tinea pedis – feet
- Tinea corporis – body
- Tinea capitis – scalp and hair
- Tinea manus – hands
- Tinea unguium – nails
- Tinea cruris – groin area covering the T of the genital area extending behind
- along the gluteal cleft
- Tinea facialis – face
- Tinea barbae – beard area
- Tinea versicolor
- Cutaneous candidiasis

11.2.1 Tinea pedis (athletes foot)

Definition

This is a contagious fungal infection of the foot caused by Trichophyton mentagrophytes and T. rubrum most commonly.

Clinical features

- Itching of the foot
- Burning or stinging lesions with scaling borders between the toes
- Vesicular eruptions with white scaling between the 4th or 5th toes or the instep of the sole
- May be accompanied by vesicles on the palms and sides of fingers called 'id' reaction. The vesicles do not contain fungus and gets better when the fungus is treated

Diagnosis

Scrape the scales from the infected site and put on a glass slide with a drop of 20% KOH. On microscopy branching fungal hyphae are seen.

Treatment

Drugs

Miconazole 2% cream, topically twice daily

Continue treatment for 2 weeks after the symptoms have cleared.

Supportive

- Keep feet dry all the time
- Wear open footwear
- Wear cotton socks, if need be
- Change socks daily

11. 2.2 Tinea corporis (ringworm of body, trunk and limbs)

Definition

This is a condition which can be acquired from animal (*Trichophyton verrucosum*, *Microsporon canis*) or human contact (*T. rubrum*). It is characterised by itchy lesions appearing as scaly grayish patches with raised borders. It can affect any part of the body, with the most commonly affected parts being the arms, groin, buttocks, waist and the area under the breasts.

Treatment

Drugs

- Miconazole cream 2%, topically twice daily for 2 to 6 weeks.
- Ketoconazole 200mgs O.D. oral for 6 wks
- Griseofulvin 500mgs O.D. oral up to 2 weeks after lesions disappear

Supportive

- Maintenance of general hygiene
- Avoid sharing of personal items such as towels and clothes

11.2.3 Tinea capitis (scalp ringworm)

This is a fungal infection of the scalp which is especially common in children. It is caused by Trichophyton species – violaceum in Africa and Asia, T. rubrum in Europe. Non-inflammatory invasion of the hair shaft can occur due to Microsporum audouinii transferred by contact with barber shears, hats or m.canis from pets.

Clinical features

- Diffuse scaling of scalp with no hair loss
- Circular scaly patches in the scalp with associated alopecia (hair loss)
- In severe cases, a boggy swollen mass with discharging pus and exudates called Kerion is due to animal fungus.

Diagnosis

Remove scales and broken hairs with a blunt scalpel and put it on a slide with KOH (Potassium Hydroxide 20%). The hair shaft is seen under the microscope full of fungal spores.

Treatment

Drugs

- Griseofulvin, adults; 500mg orally daily as a single dose or in divided doses (in severe infection dose may be doubled, reducing when response occurs), children; 10mg/kg body weight daily as a single dose or in divided doses continue till two weeks after the lesions disappear and hair is growing

Supportive

- Maintenance of good general hygiene
- Avoid sharing of personal items such as, towels and clothes
- Keep hair short

11.2.4 Cutaneous Candidiasis

Definition

This is an infection of the skin caused by *Candida albicans* a yeast fungus which is a normal commensal occupying the gut. Under certain circumstances such as diabetes or other endocrine diseases or immunosuppressive states it becomes pathogenic. The infection usually occurs in the skin folds such as, around the groin area, under the breasts, in the nail folds and axilla. In chronic or severe cases suspect HIV/AIDS.

Clinical features

Moist, white curdlike papules and plaques form which are easily scrapped off leaving red and raw-looking patches with clear edges.

Diagnosis

Scrape off white patch and place on glass slide with a drop of KOH. Hyphae and yeast are seen.

Treatment

Drugs

- Miconazole cream 2%, topically twice daily. Continue treatment for 14 days after lesions have healed.

For nail infections apply under occlusive dressing.

Supportive

- Patient should be advised to keep the skin dry
- Long-term antibiotic use should be avoided

Patients not responding to topical applications should be referred to a specialist.

11.3 VIRAL SKIN INFECTIONS

These include:

- Chickenpox
- Herpes zoster
- Herpes simplex

11.3.1 Chickenpox

Definition

This is a condition caused by the Varicella zoster virus (VZV). It is a common childhood infection. It is characterized by an itchy rash, which appears first on the trunk and spreads out to other parts of the body. Papules and crusts form within a few days. Fever may be present. When the blisters occur they are in crops. The rash lasts 2 to 4 weeks. The condition is usually more severe in the elderly.

Diagnosis

Diagnosis is usually done clinically.

Treatment

Drugs

- Calamine lotion, topically twice daily or
- Chlorpheniramine, adults; 4mg orally twice daily, children up to 10 years; 2mg orally twice daily
- Acyclovir, 800mg orally 5 times daily for 7 days
- Paracetamol, adults; 500mg-1g orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily

11.3.2 Herpes Zoster

Definition

This is condition caused by the resurgence of the Varicella-zoster virus. It is characterised by burning pain before vesicular rash appears. The rash is always unilateral and does not cross the midline (see section 8.8, malignancies).

Treatment

Drugs

- Paracetamol, 500mg-Ig orally 3-4 times daily.
- Gentian violet maybe applied
- Acyclovir 5%, topically 4 hourly for 10 days.
- Acyclovir, 800mg orally 5 times daily for 7 days.
- Carbamazepine, 200-400mg orally 3 times daily. (for post herpetic neuralgia)

Treat secondary bacterial infection with appropriate antibiotics.

Severe neuralgia should be referred to a neurologist.

11.3.3 Herpes Simplex

Definition

This is a condition caused by Herpes simplex virus (HSV) type 1 characterised by a vesicular rash around the mouth or genitalia.

Treatment

Drugs

- Usually no drugs are required
- Wash lesions with saline water
- Paracetamol, adults; 500mg-1 g orally 3-4 times daily, children; 10- 20mg/kg orally 3-4 times daily
- Acyclovir cream, 4 hourly

11.4 PARASITIC INFESTATIONS

Definition

Parasitic infestations of the body include:

- Pediculosis
- Scabies

11.4.1 Pediculosis (lice)

Definition

This is the infestation of the hair or body with lice. Hair infestation (*Pediculus humanus var capitis*) is characterised by eggs (nits) which appear as small white specks attached to the hair. Body infestation (*P. humanus corporis*) is characterised by bite marks. Both hair and body infestations cause itching. Eczema may be present. The lice usually live in cloth folds. Infestation of the pubic area called pediculosis pubis is caused by the crab or pubic louse *Phthirus pubis* transmitted during close physical contact which may be sexual in nature.

Treatment

Drugs

- Malathion 0.5% lotion. Apply to affected parts. Let it dry naturally and remove by washing after 12 hours.
- Permethrin 1% cream. Apply to clean damp hair.
- Rinse after 10 minutes and dry.

Supportive

- The whole family should be examined and treated if possible
- Bed linen and clothes should be washed in warm water and dried in the sun
- Maintenance of good personal hygiene

11.4.2 Scabies

Definition

This is an infestation of the skin by mites, *Sarcoptes scabiei*, which burrow the skin causing lesions where the female rests and lays eggs. The most common sites are skin folds, wrists, in between fingers and axilla. The main characteristic is intense itching which worsens at night.

Treatment

Drugs

- Benzyl Benzoate 25%, applied all over the body from the neck downwards. Leave to dry and repeat without bathing after 24 hours. Wash off on the third day. A third application may be required. (Not recommended in children, pregnancy and breastfeeding mothers) or
- Permethrin cream 5%, applied all over the body from the neck down to the feet. Wash off after 8 to 24 hours
- For children apply all over the body including the face, neck, scalp and ears
- If hands are washed with soap within 8 hours of application, cream should be re-applied or
- Malathion 0.5% lotion. Apply all over the body and wash off after 24 hours

Supportive

- All members of the family should be examined and treated (if possible)
- Clothes and bedding should be washed in warm water and dried in the sun
- After treatment only clothes washed as above should be worn
- Dicourage scratching
- Keep fingernails short and clean

12

CONDITIONS OF THE EAR, NOSE AND OROPHARYNX

These include:

- Oral diseases
- Pharyngeal diseases
- Nasal diseases
- Ear conditions

12.1 ORAL DISEASES

These include:

- Dental caries
- Periodontal disease
- Oral candidiasis
- Herpes simplex stomatitis
- Mouth ulcers

12.1.1 Dental caries

Definition

This is a sugar-dependent disease, which by a combination of chemical and bacterial action, progressively destroys the enamel of the tooth. Many bacteria ferment sugar to produce acid, which in turn causes lesions on the enamel of the tooth.

Clinical features

- Chalky white spots on the chewing surface of the tooth
- Sensitivity of tooth to cold or hot drinks and foods
- Cavity on the tooth
- Pain
- Swelling at the base of the tooth if pulp nerve roots are involved
- Fever

Treatment

The aim of treatment is to preserve the tooth as far as possible.

Drugs use in infections, complicated extractions or prophylaxis:

- Phenoxyethyl penicillin, adults; 250-750mg orally 6 hourly, children; 1 – 5 years; 125mg orally 6 hourly, 6 – 12 years; 250mg orally 6 hourly
- Paracetamol, adults; 500mg -1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily or
- Aspirin, adults; 600mg orally 3 times daily (Not recommended for children)

Conservation

- Tooth filling
- Root canal treatment if pulp is affected

Surgical

- Extraction
- Apicectomy

Prevention

- Encourage maintenance of good oral hygiene
- Reduce intake of sugary foods
- Use of fluoride containing toothpaste
- Use of mouth rinses containing fluoride
- Use of topical fluoride applications
- Use of sealants in children, where available
- Dental check at least twice a year

12.1.2 Periodontal disease

Definition

This is a pathological condition of the periodontium and refers to inflammatory diseases which are plaque-induced. These fall into two groups:

- Gingivitis
- Periodontitis

12.1.2.1 Gingivitis

Definition

This is an inflammatory condition of the free gingivae. It is caused by dental plaque and supragingival calculus or tartar. In this condition there is no destruction of the supporting tissue.

Clinical features

- Red mucosa
- Loss of gum texture
- Gums bleed easily

Treatment

Scaling and prophylaxis

Drugs

- Metronidazole, adults; 200mg orally 3 times daily for 5 days, children; 7.5mg/kg orally 8 hourly for 5 days
- Phenoxyethyl penicillin, adults; 250-500mg orally 6 hourly for 5 days, children; 12.5 - 25mg/kg orally 6 hourly for 5 days or
- Erythromycin, adults; 250-500mg orally 6 hourly for 5 days, children; 2-8 years; 12.5 - 25mg/kg orally 6 hourly, 8-12 years; 25 - 50mg/kg 6 hourly for 5 days

Preventive

- Encourage maintenance of good oral hygiene
- Gargle warm salty water or mouthwash after every meal
- Brush teeth at least twice daily
- Flossing

12.1.2.2 Periodontitis

Definition

This is an inflammatory response of the free gingivae affecting all the periodontal structures. It is caused by plaque and supra or sub gingival calculus. It results in the destruction of the attachment apparatus and the development of a periodontal pocket. Halitosis is usually present.

Treatment

- Scaling and prophylaxis
- Sub gingival curettage

Drugs

Metronidazole, 200mg orally 3 times daily for 5 days
Refer patient to next level

Prevention

- Encourage maintenance of good oral hygiene
- Use of mouthwash containing fluoride

12.1.3 Oral candidiasis

Definition

This is an infection of the mouth caused by *Candida albicans*. It is commonly known as oral thrush. The infection sometimes also affects the pharynx.

The predisposing factors include: trauma, denture wearing, dryness of the mouth, inhaled steroids, radiotherapy, diabetes mellitus, antibiotic therapy, HIV/AIDS.

Clinical features

- Creamy white or yellow plaques on normal mucosa
- Patches on the palatal and buccal mucosa and dorsum of the tongue and gums.

- Removal of plaques reveals bleeding surface.

Treatment

Drugs

- Gentian violet solution, topically 2 times daily for 7 days or
- Nystatin oral suspension or lozenges, 2 times daily for up to 10 days or
- Miconazole oral gel, applied 2 times daily for 10 days or

Refer to specialist in case of:

- No improvement
- Painful or difficulty in swallowing or
- Affected pharynx

Supportive

- Remove or treat predisposing factor.
- Use snugly-fitting dentures
- Good oral hygiene.
- Gargle warm salty water after every meal.

12.1.4 Herpes simplex stomatitis

Definition

This is inflammation of the mucosal area due to infection by the herpes simplex virus. It is usually a self-limiting condition clearing up after 7 - 10 days. It is characterised by painful, shallow ulcers around the lip area, gums and tongue. It is common in small children who usually present with high fever and refusal of food because it is too painful to eat.

Treatment

- Debridement
- Mouthwash with tetracycline

Drugs

- Paracetamol, adults; 500-1g orally 3 times daily, children; 10-20mg / kg orally 3 times daily for 5 days.
- * Metronidazole, adults; 200-400mg orally 3 times daily, children; 100-200mg orally 3 times daily for 5 days or
- *Phenoxymethyl penicillin, adults; 250-500mg orally 4 times daily, children; 125-250mg orally 4 times daily for 5 days

*In case of secondary infection only

Supportive

- Increase fluid intake
- In severe cases, a nasogastric tube may be necessary until
- the child can feed again.
- Saline mouthwash and gargle

Avoid acidic foods and drinks

Refer to a specialist if the condition is severe or does not heal within 7-10 days

12.1.5 Mouth Ulcers

Definition

This is a condition in which there is damage to the mucosal lining of the mouth, including the tongue. These are similar to ulcers due to the herpes simplex virus. They are painful and may occur singly or in groups. They frequently recur and can be very troublesome.

Treatment

- Paracetamol, adults; 500-1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily
- Aspirin, 600mg orally 3 times daily for adults only
- Chlorhexidene gluconate, 10-15ml as a mouthwash

kept in the mouth for about 30 seconds to 1 minute 2-3 times daily

Ulcers that do not heal rapidly should be referred to a specialist.

12.2 PHARYNGEAL DISEASES

These are conditions affecting the pharynx. They include:

- Tonsillitis and pharyngitis
- Peri-tonsillar abscess
- Epiglottitis

12.2.1 Tonsillitis and Pharyngitis

Definition

This is an inflammation of the pharynx and tonsils. There are two types of pharyngitis; viral and bacterial. The vast majority of pharyngitis is viral, which is self-limiting. In clinical practice, it is difficult to distinguish between viral and bacterial pharyngitis. It is important to diagnose and treat streptococcal throat infections to prevent Rheumatic fever and other complications.

Acute tonsillitis is most frequent in childhood. However, it is very rare in adults. Untreated acute tonsillitis will subside over the course of one week. Appropriate treatment will make the illness shorter.

Diphtheria infection is an important differential diagnosis.

Clinical features

Symptoms

- Sore throat
- Pain on swallowing
- Headache
- Fever
- Voice change

Signs of streptococcal pharyngitis

- High fever
- White pharyngeal exudates
- Tender enlarged anterior cervical lymph nodes
- Grossly enlarged painful tonsils which are asymmetrical
- Absence of signs suggesting a viral pharyngitis

Signs of viral pharyngitis

- Nasal stuffiness
- Coryza
- Irritating cough
- Conjunctivitis

Signs of tonsillitis:

- Hyperaemic tonsils
- Enlarged tonsils
- Pus in the crypts

Treatment

Viral pharyngitis

- No antibiotics should be given
- Analgesia for pain and fever relief

Streptococcal pharyngitis and tonsillitis

Drugs

- Phenoxymethyl penicillin, adults; 250-500mg orally 6 hourly at least 30 minutes before food, children, up to 1 year; 62.5mg orally 6 hourly, 1-5 years; 125mg orally 6 hourly, 6-12 years; 250mg orally 6 hourly for 7 days or
- Erythromycin, adults; 250mg-500mg orally 6 hourly, children, up to 2 years; 125mg orally 6 hourly, 2-8 years; 250mg orally 6 hourly for 7 days
- Paracetamol, adults; 500mg-1g orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily

Complications of streptococcal pharyngitis

- Peritonsillar and parapharyngeal abscesses
- Rheumatic fever

Refer for specialist treatment

12.2.2 Peri-tonsillar abscess

Definition

This is an abscess around the tonsils

Clinical features

It presents with signs of acute tonsillitis but with more pain on one side and almost always a large, very tender lymph node on that side. The patient may be unable to swallow fluids. It is always difficult to see into the mouth because the mouth cannot be opened widely. Use a good light and gently depress the tongue on the painful side to look for bulging of the tonsil and the palate above the tonsil.

Treatment

Drugs

- Pethidine (if needed) , adults; 50-100mg intramuscularly repeated 4 hourly, children; 0.5-1mg/kg intramuscularly repeated 4 hourly
- Dextrose solution or Normal Saline intravenously
- Benzyl Penicillin, adults; 1 MU intravenously 6 hourly, children; 50,000-100,000 IU/kg/day intravenously in 4 divided doses for 5 days or
- Phenoxyethyl penicillin, adults; 500-750 mg orally 6 hourly, children; 20-50 mg/kg orally daily in 4 divided doses for 5 days
- Metronidazole, adults; 500mg intravenously or 400 mg orally 8 hourly for 5 days, children; 20-30 mg/kg orally or 7.5 mg/kg intravenously in divided doses 8 hourly

Surgical

- Incision and drainage, if necessary

Patients should be nursed in a place where surgery can be done urgently.

12.2.3 Epiglottitis

Definition

This is an acute inflammation of the epiglottis due to *Haemophilus influenzae* type B. The condition can be life threatening.

Clinical features

- Acute onset, usually within 6 hours
- High fever
- Toxic patient
- Drooling of saliva
- Respiratory stridor

Diagnosis

Diagnosis should be suspected from clinical features. Avoid throat examination as the patient's airway may become completely obstructed.

Treatment

Refer immediately for specialised treatment

Drugs

- Chloramphenicol, adults; 500mg-1g intravenously 4 times daily, children; 50-100mg/kg daily in 4 divided doses for 5 days.
- Cefotaxime, adults; 1g intramuscularly/ intravenously 12 hourly, increased in severe infection to 8 - 12 g in 3-4 divided doses, children; 100-150mg/kg daily in 2-4 divided doses increased up to 200mg/kg daily in very severe infections.

12.3 NASAL DISEASES

These include:

- Acute sinusitis
- Allergic rhinitis

12.3.1 Acute sinusitis

Definition

This is inflammation of one or more sinuses. This condition usually occurs after suffering from a cold or allergic rhinitis.

Clinical features

- Tenderness over the affected sinuses
- Headache
- Blocked nose
- Copious mucopurulent discharge
- Fever

Treatment

Drugs

- Paracetamol, adults; 500mg-1g orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily
- Amoxicillin, adults; 250 - 500mg orally 3 times daily, children over 20kg; 250mg orally 3 times daily, 10 - 20 kg; 125mg orally 3 times daily, below 10kg; 62.5mg orally 3 times daily for 5 days or
- Cotrimoxazole, adults and children over 12 years old; 960mg orally 2 times daily, children 5 - 12 years; 480mg orally 2 times daily, 6 months to 5 years; 240mg orally 2 times daily

Supportive

- Steam inhalation
- Saline nasal drops

Complications

- Dental abscess
- Periorbital swelling

Patients with complications need referral to a specialist.

12.3.1.2 Allergic rhinitis

Definition

This is inflammation of the nasal mucosa due to hypersensitivity to allergens. The common allergens include pollen, dust, animals, or food.

Clinical features

- Recurrent nasal blockage
- Irritation
- Watery nasal discharge
- Sneezing
- Watery and itchy eyes

Treatment

Drugs

- Chlorpheniramine, adults and children over 12 years; 4mg orally 2 times daily, children 5 - 12 years old; 2mg orally 2 times daily, 6 months to 1 year 1mg orally 2 times daily
- Loratidine, adults; 10mg orally once daily, children 2-5 years; 2-5mg orally once daily

Supportive

- Saline nasal drops used at night. But these should not be used for too long periods, as rebound blockage is likely to occur
- Avoid causative allergens

Persistent attacks with severe symptoms should be referred to the specialist.

12.4 EAR CONDITIONS

These include:

- Acute otitis media
- Chronic suppurative otitis media

12.4.1 Acute otitis media

Definition

This is inflammation of the middle ear. It usually follows an upper respiratory tract infection.

Clinical features

- Fever
- Severe pain in the ear, worse at night
- Babies cry, rub or pull the ear
- Red bulging eardrum
- Blood and/or pus discharge

Treatment

Drugs

- Amoxicillin, adults; 250-500mg orally 8 hourly, children; 12.5-25mg/kg orally 8 hourly for 5 days
- Aspirin (adults only); 600mg orally 3 times daily
- Paracetamol, adults; 500mg-1g orally 3-4 times daily, children; 10-20mg/kg orally 3-4 times daily
- Phenoxymethyl penicillin, adults; 250-500mg orally 6 hourly, children up to 1 year; 62.5 orally 6 hourly, 1-5 years; 125mg orally 6 hourly, 6-12 years; 250mg every 6 hours for 7-10 days or
- Erythromycin, adults; 250-500mg orally 4 times daily, children; 125-250mg orally 4 times daily for 5 days

Supportive

- Avoid wetting the inside of the ear

Complications

- Mastoiditis
- Hearing loss
- Acquired cholesteatoma

12.4.2 Chronic suppurative otitis media

This is a condition in which there is an ear discharge lasting more than two weeks and results from inadequately treating or neglecting acute otitis media.

Clinical features

- Painless discharge from one or both ears
- Perforation of the eardrum
- Discharge may be thin, clear, mucoid to thick, pasty, offensive mucopus
- Presence of multiple organism infection
- Red and swollen middle ear mucosa
- Mucosa may bulge if blocked

Treatment

- Wick dry with a cotton cloth
- Keep the ear as dry as possible
- Antibiotics are not usually indicated
- The patient should be referred if:
 - Pain is present
 - There is swelling behind the ear
 - There is poor response to treatment

13

SURGICAL CONDITIONS

This chapter discusses the following conditions:

- Injuries
- Animal bites
- Testicular torsion
- Strangulated hernia
- Hydrocele
- Varicocele

13.1 INJURIES

Definition

Injuries refers to harm that occurs to the body. They may be intentional or due to accidents. The cause may be physical, chemical, burns, or traffic accidents.

Injuries may cause temporary or permanent disability. Injuries may be divided into minor and major injuries.

13.1.1 Minor injuries

These include cuts and blunt injuries. Cuts are usually from sharp objects, especially household implements. Blunt injuries usually follow assault.

Clinical features

Cuts may bleed and if seen late may have developed infection with pus formation.

Blunt injuries will cause bruises or haematomas or more serious deeper injuries, such as bone fractures.

Treatment

- Clean open wounds thoroughly with soap and water

or a disinfectant

- Remove foreign matter and dead tissue
- Suture fresh superficial wounds
- Do not suture open wounds after 6 hours of injury
- Cover the wound with dressing

Drugs

- Tetanus toxoid, 0.5ml intramuscularly as a single dose
 - Anti-tetanus serum, 250 IU as a single dose (for non-immunised patients)
 - Paracetamol, adults; 500mg-1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily or
 - Aspirin, (adults only) 600 mg orally 3 times daily
- Haematomas usually resolve on their own

13.1.2 Major injuries

These are multiple injuries or serious injuries to specific body parts.

13.1.2.1 Multiple injuries

These may be characterised by fractures, bruises, internal injuries, head injuries, spinal injuries, and chest trauma or eye injuries. The patient will present with two or more of such injuries. They may result from traffic accidents, assault or war.

Treatment

Initially a quick history and examination should be carried out to establish the severity of the injuries.

- Establish a clear airway
- Remove any debris in the mouth
- Insert airway breathing, if necessary
- Ensure good circulation
- Set up an intravenous line with the largest gauge

- possible
- Control bleeding
- Resuscitate, if necessary
- Treat shock
- Look for signs of internal haemorrhage
- Group and cross match blood
- Clean and debride wounds before suturing
- Immobilize fractures immediately

Drugs

- Tetanus toxoid, 0.5ml intramuscularly as a single dose

Refer patient to the nearest hospital in case of head or chest injuries, suspected internal haemorrhage, loss of consciousness or need of additional care.

13.1.3 Specific injuries

13.1.3.1 Head injuries

The patient may present with a laceration, fracture, a history of altered consciousness or amnesia

General Management

- An accurate history is needed, especially to find out if the patient was unconscious at any time after the head injury. A careful examination is needed. Head injuries may be associated with a fracture or dislocation of the cervical spine
- Brainstem compression causes hypertension and bradycardia, with irregular respiration
- Assess the conscious level using the Glasgow Coma Scale (GCS). The face and head should be examined carefully for blood or cerebrospinal fluid draining from the nose or ears, suggesting a fractured base of the skull
- Examination of the eyes is needed as a unilateral

fixed and dilated pupil may indicate a haematoma on the same side

Investigations

- X-ray of the cervical spine (lateral view)
- X-ray of the skull (antero-posterior, lateral and Townes' views)

Specific treatment

Patient should be admitted to hospital for observation for at least 24 hours, even if it is apparently a trivial injury, if there is:

- History of loss of consciousness
- Loss of consciousness on arrival in hospital
- Focal neurological signs
- Post traumatic amnesia
- Significant drowsiness
- Severe headache or vomiting
- Blurred vision
- Other associated injuries
- Skull fracture

Management

- Do hourly observation of GCS, breathing pattern, vital signs, and pupil reaction
- The airway must be safe and patients nursed with the head propped up at 15°
- Severe injuries need specialised management by a neurological centre
- Restrict intravenous fluids to minimise cerebral oedema. Sufficient fluid to maintain a urine output of 0.5 – 1ml/kg/hour should be given

1.1.3.2 Facial injuries

Treatment

- Maintain the airway as swelling may be severe

- Intubation or tracheostomy may be performed, if necessary
- Prophylactic antibiotics should be given for facial fractures

13.1.3.3 Spinal injuries

This should always be suspected in patients with head injury or multiple trauma(s). There may be numbness, parasthesia, weakness of the limbs or pain radiating down a limb.

Diagnosis

Lateral view X-ray of the cervical spine, including all cervical vertebrae and first thoracic vertebra.

Treatment

- The patient should be moved very carefully
- Avoid rotation and extremes of flexion and extension
- The attendants should work as a team to move the patient. One assumes responsibility for the neck and places the fingers under the angle of the mandible with palms over the ears and parietal region and maintaining gentle traction. Keep the neck straight and in line with the body. The neck can be splinted with a sandbag on either side or a cervical collar

Refer for specialised management, which will be needed for specific injuries.

13.1.3.4 Eye injuries

For penetrating or blunt trauma refer patient for specialised treatment at higher level of care. (See also chapter 9)

13.1.3.5 Chest injuries

Clinical features

- Pain on breathing
- Dyspnoea
- Unequal movement of chest wall
- Surgical emphysema of neck and chest
- Palpable rib fractures
- Bruising
- Tracheal deviation
- Restlessness
- Central cyanosis
- Tachycardia
- Hypotension
- Sweating

Diagnosis

- Bruising over the lower left ribs may indicate a ruptured spleen
- Bruising over the right lower ribs may indicate a ruptured liver
- Chest X-ray (antero-posterior view)

Treatment

- Rib fractures do not require any specific management apart from analgesia
- Large flail chest may require mechanical ventilation for 10-14 days and stronger analgesia

Pneumothorax

There are two types: open and tension.

Open

- Conservative management
- Refer for appropriate treatment if patient's condition deteriorates

Tension

- This is an emergency
- Convert to open pneumothorax by pushing a large bore needle into the 2nd intercostal space along the midclavicular line
- Insert an intercostal under water seal drainage

Haemothorax

There are two types: asymptomatic and symptomatic.

Asymptomatic

- Conservative management
- Refer for appropriate treatment if patient's condition deteriorates

Symptomatic

- Insert an intercostal under water seal drainage
- Patient should be referred to higher level or specialist

Flail chest

- Patient needs oxygen or mechanical ventilation
- Ribs may need to be fixed.
- Refer to higher level or specialist

13.1.3.6 Abdominal injuries

Penetrating injuries are usually due to stab and bullet wounds. The patient may present with a metal protrusion or disembowelment. The injuries may result in haemoperitoneum. Haemoperitoneum may be present with pain, abdominal distension, rigidity or tenderness.

Diagnosis

Peritoneal aspiration for haemoperitoneum should be done

Treatment

All abdominal bullet or stab wounds should be explored by laparotomy

13.1.3.7 Renal injuries

There is usually microscopic or macroscopic haematuria.

Diagnosis

- Abdominal ultra sound
- Intravenous urogram

Clinical features

- Swelling in the loin area
- Bruising in the loin area
- Tenderness in the loin area

Treatment

- Catheterise patient

Refer patient to a specialist for specific treatment

13.1.3.8 Burns

A burn is an injury occurring after exposure of the body surface to friction, chemicals, electricity or extreme temperature.

Clinical Features

Burns may result in damage to the dermis. Such damage may be partial or full thickness.

Partial thickness burns

- Some of the dermis is alive
- Heals in 10-14 days without scarring
- Blisters may be present
- Pain
- Shock may be present

Full thickness burns

- Damage to all of the dermis
- Usually heal after 21 days with scarring
- Painless
- Shock may be present

Complications

- Infection
- Anaemia
- Contractures
- Pulmonary oedema may occur after inhalation of smoke
- Acute peptic ulcers
- Acute renal failure

Management

Assessment

- Examine for shock and loss of fluids
- Assess the extent and depth of the burn
- Look for signs of infection

Treatment

Drugs

- Paracetamol, adults; 500mg-1g orally 3 times daily, children; 10-20mg/kg orally 3 times daily or
- Pethidine, 0.5-1mg/kg intramuscularly 4-6 hourly for severe burns
- Tetanus toxoid 0.5ml intramuscularly as a single dose, if necessary
- Topical antibacterial agents – silver nitrate, and silver sulphadiazine cream. Others used are povidone-iodine, chlorhexidine

Supportive

- High calorie, high proteins diet
- Physiotherapy for burns affecting joints as soon as patient is resuscitated and pain has been controlled

Specific Care

- Superficial burns should be cleaned with water, dried and left open
- Fluid replacement. Suggested fluids are normal saline, ringer's lactate or hartmann's solution. 50ml of 50% dextrose per litre can be added
- Do not open blisters
- Dress burns with vaseline gauze but exposure method is preferred
- Wash burns every 4-6 hours with salt water
- Use showers. Avoid baths which may allow cross-infection
- Slough is removed using wet to dry dressings
- Dressings should not be allowed to dry and stick
- Specific areas such as the eyes, eyelids, ears, perineum and hands need specific care
- The haemoglobin should be checked once a week and transfusion given, if necessary
- Monitor urine output. It should be at least 1ml/kg /hour

All patients with deep and extensive burns should be referred to a specialist

Determination of burn size

The burn size in adults is determined using the rule of nines in which the following body areas are taken to represent 9% or 18%:

Whole of each upper limb	= 9%
Whole of each lower limb	= 18%
Front of trunk	=18%
Back of trunk	=18%
Whole of head and neck	=9%
Perineum	=1%

The above formula is not applicable to children. In children the burn size can be determined by considering the area

of one palm surface of the patient's hand as 1% of body surface area. This palm surface formula is also applicable to adults.

Fluid therapy in burns

Fluid requirements

a) Maintenance requirements

Age group	Weight (kg)	ml/kg/ 24hours	ml/kg /hour
Neonates (<3months)	3	150	6
Infants (>3months)	3-10	10-20	5
	120	80	3
Children	>20	60	2.5
Adults		35	1.5

b) Extra requirements

Age under 6

One ration = 2 x burn size x weight

Age 6 or over

One ration = 1 x burn size x weight

Note:

On top of the maintenance fluid requirement which is given at a constant rate, one ration of extra fluid is given during the first 8 hours from the time of the burn, a second ration during the next

8 hours and a third ration during the next 24 hours.

Prevention of injuries

- Public education on supervision of young children
- Household chemicals, insecticides, sharp objects should be kept out of reach of children.
- Teach road safety measures at an early age
- Safety standards in places of work should be maintained

13.2 BITES

These are bites which are inflicted by animals or humans.

Clinical features

A wound may sometimes be associated with fractures or amputations if inflicted by large animals. There may be bleeding.

Complications

Infection with both aerobic and anaerobic bacteria or viruses.

Treatment

- Clean, debride the wound
- Excise dead tissue
- Leave the wound open for delayed primary or secondary suture

Drugs

- Phenoxymethyl penicillin, adults; 250 -500mg orally 4 times daily, children; 125-250mg orally 4 times daily for 5 days
- Metronidazole, adults; 200-400mg orally 3 times daily, children; 100mg -200mg orally 3 times daily for 5 days
- Tetanus toxoid, 0.5ml intramuscularly as a single

dose.

If bite is from suspected rabid animal, administer post-exposure rabies treatment. (Refer to chapter 2.7).

13.3 TESTICULAR TORSION

Definition

This is the twisting of the testis along its vertical axis, resulting in compromised blood supply to the testis and the adjoining spermatic cord. It may be spontaneous or following strenuous activity. It may also result from anomalies in the development of the tunica vaginalis and the spermatic cord.

Clinical Features

Symptoms

- Severe local pain
- Nausea
- Vomiting
- Scrotal swelling
- Dark discoloration of the scrotum
- Fever

Diagnosis

This is clinical and confirmed on surgical exploration

Treatment

- Immediate surgical intervention is advised if torsion is suspected. Surgical exploration of the scrotum within a few hours offers the only hope of testicular salvage. Fixation of the contra lateral testis is performed to prevent torsion on that side.
- Appropriate antibiotic cover is required.

13.4 STRANGULATED HERNIA

Definition

This is a condition in which the blood flow to an abnormally protruding viscus is compromised. The strangulation can occur in any type of hernia.

Clinical Features

- Abdominal pain
- Fever
- Vomiting
- Irritability
- Restlessness
- Abdominal distension
- Guarding of the abdomen
- Rebound tenderness

Diagnosis

- History and examination is very important in making a diagnosis
- Abdominal X-rays

Treatment

The basic line of management is immediate surgical intervention and relieving the obstruction. It is mandatory to inspect the bowel if gangrenous resection is done and anastomose the viable segments.

Drugs

- Benzyl penicillin, adults; 2MU intravenously 4 times daily, children; 50,000-100,000 IU/kg intravenously in 4 divided doses for 5 days
- Metronidazole, adults; 500mg intravenously 3 times daily, children; 7.5mg/kg 8 hourly for 5 days
- Gentamicin, adults; 80mg intravenously 3 times daily, children; 2-3mg/kg intravenously in three divided doses for 5 days
- Intravenous fluids

13.5 HYDROCELE

Definition

This is a condition characterised by the accumulation of fluid in the tunica vaginalis and it presents as a cystic scrotal mass.

Clinical Features

- Intrinsic, often cystic and painless scrotal mass
- May be painful when severely distended
- Mass is unilateral
- Transluminable mass
- Spermatic cord is palpable above the cystic mass

Treatment

- Hydrocelectomy
- Appropriate antibiotic cover is required

13.6 VARICOCELE

Definition

This is a collection of large veins, usually occurring in the left scrotum. It feels like a “bag of worms”. It is present when the patient is in the upright position and should empty in the supine position.

Clinical Features

- Pain
- Feeling of scrotal fullness

Treatment

- Varicocelectomy
- Appropriate antibiotics cover is required

14

POISONING

Definition

This is the exposure by ingestion, inhalation or other means of a substance capable of causing harm to the body.

Clinical features

The patient may present a variety of symptoms ranging from mild to serious ones like the loss of consciousness.

Diagnosis

- Assess for vital signs
- Ascertain as far as possible, the nature and quantity of the poison and when it was taken.

14.1 MANAGEMENT

Management depends on the type of poison taken and the clinical condition of the patient. Treatment is aimed at slowing down, reducing or preventing further absorption of the poison and to counteract the effects of the poison already absorbed.

All patients with poisoning should be referred to a specialist after emergency treatment.

Emergency resuscitation measures should be taken in the following circumstances:

- a) Obstructed airway
 - Pull the tongue forward
 - Remove dentures, foreign bodies (e.g. food) and oral secretions
 - Hold the jaw forward and insert an oropharyngeal airway if possible

- Put the patient in a semi-prone position with head down to minimise the risk of inhaling vomit
- b) Inadequate respiration
- Give continuous oxygen
 - Apply assisted ventilation with an ambu bag or mouth to mouth or intubate and do mouth to tube respiration.
 - Do not use respiratory stimulants as they cause harm
- c) Hypotension
- Keep patient in a position with his head downwards by elevating the foot of the bed
 - Administer 0.9% sodium chloride intravenously
- d) Recurrent fits
- Control with diazepam, adults; 5-10mg intravenously stat, children; 0.2-0.3mg/kg intravenously stat.
Repeat as necessary
- e) Removal of poison from the stomach

Gastric emptying carries the risk of the victim inhaling gastric contents. The benefit of the procedure should therefore be weighed against this risk. The procedure should not be performed in the following circumstances:

- When corrosive substances (e.g. acids, alkalis and petroleum products) have been swallowed.
- When there is marked hypothermia (less than 30°C)
- When the amount of poison swallowed is minimal
- If poison was ingested more than 2 hours earlier (except in the case of poisoning with salicylates, tricyclic anti-depressants and beta-blockers)

Procedure

To remove poison from the stomach, two methods may be used:

- Inducing vomiting by giving:
 - Ipecacuanha syrup, adults; 30ml, children above 1 year; 15ml, children below 1 year;

10ml followed by a glass of water. Repeat after 20 minutes if necessary.

- Gastric lavage
If done in an unconscious patient, a cuffed endotracheal tube should be passed to prevent aspiration of stomach contents into the lungs.
Reduction of absorption of poison

After vomiting has occurred:

- Activated charcoal; 50g mixed with 400ml water in a bottle and shaken well. Administer the suspension in a dose of 5ml/kg. Repeat every 4 hours. Total dose of 100g for adults, if necessary
- Magnesium sulphate mixture or magnesium hydroxide mixture; 50ml to avoid constipation
- Milk, cooking oil or beaten raw egg may also be given in the absence of activated charcoal, to delay absorption of the poison

14.2 TREATMENT OF SPECIFIC COMMON POISONING

14.2.1 Aspirin and other salicylates

Treatment

- Induce emesis with ipecacuanha, unless respiration is depressed
- Give activated charcoal
- If respiration is depressed, do airway-protected gastric lavage
- Gastric emptying is effective up to 4 hours after ingestion of poison

14.2.2 Carbon monoxide

Treatment

- Remove patient from further exposure

- Give oxygen for several hours
- Maintain blood pressure and normal body temperature
- To reduce cerebral oedema, give 20% mannitol, intravenously 5ml/kg body weight over 20 minutes and a corticosteroid intravenously or intramuscularly 4 hourly (e.g. prednisolone, 1mg/kg body weight dexamethasone, 0.15mg/kg body weight or hydrocortisone, 4mg/kg body weight)
- Control convulsions or hyperactivity with diazepam, 0.1mg/kg body weight by slow intravenous or per rectum

14.2.3 Ethanol

Treatment

- Remove unabsorbed ethanol by gastric lavage or inducing emesis with ipecacuanha syrup
- Give activated charcoal
- Maintain adequate airway
- Maintain normal body temperature
- If patient is hypoglycaemic give dextrose 50%, followed by 5% intravenously
- May need Vitamin B compound, if chronic alcohol abuser

14.2.4 Insecticides

14.2.4.1 Organochlorine

Treatment

- Remove patient from source of poisoning and remove contaminated clothing
- Give ipecacuanha syrup
- After vomiting give activated charcoal followed by gastric lavage with 2 – 4 litres water (adult dose)

- Give a laxative such as magnesium hydroxide
- Do not give milk, fats or oils as they will increase absorption of the poison
- Scrub the skin with soap and cold water to remove skin contamination
- Give artificial respiration with oxygen if there is respiratory depression
- Give diazepam, 10mg slow intravenous or phenobarbitone, 100mg intramuscularly to control convulsions, hyperactivity or tremors

Organophosphates and carbamate

Treatment

- Remove patient from source of poisoning and remove contaminated clothing
- Establish airway and give artificial respiration if necessary
- Remove excess bronchial secretions by suction
- Give ipecacuanha syrup or start gastric lavage
Give atropine, adults; 2mg intravenously/
intramuscularly stat , children; 100-200mcg
intravenously/intramuscularly/orally every 3 – 8
minutes until signs of atropinisation appear (hot dry
skin, dry mouth, widely dilated pupils and fast pulse)

14.2.5 Paraffin, petrol and other petroleum products

Treatment

- Prevent the substance from entering the lungs to avoid damage to tissue
- Do not induce vomiting
- Do not do gastric lavage
- Look out for pulmonary oedema and chemical pneumonitis and treat accordingly

14.2.6 Paracetamol poisoning

Clinical features

Liver damage may result in paracetamol overdose. The damage occurs within a few hours of ingestion.

Treatment

- Keep the patient quiet and warm
- Induce emesis with ipecacuanha syrup
- Where there is depressed respiration use airway-protected gastric lavage
- N-acetylcysteine, 20% solution, orally 140mg/kg as a loading dose, followed by 70mg/kg every 4 hours for 3 days. It may be necessary to administer through a nasogastric tube
- Dextrose, 5% intravenously for the first 48 hours
- Phytomenadione, 1– 10mg intramuscularly if the prothrombin time ratio exceeds 2.0
- Do not force diuresis

14.2.7 Chloroquine poisoning

Clinical features

Characterised by blurred vision, tinnitus, weakness, haemoglobinuria, oliguria, low blood pressure, shock, convulsions, cardiac arrest

Treatment

- Induce emesis
- Stomach wash (air-way protected gastric lavage, if respiration is depressed)
- Give activated charcoal
- Treat symptomatically

14.2.8 Mushroom or other foods poisoning

Clinical Features

There will be abdominal pain, nausea, vomiting, and diarrhoea.

Shock, in severe cases

Treatment

Symptomatic:

- Bed rest
- Keep patient warm
- Stomach wash using normal saline
- Give Oral Rehydration Salts (ORS) or intravenous fluids to re-hydrate
- If no improvement refer to specialist

14.2.9 Snake Bites

Treat all snake bites an emergency

Clinical features

- Pain
- Swelling
- Tissue necrosis
- Regional lymph node swelling
- Haemorrhagic symptoms; bleeding at wounds site
- And other parts of the body

Danger signs

- Drowsiness
- Slurred speech
- Excessive oral secretions
- Difficulty in breathing
- Neurological signs

Treatment

- Immobilise limb And keep slightly elevated

- Administer tetanus toxoid
- Dextrose 5% in saline intravenously
- Treat shock
- Vitamin K, 1-10mg intramuscularly
- Anti-snake venom, if available
- Transfer patient to specialist

Prevention

- Wear protective shoes
- Clear bushes near dwelling places
- Avoid walking on dark paths

15 DISORDERS OF THE RENAL SYSTEM

15.1 METABOLIC DISORDERS

15.1.1 Hyperkalemia

Definition

This is serum Potassium $> 5.5\text{mmol/L}$

Clinical features

Symptoms

Muscle weakness

Signs

- Ascending paralysis with respiratory failure
- Cardiac instability, ventricular fibrillation, cardiac arrest
- May have signs of acute kidney injury or metabolic acidosis

Investigations

- Serum Potassium
- ECG – tall, peaked symmetrical T wave, flat P, increased PR interval, wide QRS, bradycardia, AV block

Therapy

- Stop source of K^+ (oranges, bananas, ACEI, K^+ sparing diuretics, septrin, heparin, NSAIDS, B-blockers)

1. Severe Hyperkalemia ($\text{K} > 6.5$) and ECG changes

- a. Protect the heart- 10mls 10% Calcium Gluconate over 10mins.
- b. Push K^+ into cell
 - 0mls of 8.5% NaHCO_3 over 5minutes if patient is also acidotic. Another dose after 5 -10mins. Can then

infuse 100mls over 1-2 hrs (DONT USE or INFUSE WITH RL OR with CALCIUM- PPT but YOU CAN USE 5% Dextrose for infusion)

- 50mls 50% Dextrose with 10iu soluble insulin over 15-20mins. May given 2-4 hourly as required. Monitor serum glucose 2-4 hourly
 - 10-20mg nebulised salbutamol
- c. Push K⁺ out of the body
- Frusemide 1mg/kg IV (Please hydrate patient first if dehydrated)
 - Kayexalate/sodium Resonium 15-30g in 50-100mls 20% Sorbitol or with lactulose PO/PR
 - Consider Hemodialysis if refractory
2. **Moderate Hyperkalemia (K⁺ 6.0 – 6.5)**
- a. Push K⁺ into cell
 - b. Push K⁺ out of the body
3. **Mild Hyperkalemia (K⁺5.5 – 5.9)**
Push K⁺ out of the body

15.1.2 Hypokalemia

Definition

Serum K⁺ < 3.5, maybe associated with hypomagnesaemia and hypocalcaemia

Clinical features

Symptoms

Muscle weakness, fatigue, constipation, muscle cramps

Signs

- Paralytic ileus, ascending paralysis, reduced reflexes.

- Tetany when associated with alkalosis
- Arrhythmias

Causes

- GIT and Renal losses

Management

Investigations

- check K⁺, other electrolytes and serum pH
- ECG- flat or inverted T wave, prominent U wave

Therapy

- 20mmol KCL in 250-500mls Normal saline over one hour. Check K⁺ before repeating dose and ECG monitoring.
- Consider 6-12mls (5-10mml/l) 20% MgSO₄ or 2mls 50% diluted in 50mls over one hour.
- If cardiac arrhythmia or arrest give 2mmol KCL per minute iv for 5mins. Repeat ONCE only if necessary
- Oral K⁺ supplements if K⁺>3.0

15.1.2 Hypernatremia

Definition

serum Na⁺ > 150mmol/ L

Clinical features

Symptoms

- thirsty, nausea, vomiting, weakness, malaise
- muscle tremor, weakness

Signs

Drowsiness, stupor, coma, convulsions, tremors, ataxia

Causes

- water loss more than electrolyte

- GIT losses,
- Renal losses (osmotic diuresis, DI)
- increase in Na⁺
 - Hyperaldosteronism, cushings
 - Excessive saline or sodium bicarbonate infusion

Management

- Investigate and treat cause
- Please do urine Na⁺ as well

Therapy

- Correct water deficit – rehydrate first if patient is dehydrated
- Stable/asymptomatic patients
 - take it easy
 - replace fluids orally
- unstable/symptomatic patients
 - IV fluids with NS, DNS, avoid 5%Dextrose as Na⁺ may drop too fast
 - rate of lowering serum Na⁺ 0.5-1mmol/hr, aim for 12mmol/l in 24hrs and not more than this
 - ESTIMATE THE EFFECT OF 1 LITRE OF ANY INFUSATE ON SERUM Na⁺
 - Change in serum Na⁺ = (infusate Na⁺ _ serum Na) divided by (total body water + 1)
 - The answer is in mmol/L. the formular helps to calculate the infusion rate so that you do not exceed 1 mmol/min.

15.1.3 Hyponatremia

Definition

Low serum Na but treatment warranted with severe (<120mmol/l) or acute

Clinical features

- asymptomatic unless severe or acute

- nausea, vomiting, seizures, coma

Causes

- hypovolemic
- GI losses, renal losses

Euvolemic

- SIADH
- Hypothyroidism
- Adrenal insufficiency

Hypervolemic

- CCF
- cirrhosis
- Nephrotic syndrome

Management

- Investigate and treat cause
- Urine Na⁺ should be ordered, urine and serum osmolarity should be measured

Therapy

- CNS manifestations
 - 200mls 5% NaCl over 6 hours. Monitor serum Na⁺ hourly
 - Aim to increase Na⁺ to 120mmol/l at a rate of 0.5 – 1.0mmol/l per hour
 - If no CNS symptoms, do not use Hypertonic saline.
 - Once serum sodium is around 120mmol/l, stop active therapy and restrict fluid intake to approx. 500mls/day.
- Asymptomatic
 - Can use conservative measures like fluid restriction may be enough.
- SIADH
 - restrict fluid intake to 50-60% of estimated maintenance fluid requirements(±1L/day).

15.1.5 Hypercalcaemia

Definition

Corrected serum Ca $2+$ > 2.65mmol/l

Clinical features

Symptoms Polyuria, polydipsia, dysphagia, bone pain, renal colicky

- Muscle weakness

Signs

- Confusion, hypotonia, dysarthria, coma, seizures

Causes

Hyperparathyroidism, malignancy, sarcoidosis, drugs, Vitamin D intoxication esp in renal patients

Investigations

- ECG- short QT interval, wide QRS complex, flat T, AV block, may have fatal arrhythmias
- Serum Calcium U+Es, albumin, Mg $2+$, Phosphate, ALP, Serum electrophoresis
- PTH
- X-RAYS

Frequent association with hypokalemia increasing risk of arrhythmias.

Therapy

- Hydrate with Normal Saline 500mls/hr until Urine out > 200mls/hr then reduce 100-200mls per hour.
- Furosemide 1mg/kg only when patient has been hydrated or if in cardiac failure
- Hemodialysis or peritoneal Dialysis with low Calcium dialysate. Hemodialysis preferred
- Prednisolone 40mg daily esp for Vit D intoxication, sarcoidosis, multiple myeloma, metastasis
- Pamidronate 60-90mg in 500-1000mls NS infusion

- over 4-6hrs. should be effective within 48hrs
- Monitor and replace K⁺ and Mg²⁺

15.4 CATHETER RELATED BLOOD STREAM INFECTIONS (CRBSI)

Intravenous catheters inserted into central veins such as the internal jugular vein, subclavian vein or femoral vein provide the only and vital access for hemodialysis for patients with no arterio-venous fistulas. Introduction of catheters including venous and urinary catheters increases the risk of blood stream infections.

In most cases CRBSI can be prevented by simple interventions:

- Hand hygiene
- Using full barrier precautions during the insertion of central venous catheters,
- Cleaning the skin with chlorhexidine,
- Avoiding the femoral site if possible
- Removing unnecessary catheters including urinary catheters as soon as possible

Management of CRBSI

Patients with central venous accesses and new fevers should be evaluated for CRBSI, with the catheter as the source of the infection unless otherwise excluded by patient examination and investigations. The following minimum evaluations should be done.

- Thorough patient history and examination including the central line insertion sites to assess for superficial thrombophlebitis and insertion site abscess
- Two sets of blood cultures obtained from two different sites and another drawn from the central venous access site
- If you suspect bacteremia/sepsis remove catheters and culture the tip to guide antibiotic treatment

required.

- Other investigations as determined from history and physical examination of the patient
- Empiric antibiotics guided by local microbiology and susceptibility of organisms
- Vancomycin 1gm IV Stat dose and thereafter dosed according to renal function for empiric treatment of Methicillin Resistant Staphylococcus aureus, Coagulase Negative Staph, Enterococci species
- For patients unable to tolerate Vancomycin due to deteriorating renal function, switch to Linezolid for the treatment of MRSA and resistant Enterococcus
- Fourth Generation Cephalosporins (Cefepime 2gm IV Stat) or Carbapenems (Doripenem or Meropenem) should be initiated for empiric gram negative bacteremia such as Pseudomonas that may be resistant to routinely used gram negative antibiotics.
- If cultures are positive for fungal elements particularly Candida albicans, initiate Caspofungin until sensitivity results are available and switch to Fluconazole if susceptible. Remove the central line immediately in the case of candidemia.

15.5 GLOMERULAR DISORDERS

Five clinical syndromes

- Nephrotic syndrome
- Nephritic syndrome
- Rapid progressive glomerulonephritis
- Asymptomatic Hematuria or and proteinuria
- Chronic glomerulonephritis

15.5.1 Nephrotic syndrome

Definition

- At least 3.5g proteinuria in 24hrs
- Generalised edema

- Low serum albumin
- Hypercholesteronaemia

Causes

- Minimal change disease Membranous
- Membranous
- Focal segmental glomerulosclerosis (FSGS)
- Membranoproliferative glomerulonephritis (MPGN)
- Lupus Nephritis
- Diabetic nephropathy
- Amyloidosis

Clinical features

Symptoms

- Facial swelling worse in the morning
- froth urine

Signs

- Edema
- Usually normal BP
- Urine dipstick >2 + proteinuria, rare hematuria except in FSGS

Diagnosis

- Renal biopsy needed for light microscopy, IF and EM
- Thus early referral to Nephrologist important

General Management

- Salt restriction
- No need for protein restriction in our setting
- Furosemide 80-120mg/day (aim 0.5-1L/day)
- Proteinuria lowering drugs
 - Titrate dose depending on proteinuria
 - ACEI- enapril 2.5 – 20mg/day or Perindopril 4-16mg daily
 - ARB- Lorsatan 25-100mg/day or Micardis 40-160mg/day

- Lipid lowering
 - Simvastatin 10-40mg daily or atorvastatin 10-20mg daily
- Anti-coagulation (INR 2-3).
 - Only if albumin < 20g/l, bedridden, very rapid diuresis, otherwise don't use routinely
 - Warfarin daily

Pathological classification

- a. Minimal change disease

Definition

Pathologically no glomerular changes on light microscopy but podocytes are effaced on electron microscopy
Presents with nephrotic syndrome

Causes

- Idiopathic
- NSAIDS, bee sting, lymphomas

Therapy

Idiopathic MCD

- ACEI/ARB are not used initially in MCD
- Prednisone, 1 mg/kg daily or 2 mg/kg qod in am for a minimum of 8 weeks. (If response is after 8 weeks, treat 2 weeks after response)
- Taper 5 mg/day every 3-4 days to 30, then use QOD, taper 5 mg/dose/week to 0.
- If relapse while tapering (steroid dependent) retreat with 4 week course.
- If relapse off steroids, retreat with 4 week course.
- If pt remains steroid dependent or has > 3 relapses/year can use low dose prednisone (10-15 mg) for a year to maintain remission,
- If using more than 0.3-0.4 mg/day of prednisone long term, treat with cyclophosphamide 2 mg/kg po for 12 weeks.

- Steroid resistance is usually defined as no response after 4 mos of 1 mg/kg.

b. Membranous

Pathologically immune deposits are visible just above or within the glomerular basement membrane

Presents with nephrotic syndrome

Definition

Immune

Causes

- Idiopathic – 80%
- Infections -HBV, HCV, ?syphilis,? schistosomiasis, malaria
- Drugs- penicillamine, NSAIDS, Captopril, Gold
- Malignancies- lung, breast, thyroid, GI
- Autoimmune- SLE, Thyroid disease

Management

Membranous nephropathy: Approach to therapy based on risk of progression (6 mos observation)

Feature/risk	Low risk	Medium risk	High risk
Urine protein	< 4	>4 but <8	>8
GFR (onset)	Normal	Normal	Normal or low
GFR (6 mos)	Stable	Stable	Stable or declining
Risk ESRD (10 yrs)	< 10%	55%	66-80%
Therapy	ACEI/ARB Conservative,	Steroids, MMF ^{***} CTX [*] , CTX [*] , CSA ^{**}	Steroids, CSA ^{**} , MMF ^{***}

CTX^{*} - cyclophosphamide, CSA^{**} - cyclosporine, MMF^{***} - Mycophenolate

- Prednisone (0.5 mg/kg/day) and Cyclophosphamide (1.5-2.0 mg/kg/day) po for 6 months or
- Cyclosporine 3.5 mg/kg for 12-24 months (keep levels 110-170 mg/L) (or FK .05 mg/kg in bid dose to level 3-5 mg/L) (plus pred 0.15 mg/kg to max 15)
- Prophylaxis
 - INH 300mg od po
 - Co-trimoxazole(single dose) 2tab od po
 - Fluconacozole 100-200mg od po
 - At least for 3 months

IF NO RESPONSE IN 6 MONTHS

- Methylpred 1.1 g/IV x 3 and then prednisolone 0.5 mg/kg x 27 days;

- Chlorambucil 0.2 mg/kg (or Cyclophosphamide, 2 mg/kg) daily x 30 days,
- Alternate these monthly for 6 months Do not initiate immunosuppression if sepsis suspected or present
- Do not initiate immunosuppression if sepsis suspected or present

a. **Focal Segmental Glomerulosclerosis (FSGS)**

Definition; pathologically < 50% of all glomeruli affected and of the affected glomeruli, < 50% of their tuft is affected. Presents commonly with Nephrotic syndrome, asymptomatic hematuria and proteinuria

Causes

- Idiopathic
- collapsing (HIV), collapsing (non-HIV)
- Low birth weight. prematurity
- Obesity
- Sickle cell anemia,
- Anabolic steroids, Heroin, Lithium, pamidronate

Therapy

- General measures for Nephrotic syndrome

Idiopathic FSGS

- Conservative therapy (ACEI/ARB/aldo blocker)
- Exclude secondary causes
- Prednisone, 1 mg/kg daily (or 2 mg/kg alt days) for 12-16 weeks (20% CPR at 8 wks, 50% at 16)
- May go to 6 months if no steroid contraindication and/or bad prognostic signs are present.
- If CR continue for 2 weeks and taper over 2-3 mos using qod regimen. If Up increases to >2.0 gms, start CSA.
- If no reponse at all by 16 weeks, taper and start CSA.
- Steroid resistance is usually defined as no response

after 4 mos of 1 mg/kg.

- If the disease is non-immunologic (eg genetic, drug-induced, etc) use only low dose steroids (.15 mg/kg) with a calcineurin inhibitor)

Guidelines for use of cyclosporine

- Do not use if GFR <40 or severe interstitial or vascular disease on biopsy.
- Use 3-5 mg/kg in divided doses and monitor trough levels (100-200 ng/ml).
- Use concomitant low dose prednisone (0.15 mg/kg, maximum 15mg) until remission.
- Treat for 6 mos after a CR or 12 mos after a PR occurs and taper slowly over several months. relapse rate is determined by duration of therapy
- Tacrolimus is an alternative to cyclosporine

Indications for use of Cyclosporine

- Steroids are contra-indicated
- Proteinuria does not diminish by 50% or more after 4 mos of steroids.
- Patient is steroid-dependent
- Relapse in < 1 yr after CR or PR
- There is a significant increase in proteinuria during steroid taper after CR or PR
- GFR must be >40 ml/min and interstitial/ vascular disease on biopsy minimal
- The cause of FGS is not immunologic

FSGS due to HIVAN

- General measures
- HAART
- May add prednisolone after six months if maximum dose of ACEI reached but still proteinuric.

b. MPGN

Glomerular disease with subendothelial immune deposits

forming a double basement membrane or a dense basement membrane

Causes

- Idiopathic
- HCV, HBV, Infective endocarditis, Shunts, abdominopelvic sepsis

Clinical features

- Nephrotic syndrome – see definition above
- Nephritic syndrome – see definition below

Therapy

- General measures for treatment of Nephrotic syndrome
- Treat secondary cause

c. LUPUS Nephritis

Definition

Glomerular disease as a result of chronic autoimmune, multisystem, inflammatory connective tissue disorder of unknown cause(SLE)

Clinical presentation

- Nephrotic syndrome – see definition above
- Nephritic syndrome – see definition below
- Rapid progressive glomerulonephritis – see definition below
- Asymptomatic proteinuria or and hematuria
- Proteinuria or hematuria without any other renal symptoms
- Chronic glomerulonephritis
- Disease with irreversible damage to the kidney. GFR will not improve despite intervention but may delay further drop in GFR

Diagnosis

- Should meet criteria for diagnosis of Lupus and look for systemic features; CNS(psychosis, fits), Cardiac (pericarditis) ,Respiratory (pleuritis), hematologic (Thrombotic microangiopathy, leukopenia), rheumatologic (arthritis), dermatologic(malar rash, discoid rash, photosensitivity, mucosal ulcers) renal(hematuria, proteinuria) immunologic (low C3/C4), GIT(serositis), ANA, ds DNA, anti-Sm
- Should have 4 of the 11 manifestations
- Biopsy needed for LUPUS as histological diagnosis defines treatment

Therapy

- Depends on histological staging (stage 1-6)
- 1 and 2 do not need immunosuppression
 - Stage 2 may need treatment if 24hr protein > 1g.then give prednisolone 20-40mg/day for 1-3months and taper to 5-10mg/day
- Stage 5 follow guidelines for membranous
- Stage 6 damage already done and do not need active immunosuppression but follow measures for management of CKD

Stage 3 and stage 4

- Induction phase treatment for 24 weeks with:
 - Mycophenolate Mofetil (MMF) 1- 1.5g b.d. or
 - IV Cyclophosphamide 0.5-1.0g/m² monthly
 - Plus oral prednisolone 60mg/day (1mg/kg) with taper
 - Do not initiate immunosuppression if sepsis suspected or present
- Prophylaxis
 - INH 300mg od po
 - Co-trimoxazole(single dose) 2tab od po
 - Fluconazole 100-200mg od po

- β At least for 3 months
- Maintenance upto at least 18 months
 - MMF 1 – 1.5g bd PO or
 - Azathioprine 1-3mg/kg/day po
 - IV cyclophosphamide 0.5-1.0g/m² every 3 months
 - Plus prednisolone 5-10mg/day

d. Diabetes Nephropathy

Definition

Persistent microalbuminuria or proteinuria on albustix or dipstick respectively and or urine albumin:creatinine ratio. Persistent means tests should be done three months apart.

Clinical presentation

Symptoms

- Asymptomatic proteinuria, microalbuminuria
- Body swelling

Signs

- No clinical signs on general examination
- Pedal Edema, facial puffyness
- Presence of Diabetic neuropathy and retinopathy makes the diagnosis of nephropathy more likely
- Classical presentation of diabetic nephropathy does not require renal biopsy but atypical presentation need renal biopsy. These include
 - Rapid drop in GFR over few days to weeks
 - Diabetic with hematuria
 - Proteinuria in presence of HIV, Hepatitis B, SLE, small vessel vasculitis (ANCA positive)

Management

- General Measures of managing Nephrotic syndrome
- Target BP < 125/75
- Target HBAc1 < 6.5%

- Low dose aspirin 75-150mg daily

e. **Amyloidosis**

AL-primary

AA- secondary

15.5.2 Nephritic syndrome

Definition and clinical presentation

- mild proteinuria
- Hematuria
- High blood pressure
- Acute reduction in GRF
- Some edema

Causes

Reduced compliment

- Post streptococcal Glomerulonephritis
- Shunt Nephritis
- Endocarditis
- SLE
- HCV
- Athero-emboli GN

Normal compliment

- IgA
- HSP
- Anti-GBM
- ANCA positive GN

Clinical features

History of sore throat esp children, features of lupus, purpura(HSP,HCV), peripheral neuropathy (HSP,HCV), pulmonary hemorrhage(ANCA), chronic sinusitis(ANCA), associated asthma (ANCA)

Diagnosis

- ANA, ANCA, ds-DNA, ASOT, DNase, HBsAg, Anti-HCV, anti-GBM, RPR, C3, C4
- Renal biopsy except for post streptococcal

Therapy

- a. Post streptococcal
 - Supportive
 - BP control
 - Antibiotic
 - Fluid management Dialysis
 - Dialysis
 - Prognosis good
- b. ANCA positive/Anti-GBM
 - See under Rapid progressive Glomerulonephritis
- c. Systemic Lupus Erythromatosis
 - See Nephrotic syndrome
- d. Others (HBsAg, HCV, IgA, HSP, Shunt)
 - Treat cause

15.5.3 Asymptomatic hematuria/proteinuria

Definition/Features

- Isolated proteinuria/hematuria with no other features like hypertension, Edema etc
- Common Causes in our setting
- Diabetes Mellitus
- SLE
- HIVAN
- FSGS
- UTI
- IgA/HSP

Therapy

See under specific conditions

15.5.4 Rapid progressive Glomerulonephritis

Definition

- Sub acute reduction in renal function as opposed to acute nephritis that is rapid.
- Takes few weeks to few months for renal function to deteriorate

Clinical features

Similar to acute nephritis except this is more insidious, Hemoptysis, asthma, sinusitis, epistaxis, abdominal pain, peripheral neuropathy, petechiae, purpura.

Causes

- Type 1
 - Anti-Glomerular basement disease (Anti-GBM)
- Type 2
 - Immune complex disease
 - SLE
 - Post streptococcal
 - IgA/HSP
- Type 3
 - ANCA positive (Wegners, Churg strass, microscopic polyangitis)

Management

- Serum p-ANCA and C-ANCA
 - Renal biopsy mandatory for light, Immunoflourence, electron microscopy
1. Anti-GBM
 - a. Prednisolone 60 mg/day and reducing
 - b. Cyclophosphamide 2mg/kg/day and adjusted for white cell count
 - c. Plasma exchange (50ml/kg to a maximum of 4L daily for 14 days or until anti-GBM antibodies undetectable)
 - d. Treat for 6 months

2. Immune complex
 - a. except for Streptococcal, treat as in 3 except plasma exchange may not be indicated
3. ANCA positive
 - a. Methylprednisolone 7mg/kg for 3days and then prednisolone 1mg/kg/day for 4 weeks then taper with either
 - b. IV cyclophosphamide 0.5g/m² monthly for 6 months or
 - c. Oral cyclophosphamide 2mg/kg for 6-12months
 - d. Plasma exchange for patients with lung hemorrhage and renal dysfunction
 - e. Co-trimoxazole prophylaxis

15.5 HYPERTENSION

Check detail on hypertension under CVS

15.5.1 Malignant hypertension

Definition

- a. BP 180/120
- b. Fundal changes/encephalopathy
- c. Proteinuria or increased urea/creatinine
- d. Thrombotic microangiopathy

Common causes

- a. Chronic kidney disease (small kidney on U/S)
- b. Acute Nephritis
- c. Renal vascular disease (one kidney 1.5cm than the other kidney on US)

Scleroderma

- d. Cocaine
- e. Other endocrine disease- conns, cushings etc

Clinical features

- a. Above but look for signs of possible etiology
- b. Suspect in elderly Diabetics (atherosclerotic) and young women (fibromyoplasia)

Management

- a. FBC- thrombocytopenia
- b. Peripheral smear – RBC fragments
- c. Urinalysis
- d. U+Es
- e. Specific tests to rule out etiology like kidney sonar, MRI angiogram to rule out renovascular disease

Therapy

- a. Check under cardiovascular disorders
- b. ACEI should be given if scleroderma
- c. Renal vascular disease needs referral to specialist if suspected and BP unresponsive
Increase of serum creatinine $<30\mu\text{mol/l}$ from baseline should not prompt withdraw of ACEI but monitor closely
- d. If dialysis needed peritoneal dialysis preferred to allow possible recovery. Recovery may take up to several months.

15.52 Hypertension or kidney disease in pregnancy

PLEASE CHECK HYPERTENSION IN PREGNANCY FOR OTHER DETAILS

- Effects of Pregnancy on kidney
 - i. Hemodynamic changes leads to hyperfiltration
 - ii. Presence of HTN, Uremia
 - iii. Facts that may predict deterioration
 - iv. Proteinuria
 - v. Intercurrent pregnancy related illnesses e.g Pre-eclampsia

- vi. Possibility of permanent loss of function Kidney on pregnancy

Effects of Kidney disease on pregnancy

- vii. Risk of pre-eclampsia
- viii. Prematurity
- ix. IUGR

LUPUS Versus Pre-Eclampsia/Eclampsia

Other conditions that may present like pre-eclampsia or eclampsia or HELLP need to be considered.

LUPUS

	Lupus flare	PRE-ECLAMPSIA
PROTEINURIA	+	+
HTN	+	+
RBC CASTS	+	-
AZOTEMIA	+	+
C3/C4	+	-
ABNORMAL LETs	-	+ -
LOW PLTS	+	+ -
LOW WBC	+	-

- Thrombotic microangiopathic disorders
 - Thrombotic thrombocytopenic purpura
 - Hemolytic Uremic syndrome
- Acute Fatty Liver of Pregnancy

Other conditions that may mimic HELLP in pregnancy

	HELLP/ ECLAMPSIA	AELP	TIP	HUS
Hypertension	80%	25-50%	Occasional	present
Renal Dysfn	Mild to moderate	Moderate	Mild to moderate	Severe
Fever, neurological signs	++	0	++	0
Onset	3rd Trimester	3rd Trimester	Anytime	Post partum
Platelet count	Low	Low	Low	low
LFTS	High	Very high	Usually normal	Usually normal
PTT	Normal to high	High	Normal	Normal
Anti- thrombin III	Low	Low	Normal	normal

LUPUS and PREGNANCY

Poor Outcomes

- Active disease at conception
- Disease first appearing in pregnancy
- HTN, Azotemia 1st trimester
- High titres of lupus anticoagulant,
- antiphospholipid antibodies

Antiphospholipid antibody in pregnancy

- Increase fetal loss
- Venous and arterial thrombosis
- Renal vasculitis

- Thrombotic microangiopathy
- Pre-eclampsia
- Treatment- ASA, Heparin

15.6 RENAL AND PANCREATIC TRANSPLANT

15.6.1 ESKD patients who meet the following criteria will be suitable for recommendation for Renal or/and Pancreatic Transplant

- No malignancy or free of malignancy for at least 5 years
- No serious cardiovascular disease or ischemic heart disease (minimum Ejection Fraction of 40%)
- No Major pulmonary disease
 - No major restriction or obstruction
- No major urological disease
- No major psychiatric illness
- BMI < 35
- Low preformed antibodies (PRAs). High PRAs are associated with the following
 - Multiple pregnancies
 - Multiple blood transfusions
 - Prior failed transplant
- GI disorders should have been addressed
- PUD
- Pancreatitis
- Diverticulitis
- Infections
- HIV patients can be transplanted as long as they meet the following:
 - CD4 >200
 - On HAART for at least 6 months
 - VL undetectable
 - Adherence with HAART

- All other active infections should be treated first
 - Special considerations should be taken for HBV and HVC
- Should not a smoker or chronic alcoholic

15.62 The basic work-work up for a recipient should include the following;

- A. Serum/blood
- HIV test
 - HBsAg
 - Anti-HCV
 - Anti-CMV
 - Anti-EBV
 - Anti-HTLV-1
 - RPR
 - Blood group
 - PRAs
 - X match for CDC and flow cytometry
- B. Imaging/Invasive
- CXR
 - Doppler US of femoral/iliac veins
 - ECG
 - VCU
 - Gastroscopy
 - Doppler of carotids for Diabetics
 - Other tests will be dependent on condition of patients
- C. Other aspects that patient need to meet which are dependent on dialysis adequacy
- CaPO₄ product should be acceptable
 - PTH within recommended levels
 - Hb 11-12g/dl
 - Potassium normal

A check list should be done the day before transplant to make sure candidate is ready if possible do the tests.

Repeat HIV test as well unless already HIV positive
Patients should be fully examined the day before transplant and ensure no comorbidity

D. Stop-or-go Strategy for Evaluation of a Potential Living Donor

- Blood group determination: Stop if incompatible with recipient blood group....
- Plasma Urea, creatinine; proteinuria; urinary sediment:

Stop if abnormal

- Viral tests: HBV, HCV, HIV Stop if positive
- Renal ultrasound: stop if solitary kidney
- HLA A, B, DR, DP and DQ typing
- CDC Cross match; FC cross match: Stop if positive (T cell-positive Xmatch with IgG)

E. Full medical evaluation of the potential donor

- BMI, blood pressure, cardiac evaluation (at least EKG and ultrasound)
- Aorto-iliac CT scan, and renal angiography; urography
- Measurement of GFR: Cr51-EDTA, iohexol, or other method
- Blood glucose, HbA1c, cholesterol, microalbuminuria
- Liver enzymes, alkaline phosphatases, gGT
- Gynecologic evaluation: mammography, uterine cervix smear
- Prostate evaluation, clinical and PSA
- Evaluation of skin, lung, thyroid, infectious diseases, etc...
- Psychologic/ psychiatric evaluation
- Validation by urologist and anaesthesiologist

f. The best kidney donor

- Iso blood group and HLA identical
- Less than 50 y
- Normal BP (< 140/90 mmHg)

- BMI < 25 Kg/m²
- GFR > 80 ml/min/ 1,73m²
- Proteinuria < 300 mg/d ; microalbuminuria <30 mg/d
- No hematuria
- No diabetes nor dyslipidemia
- No cardiac disease nor past history of cancer
- No infectious (viral) disease

15.6.3 Immunosuppression in live-donor Kidney Transplant patients

- Immunosuppression can be started PRIOR to transplantation, e.g. one week before; this aims at achieving efficient immunosuppression.
- This might result in avoiding induction therapy with antilymphocyte preparations or monoclonal anti-IL2 receptor antibody
- The HLA matching (D/R) can sometimes be very good, thereby allowing “lighter” immunosuppression, e.g. avoiding the use of calcineurin inhibitors
- There is no cold ischemia time: thus the risk of delayed graft function is almost nil, decreasing the risk of acute rejection

15.6.4 Immunosuppression protocols

- Calcineurin inhibitors (ciclosporine OR tacrolimus) plus antiproliferative agent (azathioprine-AZA- OR mycophenolate mofetil –MMF) with OR without steroids
- With or without induction therapy: antilymphocyte agents –ATG- OR anti-IL2 receptor monoclonal antibodies, e.g. basiliximab, daclizumab
- Calcineurin inhibitors can be avoided (from the beginning or after a few months) provided the use of mTOR-inhibitors such as sirolimus or everolimus

Induction

- Simulect 20 mg (baxiliximab) pre-operative, day 4
- Methyl prednisolone 500mg-1000mg day 0 (in operating theatre)
- MMF or Azathioprine 1.5g or 1-3mg/kg/day respectively
- 4. Cyclosporine 8-12mg/kg start or Tacrolimus 0.15-0.30mg/kg/day bd

Maintenance

- MMF 1.5g BD PO or Azathioprine 1-3mg/kg/day
- Cyclosporine or Tacrolimus (dose adjusted according to C-2 levels or Tacrolimus levels)
- Prednisolone 60mg first day and taper down fast as long as creatinine remain stable. By end of month dose should be 20mg or less

Prophylaxis

- INH 300mg od for 6 months
- Valcyclovir 450 bd PO (depending on CMV status of donor and recipient) for 3 months
- Nystatin suspension 10mls od po for 3months
- Amphoterin B oral suspension for 3 months
- Co-trimoxazole 960mg od po for 6 months

Tacrolimus or Cyclosporine levels to be done daily till discharge then twice weekly then weekly , fortnightly and so on.

Kidney US sound and renogram will be routine within 5 days of transplant

Acute rejection will be defined on the basis of an increase in serum creatinine or amylase (urine as well) and renal biopsy. Rejection will be managed on protocols to be developed but will require induction agents like ATG or methylprednisolone or and modification of maintainance

regimen

Fertility and Pregnancy

- Fertility restored
- Pregnancy outcomes improve if renal fn normal and hypertension absent
- Pregnancy accelerates graft loss???
- Advisable to wait for 2 years
 - So that renal fn stabilises
 - Lowest doses of Immunosuppressive
 - Cyclosporine, prednisolone, Azathioprine safe, MMF no experience

16 INFECTIVE ENDOCARDITIS

Definition

This is microbial infection of the endocardium, which may result in valvular damage, myocardial abscess, or mycotic aneurysm.

Causes

Streptococcal species (especially *Streptococcus viridans*), Staphylococci, HACEK group, Enterococci

Predisposing factors

Preexisting valvular disease, congenital heart disease, dental and surgical procedures, intracardiac devices (prosthetic valves, pacemaker), intravascular catheters, intravenous drug abuse.

Can be acute and subacute

Clinical features

Symptoms

- Fever
- Night sweats
- Arthralgia
- Malaise
- Weight loss
- Dyspnea

Signs

- Fever
- Peripheral stigmata (splinter hemorrhages, Osler's nodes, Janeway lesion, Roth's spots)
- Pallor and jaundice
- Heart murmurs
- Features of heart failure
- Embolic phenomena

- Splenomegaly
- Hematuria

Diagnosis

Duke's criteria:

1. Criteria for Infective Endocarditis
 - A. Two major criteria or
 - B. One major and three minor or
 - C. Five minor criteria

2. Major criteria
 - A. Positive blood culture $\times > 2$ (typical microorganisms for infective endocarditis)
 - B. Positive Echocardiographic study (vegetations on the valves, wall abscess, new valve regurgitation)

3. Minor criteria
 - A. Predisposing heart condition or injected drug user
 - B. Febrile syndrome
 - C. Vascular phenomena (embolism, CNS hemorrhage, conjunctival hemorrhage, Janeway lesion)
 - D. Immunologic phenomena (glomerulonephritis, Rheumatoid factor, Osler's nodes, Roth's spots, false positive VDRL test)
 - E. Microbiologic evidence (positive blood culture, but not typical microorganisms)
 - F. Echocardiography : suggestive but not positive for infective endocarditis

Management

Investigations

- Blood culture
- Echocardiography
- FBC
- Urinalysis and microscopy

- U/E, LFTs

Treatment

1. Appropriate antibiotics: Penicillin G 10-20 MU /day IV in divided doses (4 times)or Ampicillin 8-12 g/day IV for 4 weeks and Gentamycin 1 mg/kg (up to 80 mg) 3 times IV daily 2-4 week. If Staphylococcus aureus: Oxacillin or Vancomycin IV
2. Bed rest
3. Treat heart failure and arrhythmias
4. Surgery - valvular replacement (indications : refractory heart failure, uncontrolled infection, fungal infections with large vegetations > 10 mm in size, recurrent systemic embolism, suppurative pericarditis, mycotic aneurysm or rupture of sinus of Valsalva)

Prophylaxis

Conditions in which prophylaxis is recommended:

1. Prosthetic cardiac valves
2. Previous infective endocarditis
3. Certain types of Congenital Heart Diseases (unrepaired cyanotic CHD, complete repair of CHD with prosthetic material or device for first 6 months; repaired CHD with the residual defects at the site of prosthetic valve or patch)
4. Cardiac transplantation with valvulopathy
No prophylaxis is recommended for most dental, GIT and GUT procedures, with acquired valve disease, hypertrophic cardiomyopathy, pacemaker or coronary by-pass surgery.

Prevention

Good oral hygiene, regular dental review

Antibiotics for prophylaxis, 1 hour before procedure:

Oral:

Amoxicillin 2 g (adult), 50 mg/kg (children) or

Cephalexin 2g (adult), 50 mg/kg (children) or

Azithromycin 500 mg (adult), 15 mg/kg (children)

Parenteral

Amoxicillin 2 g IM/IV (adult), 50 mg/kg (children)

Cefazolin or Ceftriaxone 1 g IM/IV (adult), 50 mg/kg (children)

Clindamycin 600 mg IM/IV (adult), 20 mg/kg (children)

Zambia Essential Medicine List (ZEML)

Drug	Presentation	Level	VEN
1	Drugs used in anaesthesia		
1.1	Drugs used in general anaesthesia		
1.1.1	Intravenous and intramuscular anaesthetics		
1.1.1.1	Ketamine	injection 10mg/ml powder for reconstitution 1g and 5g vials	V V
1.1.1.2	Thiopentone sodium		V
1.1.2	Inhalation anaesthetics		E
1.1.2.1	Halothane	inhalation medical gas	V E
1.1.2.2	Nitrous oxide		V
1.1.3	Muscle relaxants		
1.1.3.1	Suxamethonium chloride	injection 50mg/ml, (2ml)	V
1.1.4	Anticholinesterases		
1.1.4.1	Neostigmine	injection 2.5mg/ml, (1ml)	V
1.2	Drugs used in local anaesthesia		
1.2.1.	Lignocaine	injection 1% (10ml, 50ml)	V
1.2.2	Lignocaine + adrenaline	dental cartridge injection 2% (1 in 80,000)	V
1.3	Drugs used in spinal anaesthesia		
1.3.1	Bupivacaine/glucose	injection 0.5%, (4ml)	E

Drug	Presentation	Level	VEN
2. Drugs acting on the gastrointestinal system			
2.1 Antacids			
2.1.1 Aluminium hydroxide	gel, chewable tablets	I-IV	E
2.1.2 Magnesium trisilicate Compound	chewable tablets, mixture	I-IV	E
2.2. Antispasmodics			
2.2.1 Hyoscine butyl bromide	injection 20mg/ml, (1ml)	II-IV	E
2.2.2 Propantheline bromide	tablets 15mg	I-IV	E
2.3 Ulcer healing drugs			
2.3.1 Cimetidine	tablets 200mg	II-IV	E
2.3.2 Omeprazole	tablets 10mg,	II-IV	E
2.3.3 Ranitidine	tablets 150mg	II-IV	E
2.3.4 Tripotassium dicitratobismuthate	tablets 120mg	II-IV	E
2.3.5 Clarithromycin	tablets 250mg	II-IV	E
2.4. Antidiarrhoeals			
2.4.1 Codeine phosphate	tablets 15mg	II-IV	E
2.4.2 Loperamide	tablets 2mg	IV	E
2.4.3 Nitazoxanide	suspension 100mg	III-IV	E

Drug	Presentation	Level	VEN
2.5. Laxatives			
2.5.1 Glycerol	suppository 1g,4g	I-IV	E
2.5.2 Senna	tablets 7.5mg	II-IV	E
2.6 Drugs used for treating haemorrhoids			
2.6.1 Bismuth subgallate and zinc oxide	suppository, cream	II-IV	E
3 Drugs acting on the central nervous system			
3.1 Anxiolytics and Antipsychotic drugs			
3.1.1 Alprazolam	tablets 0.25 microgram	III-IV	E
3.1.2 Lorazepam	tablets 2mg tablets	III-IV	E
3.1.3 Diazepam	tablets 2mg, injection 5mg/ml (2ml)	II-IV	V
3.1.4 Medazolam	injection 1mg/ml	III	E
3.1.5 Selective serotonin reuptake inhibitors			
3.1.5.1 Sertraline	tablets 50mg	IV	E
3.2 Tricyclic Antidepressants			
3.2.1 Clomipramine	tablets 25mg	III	E
3.3 Anti-depressant drugs			
3.3.2 Fluoxetine	tablets 20mg	IV	E

Drug	Presentation	Level	VEN
3.3.4	Lithium carbonate		
3.3.5	Sodium valproate	IV II-IV	E E
3.4	Antiepileptic drugs		
3.4.1	Carbamazepine injection 5mg/ml	II-IV I-IV	V V
3.4.2	Lamotrigine	I-IV	V
3.4.3	Ethosuximide	III-IV	V
3.4.4	Phenobarbitone	II-IV	V
3.4.5	Phenytoin	II-IV	V
3.4.6	Sodium valproate	II-IV	V
3.4.7	Clonazepam	II-IV	V
3.4.8	Acetazolamide	IV	E
3.4.9	Gabapentin	IV	E
3.5	Drugs used in Parkinsonism and related disorders		
3.5.1	Benzhexol	II-IV	V
3.5.2	Bromocriptine	III-IV	E
3.5.3	Procyclidine	I-IV	E
3.5.4	Selegiline	III-IV	E
3.5.5	Levodopa	III-IV	E

Drug	Presentation	Level	VEN
3.6	Drugs used in nausea		
3.6.1	Cyclizine	IV	E
3.6.2	Domperidone	II-IV	E
3.6.3	Metoclopramide	II-IV	E
3.6.4	Prochlorperazine	III-IV	E
3.6.5	Promethazine	I-IV	V
3.6.6	Trifluoperazine	II-IV	E
3.7	Analgesics		
3.7.1	Non-opioid analgesics		
3.7.1.1	Acetyl salicylic acid (aspirin)	I-IV	V
3.7.1.2	Paracetamol (acetaminophen)	I-IV	V
3.7.2	Opioid analgesics		
3.7.2.1	Dihydrocodeine	II-IV	E
3.7.2.2	Morphine sulphate	II-IV	V
3.7.2.3	Pethidine	II-IV	V
3.8	Anti-migraine drugs		
3.8.1	Ergotamine tartrate	II-IV	E
3.9	Stimulants		
3.9.1	Methylphenidate	IV	E

Drug	Presentation	Level	VEN
3.10	Non-steroidal anti-inflammatory drugs		
3.10.1.	Ibuprofen tablets 200mg, 400mg	I-IV	E
4	Drugs used in the treatment of infections		
4.1	Antibacterial drugs		
4.1.1	Penicillins		
4.1.1.1	Benzathine penicillin	I-IV	E
4.1.1.2	Benzyl penicillin	I-IV	V
4.1.1.3	Phenoxymethyl penicillin	I-IV	E
4.1.1.4	Procaine penicillin	I-IV	E
4.1.2	Broad-spectrum penicillins		
4.1.2.1	Amoxycillin	I-IV	V
4.1.2.2	Ampicillin	II-IV	V
4.1.3	Penicillinase-resistant penicillins		
4.1.3.1	Amoxycillin+clavulanic acid	III-IV	E
4.1.3.2	Cloxacillin capsules 250mg	II-IV	V
4.1.3.3	Flucloxacillin capsules 250mg	III-IV	E
4.1.4	Aminoglycosides		
4.1.4.1	Gentamicin	I-IV	V
4.1.4.2	Kanamycin	I-IV	E

Drug	Presentation	Level	VEN
4.1.5 Aminocyclitol			
4.1.5.1 Spectinomycin	injection 2g vial	III-IV	E
4.1.6 Sulphonamides and trimethoprim			
4.1.6.1 Co-trimoxazole	tablets 120mg, 480mg, (sulfamethoxazole + trimethoprim)mixture 240mg/5ml tablets 200mg	I-IV I-IV	V E
4.1.6.2 Trimethoprim			
4.1.7 quinolones			
4.1.7.1 Ciprofloxacin	tablets 250mg I.V 2mg/ml 50ml, 100ml bottle	III-IV IV	E E
4.1.7.2 Nalidixic acid	tablets 500mg, suspension 30mg/5ml	I-IV	V
4.1.7.3 Ofloxacin	tablets 400mg, I.V 2mg/ml IV E		
4.1.8 Nitro-furan drugs			
4.1.8.1 Nitrofurantoin	tablets 50mg	I-IV	E
4.1.9 Macrolides			
4.1.9.1 Erythromycin	tablets 250mg, injection 500mg vial, syrup 125mg/5ml	I-IV	V
4.1.9.2 Azithromycin	capsules/tablets 250mg, Suspension 200mg/5ml	II-IV	V
4.1.9.10 Clindamycin	capsule 75mg, suspension 75mg/5ml, injection 150mg/ml	III-IV	E
4.1.10 Cephalosporins and cephamycins			
4.1.11.1 Cefotaxime	injection 500mg vial	III-IV	E
4.1.11.2 Cefoxitine	injection 1g, 2g vial	II-IV	E

Drug	Presentation	Level	VEN
4.1.11.3	Ceftriaxone	II-IV	E
4.1.11.4	Cephalexin	III-IV	E
4.1.12	Tetracyclines	I-IV	E
4.1.12.1	Doxycycline	I-IV	E
4.1.12.2	Tetracycline	I-IV	V
4.1.13	Metronidazole	III-IV	V
	Other antibacterials		
4.1.14	Chloramphenicol	II-IV	V
	Anti-tuberculosis drugs		
4.2	Rifampicin + Isoniazid	I-IV	V
4.2.1	Rifampicin + Isoniazid	I-IV	V
4.2.2	Rifampicin + Isoniazid	I-IV	V
4.2.3	Rifampicin + Isoniazid + Ethambutol	I-IV	V
4.2.4	Rifampicin + Isoniazid + Pyrazinamide	I-IV	V
4.2.5	Rifampicin + Isoniazid + Ethambutol + Pyrazinamide	I-IV	V
4.2.6	Ethambutol	I-IV	V
4.2.7	Pyrazinamide	I-IV	V
4.2.8	Streptomycin	I-IV	V

Drug	Presentation	Level	VEN
4.3 Anti-leprosy drugs			
4.3.1 Clofazimine	capsules 50mg, 100mg	II-IV	V
4.3.2 Dapsone	tablets 10mg, 25mg, 50mg	II-IV	V
4.3.3 Rifampicin	capsules 150mg, 300mg, syrup 100mg/5ml	II-IV	V
4.4 Antifungal drugs (also see section 12.3 and 13.3)			
4.4.1 Amphotericin B	injection 50mg	III-IV	E
4.4.2 Clotrimazole vaginal	tablet 500mg II-IV E		
4.4.3 Fluconazole	50mg, 150mg, 299mg, IV 2mg/ml	III-IV	V
4.4.4 Flucytosine	Injection 10mg/ml	III-IV	E
4.4.5 Griseofulvin	tablets 125mg	III-IV	E
4.4.6 Ketoconazole	tablets 200mg	II-IV	E
4.4.7 Nystatin vaginal	tablets 100,000 IU	II-IV	V
4.5 Anti-protozoal drugs			
4.5.1 Antimalarials			
4.5.1.1 Artemether-lumefantrine	tablets 20mg/120mg I-IV		V
4.5.1.2 Pyrimethamine + sulphadoxine	tablets 25mg/500mg	I-IV	V
4.5.1.3 Quinine	tablets 300mg, injection 300mg/1ml (2ml)	I-IV	V
4.5.2 Amoebocides			
4.5.2.1 Metronidazole	tablets 200mg	I-IV	V
4.5.2.2 Tinidazole	tablets 500mg	III-IV	E

Drug	Presentation	Level	VEN
4.6 Trypanocides			
4.6.1 Melarsoprol	injection 3.6%	III-IV	V
4.6.2 Suramin sodium	injection 1g vial	III-IV	V
4.7 Drugs used in pneumocystis pneumonia			
4.7.1 Co-trimoxazole (sulfamethoxazole + trimethoprim)	tablets 120mg, 480mg, mixture 240mg/5ml	II-IV	V
4.8 Herpes zoster and varicella zoster drugs			
4.8.1 Acyclovir	cream	II-IV	E
4.8.2 Acyclovir	tablets 200mg, 400mg	II-IV	E
4.9 Antiretrovirals			
4.9.1 Nucleoside Reverse Transcriptase Inhibitors			
4.9.1.1 Abacavir	tablets 300mg	II-IV	E
4.9.1.3 Lamivudine, 3TC	tablets 150mg	II-IV	E
4.9.1.4 Lamivudine + zidovudine	tablets 150/250mg	II-IV	E
4.9.1.5 Lamivudine + Stavudine	tablets 150/30mg	II-IV	E
4.9.1.6 Lamivudine + Stavudine + Nevirapine	tablets 150/30/200mg	II-IV	E
4.9.1.7 Stavudine, D4T	tablets 30mg	II-IV	E
4.9.1.8 Zidovudine, ZDV, AZT	tablets 100mg, 250mg	II-IV	E
4.9.1.9 Tenofovir	tablets 245mg	II-IV	E
4.9.1.10 Emetritabine	tablets 200mg	II-IV	E

Drug	Presentation	Level	VEN
4.9.1.11 4.9.2 4.9.2.1 4.9.2.2 4.9.3 4.9.3.2 4.9.3.3 4.9.3.4	Tenofovir/Emitricitabine Non-nucleoside Reverse Transcriptase inhibitors Efavirenz Nevirapine Protease inhibitors Ritonavir Lopinavir/Ritonavir Nelfinavir	tablets 300/200mg tablets 600mg tablets 200mg tablets 600mg tablets 133.3/33.3mg tablets 750mg	II-IV E E E E E E
4.10 4.10.1 4.10.2 4.10.3 4.10.4 4.10.5	Anthelmintics Mebendazole chewable Niclosamide Pyrantel Thiabendazole Albendazole	tablets 100mg tablets 500mg tablets 125mg, suspension 250mg/5ml tablets 500mg tablets 400mg	I-IV I-IV I-IV E E E
4.11 4.11.1	Schistosomicides Praziquantel	tablets 600mg	I-IV V
4.12 4.12.1 4.12.2	Anti-filarials Diethylcarbamazine Ivermectin	tablets 50mg tablets	III-IV E E

Drug	Presentation	Level	VEN
4.12.3	Suramin sodium	III-IV	V
5.	Drugs acting on the endocrine system and obstetrics, gynaecology and contraception		
5.1	Drugs used in diabetes		
5.1.1	Insulin		
5.1.1.1	Short acting (soluble)	II-IV	V
5.1.1.2	Isophane Insulin, Biphasic Insulin	II-IV	V
5.1.1.3	Actraphane or mixtard (30/70)Intermediate-and long acting	II-IV	V
5.1.2	Oral hypoglycaemics		
5.1.2.1	Chlorpropamide	II-IV	V
5.1.2.2	Glibenclamide	II-IV	V
5.1.2.3	Metformin	II-IV	V
	Other Antidiabetics		
5.1.4.1	Glucagon	II-IV	V
5.2	Preparations acting on the thyroid		
5.2.1	Carbimazole	III-IV	E
5.2.2	Iodine aqueous	III-IV	E
5.2.3	Thyroxin	III-IV	V
5.3	Corticosteroids		

Drug	Presentation	Level	VEN
5.3.1 Dexamethasone	tablets 500mcg, injection 5mg/ml (5ml)	III-IV	V
5.3.2 Hydrocortisone sodium succinate	injection 100mg vial	I-IV	V
5.3.3 Prednisolone	tablets 5mg	I-IV	V
5.4 Oestrogens and progestogens			
5.4.1 Norethisterone	tablets 5mg	III-IV	E
5.4.2 Conjugated oestrogens	tablets 62.5micrograms	III-IV	E
5.5 Androgens and anti androgens			
5.5.1 Cyproterone	tablets 50mg	III-IV	E
5.5.2 Stilboestrol	tablets 1mg	III-IV	E
5.5.3 Testosterone	capsules 40mg, injection oily depot 250mg/ml,(1ml)	III-IV	E
5.6 Other endocrine drugs			
5.6.1 Bromocriptine	tablets 2.5mg	III-IV	E
5.6.2 Clomiphene citrate	tablets 50mg	III-IV	E
5.6.3 Danazol	capsules 100mg	III-IV	E
5.7 Drugs used in obstetrics and gynaecology			
5.7.1 Drugs acting on smooth muscle			
5.7.1.1 Anticonvulsants			
5.7.1.1.1 Magnesium sulphate	injection 50%	II-IV	E

Drug	Presentation	Level	VEN
5.7.1.2 Prostaglandins and oxytocics			
5.7.1.2.1 Dinoprostone	tablets 500mcg, injection 1mg/ml	II-IV	E
5.7.1.2.2 Ergometrine maleate	tablets 250mcg,500mcg, injection 200mcg/ml injection	I-IV	V
5.7.1.2.3 Ergometrine/ oxytocin		II-IV	E
5.7.1.2.4 Oxytocin	injection 10IU/ml,1ml	II-IV	V
5.7.1.2.5 Misoprostol	Tablet 200microgram	I-IV	V
5.7.1.3 Myometrial relaxants			
5.7.1.3.1 Salbutamol	injection 500mcg/ml (1ml)	II-IV	V
5.8 Contraceptives			
5.8.1 Combined oral contraceptives			
5.8.1.1 Ethinylloestradiol/levonorgestrel	tablet 30mg/150mcg	I-IV	V
5.8.2 Emergency contraception			
5.8.2.1 Levonorgestrel	tablet 750mcg	I-IV	V
5.8.3 Progesterone-only oral contraceptives			
5.8.3.1 Levonorgestrel	tablet 30mcg	I-IV	V
5.8.4 Progesterone-only injectable contraceptives			
5.8.4.1 Medoxyprogesterone acetate	injection 150mg/ml,1ml	I-IV	V
5.8.4.2 Norethisterone enanthate	injection, oily 200mg/ml,1ml	I-IV	V
5.8.5 Barrier methods			
5.8.5.1 Female condoms	artificial plastic sheath	I-IV	V
5.8.5.2 Intrauterine device (IUD)	copper long coil type (Copper T 380A)	II-IV	V

Drug	Presentation	Level	VEN
5.8.5.3	Male condoms		V
5.8.5.4	Menefegol vaginal foaming	latex sheath with/without spermicide tablets	I-IV E
5.8.6	Implants		V
5.8.6.1	Levonorgestrel implant 38mg in silicone	capsule	IV
6	Drugs used in the treatment of diseases of the respiratory system and allergy		
6.1	Bronchodilators		
6.1.1	Adrenaline	1 in 1000, (1ml)	I-IV
6.1.2	Aminophylline	tablets 100mg, injection 25mg/ml (10ml) suppositories 50mg,360mg	I-IV V E
6.1.3	Salbutamol	tablets 2mg, syrup 2mg/5ml, inhaler 100mcg/dose	I-IV V E
6.2	Corticosteroids		
6.2.1	Hydrocortisone sodium succinate	injection 100mg vial	I-IV
6.2.2	Prednisolone	tablets 5mg	II-IV
6.3	Asthma prophylaxis therapy		
6.3.1	Beclomethasone	inhaler 5mgcg/dose	II-IV
6.3.2	Sodium chromoglicate	inhaler 5mg/dose	II-IV
6.4	Antihistamines		

Drug	Presentation	Level	VEN
6.4.1	Chlorpheniramine		
6.4.2	Promethazine	I-IV I-IV	E E
6.5	Oxygen		
6.5.1	Oxygen	I-IV	V
7	Drugs used in the treatment of diseases of the cardiovascular system		
7.1	Cardiac glycosides		
7.1.1	Digoxin	II-IV	V
7.2	Diuretics		
7.2.1	Thiazides		
7.2.1.2	Bendrofluzide	II-IV	E
7.2.1.3	Hydrochlorothiazide	II-IV	E
7.2.2	Loop diuretics		
7.2.2.1	Frusemide	II-IV	V
7.2.3	Potassium sparing diuretics		
7.2.3.1	Amiloride + hydrochlorothiazide	II-IV	E
7.2.4	Osmotic diuretics		
7.2.4.1	Mannitol	II-IV	V

Drug	Presentation	Level	VEN
7.3	Antiarrhythmic drugs		
7.3.1	Amiodarone	III-IV	E
7.3.2	Atenolol	II-IV	E
7.3.3	Digoxin	II-IV	V
7.3.4	Lignocaine	II-IV	V
7.3.5	Quinidine	V	V
7.4	Anti-angina drugs		
7.4.1	Atenolol tablets 50mg	III-IV	E
7.4.2	Glyceryl trinitrate sub-lingual	II-IV	E
7.4.3	Isosorbide mononitrate	II-IV	E
7.4.4	Nifedipine	II-IV	E
7.5	Diuretics		
7.5.1	Thiazide diuretics		
7.5.1.1	Hydrochlorothiazide	II-IV	E
7.5.1.2	Potassium sparing diuretics		
7.5.1.2.1	Amiloride + hydrochlorothiazide	II-IV	E
7.5.1.2.2	Spironolactone	II-IV	E
7.5.2	Beta blockers		
7.5.2.1	Atenolol	II-IV	E
7.5.2.2	Propranolol	II-IV	E

Drug	Presentation	Level	VEN
7.5.2.3	Carvedilol		
7.5.2.4	Labetalol	IV	E
7.5.2.5	Metoprolol	III-IV	E
7.5.3	Vasodilators	III-IV	E
7.5.3.1	Hydralazine		
7.5.4	ACE inhibitors	II-IV	E
7.5.4.1	Captopril		
7.5.4.2	Lisinopril	III-IV	E
7.5.4.3	Enalapril	III-IV	E
7.5.4.4	Losartan	IV	E
7.5.5	Calcium channel blockers		
7.5.5.1	Nifedipine	III-IV	E
7.5.5.2	Verapamil	III-IV	E
7.5.5.3	Amlodipine	III-IV	E
7.6	Drugs used in shock - sympathomimetics		
7.6.1	Adrenaline	I-IV	V
7.7	Alpha-adrenoceptor blocking agents		
7.7.1	Prazosin		
7.8	Lipid-regulating drugs	III-IV	E

	Drug	Presentation	Level	VEN
7.8.1	Statins			
7.8.1.1	Simvastatin	tablets 20mg, 40mg	IV	E
7.9.	Inotropic sympathomimetics			
7.9.1	Dopamine	injection 40mg/ml	IV	E
8	Drugs used in the treatment of malignant disease: anti-neoplastic drugs			
8.1	Actinomycin D	injection 500mcg	III-IV	V
8.2	Asparaginase	injection 1000 IU		
8.3	Azathioprine	tablets 50mg, injection 50mg vial	IV	V
8.4	Bleomycin	injection 15 unit ampoule	IV	V
8.5	Busulphan	tablets 500mcg	IV	V
8.6	Calcium folinate	tablets 15mg	IV	V
8.7	Carboplatin	injection 10mg/ml	IV	V
8.8	Carmustine	vial 100mg	IV	V
8.9	Chlorambucil	tablets 2mg	IV	V
8.11	Cisplatin	injection 1mg/ml	IV	V
8.12	Cyclophosphamide	tablets 50mg, injection 100mg	IV	V
8.13	Cytarabine	injection 100mg,500mg, 1g vial	IV	V
8.14	Cytosine arabinosate	injection 100mg	IV	V
8.15	Cyproteron acetate	tablets 50mg, 100mg	IV	V

Drug	Presentation	Level	VEN	
8.16	Darabazine	injection 200mg	IV	V
8.17	Daunorubicin	injection 20mg	IV	V
8.18	Doxorubicin	injection 10mg,50mg	IV	V
8.19	Etoposide	IV infusion 20mg/ml	IV	V
8.20	Fludarabine	my mouth 40mg/m2, injection, infusion	IV	V
8.21	Filgastrin	injection 300mcg/ml	IV	V
8.22	Fluorouracil	injection 25mg/ml	IV	V
8.23	Hydroxyurea	capsules 500mg	IV	V
8.24	Ifosfamide	injection, 1g, 2g vial	IV	V
2.29	Imatinib	tablets 100mg	IV	V
8.25	Interferon	injection 300mg	IV	V
8.26	Lomustine	capsules 40mg	IV	V
8.27	Melphalan	tablets 2mg, injection 100mg	IV	V
8.28	Mercaptopurine	tablets 50mg	IV	V
8.29	Methotrexate	tablets 2.5mg, injection 50mg	IV	V
8.30	Mitomycin	injection 40mg	IV	V
8.31	Mustine	injection 10mg	IV	V
2.32	Paclitaxel	IV infusion 6mg/ml	IV	V
8.33	Procarbazine	capsules 50mg	IV	V
8.34	Stilboestrol	tablets 1mg	IV	V
8.35	Tamoxifen	tablets 20mg	IV	V
8.36	Temozolamide	capsules 5mg	IV	V

Drug	Presentation	Level	VEN
8.37 Thioguanine	tablets 40mg	IV	V
8.38 Vinblastine	injection 1mg/ml		
8.39 Vincristine	injection 1mg, 5mg	III-IV	V
9 Drugs acting on the eye			
9.1 Ophthalmic diagnosis			
9.1.1 Fluorescein sodium	eye drops, strips	III-IV	E
9.2 Anti-infective preparations			
9.2.1 Antibacterial			
9.2.1.1 Chloramphenicol	eye drops 0.5% eye ointment 1%	II-IV	E
9.2.1.2 Chloramphenicol/dexamethasone	eye drops 15/0.1%	III-IV	E
9.2.1.3 Framycetin	eye drops, eye ointment	III-IV	E
9.2.1.4 Tricycline	eye ointment 1%	I-IV	E
9.2.1.5 Oxy-tetracycline/Hydrocortisone	eye drops 3%/1%	III-IV	E
9.2.1.6 Neomycin/betamethasone	eye drops 0.5%/o.1%	III-IV	E
9.2.1.7 Gentamicin	eye drops 0.3%	II-IV	E
9.2.1.8 Cefotaxime	injection 500mg, Ig vial	III-IV	E
9.2.2 Antifungals – Preparations are not generally available and could be made extemporaneously			
9.2.2.1 Pivodine Iodine	eye drops 2%	III-IV	E

Drug	Presentation	Level	VEN
9.2.2.2 Natamycin	eye suspension 5%	IV	E
9.2.2.3 Econazole	eye suspension 1%	IV	E
9.2.2.4 Miconazole	eye suspension 10mgg/ml	IV	E
9.2.2.5 Amphotericine B	eye solution 0.05%-0.2%	IV	E
9.2.3 Antiviral			
9.2.3.1 Aciclovir	eye ointment	III-IV	E
9.2.3.2 Ganciclovir	IV infusion 500mg vial	IV	E
9.2.3.3 Forscarnet	IV infusion 24mg/ml	IV	E
9.3 Anti-inflammatory preparations			
9.3.1 Betamethasone	eye drops, eye ointment	III-IV	E
9.3.2 Hydrocortisone acetate	eye drops, eye ointment	II-IV	E
9.3.3 Dexamethasone	eye drops 0.1%	III-IV	E
9.3.4 Prednisolone	eye drops 0.5%, 1%	III-IV	E
9.3.5 Tropicamide	eye drop 1%	III-IV	E
9.3.6 Sodium chromoglycate	eye drops 2%	III-IV	E
9.4 Miotics and anti-glaucoma drugs			
9.4.1 Pilocarpine	eye drops 2%, 4%	III-IV	E
9.5 Mydriatic drugs			
9.5.1 Atropine sulphate	eye drops 1%	III-IV	E

Drug	Presentation	Level	VEN
9.6 9.6.1	Systemic preparations Acetazolamide sodium	III-IV	V
9.7 9.7.1	Local anaesthetics Lignocaine hydrochloride	III-IV	E
9.8 9.8.1	Prostaglandin Analogue Latanoprost	IV	E
9.9 9.9.1	Sympathomimetics Dipivefrine	IV	E
9.10 9.10.1	Beta-blocker Timolol maleate	III-IV	E
9.11 9.11.1	Diuretics Cyclopentiazide	IV	E
9.12 9.12.1	Artificial tears Hypromellose	III-IV	E

Drug	Presentation	Level	VEN
9.13	Hyperosmotic agents		
9.13.1	Mannitol	III-IV	E
9.13.2	Urea	III-IV	E
	solution in water 20%		
	solution 30% in 10% invert sugar		
10	Blood		
10.1	Anti-coagulants		
10.1.1	Heparin	II-IV	V
10.1.2	Warfarin	II-IV	V
	injection 5000IU/ml,1ml		
	tablets 1mg,5mg		
10.2	Anti-haemorrhagic		
10.2.1	Amino caproic acid	III-IV	E
	Effervescent powder 3g		
10.2.2	Fibrinogen	III-IV	V
10.2.3	Human anti-haemophilic fraction(dried)		
10.2.4	Phytomenadione (vitamin K)	II-IV	V
	Oral suspension 10mg/5ml		
	dry or freeze dried powder		
	3 units/ml IV E		
	injection 10mg/ml,(1ml)		
10.3	Haemopoetics		
10.3.1	Ferrous sulphate	I-IV	V
10.3.2	Folic acid	I-IV	V
10.3.3	Hydroxocobalamin (vitamin B12)	II-IV	E
10.3.4	Iron dextran	II-IV	E
	tablets 50mg,200mg		
	tablets 5mg		
	injection 1mg/ml,1ml		
	injection 50mg iron in 2ml ampoule		

Drug	Presentation	Level	VEN
11	Nutrition		
11.1	Vitamins, minerals and dietary supplements		
11.1.1	Ascorbic acid (vitamin C)	tablets 50mg,200mg	I-IV
11.1.2	Calcium gluconate	injection 10%, (5ml, 10ml)	III-IV
11.1.3	Ergocalciferol (vitamin D)	tablets 50,000 IU, solution 3000 IU/ml	II-IV
11.1.4	Nicotinamide	tablets 50mg	II-IV
11.1.5	Pyridoxine (vitamin B6)	tablets 50mg	I-IV
11.1.6	Retinol (vitamin A)	capsules/tablets 200,000IU	I-IV
11.1.7	Riboflavin (vitamin B2)	tablets 5mg	III-IV
11.1.8	Thiamine (vitamin B1)	tablets 50mg	III-IV
11.2	Electrolyte and water replacement		
11.2.1	Oral administration		
11.2.1.1	Oral rehydration	salts sachet 27.9g powder to make 1 litre	I-IV
11.2.1.2	Potassium chloride	tablets slow-release 600mg	II-IV
11.2.2	Infusions		
11.2.2.1	Dextrose (glucose)	solution 5%, 20, 50%	I-IV
11.2.2.2	Potassium chloride	solution 11.2%	II-IV
11.2.2.3	Sodium bicarbonate	solution 4.2%	III-IV
11.2.2.4	Sodium chloride (normal saline)	solution 0.9%	I-IV
11.2.2.5	Sodium lactate and glucose (Darrow's)	solution, full and half strength	I-IV

Drug	Presentation	Level	VEN
11.2.2.6	Sodium lactate compound (Ringers lactate)		
11.2.2.7	Water for injection	I-IV	V
11.2.3	Plasma substitutes		
11.2.3.1	Dextran 40	I-IV	V
11.2.3.2	Gelatin (as polygeline)	III-IV	V
		III-IV	E
12	Drugs acting on the skin		
12.1	Topical corticosteroids		
12.1.1	Betamethasone	III-IV	E
12.1.2	Hydrocortisone	I-IV	E
	cream/ointment 0.1%		
	cream/ointment 1%		
12.2	Soothing preparations		
12.2.1	Aqueous	I-IV	E
12.2.2	Calamine	I-IV	E
12.2.3	Zinc oxide	I-IV	E
	cream		
12.3	Antifungal preparations		
12.3.1	Miconazole nitrate	III-IV	E
12.3.2	Ketokonazole	III-IV	E
12.3.3	Griseofulvin	II-IV	E
	cream 2%		
	tablets 200mg		
	tablets 500mg		

Drug	Presentation	Level	VEN
12.4 12.4.1	Anti-bacterial preparations Tetracycline	I-IV	E
12.5 12.5.1 12.5.2	Antiseptic preparations Gentian violet Potassium permanganate	I-IV I-IV	E E
12.6 12.6.1 12.6.2 12.6.3	Anti-parasitic preparations Benzyl benzoate Malathion Permethrin	I-IV I-IV I-IV	E E E
12.7 12.7.1 12.7.2 12.7.3 12.7.4	Keratoplastics and keratolytics Coal tar Dithranol Podophylline Salicylic acid ointment 5%, 10%, 20% I-IV E	I-IV III-IV II-IV	E E E
12.8 12.8.1 12.8.2	Acne preparations Salicylic acid Benzyl peroxide	I-IV I-IV	E E

Drug	Presentation	Level	VEN
12.9 Surgical disinfectants			
12.9.1 Cetrimide	solution 1%	I-IV	E
12.9.2 Chlorhexidine + cetrimide	concentrated solution (1.5%/15%)	I-IV	E
12.9.3 Chlorhexidine gluconate concentrated solution 5% I-IV V			
12.9.4 Chloroxylenol	concentrated solution 4.8%	I-IV	E
12.9.5 Povidone iodine	solution 10%	I-IV	V
12.9.6 Sodium hypochlorite	0.1% available chlorine	I-IV	V
12.10. Antivirus 12.10.1 Acyclovir	cream 5% Tablets 50mg	II-IV II-IV	E E
13 Drugs used in the treatment of diseases of the ear, nose and throat			
13.1 Drugs acting on the ear			
13.1.1 Betamethasone	eye/ear drops	III-IV	E
13.1.2 Gentamicin + hydrocortisone	ear drops	II-IV	E
13.1.3 Sodium bicarbonate	ear drops	III-IV	E
13.1.4 Vegetable oil	ear drops	I-IV	E
13.2 Drugs acting on the nose: topical nasal decongestants			
13.2.1 Normal saline	nasal drops	II-IV	E

Drug	Presentation	Level	VEN
13.3	Drugs acting on the throat		
13.3.1	Chlorhexidine	I-IV E	
13.3.2	Ketaconazole	I-IV E	
13.3.3	Miconazole	I-IV E	
13.3.4	Nystatin	I-IV E	
14	Drugs used in the treatment of musco-skeletal disorder		
14.1	Drugs used in rheumatic diseases		
14.1.1	Acetyl salicylic acid	I-IV V	
14.1.2	Ibuprofen	I-IV E	
14.2	Drugs used in gout		
14.2.1	Allopurinol	II-IV E	
14.2.2.	Colchicine	IV E	
15	Immunological products		
15.1	Antisera, immunoglobulins and anti-toxins		
15.1.1	Anti-D immunoglobulin	II-IV V	
15.1.2	Diphtheria antitoxin	II-IV V	
15.1.3.	Mamba anti-sera	II-IV V	

Drug	Presentation	Level	VEN
15.1.4	Polyvalent snake anti-sera		
15.1.5	Tetanus antitoxin	II-IV I-IV	V V
15.2	Vaccines		
15.2.1	BCG	I-IV	V
15.2.3	Diphtheria-pertussis tetanus, haemophilia influenza B and hepatitis B (Pentavalent.)	I-IV I-IV	V V
15.2.4	Hepatitis B	I-IV	V
15.2.5	Measles	II-IV	E
15.2.6	Poliomyelitis	I-IV	V
15.2.7	Rabies	I-IV	V
15.2.8	Tetanus toxoid (TT)	I-IV	V
15.2.9	Typhoid	III-IV	E
15.2.10	Yellow fever	III-IV	E
16	Antidotes and other substances used in poisoning		
16.1	General treatment of poisoning		
16.1.1	Activated charcoal	I-IV	V
16.1.2	Ipecacuanha	I-IV	V
	powder		
	syrup 0.14% ipecacuanha alkaloids		

Drug	Presentation	Level	VEN
16.2	Specific treatment of poisoning		
16.2.1	Atropine	III-IV	V
16.2.2	Naloxone	III-IV	V
16.2.3	Pralidoxime mesylate	III-IV	V
16..2.3.	N-acetylcysteine	IV	E

Essential Laboratory Supplies List

TEST	REAGENT	UNIT PACK
CD4 estimation	BD FACSCalibur	
	BD Tritest CD3/CD4/CD45 with TruCount Tubes	Kit of 50 tests
	BD Calibrate 3 Beads	Kit of 25 tests
	BD FACS Lysing Solution	100 ml
	True Count Control	Kit of 30 test
	BD FACSCount	
	BD FACS Count CD4/CD8 Reagents	Kit of 50 tests
	BD FACS Count Controls	Kit of 25 tests
	BD FACS Rinse Solution	5 L
	BD FACS Clean Solution	5 L
	BD FACS Flow Sheath Fluid	20 L
	BD FACSCount Thermal Paper	Roll
	Guava	
	Guava Auto CD4/CD4 % reagent kit	100 tests
	Guava easy CD4 microcentrifuge tube	500 x 1.5 ml
	Guava check kit	50 tests
	Guava cleaning fluid	100 ml

Full Blood count	
Sysmex Poch 100i	
Eight Check-H	1.5 ml
Eight Check-N	1.5 ml
Eight Check-L	1.5 mL
Poch pack 65	Pack of 2.7L pack D and 50ml pack L
Sysmex Clean	50ml
Sysmex Thermal Paper	Roll
ABX Micros 60/80	
ABX Minotrol 16 Twin Pack Low	2 x 2.5 ML
ABX Minotrol 16 Twin Pack Normal	2 x 2.5 ML
ABX Minotrol 16 Twin Pack High	2 x 2.5 ML
ABX Miniclean	1 L
ABX Minilyse	1 L
ABX Minidil	20 L
ABX Pentra 60C+/80XL	
ABX Diffrol Twin Pack Low	2 x 3ML
ABX Diffrol Twin Pack Normal	2 x 3ML
ABX Diffrol Twin Pack High	2 x 3ML
ABX Lysebio	400 ml
ABX Basolyse	1 L
ABX Cleaner	1 L

Full Blood count	
ABX Diluent	20 L
ABX Eosinofix	1 L
Sysmex XS 800i/XS1800i/XT 2000i	
Sysmex control e-Check Low	8 x 4.5ML
eCheck Sysmex control e-Check Normal	8 x 4.5ML
Sysmex control e-Check High	8 x 4.5ML
Sysmex Cell pack	20L
Sysmex Stromatolyser 4DL	5L
Sysmex Stromatolyser 4DS	3 x 42 ML
Sysmex Sulfolyser	5L
Sysmex Cell clean	50ML
Sysmex Retsearch Diluent/Dye	1L
Sysmex Stromatolyser FB	5L

Clotting profile	
Coagulation	
Activated Partial thromboplastin time (APTT) test kit	each
Prothrombin Time (PT) test kit	each
Thrombin Time (TT) test	each
CaCl 0.025mmol/L	10 ml
Factor VIII deficient plasma	vial
Factor IX deficient plasma	vial
Fibrin degradation products	kit

Peripheral smear	HAEMATEK slide stainer	pack
	Blood film stain pack	pack
Special Stains	Bone marrow stain pack	pack
	Cytochemistry	
	Glucose 6 phosphate dehydrogenase (G6PD)	kit
	Sudan black B stain	kit
	Myeloperoxidase	kit
	Antinuclear antibody test by indirect method	kit

Clotting profile	Coagulation	
	Activated Partial thromboplastin time (APTT) test kit	each
	Prothrombin Time (PT) test kit	each
	Thrombin Time (TT) test	each
	CaCl 0.025mmol/L	10 ml
	Factor VIII deficient plasma	vial
	Factor IX deficient plasma	vial
	Fibrin degradation products	kit
	HAEMATEK slide stainer	
	Blood film stain pack	pack
Bone marrow stain pack	pack	

Peripheral smear

Special Stains	Cytochemistry	
	Glucose 6 phosphate dehydrogenase (G6PD)	kit
	Sudan black B stain	kit
	Myeloperoxidase	kit
	Antinuclear antibody test by indirect method	kit
Clinical chemistry	Cobas Integra 400	
	Cobas ALT/ GPT	500 test cassette
	Cobas AST/ GOT	500 test cassette
	Cobas Creatinine	700 test cassette
	Cobas Urea	500 test cassette
	Cobas Cholesterol	400 test cassette
	Cobas Glucose	800 test cassette
	Cobas Triglycerides	250 test cassette
	Cobas Bilirubin Total	500 test cassette
	Cobas Bilirubin Direct	500 test cassette
	Cobas Total Protein	400 test cassette
	Cobas Albumin	300 test cassette
	Cobas Cfas	36 ml
	Cobas Precinorm U	4 X 5 ml
	Cobas Precipath U	4 X 5 ml
	Cobas Deproteinizer	23 ml

Clinical chemistry	Cobas Amylase	300 test cassette
	Cobas Lipase	200 test cassette
	Cobas Lactate	300 test cassette
	Cobas Cuvettes	Pack of 2000 cuvettes
	Cobas Sample cups (white)	Pack of 1000 cups
	Cobas Control cups (brown)	Pack of 1000 cups
	Cobas Waste container	Each
	Cobas Cleaner	1 L
	Cobas c 111	
	Cobas ALT/GPT	4 x 100 test
	Cobas AST/GOT	4 x 100 test
	Cobas Creatinine	2 x 200 test
	Cobas ALP	4 x 50 test
	Cobas Urea	4 x 100 test
	Cobas Cholesterol	4 x 100 test
	Cobas Glucose	4 x 100 test
	Cobas Triglycerides	4 x 50 test
	Cobas Bilirubin Total	4 x 100 test
	Cobas Bilirubin Direct	4 x 50 test
	Cobas Total Protein	4 x 100 test
	Cobas Albumin	4 x 100 test

Clinical chemistry	Cobas Bicarbonate	4 x 100 test
	Cobas HbA1C	400 test
	Cobas LDH	4 X 50 tests
	Cobas Uric	4 x 100 tests
	Cobas Amylase	4 x 100 tests
	Cobas Lipase	4 x 50 tests
	Cobas Lactate	4 x 50 tests
	Cobas Cuvettes	Pack of 2000 cuvettes
	Cobas Sample cups (white)	Pack of 1000 cups
	Cobas Control cups (brown)	Pack of 1000 cups
	Cobas Waste container	Each
	Cobas Cleaner	1 L
	Humalyzer 2000	
	Human ALT(GPT) Liquicolor UV	10 X 10 ml
	Human AST(GOT) Liquicolor UV	10 X 10 ml
	Human Creatinine Liquicolor	200 ml
	Human Glucose Liquicolor	1 L
	Human Urea Liquicolor	2 X 100 ml
	Human Bilirubin Direct	100 ml
	Human Bilirubin Total	100 ml
	Humatrol Normal (N19)	6 X 5 ml

Clinical chemistry	Humatrol Pathological (P17)	6 X 5 ml
	Humalyzer 2000 Thermal Printing Paper	Roll
	Humalyzer 2000 Cuvettes	Pack of 1000
	Humalyte	
	Na	ISE
	Cl	ISE
	K	ISE
	Olympus AU400	
	Olympus ALT	4x12, 4x6 ml
	Olympus AST	4x6, 4x4 ml
	Olympus Cholesterol	4 X 22.5 ml
	Olympus Cholesterol HDL	4 X 22.5 ml
	Olympus Bilirubin Direct	4 X 25 ml / 4 X 25 ml
	Olympus Bilirubin Total	2 X 100 ml
	Olympus Electrode Na+	Each
	Olympus Electrode K+	Each
	Olympus Electrode Cl	Each
	Olympus ISE Buffer	1 L
	Olympus Mid ISE Standard	2 L
	Olympus Electrode Cleaning Solution	2 X 50 ml
	Olympus Control Serum 1	20 X 5 ml

Clinical chemistry	
Olympus Control Serum 2	20 X 5 ml
Olympus Creatinine	4 X 60 ml
Olympus Glucose	4x25 ml/ 4x12.5 ml
Olympus System Calibrator	20 X 5 ml
Olympus Triglyceride	4x50 ml/ 4x12.5 ml
Olympus Urea	2x4x25 ml
Olympus Wash Solution	5 L
Olympus Total Protein	500 test cassette
Olympus Albumin	500 test cassette
Olympus Amylase	?
Olympus Lipase	?
Olympus Lactate	?
Pentra 200/400	
Alanine Amino transferase (ALT/GPT)	1*70ml
AST (Cobas III)	1*90ml
Creatinine	1*90ml
Urea	1*90ml
Cholesterol	1*90ml
Glucose	1*90ml
Total Protein	1*90ml
Bilirubin Total	1*90ml

Clinical chemistry	Cuvette Segements Rack	1*90ml
	Control Pathological	1*90ml
	Control Normal	1*90ml
	Amylase	1*90ml
	Lipase	1*90ml
	Lactate	1*90ml
	Deproteinizer	1*30ml
	Standard 1	100ml
	Standard 2	100ml
	Reference	100ml

HIV Viral load and qualitative tests	Cobas Taqman 48 analyser	
	CAP/CTM HIV - version 2.0	
	COBAS TaqMan K Tubes	
	CAP - G Wash Buffer	
	CAP SPU Flapless	
	CAP S Tubes (input)	
	CAP K tips	
	DNA PCR - Pediatric	
	DNA, PCR AMPLICOR HIV-/ Monitor Test	Kit of 96 tests
	PCR Consumables Kits, for 960 Tests	Kit for 960 tests
	DBS Bundles for 50 tests	Bundles for 50 tests

Bacteriology	Acetone	L
	Ammonium Oxalate	g
	Bacitracin 0.04units	250 discs
	Basic Fuchsin Powder	g
	Blood Culture Media Adult	Bottle
	Blood Culture Media Pediatric	Bottle
	Blood Agar Base	g
	MacConkey agar with crystal violet	
	Campylobacter Karmali Agar	g
	Bacitracin 0.04units	250 discs
	Basic Fuchsin Powder	g
	Cary Blair	g
	Simmon Citrate Agar	g
	Crystal Violet Powder	g
	Cystine Lactose Electrolytes Deficient Agar (CLED medium)	g
	Mueller Hinton Agar	g
	N,N,N,N Tetramethyl-P-Phenylene Diamine (Oxidase Reagent)	g
	Orange G 6 Solution	L

Glucose test	Accucheck active Glucometer Strips	Strips
Hepatitis tests	Hepatitis B Test Kit	Strips
	Hepatitis C Test kit	strips

Histopathology	Ethanol Absolute (99.9%)	L
	Methanol Absolute	L
	Formalin	L
	Hydrochloric Acid	L
General laboratory use	Kovacs Reagent	ml
Syphilis	RPR (syphilis reagent kit)	Tests
Meningitis investigation	Cryptococcus antigen Test Kit	Tests
Pregnancy	Pregnancy Test Kit (Latex)	Tests
Stool Microscopy culture and identification	Salmonella Typhi Hd antisera	2ml
	Salmonella Typhi Vi antisera	2ml
	Salmonella Typhi O-9 antisera	2ml
	Salmonella Paratyphi A antisera	5 ml
	Salmonella Paratyphi B antisera	5 ml
	Salmonella Paratyphi C antisera	5 ml
	Salmonella Polyvalent H Phase 1 and 2 Antisera	5 ml
	Salmonella Polyvalent O groups A - S Antisera	5 ml
	Selenite F Broth	g
	Shigella boydii types 1 - 6	5 ml
	Shigella boydii types 12 - 15	

Stool Microscopy culture and identification	Shigella boydii types 7 - 11	
	Shigella dysenteriae type 1 -10 antisera	5 ml
	Shigella dysenteriae type 1 antisera	
	Shigella flexneri types 1-6, x,y Antisera	5 ml
	Shigella sonnei Phase 1 and 2 antisera	5 ml
General laboratory use	Sodium Chloride (Analar grade)	g
Bacteriology (MCS)	Sulphide Indole Motility (SIM) medium	g
	Triple Sugar Iron Agar (TSI)	g
	Urea Agar	g
	Urea (analar grade)	g
	Urine Multistix	Pack of 100 Strips
Bacteriology (MCS)	Deoxycholate citrate agar (DCA) agar	g
	Ampicillin 10 µg	250 discs
	Cefotaxime 30µg	250 discs
	Chloramphenicol 30 µg	250 discs
	Ciprofloxacin 5 µg	250 discs
	Cotrimoxazole 25 µg	250 discs
	Erythromycin 15 µg	250 discs
	Gentamicin 10 µg	250 discs
	Nalidixic Acid 30 µg	250 discs

Bacteriology (MCS)	Nitrofurantoin 300 µg	250 discs
	Penicillin 10 units	250 discs
	Oxacillin 1 µg	250 discs
	Nofloxacin 10 µg	250 discs
	Chloroform	L
Histopathology	Haematoxylin (Harris Alum Haematoxylin)	ml
	DPX Mountant	ml
	EA 50	ml
	Acetic acid	

Malaria	Giemsa powder	g
	Glycerol	5L
	Aesculine-bile agar	
	Peptone water	
	Lysine Iron agar	
	Sabourauds agar	
	Thiosulphate citrate bile-salt sucrose (TCBS) medium	
	Tryptone soy broth	
	0.5 McFarland standard (Latex)	
	Amyl alcohol	
	Chlamydia test kit	

Malaria	Coagulase test (Commercially prepared kit e.g. StaphAurex kit or equivalent) diSodium hydrogen phosphate (Na ₂ HPO ₄) Anhydrous Eosin powder
General laboratoru use	Hydrogen peroxide Iodine Methylene blue Nigrosin p-dimethyaminobenzaldehyde powder Phenol crystals Potassium hydroxide Potassium iodide Potassium permanganet Sodium biselenite powder Sodium hydroxide crystals Sodium dihydrogen phosphate (NaH ₂ PO ₄ .2H ₂ O) hydrated Streptococcus Lancefield typing kit (e.g. Strepdex kit or equivalent) Sulphuric acid
Bacteriology (MCS)	
General Laboratory use	
Special stains	Toluidine blue O stain

Toxoplasmosis	Toxoplasma antigen detection test
General	Xylene
	Formic Acid
Bacteriology (MCS)	Cefoxitin 30 µg (Disc)
	Cefazidime 30 µg (Disc)
	Ceftriazone 30 µg (Disc)
	Colistin 10 µg (Disc)
	Polymyxin B 300 Units (Disc)
	E-test strips
	Cefotaxime (E-test)
	Penicillin (E-test)
	Diagnostic discs
	Colistin 10 µg (Disc)
	Furazolidone 100 µg (Disc)
	Indole test discs
	Nitrocefin discs
	Novobiocin 5 µg (Disc)
	Optochin disc
	Polymyxin B 300 units (Disc)
	Pyrolydonyl arylamidase test (PYR) discs
	V factor (Disc)

Bacteriology (MCS)	X factor (Disc)	
	XV factor (Disc)	
	Antisera	
	Vibrio cholerae O1 polyvalent antisera	
	Vibrio cholerae O139 antisera	
	Vibrio cholerae Inaba antisera	
	Vibrio cholerae Ogawa antisera	
	E.coli O 157:H7 antisera	
	Clavulanic Acid Powder	
	Streptococcus pyogenes group A Rapid test strips	
Bacteriology (MCS)	Streptococcus agalactiae group B Latex agglutination antigen detection kit	
	Gonorrhoeae Rapid test strips	
	Thyroid Hormones	
	TSH	
	T3	
	T4	
	Tumor Markers	
	CEA	
	PSA	
	AFP	
Endocrinology		
Cancer		

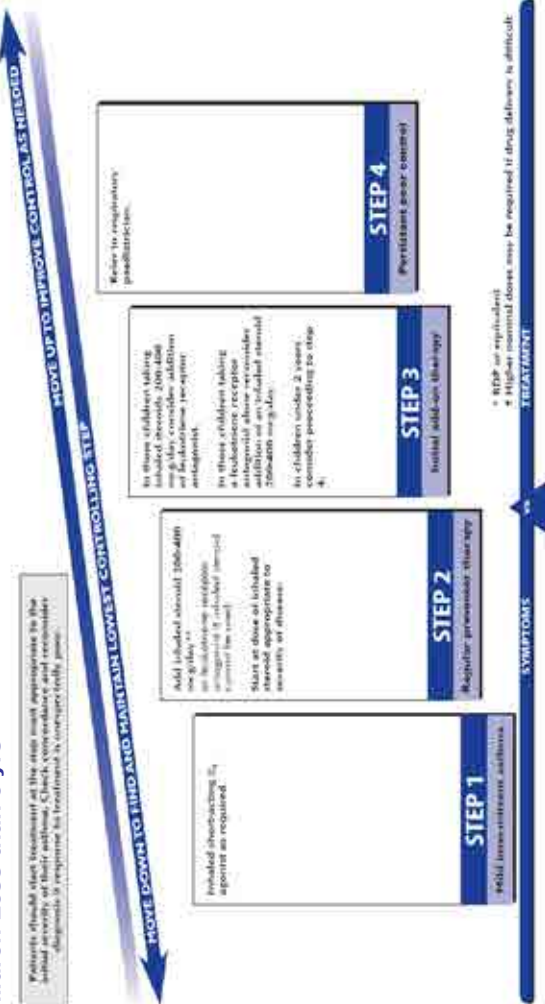
Heart/cardiac	Cardic Markers	
	CK MB	
	CKNAC	
	Troponin T	
	Troponin I	
General laboratory use	General Consumables	
	Applicator Sticks, Orange	Pack of 1000 sticks
	Cotton Wool	g
	Filter Paper, Medium	Pack of 100 pieces
	Filter Paper, Large	Pack of 100 pieces
	Examination Gloves, Medium	Pack of 100 gloves
	Examination Gloves, Large	Pack of 100 gloves
	Sodium Hypochlorite (Jik)	Bottle (750mls)
	Lancets	Pack of 100
	Kimwipes	Pack of 140
	Lens Tissue	Book of 25 pieces
	Microcapillary Tubes, Non-Heparinized	Pack of 100 tubes
	Microcapillary Tubes, Heparinized	Pack of 100 tubes
Microscope Cover Slips 22 X 22mm	Pack of 100 slips	
Microscope Cover Slips 22 X 40mm	Pack of 10 boxes	
Microscope Slides	Pack of 50	

General laboratory use	CD4 Stabilization tubes	pack of 100
	Microtube, 2 ml Screw Cap	Pack of 500
	Plastic transfer Pasteur Pipettes, 3 ml	Pack of 500
	Petri Dish, Plastic	Box of 500
	Pipette Tips, Blue	Pack of 500
	Pipette Tips, Yellow	Pack of 1000
	Spirit, Methylated	2.5 L
	Sputum Containers	Pack of 1000
	Sterile Swab	Pack of 1000
	Swabs (sterile cotton swabs with activated charcoal in Amies transport medium)	Pack of 1000
	Stool Containers, 28 ml, Screw Cap, with Scoop	Pack of 1000
	Universal Container, 20 ml Screw Cap	Pack of 200
	Vacutainer, 4ml, Plain Red Top	Pack of 100
Vacutainer Needle, 21G X 1	Pack of 100	
Vacutainer, 4 ml, EDTA	Pack of 100	
Vacutainer, Flouride Oxalate	Pack of 100	
Vacutainer, L.Heparin	Pack of 100	
Vacutainer Holders	Pack of 250	
Blood collection		

General	Disposable Biohazard Bags	Pack of 100
Laboratory use	Autoclavable Bags	Pack of 100
Histopathology	Histopathology Cassettes	Pack of 100
	Histopathology Paraffin wax	25Kg
Haemoglobin	Haemacue cuvettes	Pack of 100

Children Less than 5 yrs

Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check concordance and reassess diagnosis if response to treatment is unexpected (fully panel).



Initial Management of Severe Malaria Antimalarial Treatment

For severe (complicated) malaria, Quinine is recommended, however Intravenous Artesunate could be used as an option to Quinine in treatment of severe malaria where available.

Give Artesunate intravenously. If intravenous administration is not possible, Artesunate may be given intramuscularly into the anterior thigh.

Children: Artesunate 2.4 mg/kg BW IV or IM given on admission (time = 0), then at 12 h and 24 h, then once a day is the recommended treatment.

Adults: Artesunate 2.4 mg/kg BW IV or IM given on admission (time = 0), then at 12 h and 24 h, then once a day is the recommended treatment.

Give 2.4 mg/kg body weight IV or IM stat, repeat after 12 hours and 24 hours, then once daily afterward. However once patient regains consciousness and can take orally, discontinue parenteral therapy and commence full course of recommended ACT, such as, Artemether plus Lumefantrine

Side Effects: None known.

INDEX

- 2 NRTI, 149
- 3TC, 141, 142, 155
- Abdominal pain, 1, 31, 22, 24, 114, 223
- Abortion, 196
- Acetazolamide, 307
- Acetylsalicylic Acid, 228, 230, 231
- Activated charcoal, 403
- Acute Angle Closure Glaucoma, 306
- Acute Pyelonephritis, 111
- Acyclovir, 98
- Acyclovir eye ointment, 311
- Albendazole, 22
- Alprazolam, 34
- Aluminium hydroxide, 3
- Amenorrhoea, 198
- Amiloride, 223
- Aminophylline, 216
- Amiodarone, 242
- Amoxicillin, 4, 441, 442
- AMOXYCILLIN, 112
- Amphotericin, 79
- Amphotericin B, 79
- Ampicillin, 78, 79, 441
- Anaemia, 1, 2, 28, 248, 255, 259
- Angina Pectoris, 235
- Animal bites, 53
- Antepartum Haemorrhage (APH), 224
- Anthrax, 81
- anti D, 225
- Antibiotics, 17, 82,
- Anti-tetanus serum, 386
- Anxiety Disorders, 26, 27
- Aqueous cream, 361, 362
- Artemether, 59, 60
- Artemisin, 68
- Ascorbic acid, 308,
- Aspirin, 234, 236, 242,
- ASTHMA, 213
- Atenolol, 236
- athletes foot, 363
- Atropin, 305
- Atropine, 308
- Azithromycin, 316, 442
- AZT, 149, 150, 156
- Bacterial infections, 304
- Bacterial Vaginosis, 91
- Bebendazole, 352
- Benzathine Penicillin, 94, 98, 240
- Benzodiazepine, 30, 36
- Benzoyl peroxide gel, 358
- Benzyl Benzoate, 370
- benzyl penicillin, 78
- Benzyl penicillin, 205, 210
- Bethamethasone, 305
- Bethamethasone, 305
- Biguanides, 170
- Bismuth chelate, 4
- blood pressure, 114
- Bubonic Plague, 113
- Bumps, 317
- Calamine lotion, 367
- calcium gluconate, 191
- Cancer, 245
- Captopril, 227
- Carbamazepine, 40, 368
- Cardiac Arrhythmias, 306
- Cardiac diseases, 219
- Cardiogenic shock, 233
- Cefotaxime, 195
- Ceftriaxone, 205, 442
- Chancroid, 94, 95
- Chelates calcium, 309
- Chemical Injury to the Eye, 337
- Chickenpox, 367
- Chloramphenicol, 210
- Chloramphenicol, 78, 79
- Chloramphenicol injection, 78
- Chloramphenicol, 305
- Chlorhexidene gluconate, 376
- Chlorpheniramine, 367
- Chlorpropamide, 176
- Cholera, 13
- Chronic rheumatic heart disease, 239
- Cimetidine, 3
- Ciprofloxacin, 11
- Ciprofloxacin, 95, 96, 211
- Clarithromycin, 4
- Clindamycin, 62, 442
- Clomipramine, 32
- Codeine phosphate, 8, 9
- Common Cold, 202
- Congenital Glaucoma, 341
- Congestive Heart Failure, 205
- Conjunctivitis, 11, 57, 58, 59
- Convulsions, 10, 58, 59,
- Corneal Ulcers, 309
- Coronary angioplasty, 236
- Cotrimoxazole, 208
- Co-trimoxazole, 9, 410
- Cough, 113
- Cough mixtures, 203
- Cutaneous Candidiasis, 366
- Cytomegalovirus Retinitis, 323
- d4T, 149

Dexamethasene, 212, 403
 Dextrose, 175
 Dextrose solution, 215
 Diabetes Mellitus, 194
 Diazepam, 29, 52, 403
 Didanosine, 124, 160
 Diethylcarbamazine, 20
 Digoxin, 195
 Dihydroxypropoxymethyl guanine, 324
 Dilated, 93
 Dipivefrine, 341
 diploid vaccine, 54, 55
 Dopamine, 229
 DOTs, 68
 Doxycycline, 17, 98
 Doxycyline, 94, 96
 Dysentery, 10, 11
 Dysmenorrhoea, 197
 Dysthroid Eye disease, 332
 Ear conditions, 371
 Eclampsia, 188
 Econazole, 310
 Eczema, 360
 Emphysema, 217
 emtricitabine, Enalapril, 228
 Epiglottitis, 380
 Epilepsy, 37, 51
 Epinephrine,
 Erythromycin, 17, 94, 96, 102, 105
 ERYTHROMYCIN, 88
 Ethambutol, 70
 Eye Diseases, 427, 438
 EYE DISEASES, 304
 Ferrous Sulphate, 347
 Fever, 10, 119
 Fluconazole, 91
 Flucytosine, 79
 fluorouracil cream, 102
 Fluoxetine, 32, 37
 Forscarnet IV, 324
 Frusemide, 195, 237
 Fungal infections, 362
 Fungal Ulcers, 310
 Furosemide, 416
 Gancidovir IV, 324
 gastric lavage, 278
 Genital Growth, 100
 Genital Ulcer Disease, 102
 Gentamicin, 87, 441, 211
 Gentian violet, 375
 Giardiasis, 24
 giemsa stain, 113
 Gingivitis, 373
 Glibenclamide, 170
 Glucose, 51
 Glycerol trinitrate, 236
 Glyceryl trinitrate, 237
 Gonococcal urethritis, 84, 85
 Griseofulvin, 364
 Helminthes Infestation, 18
 Heparin, 234
 Hepatitis, 102
 Hepatitis B vaccine, 103
 Herpes Genitalis, 92, 97
 Herpes simplex, 321, 368
 Herpes Zoster, 322, 367, 368
 Herpes Zoster Ophthalmicus, 321
 HIV, 104, 116
 Human Immunodeficiency Virus, 116
 Humidified oxygen, 216
 Hydralazine, 228
 Hydrocele, 399
 Hydrochlorothiazide, 223
 Hydrocortisone, 216, 308
 Hyperglycaemic/Ketoacidosis Coma/
 Precoma, 172, 175
 Hypertension, 220
 Hypertensive Retinopathy, 329, 330
 Hypertrophic, 230
 Hypovolaemic shock, 187
 Hypromellose, 333
 Hypromellose, 309
 Impetigo, 360
 Injuries, 385
 Ivermectin, 20
 Ipecacuanha syrup, 403
 Iritis, 404
 Iron Dextran, 347
 Isoniazid, 70
 isophane insulin, 168
 Isosorbide dinitrate, 236
 IV Glucagon, 176
 IV Ranitidine, 234
 Ketoconazole, 364
 Kwashiorkor, 384
 Labetalol, 225
 Labour, 195
 Lamivudine, 124
 Laryngotracheobronchitis, 203
 Lignocaine, 308
 Lithium, 40, 41
 Loperamide, 8, 9
 Loratidine, 382
 Lorazepam, 34, 36, 37, 44
 Losartan potassium, 228
 Low Vision, 236
 Lumefantrine, 60
 Lumps, 317

Lymphogranuloma Venereum, 92
 Magnesium hydroxide, 350
 magnesium hydroxide mixture, 350
 Magnesium sulfate, 351
 magnesium sulphate, 402
 Magnesium sulphate mixture, 191, 402
 Magnesium trisilicate compound, 3
 Magnesium trisilicate suspension, 3
 Malaria, 55, 59
 Malathion, 369
 Malignant, 428
 Malnutrition, 348
 Mannitol, 403
 Marasmic-kwashiorkor, 349
 Marasmus, 348
 Mebendazole, 21, 22
 Meningitis, 76, 77
 Meno-metrorrhagia,
 Menstrual Disorders, 197
 Metformin, 170
 Metronidazole, 4, 9, 12
 Miconazole, 364
 Miconazole oral gel, 366, 375
 Moluscum Contagiosum, 321
 Mood Disorders, 38, 41, 42
 Morphine, 234
 Mouth ulcers, 376, 371
 Multivitamin syrup, 351
 Myocardial Infarction, 232
 Myoclonic seizures, 51
 N-acetylcysteine, 405
 Nalidixic Acid, 11, 208
 Nasal diseases, 371, 381
 Natamycin, 310
 Nebulised salbutamol, 409
 Nematodes - Intestinal, 18, 20
 NFV, 155
 Nicotinamide, 354
 Nicotinic Acid, 354
 Nifedipine, 190, 236
 Nifedipine retard, 223
 Nitazoxznide, 9
 Nitrofurantoin, 111
 Nitroglycerine, 234
 NNRTI, 149
 Non-gonococcal urethritis, 84
 Normal Labour, 179
 Normal saline, 15
 Nystatin oral suspension, 375
 Obstetric and Gynaecological, 178
 OBSTETRIC AND GYNAECOLOGICAL, 178
 Ocular Emergencies, 337
 Ocular motor palsies, 330
 Oedema, 335
 Oligomenorrhoea, 199
 Omeprazole, 4
 ophthalmic ointment, 88
 Oral candidiasis, 371
 Oral diseases, 371
 ORS, 14
 otitis media, 383, 384
 Oxygen, 195
 Oxytetracycline, 323
 Oxytocin, 195
 Paracetamol, 386, 405
 Parasitic infestations, 369
 Pediculosis (lice), 369
 Pelvic Inflammatory Disease, 88, 89
 Penicillin, 82, 94
 Periodontitis, 373, 374
 Peri-tonsillar abscess, 377
 Permethrin, 370
 Permethrin cream, 379
 Pethidine, 370
 Petit mal attacks, 51
 Pharyngeal diseases, 377
 Phenoxymethyl penicillin, 376
 Pilocarpine, 341
 Pinguicula, 318, 320
 Plague, 113
 Pneumonia, 204
 Podophylline, 102
 Polymenorrhoea, 200
 Post menopausal bleeding, 200
 Post Partum Hæmorrhage (PPH), 185
 Potassium, 351
 Potassium chloride, 215
 Povidone Iodine, 88
 Praziquantel, 23, 24
 Prednisolone, 247
 Prednisolone, 255
 Primary Pneumonic Plague, 114
 procaine penicillin, 82, 94
 Procaine Penicillin, 94
 Propranolol, 231
 Psychiatric Disorders, 26
 Psychotic Disorders, 43
 Pterygium, 319
 Pulmonary Oedema, 236, 239
 Pyrazinamide, 70
 Pyrimethamine, 64
 Quinine, 61, 62
 Rabies, 53
 Ranitidine, 3
 Reflux oesophagitis, 2
 Respiratory Tract Infections, 202
 Restrictive cardiomyopathy, 231
 Retinal artery Occlusions, 341

Retinal Vein Occlusion, 341
 Retinoblastoma, 228
 Rheumatic Fever, 237
 RHZE, 70, 71
 Riboflavin, 70
 Rifampicin, 80, 82
 Running nose/nasocongestion, 202
 Salbutamol, 214
 SALBUTAMOL, 214
 Salbutamol inhaler, 214
 Scabies, 370
 Schistosomiasis (Bilharzia), 23
 Sertraline, 30
 Serum, 408, 409
 Sexually Transmitted Infections, 83
 silver nitrate, 88
 Silver nitrate, 101
 Silver nitrate crystals, 119
 silver sulphadiazine cream, 393
 Skin Conditions, 385
 SKIN CONDITIONS, 385
 Skin Infections, 367
 Sneezing, 182, 382
 Sodium ascerbate, 308
 Sodium bicarbonate, 174
 sodium chloride, 173, 401
 Sodium chromoglycate, 315
 Sodium EDTA, 309
 Sodium valproate, 40
 Soluble insulin, 173
 Spectinomycin, 86, 88, 91
 Spironolactone, 229
 Statins, 234
 Strabismus (Squint), 326
 Strangulated hernia, 106
 Streptokinase, 234
 Streptomycin, 70, 71
 Sty, 317
 Sulfadoxine, 62
 Sulphadoxine, 6
 Sulphonylureas, 170
 Syphilis, 92
 Tapeworms, 22
 Tarsal Cyst (Chalazion), 318
 Tenofvir, 124
 Testicular torsion, 397
 Testicular Tumours, 106
 tetanus toxoid, 53, 338, 393
 Tetanus toxoid, 386
 Tetracycline, 63, 82, 88
 Tetracycline ophthalmic ointment, 88
 Tetracycline ophthalmic ointment 1%, 101
 The Red Eye, 304
 Timolol, 339
 Tinea corporis, 363
 Tinidazole, 12
 Tonsillitis and pharyngitis, 377
 Trachoma, 315
 Traumatic Hyphaema, 337, 338
 Trematodes Or Flukes, 23
 Trichloroacetic acid, 101
 Trichomoniasis, 90, 91
 Trimethoprim, 122
 Triple Combination ART, 152
 Tripotassium dicitratobisthmutate, 4
 Tropicamide, 339
 Tuberculosis, 65, 67, 68, 69
 Unconscious Obstetric Patient, 187
 Upper airway obstruction, 211
 Urea, 51
 Urethral Discharge, 84
 Urinary Tract Infection, 88, 92
 Vaginal Candidiasis, 91
 Varicocele, 99, 109
 vaseline gauze, 394
 Viral infections, 358
 Viral ulcers, 310
 Virimmune, 163
 Vit. A, 64, 353
 Vitamin A, 64, 353
 Vitamin B complex, 353
 Vitamin B12, 347
 Vitamin C, 354
 vitamin D, 413
 Vitamin Deficiencies, 353
 Vitamin K, 407
 Vulvovaginitis, 88
 Zinc oxide cream, 361