

# HOSPITAL FORMULARY

4<sup>th</sup> Edition 2081



Government of Nepal

**BHARATPUR HOSPITAL**

Drugs & Therapeutics Committee (DTC)



It's my pleasure to have **4th edition** of **Bharatpur Hospital formulary**. This formulary consists of detail information on the drugs and related items available in Bharatpur Hospital.

On behalf of the Bharatpur Hospital development committee, I would like to thank entire publication team for publishing new version of formulary.

The current Edition of formulary is a collaborative effort from our clinical and pharmacy teams. Their expertise has been crucial in reviewing and updating the formulary to incorporate the latest evidence, treatment protocols, and guidelines.

I would like to thank Hospital administration, Bharatpur Hospital Pharmacy team, Drug & Therapeutics committee and those involved in publishing this compendium.

**Mr. Raju Poudel**  
**Chairman**  
**Bharatpur Hospital Development Committee**

The government of Nepal and Bharatpur Hospital are committed to ensure basic health services to the people. Addressing Hospital Pharmacy Directive-2072, it is our immense pleasure to present the 4<sup>th</sup> edition of the **Bharatpur Hospital**



**formulary.** The formulary is being revised and edited annually. The current formulary includes the detailed information on drugs and related items available in the Bharatpur Hospital Pharmacy.

As a medical superintendent, I would like to thank the entire publication team for this version of the formulary. The current version includes the drug information and their availability strength with different dosage forms, their availability on the Health Insurance Scheme of Nepal, essential medicine, SSF, and free medicines. The formulary also includes the information on the pregnancy category and WHO AwaRe classification for antibiotics for their rational use to promote quality of medicine use.

I am very much thankful to the editorial team, Drugs & Therapeutics Committee, pharmacy department, and to all those who were involved in the development and publishing of this revised version of the formulary.

**Prof. Dr Krishna Prasad Poudel**  
**Medical Superintendent**  
**Bharatpur Hospital**

As the Chairman of the Drug and Therapeutics Committee, I am honored to introduce the **4th edition** of our **Hospital Formulary**. This edition embodies our commitment to the highest standard of patient care through careful selection and use of medicines.



Current version of formulary includes detail information on drugs and related surgical items available in our Hospital. I hope this formulary would be a useful guide for physician to select drugs available in various programmes like Health Insurance Scheme, SSF, and Free medicines for poor and marginalized as well. Drugs are categorized according to their safety in pregnancy; WHO AwaRe Classification. Drug Interaction and nursing consideration wherever required are also considered.

I would like to thank entire editorial team, pharmacy department and members of drugs and therapeutics committee for their combined effort in publishing this edition of formulary.

**Dr. Gobinda Kandel**  
**Chairman**  
**Drug and Therapeutics Committee**  
**Bharatpur Hospital**

I am pleased to present the 4<sup>th</sup> **Edition** of our **Hospital Formulary**.

We aim to cover the most current clinical recommendations, research, and best practices in every edition



because the healthcare landscape is ever evolving. A collaborative effort produced this formulary, which reflects the knowledge and commitment of our doctors, nurses, pharmacists, and other medical specialists.

The formulary is continuous effort for quality of care to patients and is a vital domain of Hospital Pharmacy Directive- 2072 and we are committed to publish and revise the formulary annually. The current version of formulary includes the information on drugs and related materials available in Hospital Pharmacy. The revised version of formulary is landmark for prescribers to select drugs according to their availability in Hospital Pharmacy.

I would like to express my sincere gratitude to editorial team, Drugs and Therapeutics Committee, pharmacy department and to all those who have contributed their expertise for publishing this compendium.

**Sabin Raj Lamichhane**  
**Pharmacy Incharge**  
**Bharatpur Hospital**

As Editor-in-Chief, it is a privilege to present the **4<sup>th</sup> Edition** of our **Hospital Formulary**, a cornerstone in our commitment to evidence-based patient care. This updated edition is the result of a collaborative effort among pharmacists, physicians, nurses, and healthcare professionals, ensuring it reflects the latest clinical guidelines and practices.



Notable updates include revised drug indications, dosing recommendations, contraindications, adverse effects, and monitoring parameters, along with the inclusion of new therapeutic agents to address emerging patient needs. Inclusions of the drugs according to the Health Insurance scheme of GoN, along with their pregnancy category and storage conditions, nursing considerations, and important information-related drugs from the Drug Bulletin of Nepal (DBON), are covered in this edition.

I extend my sincere gratitude to all contributors for their expertise and dedication. We welcome ongoing feedback to help refine and elevate this vital resource, ensuring we continue to uphold the highest standards of care.

Thank you for your unwavering commitment to patient-centered excellence.

**Roshan Giri**  
**(M. pharm Clinical Pharmacy)**  
**Editor-in-Chief**

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## How to use this Compendium?

The drug classified in the formulary is by taking the reference from Nepalese National Formulary 3<sup>rd</sup> Edition (NNF).

### Medication Monograph Sample:

#### 1.3. Calcium Channel Antagonist:

##### 1. Amlodipine:

**Indication:** Hypertension, Prophylaxis of angina

**Adverse drug effect and caution:** Ankle edema, Flushing, Headache, hypotension, impotence and gynecomastia. Caution: Hepatic impairment.

**Contraindications:** Unstable angina, cardiogenic shock, significant aortic stenosis and breast feeding.

**Dose:** Hypertension or angina, initially 5 mg once daily; maximum 10 mg once daily

Preparation Available:

	Scheme on HI	Pregnancy Cat	Storage
Amlodipine 2.5 mg Tab	H.I	C	R.T
Amlodipine 5 mg Tab	H.I	C	R.T
Amlodipine 10 mg Tab	H.I	C	R.T

**1<sup>st</sup> Column:** Generic Name, Strength and Dosage form of Medicines

**2<sup>nd</sup> Column:** Availability of Drug on Insurance Scheme, **NA indicates Not available**

**3<sup>rd</sup> Column:** Pregnancy Category

**4<sup>th</sup> Column:** Storage condition of the drug.

In case of the antibiotics, the **5<sup>th</sup> column** indicates the WHO AWaRe classification of antibiotics.

## **Rational Prescribing.**

Rational prescribing is the appropriateness of the whole therapeutic set up along with follow up of the outcome.

### **The criteria to evaluate rational prescribing are:**

Appropriate indication

- Appropriate drug in efficacy, tolerability, safety, and suitability for the patient.
- Appropriate dose, route and duration according to specific features of the patient.
- Appropriate patient
- Correct dispensing with appropriate information
- Adequate monitoring of patient's adherence to medication

### **Factors influencing prescribing:**

- Knowledge of the prescriber.
- Role models
- Patient load
- Attitude to afford prompt symptomatic relief at all cost.
- Imprecise diagnosis.
- Drug promotion and unrealistic claims by manufacturers.
- Unethical inducements
- Patient's demands

**WHO guideline to Good Prescribing Steps includes:**

- Step 1: Define the patients Problem.
- Step 2: Specify the therapeutics Objectives
- Step 3: Verify the Suitability of P-drugs (Safety, Efficacy, Standard Duration of treatment, Standard Dosing Schedules)
- Step 4: Write Prescription.
- Step 5: Give information, instruction and Warning
- Step 6: Monitor (and Stop the treatment)

(P-drugs: Personal or preferred or priority choice drug of physician)

## Adverse Drug Reactions

Any drug may produce unwanted or unexpected adverse reactions. ADRs are defined as an appreciably harmful or unpleasant reaction, resulting from an intervention related to the use of a medicinal product, which predicts hazard from future administration and warrants prevention or specific treatment, or alteration of the dosage regimen, or withdrawal of the product.

Type	Mechanism	Examples
A	Augmented, dose related, Predictable	<ul style="list-style-type: none"><li>• Postural hypotension with antihypertensives</li><li>• Hypoglycaemia with oral hypoglycaemics</li><li>• Hypokalemia with diuretics</li></ul>
B	Bizzare, idiosyncratic, not dose related, Non- predictable	<ul style="list-style-type: none"><li>• Antibiotic induced rash</li><li>• Phenytoin induced Steven-Johnson Syndrome/ Toxic Epidermal Necrolysis</li></ul>
C	Chronic/ continuous, time related	<ul style="list-style-type: none"><li>• Analgesic Nephropathy</li><li>• Dyskinesia with Levodopa</li></ul>

D	Delayed	<ul style="list-style-type: none"> <li>• Thalidomide induced phocomelia</li> <li>• Vaginal cancer due to diethylstilbestrol</li> </ul>
E	End of treatment	<ul style="list-style-type: none"> <li>• Adrenocortical insufficiency due to abrupt corticosteroid withdrawal</li> <li>• Opioid withdrawal causing withdrawal syndrome</li> <li>• Insomnia due to abrupt benzodiazepam withdrawal</li> </ul>

### Information on pregnancy Category

<b>Pregnancy Category</b>	
Category A	Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters)
Category B	Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.
Category C	Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
Category D	There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Category X	Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits.
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**(NA: Indicates Not Assigned, Data on Human Study is Limited)**

### Storage Condition of Drugs

Temperature Range	Storage Condition	Abbreviation Used
2-8 °C	Cold Temperature	FT
8-15 °C	Cool Temperature	CT
20-25 °C	Controlled Room Temperature	CRT
25-30 °C	Room Temperature	RT

### Information of Pharmaceuticals Dosages form.

S N	Dosage Form	Information
A.	<b>Solid Dosage Forms</b>	
1	Chewable Tablet (CT)	They are designed to be chewed before swallowing.
2	Mouth dissolving tablet (MDT)	Dissolved or dispersed in water before swallowing.
3	Sublingual Tablet (Sub Tab)	Put the medicine under tongue and not to allowed to take food until completely absorbed.
4	Pessary Tablet (pess)	For vaginal use only, store in cool place.
5	Suppository (Supp)	For rectal use only, store in cool place.
6	Enteric coated Tablet	They are designed to dissolve in small intestine, thus should not be chewed, Broken or crushed.



7	Sustained release Tablet (SR Tab)	They are designed to prolong the time interval of drug concentration in therapeutic range, which reduce the frequency of dosing like three times a day to once a day. Do not crush or chew.
8	Controlled release Tablet (CR Tab)	They are designed to give constant plasma concentration for prolonged period. Do not crushed or chewed before administer.
9	Delayed release Tablet	They are designed to protect from low stomach pH or stomach irritation by drug. Once it reaches to desire pH site, it work like immediate tab by releasing drug. Do not crushed or chewed before administer.
10	Powder Oral (pow)	They are designed to dissolve in liquid before administer.

11	Rotacap (R/C)	Capsule contain powder for inhalation by use of rotahaler or revolizer.
<b>B</b>	<b>Semisolid Dosage</b>	
1	Ointment (Oint)	Designed to apply on the skin or mucus membrane; occlusive to protect the affected area from moisture.
2	Eye Ointment (E/O)	Sterile preparation; designed to apply on eye.
3	Cream (Cr)	For external use, store in cool place, they are easier to spread on skin and wash off with water.
4	Gel (Gel)	Designed to use topically or introduced into a body cavity.
<b>C</b>	<b>Liquid Dosage</b>	
1	Solution (Sol)	A homogenous liquid mixture designated to use externally.
2	Gargle (Garg)	For use externally; do not swallowed in large quantity. If appropriate dilute
3	Mouth Wash (MW)	Same as Gargle.

4	Mouth Paint (MP)	Not to be swallowed in large quantity. For external use only.
5	Syrup (Syp)	Concentration mixture of sugar, water and medicine for oral use.
6	Dry Syrup (D Syp)	Dry powder dissolved in water before administering.
7	Suspension (Susp)	Mostly for oral use, shake before use.
8	Lotion (Lot)	For external use only, shake before use and don not apply on broken skin.
9	Enema	For rectal use only, shake before use. Warm to body temperature before use.
10	Eye Drop (E/D)	For ophthalmic use only, to be used within 30 days after first opening
11	Ear Drop (Er/D)	For otic use only not foe eye and oral. Keep away from children.

12	Eye and Ear Drop (E/Er/D)	For the application in eye and ear. Use within 30 days after first opening.
13	Nasal Drop (N/D)	For nasal use only, for decongestant use; avoid prolong and excessive use.
14	Nasal Spray (N/S)	Do not use if seal is broken or missing. Keep out of children. The use of this dispenser by more than one person may spread infection.
15	Meter dose inhaler (MDI)	Shake before use. Keep away from heat source. Do not exceed the prescribed dose.
16	Respiratory Solution (R/Sol)	For inhalation purpose only.
17	Parenteral Injection (Ing)	Sterile preparation for parenteral use only.

**Abbreviations:**

<b>S.N.</b>	<b>Abbreviations</b>	<b>Meaning</b>
	BD	Twice a day
	E/D	Ear Drop, Eye Drop
	Gtt	(guttae) Drop
	HS	At bedtime
	ID	Intradermal
	IM	Intramuscular
	INF	Infusion
	IV	Intravenous
	MDI	Metered dose inhaler
	OD	Once a day
	PV	Per vagina
	PR	Per rectum
	PRN or P.R.N	(pro re nata) As needed
	QID	Four times a day
	RC	Rotacap
	Rx	Prescription
	Soln	Solution
	SOS	(Si Opus Sit) if needed
	Supp	Suppository
	Susp	Suspension
	Syp	Syrup
	Tbsp	Table spoon
	TDS	Three time a day
	Top	Topical
	Tsp	Teaspoon
	W/O	Without
	W/F	With food

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# Chapter-1: Drugs acting on the Gastro-intestinal System

## 1.1. Antacids

Antacids are those agents which react chemically to neutralize or buffer existing quantities of stomach acid. They have no direct effect on acid output but will increase pH value from stomach contents, thus providing relief in ulcer dyspepsia and non-erosive gastro-esophageal reflux.

### 1. Aluminum Hydroxide and Magnesium Hydroxide

**Indication:** Ulcer dyspepsia, non-corrosive gastro-esophageal reflux.

**Precaution:** Avoid taking other medicines within 2 hours before or after you take aluminum hydroxide, magnesium hydroxide, and simethicone.

**Preparation Available:**

	Scheme on HI	Pregnancy Cat	Storage
Aluminum Hydroxide 500 mg + Magnesium Hydroxide 500 mg/10 ml 170 ml Susp	HI	C	RT

### 2. Sodium Bicarbonate

**Indication:** Relief of discomfort in mild urinary-tract infections; alkalinisation of urine: metabolic acidosis



**Precautions:** Cardiac disease; patients on sodium-restricted diet; elderly; Pregnancy use with caution

**Side-effects:** eructation, alkalosis on prolonged use

**Preparation Available:**

Sodium Bicarbonate 75 mg/ml, 25 ml Inj	HI	C	RT
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## 1.2 Antispasmodics

### 1. Atropine

**Indication:** Smooth muscle spasm, antidote for organophosphorus or muscarinic mushroom poisoning

**Dose:** By intravenous injection, 300-600 mg immediately before induction of anesthesia; child: 20 mg/kg (maximum 600 mg)

**Adverse effects and cautions:** Dry mouth, blurred vision, cycloplegia, dilation of pupils, photophobia, urinary hesitancy, tachycardia and constipation.

**Preparation Available:**

Atropine 0.6 mg/ml, 1 ml Inj	HI	NA	RT
Atropine 0.6 mg/ml, 10 ml Inj	NA	NA	RT

### 2. Hyoscine Butyl bromide

**Indication:** see atropine

**Dose:** Oral 20 mg QID, child 10mg TDS. In case of acute spasm 20 mg repeated over 30 minutes if necessary by IV or IM.

**Adverse effects and caution:** See Atropine

### Preparation Available:

Hyoscine 10 mg tab Tab	HI	C	RT
Hyoscine 20 mg Tab	HI	C	RT
Hyoscine 20 mg/ml, 1ml Inj	HI	C	RT

### 3. Dicyclomine

**Indication:** Gastrointestinal symptom characterized by smooth muscle spasm

**Adverse effects and cautions:** See under Atropine and hyoscine

**Dose:** 10-20 mg 3 times daily, CHILD 6-24 months 5-10 mg up to 3-4 times daily, 15 minutes before feeds, 2-12 years 10 mg 3 times daily.

### Preparation Available:

Dicyclomine HCL	NA	B	RT
Dicyclomine 10 mg/5 ml, 30 ml Syrup	HI	B	RT
Dicyclomine 10 mg simethicone 40 mg / 5ml , 30ml	HI	B	RT

### 4. Mebeverine

**Indication:** Irritable bowel syndrome, adjunct in gastrointestinal disorder characterised by smooth muscle spasm

**Adverse effects and cautions:** Rash, urticaria, angioedema; used with caution in pregnancy

**Contraindication:** Paralytic ileus

**Dose:** Adult and Child over 10 years 135 mg three times daily preferably 20 minutes before meals; child below 10 years not recommended

### Preparation Available:

Mebeverine 135 mg tab	HI	NA	RT
Mebeverine 200 mg SR tab	NA	NA	RT

### 5. Drotaverine

**Indication:** Smooth muscle spasm.

**Adverse effects and cautions:** Nausea, vomiting, vertigo, transitory decrease in blood pressure

### Preparation Available:

Drotavarine 40 mg Tab	HI	C	RT
Drotavarine 80 mg Tab	HI	C	RT
Drotaverine 40 mg/2 ml Inj	HI	C	RT

### 6. Valethamate

Two studies have recorded adverse events of moderate intensity and one study noted mild events. The WHO has brought out guidelines outlining the criteria for the selection of drugs for any indication and valethamate bromide does not satisfy even one of them. It is hoped that obstetricians will stop using this drug in pregnant women until there is convincing evidence of its efficacy and safety and it is listed in the Indian Pharmacopoeia.

Valethamate 8 mg, 1ml Inj	HI		CT
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## 1.3 Ulcer-healing drugs

### 1. Ranitidine

**Indication:** Benign duodenal ulcer, gastric ulcer, reflux oesophagitis and Zollinger-Ellison syndrome

**Adverse effects and cautions:** Headache, dizziness,

myalgia, nausea, skin rash and diarrhoea or constipation; used with caution in renal impaired patients

**Dose:** Oral benign gastric or duodenal ulcer, 150 mg twice daily or 300 mg at night for 4-8 weeks, up to 6 weeks in chronic episodic dyspepsia, and up to 8 weeks in NSAID-associated ulceration. Maintenance 150 mg at night. Reflux oesophagitis, 150 mg twice daily or 300 mg at night for up to 8 weeks, or if necessary 12 weeks.

**Preparation Available:**

Ranitidine 150 mg tab	HI	B	RT
Ranitidine 50 mg/2 ml Inj	HI	B	RT
Ranitidine 75mg/5ml,	NA	B	

**1. Esomeprazole**

**Indication:** Benign gastric and duodenal ulcer, NSAID-associated duodenal or gastric ulcer, duodenal or benign ulcer associated with Helicobacter pylori, reflux oesophagitis, Zollinger-Ellison syndrome

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, abdominal colic, skin rash, headache and dizziness.

**Dose:** Duodenal ulcer associated with Helicobacter pylori, 20 mg twice daily.

Gastro-oesophageal reflux disease, Age over 12 years, 40 mg once daily for 4 weeks, continued for further 4 weeks if not fully healed or symptoms persist; maintenance 20 mg daily; Symptomatic treatment in

the absence of oesophagitis, 20 mg daily for up to 4 weeks, then in adult over 18 years 20 mg daily when required. Not recommended in children.

The tablets should not be chewed or crushed, but should be swallowed whole.

**Preparation Available:**

Esomeprazole 20 mg tab	HI	C	RT
Esomeprazole 40 mg tab	HI	C	RT
Esomeprazole 40 mg tab (with sodium bicarbonate buffer).	HI	C	RT
Esomeprazole 40 mg Inj	HI	C	RT

## 2. Omeprazole

**Indication:** See under Esomeprazole

**Adverse effects and caution:** See under Esomeprazole

**Dose:** Benign gastric and duodenal ulcer 20 mg daily for 4 weeks in duodenal ulceration or 8 weeks in gastric ulceration; in severe cases increased to 40 mg daily, long term use not recommended.

Zollinger- Ellison syndrome, initially 60 mg once daily, usual range 20-120 mg daily (above 80 mg in 2 divided doses).

Reflux oesophagitis, 20 mg daily for 4 weeks, followed by a further 4-8 weeks if not fully healed; 40 mg daily has been given for 8 weeks in reflux oesophagitis refractory to other treatment, may be continued at 20 mg daily.

**Preparation Available:**

Omeprazole 20 mg tab	HI	C	RT
Omeprazole 40 mg Inj	HI	C	RT

**3. Pantoprazole**

**Indication:** See under Esomeprazole

**Adverse effects and caution:** On long term used increase the risk of bone fracture, Nutritional deficiencies, including magnesium, iron, and vitamin B12, other See under Esomeprazole

**Dose:** Duodenal ulcer, 40 mg daily in the morning for 2 weeks, continued for further 2 weeks if not fully healed. Benign gastric ulcer, 40 mg daily in the morning for 4 weeks continued for further 4 weeks if not fully healed. Reflux oesophagitis, 20-40 mg daily in the morning for 4 weeks, continued for further 4 weeks if not fully healed, maintenance 20 mg daily, increased to 40 mg daily if symptom returns.

Zollinger-Ellison syndrome, initially 80 mg once daily adjusted according to response.

**Preparation Available:**

Pantoprazole 20 mg tab	NA	B	RT
Pantoprazole 40 mg tab	HI	B	RT
Pantoprazole 40 mg Inj	HI	B	RT

**Combination Available:**

Pantopraole 40mg + Domperidone 30mg pellets	HI		RT
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#### 4. Rabeprazole

**Indication:** See under Esomeprazole

**Adverse effects and caution:** See under Esomeprazole and also cough, rhinitis, chest pain, anorexia, weight gain

**Dose:** Benign gastric ulcer, 20 mg daily in the morning for 6 weeks, continued for further 6 weeks if not fully healed.

Duodenal ulcer, 20 mg daily in the morning for 4 weeks, continued for further 4 weeks if not fully healed.

Gastro-oesophageal reflux, 20 mg once daily for 4-8 weeks; maintenance 10-20 mg daily.

Duodenal and benign gastric ulcer associated with *Helicobacter pylori*, 20 mg twice daily with other drugs. Not recommended in children.

#### **Preparation Available:**

Rabeprazole 20 mg tab	HI	B	RT
Rabeprazole 20 mg Inj	HI	B	RT

#### 5. Ilaprazole

**Indication:** Similar to PPI

**Adverse effects and cautions:** See omeprazole

#### **Preparation Available:**

Ilaprazole 10 mg tab	NA		RT
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6.

#### 7. Lansoprazole

**Indication:** Similar to PPI

ADR and cautions: See under omeprazole

### Preparation Available:

Lansoprazole 30mg Tab	HI	B	RT
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### 8. Sucralfate

It is a complex of aluminium hydroxide and sulphated sucrose which makes a physical barrier separating acid and pepsin from the ulcerated gastric and duodenal mucosa.

**Indication:** Benign gastric and duodenal ulceration, chronic gastritis.

**Adverse effects and cautions:** Constipation, diarrhoea, dry mouth, nausea, dizziness. The safety and efficacy of sucralfate in children have not been established.

Sucralfate should be taken at least 2 hours after administration of other drugs.

### Preparation Available:

Sucralfate 1gm/ml 200 ml Susp	HI	B	RT
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## 1.4 Antiemetics

### 1. Domperidone

It blocks the dopamine (D<sub>2</sub>) receptors in the CTZ.

**Indication:** Nausea, vomiting, dyspepsia, gastro-esophageal reflux.

**Adverse effects and cautions:** Gynaecomastia, galactorrhoea, rashes and dystonic reactions.

**Dose:** Acute nausea and vomiting 10-20 mg every 6-8 hours, Child, 250-500 micrograms/kg every 6-8 hours. Functional dyspepsia, 10-20 mg 3 times daily



before food and 10-20 mg at night; maximum period of treatment 12 weeks; Child: Not recommended.

**Preparation Available:**

Domperidone 10 mg tab	HI	C	RT
Domperidone 10 mg MDT	NA	C	RT
Domperidone 5mg/5ml, 30 ml susp.	HI	C	RT

## 2. Metoclopramide

It blocks dopamine receptors in CTZ.

**Indication:** Nausea, vomiting, particularly in gastrointestinal disorders, management of gastric stasis and gastrointestinal reflux.

**Adverse effect and cautions:** Restlessness, drowsiness, fatigue, extrapyramidal reaction.

**Contraindication:** Patients with seizure history and patients taking drugs causing extrapyramidal reactions.

**Preparation Available:**

Metoclopramide 10 mg tab	HI	B	RT
Metoclopramide 5 mg/5 ml, 30 ml syp	NA	B	RT
Metoclopramide 10 mg/ml, 2 ml Inj	HI	B	RT

## 3. Ondansetron

It is a 5-HT<sub>3</sub> receptor antagonist present in vagal afferents, solitary tract nucleus (STN) and CTZ.

**Indication:** Treatment of nausea and vomiting associated with chemotherapy, prevention and treatment of post-operative nausea and vomiting

**Adverse effect and cautions:** Headache, flushing, transient visual disturbances, arrhythmias, hypotensions. The drug should be used with caution in pregnancy, breast-feeding and moderate to severe liver impairment.

**Dose:** Treatment of postoperative nausea and vomiting, by intramuscular or slow intravenous injection, 4 mg; Child over 2 years, by slow intravenous injection, 100 micrograms/kg (maximum 4 mg).

**Preparation Available:**

Ondansetron 4 mg tab	HI	B	RT
Ondansetron 4 mg MDT	NA	B	RT
Ondansetron 2mg/5ml, 30ml susp	HI	B	RT
Ondansetron 4 mg/2ml, 2ml Inj	HI	B	

#### 4. Prochlorperazine

It is a phenothiazine act by blocking dopamine receptors in CTZ.

**Indication:** Nausea, vomiting, vertigo, labyrinthine disorders.

**Adverse effect and cautions:** Dry mouth, drowsiness, extrapyramidal symptoms. The safety and efficacy in children below 2 years has not been established.

**Dose:** By mouth, nausea and vomiting, Prochlorperazine maleate or mesylate, acute attack, 20 mg initially then 10 mg after 2 hours; prevention 5-10 mg 2-3 times daily; Child (over 10 kg only) 250 micrograms/kg 2-3 times daily.

### Preparation Available:

Prochlorperazine 5 mg Tab	HI	C	RT
Prochlorperazine 12.5 mg/ml, 1ml Inj	HI	C	RT

### 5. Promethazine

The antiemetic activity is not precisely known but may be mediated via central anticholinergic action.

**Indication:** Nausea, vomiting, motion sickness, urticaria, vertigo, dryness of mouth, blurring of vision.

**Adverse effect and cautions:** Drowsiness, dryness of mouth, blurring of vision, confusion, fatigue. Safe use of promethazine during pregnancy (Except during labour) has not been established.

**Contraindication:** Patient receiving larger dose of CNS depressant or who are comatose, infants and young children.

**Dose:** Motion sickness prevention, 25 mg at bedtime on night before travelling, repeat following morning if necessary; Child 2-5 years, 5 mg at night and following morning; 5-10 years, 10 mg at night and following morning.

### Preparation Available:

Promethazine 25 mg Tab	HI	C	RT
Promethazine 25 mg/ml 2 ml Inj	HI	C	RT
Promethazine 5 mg/5 ml, 60 ml Susp	HI	C	RT

### 6. Granisetron

It acts by blocking the specific 5HT<sub>3</sub> receptor in GT tract and CNS.

**Indication:** Nausea, vomiting, induced by chemotherapy, prevention and treatment of postoperative nausea and vomiting.

**Adverse effect and cautions:** Constipation, headache, diarrhoea, subacute intestinal obstruction, susceptibility to QT-interval prolongation (including electrolyte disturbances).

**Preparation Available:**

Granisetron 1 mg tab	HI	B	RT
Granisetron 1 mg/ml, 10 ml Symp	NA	B	RT
Granisetron 1 mg/ml, 1 ml Inj	HI	B	RT

## 7. Itopride

It has prokinetic properties. Itopride is an effective and well tolerated drug in the treatment of functional dyspepsia.

**Preparation Available**

Itopride 50 mg	HI	NA	RT
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## 1.5 Antidiarrhoeal drugs

### 1. Loperamide

It is an antiperistaltic antidiarrheal agent.

**Indication:** Symptomatic relief of acute non-specific diarrhoea and chronic diarrhea.

**Adverse effect and cautions:** Abdominal pain, distension or discomfort, constipation, dry mouth, nausea and vomiting. Loperamide should not be used

in the treatment of diarrhoea resulting from some infections.

**Dose:** Acute diarrhoea, 4 mg initially followed by 2 mg after each loose stool for up to 5 days; usual dose 6-8 mg daily; maximum 16 mg daily; chronic diarrhoea in adults initially 4-8 mg daily in divided doses; subsequently adjusted accordance to response and given in 2 divided doses for maintenance.

**Preparation Available:**

Loperamide 2 mg Tab	NA	B	RT
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## 2. Oral Rehydration Salts (ORS)

**Indication:** Replacement of water and salt lost in acute diarrhoea.

**Adverse effects and cautions:** Vomiting (too rapid administration), hypernatraemia and hyperkalaemia (overdose in renal impairment or administration of too concentrated solution). The boiled and cool water must be used to prepare the ORS solution. Antibacterials should not be given in acute diarrhoea except in cholera and shigellosis.

**Dose:** According to fluid loss, usually, 200 - 400 ml solution after every loose motion; Infant 1-1.5 times usual feed volume; Child 200 ml after every loose motion.

**Preparation Available:**

Oral Rehydration Salt	HI	A	RT
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### 3. Zinc

**Indication:** Adjunct to ORS in acute diarrhea.

**Adverse effect and cautions:** Abdominal pain, dyspepsia, nausea, vomiting, diarrhoea, headache, gastritis. The zinc may accumulate in acute renal failure.

**Dose:** Infant under 6 months 10 mg (elemental zinc) daily for 10-14 days; Child 6 months-5 years 20 mg (elemental zinc) daily for 10-14 days.

**Preparation Available:**

Zinc Sulfate 10 mg Tab	HI	NA	RT
Zinc Sulfate 20 mg Tab	HI	NA	RT

### 4. Octreotide

Somatostatin analogue, decreases hormone secretion including serotonin and various GI peptides (gastrin, vasoactive intestinal polypeptide and insulin secretion).

**Indication:** Severe secretory diarrhoea by hormone-secreting tumours of the pancreas and GI tract, diarrhoea induced by chemotherapy, diarrhoea associated with HIV infection and diabetes; sulfonyleurea overdose to control hypoglycemia.

**Adverse effects and cautions:** Gallbladder problem (like gallbladder decrease Contractility, gallstone), dysglycemia, hypothyroidism, bradycardia; hepatic and renal impairment may necessitate dosing adjustments.

### Preparation Available:

Octreotide 50 mcg/ml 1 ml Inj	NA	B	FT
Octreotide 100 mcg/ml 1 ml Inj	HI	B	FT

### 1.6 Cathartic drugs

Cathartics, laxative and purgative are terms describing drugs that promote defecation. A balanced diet including adequate fluid intake and fibre is of value in preventing constipation.

#### 1. **Bisacodyl**

It is a stimulant cathartic and produces evacuation in 10 - 12 hours after oral administration of therapeutic dose. If rectally administered evacuation will be produced within 20 minutes to one hour.

**Indication:** Constipation, bowel evacuation before radiological procedures and surgery.

**Adverse effects and cautions:** Abdominal cramp, colitis, nausea, vomiting and local irritation with rectal use. The excessive use of stimulant laxatives can cause diarrhoea and related effects such as hypokalemia-risk of electrolyte imbalance in prolonged use in children.

**Contraindication:** Acute inflammatory bowel disease, intestinal obstruction, severe dehydration

**Dose:** By mouth for constipation, 5-10 mg at night; occasionally necessary to increase to 15-20 mg; Child, more than 6 years, 5 mg. By rectum in suppositories for constipation, 10 mg in the morning, Child under 10 years, 5 mg.

**Preparation Available:**

Bisacodyl 10 mg	NA	NA	RT
Bisacodyl 10 mg Supp	HI	NA	RT

**2. Ispaghula husk**

It is a bulk-forming cathartic.

**Indication:** Constipation

**Adverse effect and cautions:** Abdominal distension and flatulence, adequate fluid intake to be maintained to avoid intestinal obstruction.

**Dose: 0.5 to 2 gm**

**Preparation Available:**

Ispaghula husk			RT
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**3. Lactulose**

It is osmotic cathartic.

**Indication:** Constipation and hepatic encephalopathy as it causes a decrease in blood ammonia concentration.

**Adverse effect and cautions:** Nausea, vomiting, gaseous distention. The lactulose solution may contain free lactose and galactose so use with caution in diabetic patients.

**Dose:** In case of solution containing 3.35g/5ml. Constipation, initially 15 ml twice daily, gradually reduced according to patient's needs, child under 1 year 2.5 ml, 1-5 years 5 ml, 6-12 years 10 ml twice daily, gradually reduced. Hepatic encephalopathy, 30-50 ml 3 times daily, subsequently adjusted to produce 2-3 soft stools daily.



### Preparation Available:

Lactulose 3.35gm/ 5ml, 100ml, 200ml, syp	HI	B	RT
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### 4. Liquid Paraffin and Milk of Magnesia

Liquid paraffin acts by lubricating the faces and produces evacuation and milk of magnesia act as osmotic cathartic.

**Indication:** Constipation.

**Adverse effect and cautions:** Mild griping and impairment of fat soluble vitamin absorption on chronic use of liquid paraffin.

### Preparation Available:

Liquid Paraffin 3.75ml + Milk of magnesia 11.25ml 200ml syrup.	HI	NA	RT
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### 5. Sodium Picosulphate

After metabolism of the colon, it stimulates the mucosa thereby increasing the motility of the large intestine.

**Indication:** Constipation.

**Adverse effect and cautions:** Abdominal cramp, nausea, vomiting, dizziness and excessive use can cause diarrhoea, hypokalaemia.

### 6. Glycerin and allied preparation

Osmotic cathartic draws fluid into the colon and stimulates evacuation.

**Indication:** Constipation.

**Adverse effects and cautions:** Rectal irritation, burning sensation, cramping pain.

**Preparation Available:**

Glycerin 2/4 gm Supp.			RT
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## 1.7 Anti-inflammatory Drugs

### 1. Sulfasalazine

**Indication:** Ulcerative colitis; Crohn's disease; severe rheumatoid arthritis.

**Adverse effects and cautions:** Blood disorder, cough, dizziness, fever, insomnia, megaloblastic anaemia, proteinuria stomatitis, taste disturbances, tinnitus; use with caution in acute porphyrias, history of allergy, history of asthma, maintain adequate fluid intake, risk of haematological toxicity, risk of hepatotoxicity, risk of renal toxicity. Theoretical risk of neonatal haemolysis in third trimester, adequate folate supplements should be given to mother.

**Preparation Available:**

Sulfasalazine 1 gm Tab	NA	B	RT
Sulfasalazine 500 mg Tab	HI	B	RT

### 2. Mesalazine

**Indication:** Mild to moderate ulcerative colitis, Crohn's disease.

**Adverse effects and cautions:** Dizziness, oligospermia.

**Preparation Available:**

Mesalazine 400 mg tab	HI	NA	RT
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Mesalazine 1200 mg tab	HI		
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## 1.8. Drugs affecting biliary composition and flow

### 1. Ursodeoxycholic acid / Ursodiol

**Indication:** Dissolution of gallstones, primary biliary cirrhosis.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, gallstone calcification, pruritus. The drug should be avoided in pregnancy, radio-opaque stones, and nonfunctioning gallbladder.

**Dose:** Dissolution of gallstones, 8–12 mg/kg daily as a single dose at bedtime or in two divided doses, for up to 2 years; treatment is continued for 3–4 months after stones dissolve. Primary biliary cirrhosis, 10-15 mg/kg daily in 2-4 divided doses.

#### Preparation Available:

Ursodeoxycholic acid 300 mg Tab	HI	B	RT
Ursodeoxycholic acid 150 mg Tab	HI	B	RT

## 1.9. Drugs for Rectal and anal disorders

### 1. Lignocaine

**Indication:** Haemorrhoids (piles) and anal fissure.

**Adverse effects and cautions:** Local irritation and extensive rashes may occur, sensitization of the anal skin when used for more than 2 weeks. It may be used safely during pregnancy and lactation.

#### Preparation Available:

Lignocaine 2 % Gel	HI	B	RT
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## 2. Nitroglycerine

**Indication:** Chronic anal fissure.

**Adverse effects and cautions:** Headache, dizziness, hypotension, application site reaction like rash, exfoliative dermatitis. Additive hypotensive effects may occur when coadministration with nitric oxide donors like isosorbide dinitrate and antihypertensive drugs.

**Preparation Available:**

Nitroglycerine 0.2 % Oint	HI		C	RT
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## Chapter-2: Drugs acting on the Cardiovascular System

### 2.1 Anti-anginal Drugs

#### 1. Nitrates

##### Glyceryl Trinitrate or Nitroglycerine

The predominant action is venous dilation. This causes venous pooling and reduces the volume of blood returning to the heart.

**Indication:** Acute attacks of angina pectoris, prophylaxis of angina pectoris, left ventricular failure.

**Adverse effect and cautions:** Throbbing headache, dizziness, flushing, tachycardia, syncope and cardiovascular collapse.

**Dose:** Sublingually, 0.3 -1 mg, repeated as required. Prophylaxis, 2.6-12.8 mg as controlled release tablets, 3 times daily or 10 mg 2-3 times daily.

##### Preparation Available:

Glyceryl Trinitrate 5 mg/ml, 5 ml Inj	HI	C	CT
Glyceryl Trinitrate 0.5 mg Sub. Lingual Tab	NA	C	RT

#### 2. Isosorbide dinitrate

**Indication:** See nitroglycerine

**Adverse effect and cautions:** See nitroglycerine.

**Dose:** Sublingually, 5-10 mg by mouth, daily in divided doses, angina 30-120 mg, left ventricular failure 40-160 mg, up to 240 mg if required.

### Preparation Available:

Isosorbide dinitrate 5 mg Tab	H.I	C	RT
Isosorbide dinitrate 10 mg Tab	H.I	C	RT
Isosorbide dinitrate 20 mg Tab	NA	C	RT

### 3. Isosorbide Mononitrate

The hepatic first pass metabolism is much less than for the dinitrate so systemic bioavailability is more reliable after oral administration.

**Indication:** Prophylaxis of angina pectoris, adjunct in congestive heart failure.

**Adverse effects and cautions:** See under glyceryl trinitrate.

**Dose:** Initially 20 mg 2-3 times daily or 10 mg twice daily in those who have not previously received nitrates; up to 120 mg daily in divided doses.

### Preparation Available:

Isosorbide mononitrate 5 mg Tab	H.I	C	RT
Isosorbide mononitrate 10 mg Tab	H.I	C	RT
Isosorbide mononitrate 20 mg Tab	H.I	C	RT
Isosorbide mononitrate 30 mg XL Tab	HI	C	RT

## 2.2 Beta-blockers

### 1. Propranolol

It is a non-selective beta-adrenergic blocking agent.

**Indication:** Stable angina, supraventricular arrhythmias, secondary prevention after acute myocardial infarction, thyrotoxicosis, migraine prophylaxis.

**Adverse effects and cautions:** Bradycardia, heart

block, tiredness, fatigue, bronchospasm. The propranolol should be used with caution in patients with inadequate cardiac function and bronchospastic disease. Abrupt withdrawal of drugs may exacerbate angina symptoms or precipitate myocardial infarction in patients with coronary artery disease. Safety and efficacy of propranolol in children have not been established.

**Dose:** By mouth, hypertension, initially 80 mg twice daily, increased at weekly intervals as required; maintenance 160-320 mg daily.

Angina, initially 40 mg 2-3 times daily; maintenance 120-240 mg daily.

Arrhythmias, hypertrophic obstructive cardiomyopathy, anxiety, tachycardia and thyrotoxicosis (adjunct), 10-40 mg 3-4 times daily.

Anxiety with symptoms such as palpitations, sweating, tremor, 40 mg twice daily, increased to 3 times daily if necessary.

Prophylaxis after infarction, 40 mg 4 times daily for 2-3 days, then 80 mg twice daily, beginning 5-21 days after infarction. Migraine prophylaxis and essential tremor, initially 40 mg 2-3 times daily; maintenance 80-160 mg daily.

**Preparation Available:**

Propranolol 10 mg Tab	H.I	C	RT
Propranolol 20 mg Tab	H.I	C	RT
Propranolol 40 mg Tab	H.I	C	RT

## 2. Atenolol

Atenolol competitively blocks beta-1 and beta-2 adrenergic receptors at high dose (more than 100 mg) and selectively block beta-1 only with little or no effect on beta-2 receptors at low dose.

**Indication:** Hypertension, chronic stable angina, supra-ventricular arrhythmias, secondary treatment after acute myocardial infarction.

**Adverse effect and cautions:** See under propranolol

**Dose:** By mouth, hypertension, 25-50 mg daily (higher doses rarely necessary), angina, 100 mg daily in 1 or 2 doses, arrhythmias, 50-100 mg daily.

**Preparation Available:**

Atenolol 25 mg tab	H.I	D	RT
Atenolol 50 mg tab	H.I	D	RT

## 3. Bisoprolol

It is a cardioselective beta-blocker.

**Indication:** Hypertension, angina, adjunct in heart failure.

**Adverse effects and cautions:** Cramp, depression, muscle weakness. Ensure heart failure does not worsen before increasing the dose.

**Dose:** Hypertension and angina, usually 10 mg once daily (5 mg may be adequate in some patients); maximum 20 mg daily.

Adjunct in stable moderate to severe heart failure, initially 1.25 mg once daily (in the morning) for 1 week then, if well tolerated, increased to 2.5 mg once daily for 1 week, then 3.75 mg once daily for 1 week, then 5



mg once daily for 4 weeks, then 7.5 mg once daily for 4 weeks, then 10 mg once daily, maximum 10 mg daily.

**Contraindication:** Acute or decompensated heart failure requiring intravenous inotropes

**Preparation Available:**

Bisoprolol 2.5 mg Tab	H.I	C	RT
Bisoprolol 5 mg Tab	H.I	C	RT
Bisoprolol 10 mg Tab	HI	C	RT

#### 4. Carvedilol

It is a beta-blocker with additional arteriolar vasodilating action and longer duration of action.

**Indication:** Hypertension, angina and adjunct to diuretics, digoxin or ACE inhibitors in symptomatic chronic heart failure.

**Adverse effects and cautions:** Postural hypotension, headache, dizziness, bradycardia and impotence. Avoid hepatic impairment.

**Dose:** Hypertension, initially 12.5 mg once daily, increased after 2 days to usual dose of 25 mg once daily, if necessary may be further increased at intervals of at least 2 weeks to maximum 50 mg daily in single or divided doses.

Angina, initially 12.5 mg twice daily, increased after 2 days to 25 mg twice daily.

Adjunct in heart failure, initially 3.125 mg twice daily (with food), dose increased at intervals of at least 2 weeks to 6.25 mg twice daily, then to 12.5 mg twice daily, then to 25 mg twice daily.

### Preparation Available:

Carvedilol 3.125 mg Tab	H.I	C	RT
Carvedilol 6.25 mg Tab	H.I	C	RT
Carvedilol 12.5 mg Tab	H.I	C	RT

### 5. Metoprolol

It is a selective beta-blocker which selectively inhibits cardiac and lipolytic beta-1 receptors at low doses. The drug competitively blocks beta-1 and beta-2 adrenergic receptors at high doses.

**Indication:** See under atenolol.

**Adverse effects and cautions:** See under propranolol.

**Dose:** By mouth, hypertension, initially 100 mg daily, increased if necessary to 200 mg daily in 1-2 doses (higher doses rarely necessary).

Angina: 50-100 mg 2-3 times daily. Arrhythmias, usually 50 mg 2-3 times daily up to 300 mg daily in a divided dose if necessary. Migraine prophylaxis, 100-200 mg daily in divided doses.

By intravenous injection, arrhythmias up to 5 mg at rate 1-2 mg/minute, repeated after 5 minutes if necessary, total dose 10-15 mg. In surgery, 2-4 mg by slow intravenous injection at induction or to control arrhythmias developing during anesthesia; 2 mg doses may be repeated to a maximum of 10 mg.

### Preparation Available:

Metoprolol 12.5 mg Tab	H.I	C	RT
Metoprolol 25 mg XL Tab	H.I	C	RT
Metoprolol 50 mg XL Tab	H.I	C	RT

Metoprolol 100mg XL Tab	H.I	C	RT
Metoprolol 1 mg/ml 5 ml Inj	HI	C	RT

## 2.3 Calcium Channel antagonists

### 1. Amlodipine

It resembles nifedipine in its effects and does not reduce myocardial Contractility. It does not produce clinical deterioration in heart failure. It has a longer duration of action and can be given once daily.

**Indication:** Prophylaxis of angina, hypertension.

**Adverse effects and cautions:** Flushing, headache, ankle edema, abdominal pain, palpitation, hypotension, impotence and gynecomastia. It should be used with caution in patients with hepatic impairment and pregnancy.

**Contraindication:** Patients with unstable angina, cardiogenic shock, significant aortic stenosis and breast- feeding.

**Dose:** Hypertension or angina, initially 5 mg once daily; maximum 10 mg once daily.

#### **Preparation Available:**

Amlodipine 2.5 mg Tab	HI	NA	RT
Amlodipine 5 mg Tab	HI	NA	RT
Amlodipine 10 mg Tab	HI	NA	RT

### 2. S-Amlodipine

Amlodipine contains (R) and (S) amlodipine isomers but only S-Amlodipine as the active moiety possesses therapeutic activity. It has equivalent efficacy and tolerability compared to amlodipine in the treatment of

mild to moderate hypertension. When all the trials were considered, (S)-amlodipine treatment was associated with significantly less edema than racemic amlodipine.

**Preparation Available:**

S Amlodipine 2.5 mg Tab	HI	C	RT
S Amlodipine 5 mg Tab	HI	C	RT

### 3. Verapamil

Verapamil reduces afterload and myocardial Contractility.

**Indication:** Supraventricular arrhythmias, paroxysmal tachyarrhythmias, angina, Hypertension, prophylaxis of cluster headache.

**Adverse effects and cautions:** Constipation, nausea, abdominal discomfort, headache, dizziness, gingival hyperplasia, bradycardia and heart block. Verapamil should be used with caution in patients with moderately severe to severe ventricular dysfunction or heart failure since the drug may precipitate or worsen heart failure.

**Contraindication:** Patients with severe hypotension, bradycardia, cardiogenic shock, second or third degree AV block.

**Dose:** By mouth, supraventricular arrhythmias 40-120 mg 3 times daily; angina, 80-120 mg 3 times daily; hypertension, 240-480 mg daily in 2-3 divided doses. By slow intravenous injection over 2 minutes (3 minutes in elderly), 5-10 mg (preferably with ECG monitoring); in paroxysmal tachyarrhythmias a further 5 mg after 5-10 minutes if required.

### Preparation Available:

Verapamil 40 mg Tab	NA	C	RT
Verapamil 60 mg Tab	NA	C	RT
Verapamil 120 mg Tab	HI	C	RT

### 4. Diltiazem

It is a calcium antagonist, similar to verapamil, to cause sinoatrial and AV nodal depression. It has less negative inotropic effect than verapamil.

**Indication:** Hypertension, may be used in patients for whom beta-blockers are **Contraindicated** or ineffective

**Adverse effects and cautions:** Bradycardia, dizziness, gastro-intestinal disturbances, hypotension, malaise.

**Contraindication:** Acute porphyrias, left ventricular failure with pulmonary congestion, second or third degree AV block

**Dose:** Angina, 60 mg 3 times daily (elderly initially twice daily); increased if necessary to 360 mg daily.

### Preparation Available:

Diltiazem 30 mg Tab	HI	C	RT
Diltiazem 90 mg XR Tab	HI	C	RT
Diltiazem 120 mg XR Tab	HI	C	RT

### 5. Nifedipine

It relaxes vascular smooth muscle and dilates coronary and peripheral arteries. It has more influence on vessels and less on the myocardium than verapamil. In contrast to verapamil, nifedipine has little or no effect on SA and AV nodal conduction. It has no antiarrhythmic action.

**Indication:** Hypertension, Raynaud's syndrome, angina prophylaxis, hiccups in palliative care,

**Adverse effects and cautions:** Dizziness, giddiness, flushing, lightheadedness, peripheral oedema and palpitation. Nifedipine should be used with caution in patients with congestive heart failure or aortic stenosis, especially in those receiving concomitant beta-blocking agents, because nifedipine may precipitate or worsen heart failure.

**Dose:** Raynaud's phenomenon, initially 5 mg 3 times daily with or after food; usual maintenance 5-20 mg 3 times daily.

Hypertension and angina prophylaxis, 20 mg twice daily with or after food. Usual maintenance 10-40 mg twice daily

**Preparation Available:**

Nifedipine 5 mg Tab	HI	C	RT
Nifedipine 10 mg Tab	HI	C	RT
Nifedipine 20 mg SR Tab	HI	C	RT

## 6. Nimodipine

It is similar to nifedipine but its smooth muscle relaxant effect is preferentially seen on cerebral arteries.

**Indication:** Prevention and treatment of ischaemic neurological deficits following aneurysmal subarachnoid haemorrhage.

**Adverse effects and cautions:** Hypotension, flushing, headache, sweating and feeling of warmth, gastrointestinal disorders.

The drug should be used with caution in cerebral oedema, hypotension, pregnancy, hepatic or renal impairment, and concomitant administration of other calcium channel blockers or beta-blockers.

**Contraindication:** Acute porphyria, unstable angina, within one month of myocardial infarction.

**Dose:** Prevention, by mouth, 60 mg every 4 hours, starting within 4 days of aneurysmal subarachnoid haemorrhage and continued for 21 days.

## 2.4 Potassium Channel Opener

### 1. Nicorandil

Nicorandil has both arterial and venous vasodilator properties. It activates ATP sensitive K<sup>+</sup> channels hyperpolarizing vascular smooth muscle. It also acts as NO donor relaxes blood vessels by increasing cGMP

**Indication:** Prophylaxis and treatment of stable angina

**Adverse effects and caution:** Nausea, cutaneous vasodilation with flushing, dizziness, headache, increase heart rate, rectal bleeding; take with caution in acute myocardial infarction, hyperkalemia, low systolic blood pressure.

**Dose:** Stable Angina 5 to 10 mg initially twice daily and can be increased up to 40 mg twice daily if tolerated.

## 2.5 Miscellaneous

### 1. Trimetazidine

Trimetazidine is an effective and well tolerated anti-ischaemic agent which, in addition to providing symptom relief and functional improvement in patients

with angina pectoris, has a cytoprotective action during ischaemia. The drug is suitable for initial use as monotherapy and as adjunctive therapy in those with symptoms not sufficiently controlled by nitrates, beta-blockers or calcium antagonists. The role of trimetazidine in other coronary conditions has yet to be clearly established.

### **Antiarrhythmic agents**

Abnormal automaticity or impaired conduction or both underlie cardiac arrhythmias.

#### **Class I**

These are Sodium channel blockers eg. Quinidine, Lidocaine, flecainide etc

#### **1. Disopyramide**

**Indication:** Atrial and ventricular arrhythmias including those resistant to lignocaine;

**Adverse effects and cautions:** Hypotension, AV block, dry mouth, blurred vision. The drug should be used with reduced dose in patients with renal or hepatic insufficiency.

Safe use of drugs in the third trimester of pregnancy has not been established.

**Contraindication:** Preexisting second or third degree AV block and cardiogenic shock.

**Dose:** By mouth 300-800 mg daily in divided doses. By slow intravenous injection, 2 mg/kg over at least 5 minutes to a maximum of 150 mg, with ECG monitoring.



## Class II (Beta-blockers)

### 1. Isoprenaline or Isoproterenol

It is an almost pure beta stimulator and has positive inotropic action on the heart i.e. increases cardiac output, it also causes peripheral vasodilation.

**Indication:** Bradycardia in patients with heart block, control attacks of Stokes Adams Syndrome.

**Adverse effects and cautions:** Tachycardia, hypotension, arrhythmias, tremor and sweating.

**Contraindication:** Patients with preexisting cardiac arrhythmias (especially tachycardia) other than those arrhythmias which may respond to drugs.

**Dose:** By mouth, initially 30 mg every 6 hours, range 90-840 mg daily (but oral route rarely used). By intravenous infusion, 0.5-10 micrograms/minute

#### Preparation Available:

Isoproterenol 1 mg Inj	HI	C	RT
Isoprenaline 2mg Inj	HI	C	

### 2. Esmolol

**Indication:** Short-term treatment of supraventricular arrhythmia (including atrial fibrillation, atrial flutter, sinus tachycardia), tachycardia and hypertension in perioperative period

**Adverse effects and cautions:** Thrombophlebitis, venous irritation, asymptomatic hypotension, nausea,

**Dose:** Adult: 50–200 micrograms/kg/minute, consult product literature for details of dose titration and doses during perioperative period.

## Preparation Available

Esmolol 10 mg/ml 10 ml Inj	HI	C	RT
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### Class III

It substantially prolongs cardiac action potential.

#### 1. Amiodarone

It has a very long half-life and only needs to be given once daily. It is used in the treatment of arrhythmias particularly when other drugs are ineffective or contraindicated.

**Indication:** Paroxysmal supraventricular, nodal and ventricular tachycardias, atrial fibrillation or flutter, and ventricular fibrillation

**Adverse effects and cautions:** Bradycardia, phototoxicity, raised serum transaminases, bradycardia and pulmonary toxicity. Liver function test and thyroid function tests should be done before treatment and then every 6 months. Serum potassium measurement and chest X-ray should be done before treatment. Safe use of drugs in the second and third trimester of pregnancy or breastfeeding has not been established.

**Contraindication:** Sinus bradycardia, SA heart block, thyroid dysfunction and iodine sensitivity.

**Dose:** 200 mg 3 times daily for 1 week reduced to 200 mg twice daily; ventricular fibrillation, by intravenous infusion over at least 3 minutes 300 mg.

#### Preparation Available:

Amiodarone 100 mg Tab	HI	NA	RT
Amiodarone 200 mg Tab	HI	NA	RT
Amiodarone 150 mg/ml 3 ml Inj	HI	NA	RT

## Class IV

### Calcium Channel blockers (include verapamil, Adenosine but not dihydropyridines groups)

#### 1. Adenosine

It slows conduction through AV nodes and interrupts AV reentry pathways, which restore normal sinus symptoms. It has a very short duration of action.

**Indication:** Paroxysmal supraventricular tachycardia (including Wolff-Parkinson-White syndrome)

**Adverse effects and cautions:** Chest pain, transient facial flush, bronchospasm, nausea and severe bradycardia. The drug should be used with caution in patients with atrial fibrillation or flutter and heart transplant.

**Contraindication:** Pre-existing second or third degree AV block, asthma, COPD and sick sinus syndrome.

**Dose:** Rapid intravenous injection into central or large peripheral vein, 3 mg over 2 seconds with cardiac monitoring; if necessary followed by 6 mg after 1-2 minutes, and then by 12 mg after a further 1-2 minutes

#### Preparation Available:

Adenosine 3 mg/ml, 2 ml Inj	HI	C	RT
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## 2.6 Antihypertensive Drugs Antiadrenergics

### 1. Atenolol

See under antianginal beta-blockers

### 2. Metoprolol

See under antianginal beta-blocker

### 3. Nebivolol

Competitive and selective beta-1 receptor antagonists have little or no effect on beta 2 receptors at doses below 10 mg.

**Indication:** Hypertension, hypertension with renal impairment, stable mild to moderate heart failure

**Adverse effects and cautions:** Depression, oedema. Used with caution in patient taking calcium-channel blocker or cardiac glycosides or using inhaled anaesthetics

**Contraindication:** Acute or decompensated heart failure requiring intravenous inotropes.

**Dose:** Hypertension 5 mg daily.

**Preparation Available:**

Nebivolol 2.5 mg Tab	HI	C	RT
Nebivolol 5 mg Tab	HI	C	RT

### 4. Labetalol

It is a nonselective beta blocker with intrinsic sympathomimetic activity and also have alpha blocking properties.

**Indication:** Hypertension of pregnancy, hypertensive emergency, controlled hypotension in anaesthesia

**Adverse effects and cautions:** Dizziness, lightheadedness, nausea, tingling sensation of scalp, fatigue; use with caution in liver disease

**Contraindication:** Asthma, COPD, severe bradycardia, cardiogenic shock

**Dose:** Hypertension of pregnancy, By IV infusion Adult: Initially 20 mg/hour, then increased if necessary to 40

mg/hour after 30 minutes, then increased if necessary to 80 mg/hour after 30 minutes, then increased if necessary to 160 mg/hour after 30 minutes, adjusted according to response; Usual maximum 160 mg/hour

**Preparation Available:**

Labetalol 5 mg/ml 4 ml Inj	HI	C	RT
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## 2.7 ACE Inhibitors

### 1. Enalapril

**Indication:** Hypertension, heart failure, prevention of symptomatic heart failure in patient with asymptomatic left ventricular dysfunction

**Adverse effects and cautions:** Persistent dry cough, headache, loss of taste, diarrhoea, hypotension (usually with initial dose), skin rash and angioedema of the extremities, myocardial infarction, angina, impotence. The drug should be used with caution in patients with impaired liver function. The safe use of drug in pregnancy has not been established.

**Dose:** Hypertension used alone, initially 5 mg daily; if used in addition to diuretic, in elderly patients or in renal impairment, initially 2.5 mg daily; usual maintenance dose 20 mg daily maximum 40 mg daily.

Heart failure (adjunct), asymptomatic left ventricular dysfunction, initially 2.5 mg daily under close medical supervision; increased over 2-4 weeks to usual maintenance 20 mg daily.

**Preparation Available:**

Enalapril 2.5 mg Tab	HI	C	RT
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Enalapril 5 mg Tab	HI	C	RT
Enalapril 10 mg Tab	HI	C	RT

## 2. Ramipril

**Indication:** Hypertension, congestive heart failure, prophylaxis after myocardial infarction, prophylaxis of cardiovascular events or stroke.

**Adverse effects and cautions:** See under enalapril.

**Dose:** Hypertension, initially 1.25 mg once daily, increased at intervals of 1-2 weeks; usual range 2.5-5 mg once daily; maximum 10 mg once daily.

Heart failure (adjunct), initially 1.25 mg once daily under close medical supervision, increased if necessary at intervals of 1-2 weeks; maximum 10 mg daily.

Prophylaxis after myocardial infarction, initially 2.5 mg twice daily, increased after 2 days to 5 mg twice daily; maintenance 2.5-5 mg twice daily.

Prophylaxis of cardiovascular events or stroke, initially 2.5 mg once daily, increased after 1 week to 5 mg once daily, then increased after a further 3 weeks to 10 mg once daily.

### Preparation Available:

Ramipril 1.25 mg Tab		D	RT
Ramipril 2.5 mg Tab	HI	D	RT
Ramipril 5 mg Tab	HI	D	RT
Ramipril 10 mg Tab		D	RT

## 2.8 Angiotensin-II Antagonist

It inhibits vasoconstriction and aldosterone-secreting effects of angiotensin II. Unlike ACE inhibitors, it

does not inhibit the breakdown of bradykinin and other kinins, thus unlikely to cause the persistent dry cough.

## 1. Losartan

**Indication:** Hypertension, congestive heart failure, diabetic nephropathy in type 2 diabetes mellitus.

**Adverse effects and cautions:** Hypotension, dizziness, diarrhoea, pruritus, rash, taste disturbance, thrombocytopenia. The drug should be avoided in pregnancy and breast-feeding.

The drug should be used with caution in renal artery stenosis, moderate to severe renal impairment or liver impairment, aortic or mitral valve stenosis.

**Dose:** Usually, 50 mg once daily (intravascular volume depletion initially 25 mg once daily); if necessary increased after several weeks to 100 mg once daily.

### **Preparation Available:**

Losartan 25 mg Tab	HI	C	RT
Losartan 50 mg Tab	HI	C	RT
Losartan 75 mg Tab	HI	C	RT

## 2. Telmisartan

**Indication:** See under losartan

**Adverse effects and caution:** Back pain, chest pain, arthralgia, eczema, GI-disturbances; correct any volume or salt depletion before initiating therapy, observe for signs and symptoms of hypotension

**Dose:** Hypertension, 40 mg daily initially and can titrated to 20-80 mg daily depending on response

### Preparation Available:

Telmisartan 20 mg Tab	HI	C	RT
Telmisartan 40 mg Tab	HI	C	RT
Telmisartan 80 mg Tab	HI	C	RT

### 3. Olmesartan

**Indication:** Hypertension

**Adverse effects and caution:** Chest pain, arthritis, fatigue, GI disturbances, haematuria; risk of hypotension especially in patients with volume or salt depletion secondary to salt restriction or prolonged diuretic treatment

**Dose:** Initially 10 mg daily, increased if necessary to 20 mg daily; maximum 40 mg per day

#### Preparation Available:

Olmesartan 10 mg Tab		C	RT
Olmesartan 20 mg Tab	HI	C	RT
Olmesartan 40 mg Tab	HI	C	RT

### 4. Irbesartan

**Indication:** Hypertension, Hypertension in patient receiving haemodialysis, renal diseases in hypertensive type 2 diabetes mellitus,

**Adverse effects and cautions:** Fatigue, musculoskeletal pain, nausea, vomiting; don't use in pregnant risk of congenital malformation, use with caution in renal artery stenosis; avoid in bilateral renal artery stenosis  
**Dose:** Hypertension 150 mg daily initially and can be increased upto 300 mg daily



### Preparation Available:

Irbesartan 150 mg Tab		C	RT
Irbesartan 300 mg Tab		C	RT

## 2.9 Diuretics

### 1. Furosemide

It decreases reabsorption of sodium and chloride and increases potassium excretion in the distal renal tubule.

**Indication:** Hypertension resistant to thiazide, oedema, oligo urea due to renal failure.

**Adverse effects and cautions:** Hypokalemia, hyponatremia, tinnitus, reversible or permanent hearing impairment or reversible deafness hyperuricemia and gout.

Furosemide should be used with caution in patients with hepatic cirrhosis. Furosemide should be used during pregnancy only when the potential benefits justify the possible risks to the foetus.

**Contraindication:** Renal failure with anuria, hypersensitivity to sulfonamides

**Dose:** By mouth, edema, initially 40 mg in the morning, maintenance 20 - 40 mg daily, increased in resistant edema to 80 mg daily; Child 1-3 mg/kg daily.

By intramuscular injection or slow intravenous injection (rate not exceeding 4 mg/minutes, initially 20-50 mg; Child 0.5-1.5 mg/kg to a maximum daily dose of 20 mg.

### Preparation Available:

Furosemide 20 mg Tab	HI	C	RT
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Furosemide 40 mg Tab	HI	C	RT
Furosemide 10 mg/ml, 2 ml Inj	HI	C	RT

## 2. Torsemide

Loop diuretics have similar properties to furosemide.

**Indication:** Edema, hypertension.

**Adverse effects and cautions:** See under furosemide.

**Dose:** Edema, 5 mg once daily, preferably in the morning, increased if required to 20 mg once daily; maximum 40 mg daily. Hypertension, 2.5 mg daily, increased if necessary to 5 mg once daily.

### Preparation Available:

Torsemide 10 mg Tab	HI	B	RT
Torsemide 20 mg Tab	HI	B	RT
Torsemide 40 mg Tab	HI	B	RT
Torsemide 100 mg Tab	HI	B	RT
Torsemide 10 mg/ml, 2 ml Inj	HI	B	RT

## 3. Hydrochlorothiazide

It inhibits sodium reabsorption in distal renal tubules, resulting in increased excretion of water, potassium, sodium and hydrogen ion

**Indication:** Hypertension, oedema.

**Adverse effects and cautions:** Hypokalemia, hyperuricemia, skin rash, thrombocytopenia, hyperglycemia, postural hypotension, impotence. Thiazides should be used with cautions in patient with severe renal disease because the drugs decrease glomerular filtration rate (GFR) and may precipitate azotemia.

**Contraindication:** The routine use of thiazides is contraindicated in pregnant women, severe hepatic impairment.

**Dose:** Edema, initially 25-50 mg daily, maintenance 25-50 mg on alternate days. Hypertension, 12.5 mg daily, can be increased to 25-50 mg daily if necessary.

**Preparation Available:**

Hydrochlorothiazide 12.5 mg Tab	HI	B	RT
Hydrochlorothiazide 25 mg Tab	HI	B	RT
Hydrochlorothiazide 50 mg Tab	HI	B	RT

#### 4. Indapamide

It is a thiazide diuretic, enhances Na, Cl and water excretion by interfering at the proximal segment of distal tubule. Vasodilation is more prominent at low dose while diuretic effect is more apparent with higher dose.

**Indication:** Hypertension, congestive heart failure

**Adverse effects and cautions:** Skin rash, hypokalaemia, anorexia, diarrhoea, orthostatic hypotension. The drug should be used with caution in pregnancy and breast-feeding.

Efficacy and safety of the drug has not been established in children.

**Contraindication:** Severe hepatic impairment, history of hypersensitivity to sulfonamides

**Dose:** Orally, 2.5 mg once a day, adjusted according to response after 1-4 weeks up to 5 mg once a day.

## 5. Metolazone

It is effective to treat diuretic resistant oedema in combination with loop diuretics (even in renal impairment). It has additional proximal tubular action that inhibits  $\text{PO}_4$  reabsorption.

**Indication:** Hypertension, Oedema

**Adverse effects and caution:** Chest pain, depression, dizziness, drowsiness; take with caution in diabetes mellitus, fluid or electrolyte imbalance, hypercholesterolemia

**Dose:** Hypertension 2.5-5 mg daily and may be increased to 20 mg daily and similarly in oedema 2.5 – 5 mg once daily initially; may be gradually increased to 20 mg daily

**Preparation Available:**

Metolazone 2.5 mg Tab	HI	B	RT
Metolazone 5 mg Tab	HI	B	RT

## Potassium Sparing Diuretics

### 1. Amiloride

It inhibits  $\text{Na/K-ATPase}$ , decreases Ca, Mg and Hydrogen excretion.

**Indication:** Oedema, potassium conservation with thiazide and loop diuretic.

**Adverse effects and cautions:** Hyperkalaemia, hyponatraemia, postural hypotension, diarrhoea, loss of appetite, dizziness. Amiloride should be used with caution in patients with diabetes mellitus, mild renal impairment.

**Contraindication:** Patients with hyperkalemia, moderate renal impairment and elderly patient

**Dose:** Used alone, initially 10 mg daily or 5 mg twice daily, maximum 20 mg daily. With other diuretics, congestive heart failure and hypertension, initially 5-10 mg daily; cirrhosis with ascites, initially 5 mg daily.

## 2. Spironolactone

It competitively binds at aldosterone-dependent Na-K exchange site in distal tubules resulting in increased excretion of Na, Cl and water with retention of K and Hydrogen.

**Indication:** Oedema and ascites in cirrhosis of liver, nephrotic syndrome, congestive heart failure, primary hyperaldosteronism.

**Adverse effects and cautions:** Hyperkalaemia, loss of appetite, nausea, vomiting, gynaecomastia, menstrual irregularities, impotence. Spironolactone should be used with caution in patients with impaired renal function or hepatic disease.

**Contraindication:** Hyponatraemia, hyperkalaemia, Addison's disease, anuria

**Dose:** 100-200 mg daily; increased to 400 mg if required; Child initially 3 mg/kg daily in divided doses.

### Preparation Available:

Spironolactone 12.5 mg Tab	HI	C	RT
Spironolactone 25 mg Tab	HI	C	RT
Spironolactone 50 mg Tab	NA	C	RT
Spironolactone 100 mg Tab	HI	C	RT

## Eplerenone

It is a selective aldosterone receptor antagonist.

**Indication:** Adjunct in chronic mild heart failure

**Adverse effects and caution:** Azotemia, constipation diarrhoea, dizziness, hyperkalaemia, hypotension; caution with elderly.

**Contraindication:** Hyperkalaemia

### **Osmotic Diuretics**

#### **1. Mannitol**

It acts by elevating the osmotic pressure of the glomerular filtrate through tubular reabsorption of water and solute. It is effective only when renal blood flow and glomerular filtration exist.

**Indication:** Cerebral oedema, reduction of intraocular pressure.

**Adverse effects and cautions:** Acidosis, thirst, urinary retention, chills, fever, angina-like chest pain. Extravasation of mannitol should be avoided, local oedema and skin necrosis may occur.

Mannitol should be used during pregnancy only when clearly needed.

**Contraindication:** Severe pulmonary congestion, congestive heart failure, active intracranial bleeding.

**Dose:** By intravenous infusion, diuresis, 50-200 g, over 24 hours, preceded by a test dose of 200 mg/kg by slow intravenous injection. Cerebral oedema, 1 g/kg as a 20% solution given by rapid intravenous infusion.

#### **Preparation Available:**

Mannitol 20 % 100 ml Inj	HI	C	RT
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## Combination Products

### 1. Furosemide and Amiloride

Indication, adverse effect and caution: See under furosemide and amiloride

#### Preparation Available:

Furosemide 40 mg + Amiloride 5 mg Tab	HI		RT
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### 2. Furosemide and Spironolactone

Indication, adverse effect and caution: See under furosemide and spironolactone

#### Preparation Available:

Furosemide 20 mg + Spironolactone 50 mg Tab	HI		RT
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### 3. Telmisartan and Hydrochlorothiazide

Indication, adverse effect and caution: See under Telmisartan and hydrochlorothiazide

Telmisartan 40 mg + Hydrochlorothiazide 12.5 mg Tab	HI	NA	RT
Telmisartan 80 mg + Hydrochlorothiazide 12.5 mg Tab	HI	NA	RT

## 2.10 Centrally acting antihypertensive

### 1. Methyldopa

Methyldopa is decarboxylated to form alpha methylnorepinephrine in the CNS, where it lowers arterial pressure by stimulation of the central alpha receptor.

**Indication:** Hypertension in pregnancy.

**Adverse effects and cautions:** Edema, vomiting, dries mouth, sedation, dizziness, sexual dysfunction, and lupus erythematosus like syndrome. The drug should be used with caution in patients with history of liver disease or renal impairment.

**Contraindication:** Active liver disease and depression.

**Dose:** By mouth, 250 mg 2-3 times daily, gradually increased at intervals of 2 or more days; maximum daily dose 3g.

**Preparation Available**

Methyldopa 250 mg Tab	HI	B	RT
Methyldopa 500 mg Tab	HI	B	RT

## 2. Clonidine

Central sympatholytic via stimulation of central alpha-2 receptors

**Indication:** Hypertension, prevention of recurrent migraine

**Adverse effects and cautions:** Constipation, depression, dizziness, drowsiness, dry mouth, headache, postural hypotension; caution in history of depression, mild to moderate bradyarrhythmia, peripheral vascular disease

**Contraindication:** Severe bradyarrhythmia secondary to second or third degree AV block or sick sinus syndrome

**Dose:** Initially 50 -100 mcg three times a day, increase dose every second or third day, usual maximum dose 1.2 mg daily



### Preparation Available:

Clonidine 100 mcg Tab	HI	C	RT
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### 2.11 Combination Products

#### 1. Amlodipine and Atenolol 25 mg.

**Indication, adverse effect and caution: See under amlodipine and atenolol.**

Amlodipine 2.5 mg + Atenolol 25 mg Tab	HI		RT
Amlodipine 5 mg + Atenolol 50 mg Tab	HI		RT

#### 2. Amlodipine and Losartan

**Indication, adverse effect and caution: See under amlodipine and Losartan.**

Amlodipine 2.5 mg + Losartan 25 mg Tab	HI		RT
Amlodipine 5 mg + Losartan 50 mg Tab	HI		RT

#### 3. Telmisartan and Amlodipine

**Indication, adverse effect and caution: See under Telmisartan and amlodipine.**

Telmisartan 40 mg+Amlodipine 5 mg Tab	HI		RT
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#### 4. S-amlodipine and Losartan

**Indication, adverse effect and caution: See under S amlodipine and Losartan.**

S-Amlodipine 2.5 mg + Losartan 50 mg Tab	NA		RT
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#### 5. Ramipril and Hydrochlorothiazide

**Indication, adverse effect and caution: See under Ramipril and hydrochlorothiazide.**

Ramipril 5 mg + Hydrochlorothiazide 12.5 mg Tab	HI		RT
Ramipril 2.5 mg + Hydrochlorothiazide 12.5 mg Tab	HI		
Ramipril 10 mg + Hydrochlorothiazide 12.5 mg Tab			

## 6. Atenolol and Hydrochlorothiazide

**Indication, adverse effect and caution:** See under atenolol and hydrochlorothiazide

**Preparation Available:**

Atenolol 50 mg + Hydrochlorothiazide 12.5 mg Tab			RT
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## 7. Losartan and Hydrochlorothiazide

**Indication, adverse effect and caution:** See under atenolol and hydrochlorothiazide

**Preparation Available:**

Losartan 50 mg + Hydrochlorothiazide 12.5 mg Tab	HI	NA	RT
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## 2.12 Cardiac Glycoside

### 1. Digoxin

It inhibits Na/K ATPase pump in myocardial cells which subsequently promotes calcium influx via sodium-calcium exchange pump. It prolongs the effective refractory period of AV node and reduces the number of impulses reaching the ventricle and thus allows them to fill well before contraction.

**Indication:** Heart failure, supra ventricular arrhythmias (particularly atrial fibrillation)

**Adverse effects and cautions:** Arrhythmias, diarrhoea, dizziness, loss of appetite, nausea, vomiting and yellow vision The drug should be used with caution in patients with hypothyroidism, acute myocardial infarction (risk of arrhythmia); hypercalcaemia, hypomagnesaemia and Hypokalaemia (risk of digitalis toxicity)

Safe use of drugs during pregnancy has not been established.

**Contraindication:** Second degree AV blocks, ventricular tachycardia or fibrillation.

**Dose:** By mouth, rapid digitalization, 1-1.5 mg in divided doses over 24 hours; less urgent digitalisation, 0.25-0.5 mg daily (higher dose divided). Maintenance, 62.5-500 micrograms daily (higher dose divided) according to renal function and, in atrial fibrillation, on heart rate response, usual range, 125-250 micrograms daily (elderly 125 micrograms)

By intravenous infusion, 0.75-1 mg, (suggested volume 50 ml) over two or more hours (too rapid a rate of administration is associated with nausea and risk of arrhythmias); this is followed by normal maintenance therapy by mouth.

**Preparation Available:**

Digoxin 0.125 mg Tab	HI	C	RT
Digoxin 0.25 mg Tab	HI	C	RT
Digoxin 0.25 mg/ml, 2 ml Inj	HI	C	RT

## 2.13 Adrenergic agonist Agents

### 1. Mephentermine

Mephentermine is a sympathomimetic drug that acts both directly and indirectly. After an intramuscular injection, the onset of action is prompt (within 5 to 15 minutes), and effects may last for several hours. Since the drug releases norepinephrine, cardiac contraction is enhanced and cardiac output and systolic and diastolic pressures usually are increased.

**Indication:** Mephentermine is used to prevent hypotension, which frequently accompanies spinal anesthesia.

**Adverse effects:** are related to CNS stimulation, excessive rises in blood pressure, and arrhythmias.

**Preparation Available:**

Mephentermine 30 mg/ml 10 ml Inj	HI	X	CT
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## 2.14 Drugs used in Cardio-vascular shock

### 1. Dopamine

Endogenous catecholamine; Low dose stimulates mainly dopaminergic receptors, producing renal and mesenteric vasodilation; higher dose stimulates both beta1-adrenergic and dopaminergic receptors, producing cardiac stimulation and renal vasodilation; large dose stimulates alpha adrenergic receptors

**Indication:** cardiogenic shock in myocardial infarction or cardiac surgery.

**Adverse effects and cautions:** Ectopic beats, tachycardia, anginal pain, palpitation, dyspnoea, headache, hypertension and peripheral vasoconstriction.

Dopamine is a potent drug and must be diluted before administration to the patient. Fluids to which it can be added are: sodium chloride injection, 5% dextrose injection, sodium chloride and 5% dextrose injection, ringer lactate solution and 1/6 molar sodium lactate solution.

Dopamine should not be added to any alkaline solution as it will be inactivated.

There has been insufficient experience to establish safety and efficacy of dopamine in children. The drug should be used in pregnant women when the possible benefits justify the possible risk to the foetus.

Dopamine may cause peripheral ischemia in patients with a history of occlusive vascular disease.

**Contraindication:** Hypersensitivity to dopamine, pheochromocytoma, ventricular fibrillation, uncorrected tachyarrhythmias

**Dose:** By intravenous infusion, 2-5 micrograms/kg/minute initially.

**Preparation Available:**

Dopamine 200 mg/5 ml Inj	HI	C	RT
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## 2. Dobutamine

It is a strong beta 1 and weak beta2/alpha effects resulting in increased cardiac contractility with little effect on rate.

**Indication:** Inotropic support in infarction, cardiac surgery, septic shock and cardiogenic shock.

**Adverse effects and cautions:** Tachycardia, increase in systolic blood pressure, phlebitis.

The drug should be used with caution in severe hypotension, complicating cardiogenic shock.

**Contraindication:** Pheochromocytoma

**Dose:** By intravenous infusion, 2.5 – 10 micrograms/kg/minute, adjusted according to response.

**Preparation Available:**

Dobutamine 50 mg/ml, 5 ml Inj	HI	B	RT
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## 2.15. Drug affecting Blood and Blood formation

### Coagulants and Anticoagulants

Anticoagulants have names ending in –parin; heparin.

#### 1. Phytonadione (Vitamin k)

It promotes hepatic synthesis of clotting factors II, VII, IX, X.

**Indication:** Antagonists to warfarin, prophylaxis against haemorrhagic disease of newborn

**Adverse effects and cautions:** Hypersensitivity characterised by flushing of the face, bronchospasm, dyspnoea, hypotension. Injection should be given very slowly because of risk of vascular collapse.

**Preparation Available:**

Phytonadione 10 mg/ml 1ml Inj	HI	C	CT
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#### 2. Heparin

Heparin is an anticoagulant drug which acts by catalysing the inhibition of coagulation factors including thrombin, IXa and Xa by antithrombin. The dose of the drug should be guided by the measurement of APTT (activated partial thromboplastin time).

**Indication:** Deep-vein thrombosis, myocardial infarction, mild to moderate pulmonary embolism  
Although a low molecular weight heparin is generally preferred for routine use, heparin (unfractionated) can be used in those at high risk of bleeding because its effect can be terminated rapidly by stopping the infusion.

**Adverse effects and cautions:** Haemorrhage, thrombocytopenia, hypersensitivity reaction and osteoporosis (after prolonged use); low body-weight (increased risk of bleeding)

**Contraindication:** Presence of active bleeding from any site, haemophilia, purpura and thrombocytopenia.

**Dose:** Prophylaxis of deep-vein thrombosis and pulmonary embolism, by subcutaneous injection, 5 000 units 2 hours before surgery, then every 8-12 hours for 7 days or until patient is ambulant;

Treatment of deep-vein thrombosis and pulmonary embolism, by intravenous injection, loading dose of 5 000 units (75 units/kg) followed by continuous infusion of 18 units/kg/hour or by subcutaneous injection of 15,000 units every 12 hours (laboratory monitoring essential - preferably on a daily basis).

**Preparation Available:**

Heparin 25000 IU/ml, 5 ml Inj	HI	C	RT
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### 3. Enoxaparin

Low molecular weight heparin is preferred over heparin (unfractionated) in the prevention of venous thromboembolism because they are as effective and they

have a lower risk of heparin induced thrombocytopenia. They have a long duration of action. The standard prophylactic regimen does not require monitoring.

**Indication:** Prophylaxis of deep-vein thrombosis in medical and surgical patients, treatment of deep-vein thrombosis and pulmonary embolism.

**Adverse effects and cautions:** See under heparin

**Dose:** Prophylaxis of deep-vein thrombosis especially in surgical patients, by subcutaneous injection, moderate risk, 20 mg (2000 units) about 2 hours before surgery then 20 mg (2000 units) every 24 hours for 7-10 days; high risk (e.g. Orthopaedic surgery), 40 mg (4000 units) 12 hours before surgery, then 4000 units every 24 hours for 7-10 days.

Prophylaxis of deep-vein thrombosis in medical patients by subcutaneous injection, 4000 units every 24 hours for at least 6 days until patient ambulant (maximum 14 days).

**Preparation Available:**

Enoxaparin 40 mg Inj	HI	B	RT
Enoxaparin 60 mg Inj	HI	B	RT

#### 4. Warfarin

It interferes with hepatic synthesis of vitamin K-dependent clotting factors II, VII, IX, and X as well as protein C and S.

**Indication:** Prophylaxis of embolism in rheumatic heart disease and atrial fibrillation, prophylaxis and treatment of venous thrombosis and pulmonary embolism, prophylaxis with prosthetic heart valve.



**Adverse effects and cautions:** Haemorrhage, nausea, vomiting and abdominal cramps.

The drug should be used with caution in any condition where risk of haemorrhage is present. The baseline prothrombin time should be determined wherever possible.

Warfarin may lead to calciphylaxis (patients should advise to consult if they develop a painful skin rash)

**Contraindication:** Ulcerations of gastro-intestinal tract, severe hypertension, bacterial endocarditis, pregnancy.

**Dose:** Initial dose, 10 mg for 2 days, subsequent doses, 3-9 mg daily, in accordance with the prothrombin activity of blood.

**Preparation Available:**

Warfarin 1 mg Tab	HI	X	RT
Warfarin 2 mg Tab	HI	X	RT
Warfarin 3 mg Tab	HI	X	RT
Warfarin 5 mg Tab	HI	X	RT

**Antiplatelet drugs**

**1. Aspirin**

It inhibits synthesis of prostaglandin by cyclooxygenase; inhibits platelet aggregation

**Indication:** Prophylaxis of cerebrovascular disease or myocardial infarction

**Adverse effects and cautions:** Adverse effects in most cases are dose related and are relatively rare when low doses are used. Gastric erosions with gastrointestinal bleeding and hypersensitivity reactions with skin rashes. Asthma may be provoked in some individuals.

**Contraindication:** Children under 16 years, breast-feeding mothers, active peptic ulcer, haemophilic and other bleeding disorders.

**Dose:** Prophylaxis of cerebrovascular disease or myocardial infarction, 75-300 mg daily. A single dose of 150- 300 mg is given as soon as possible after an ischemic event, preferably dispersed in water or chewed.

**Preparation Available:**

Aspirin 75 mg Tab	HI	NA	RT
Aspirin 150 mg Tab	HI	NA	RT

## 2. Clopidogrel

It inhibits ADP induced pathways for platelet aggregation.

**Indication:** Prevention of ischemic events with symptomatic ischemic disease, acute coronary syndrome without ST segment elevation (given with aspirin).

**Adverse effects and cautions:** Diarrhoea, dyspepsia, abdominal pain, bleeding disorders (including gastrointestinal and intracranial).

The drug should be used with caution in pregnancy, liver impairment, renal impairment; risk of increased bleeding from trauma, surgery or other pathological conditions.

**Dose:** Acute coronary syndrome, initially 300 mg then 75 mg daily (with aspirin).

**Preparation Available:**

Clopidogrel 75 mg Tab	HI	B	RT
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### 3. Cilostazol

It inhibits phosphodiesterase III causing cAMP to increase and inhibit platelet aggregation

**Indication:** Intermittent claudication in patients without rest pain and no peripheral tissue necrosis, peripheral vascular disease.

**Adverse effects and cautions:** Abdominal pain, headache, diarrhoea, headache, arrhythmia

**Contraindication:** active peptic ulcer, congestive heart failure, history of severe tachyarrhythmia, myocardial infarction in previous six months.

**Dose:** 100 mg twice daily, to be taken 30 minutes before food.

### Thrombolytic Agents / Fibrinolytics

They work by activating the natural fibrinolytic system.

#### 1. Streptokinase

Streptokinase produced by beta-hemolytic streptococci, promotes plasmin formation, which degrades fibrin clots as well as fibrinogen and other plasma proteins including pro-coagulant factors V and VIII.

**Indication:** Pulmonary embolism, deep venous thrombosis, acute myocardial infarction, central retinal venous or arterial thrombosis.

**Adverse effects and cautions:** Nausea, vomiting, bleeding, hypotension. The drug is **Contraindicated** in recent hemorrhage, trauma or surgery, severe hypertension and active internal bleeding.

Safety and efficacy of streptokinase in children and pregnancy have not been established.

Streptokinase is strongly antigenic, repeated administration elicits antibodies which diminish the effect and may cause allergic reactions.

**Dose:** By intravenous infusion, in deep vein thrombosis, pulmonary embolism, retinal thrombosis, 250,000 units over 30 minutes, then 100,000 units every hour for up to 12-72 hours according to condition.

Myocardial infarction: 1,500,000 units over 60 minutes.

**Preparation Available:**

Streptokinase 1.5 M IU Inj		C	RT
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## 2. Tenecteplase

**Indication:** Acute myocardial infarction.

**Adverse effects and cautions:** minor bleeding, nausea, vomiting, fever, allergic reaction.

**Contraindication:** Active bleeding, recent intracranial or intraspinal surgery or trauma.

**Dose:** 30–50 mg (max. per dose 50 mg), dose to be given over 10 seconds and Initiated within 6 hours of symptom onset, dose varies according to body weight, consult product literature.

## 3. Fondaparinux

It is a synthetic pentasaccharide that inhibits activated factor X, which inhibits thrombin formation.

**Indication:** Treatment of deep vein thrombosis and pulmonary embolism, prophylaxis of venous thromboembolism, treatment of unstable angina, superficial vein thrombosis.

**Adverse effects and cautions:** Anaemia, bleeding, purpura, fever, nausea.

**Contraindication:** Active bleeding, bacterial endocarditis.

## Antifibrinolytic drugs

### 1. Etamsylate

**Indication:** Blood loss in menorrhagia.

**Adverse effects and cautions:** Headache, rashes, nausea, vomiting. Exclude structural or histological causes of menorrhagia or fibroids causing distortion of the uterine cavity before initiating treatment.

**Contraindication:** Acute Prophyria.

**Dose:** 500 mg 4 times daily during menstruation.

**Preparation Available:**

Etamsylate 500 mg Tab	HI	Data is limited	RT
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### 2. Tranexamic Acid

**Indication:** Menorrhagia, epistaxis, thrombolytic overdose.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, disturbances in colour vision. The drug should be used with caution in renal impairment and pregnancy.

**Contraindication:** Severe renal impairment, thromboembolic disease, history of convulsion,

**Dose:** Menorrhagia (initiated when menstruation started) 1 g 3 times daily for upto 4 days, maximum 4 g daily, Local fibrinolysis, 15-25 mg/kg 2-3 times daily.

### Preparation Available:

Tranexamic acid 500 mg Tab	HI	B	RT
Tranexamic acid 500 mg Inj	HI	B	RT

### Blood viscosity reducer

#### 1. Pentoxifylline / Oxpentifylline

It improves blood flow by decreasing blood viscosity and increasing RBC flexibility.

**Indication:** Peripheral vascular disease, venous leg ulcer, intermittent claudication.

**Adverse effects and cautions:** Nausea, vomiting, angina, and anaphylaxis, anorexia  
**Contraindication:** Recent retinal or cerebral haemorrhage.

**Dose:** 400 mg two to three times a day.

### Preparation Available:

Pentoxifylline 400 mg Tab	HI	C	RT
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## 2.16. Lipid-regulating Drugs

### 1. Atorvastatin

It inhibits rate-limiting steps in cholesterol biosynthesis by competitively inhibiting HMG-CoA reductase.

**Indication:** Primary hypercholesterolemia, homozygous or heterozygous familial hypercholesterolemia or mixed hyperlipidemia in patients who have not responded adequately to diet and other appropriate measures.

**Adverse effects and cautions:** Headache, chest pain, arthralgia, anorexia, epistaxis, hyperglycemia, pharyngolaryngeal pain.

The drug should be used with caution in patients

with liver disease or with a high alcohol intake. Liver function tests should be carried out before and within 1-3 months of starting treatment and thereafter at intervals of 6 months for 1 year, unless indicated sooner by signs or symptoms suggestive of hepatotoxicity.

The drug is contraindicated in active liver disease.

**Dose:** Primary hyperlipidaemia and combined hyperlipidaemia, usually 10 mg once daily; if necessary may be increased at intervals of at least 4 weeks to maximum 80 mg once daily; child 10-13 years usually 10 mg once daily. Familial hypercholesterolaemia, initially 10 mg daily, increased at intervals of at least 4 weeks to 40 mg once daily; if necessary, further increased to maximum 80 mg once daily; Child 10-13 years up to 20 mg once daily.

**Preparation Available:**

Atorvastatin 5 mg Tab	HI	NA	RT
Atorvastatin 10 mg Tab	HI	NA	RT
Atorvastatin 20 mg Tab	HI	NA	RT
Atorvastatin 40 mg Tab		NA	RT

## 2. Simvastatin

**Indication:** See under atorvastatin

**Adverse effects and cautions:** See under atorvastatin, and also dizziness, jaundice, pancreatitis. The drug should also be used with caution in impaired renal function.

**Dose:** Primary hypercholesterolemia, combined hyperlipidemia, 10-20 mg daily at night, adjusted at intervals of at least 4 weeks. Homozygous familial

hypercholesterolemia, 40 mg daily at night or 80 mg daily in 3 divided doses (with largest dose at night).

### 3. Rosuvastatin

**Indication:** See under atorvastatin

**Adverse effects and caution:** Myalgia, arthralgia, proteinuria, hematuria; use with caution in patient consuming large amounts of ethanol or have a history of liver disease.

**Dose:** Hypercholesterolemia 10-20 mg daily initially and may exceed 40 mg per day.

**Preparation Available:**

Rosuvastatin 5 mg Tab	HI	X	RT
Rosuvastatin 10 mg Tab	HI	X	RT
Rosuvastatin 20 mg Tab	HI	X	RT

### 4. Fenofibrate

It increases VLDL catabolism, fatty acid oxidation and elimination of triglyceride rich particles by enhancing synthesis of lipoprotein lipase, which in turn result in 30-60% decrease in total plasma triglycerides; HDL may increase modestly in some hypertriglyceridemic patients

**Indication:** severe hypertriglyceridemia.

**Adverse effects and cautions:** Gastro-intestinal disturbances, rash, urticaria, fatigue, headache, impotence. The drug should be used with caution in renal impairment. Liver function tests recommended every 3 months for the first year.

Combination of a fibrate with statin increases the risk



of muscle effects (especially rhabdomyolysis) and should be used with caution

**Contraindication:** Pregnancy, breast-feeding, severe hepatic impairment, Gallbladder disease, pancreatitis (unless due to severe hypertriglyceridemia)

**Dose:** Initially 200 mg daily in divided doses.

**Preparation Available:**

Fenofibrate 160 mg Tab	HI	C	RT
Fenofibrate 200 mg Tab	HI	C	RT

### 5. Ezetimibe

Ezetimibe inhibits the intestinal absorption of cholesterol. If used alone, it has a modest effect on lowering LDL- cholesterol, with little effect on other lipoproteins.

**Indication:** Adjunct to dietary measures and statin treatment in primary hypercholesterolaemia.

**Adverse effect and caution:** Fatigue, headache, myalgia, GI disturbances; caution in patient with mild hepatic impairment or severe renal impairment.

**Dose:** 10 mg daily for hypercholesterolemia.

**Preparation Available:**

Ezetimibe 10 mg Tab		C	RT
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### Combination Products

#### 1. Atorvastatin and Ezetimibe

**Indication, adverse effect and caution:** See under atorvastatin and ezetimibe

**Preparation Available**

Atorvastatin 10 mg + Ezetimibe 10 mg Tab			RT
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## Chapter-3: Drugs Acting on the Respiratory System

### 3.1. Drugs for Airways disease and obstruction

#### 1. Methylxanthines

It increases tissue concentration of cAMP by inhibiting Phosphodiesterase enzyme which ultimately induces release of catecholamine from the adrenal medulla cells.

#### 2. Aminophylline

**Indication:** Acute severe asthma, reversible airways obstruction.

**Adverse effects and cautions:** Tachycardia, nausea, vomiting, cardiac arrhythmias, fall in blood pressure and sometimes even convulsions.

Rapid injection may result in sudden death from dysrhythmias. Take with caution in hypertension, hyperthyroidism, epilepsy, and peptic ulcer – risk of hypokalemia.

**Preparation Available:**

Aminophylline 250 mg/ml, 10 ml Inj	HI	C	RT
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#### 3. Theophylline and allied preparation

Etophylline is the ethyl salt of theophylline. Doxofylline is a theophylline congener having dioxane group at 7 positions of theophylline.

**Indication:** See under aminophylline.

**Adverse effects and cautions:** Arrhythmias, diarrhoea, gastric irritation, headache, convulsion, CNS

stimulation; caution in cardiac arrhythmias or cardiac disease, elderly, hypertension, hyperthyroidism, seizure.

The plasma theophylline concentration is increased in heart failure, hepatic impairment, and in viral infections. The plasma theophylline concentration is decreased in smokers, and by alcohol consumption. Measure the serum level and withhold the subsequent doses if the patient develops signs and symptoms of theophylline toxicity.

**Dose:** 125 mg 3-4 times daily after food, increased to 250 mg if required; Child 7-12 years 62.5-125 mg 3-4 times daily.

**Preparation Available:**

Theophylline 400 mg Tab	HI	C	RT
Etophylline 115 mg + Theophylline 35 mg Tab			RT
Doxofylline 200 mg Tab			
Doxofylline 400 mg Tab	HI	C	RT

### 3.2. Adrenergic Drugs

#### 1. Salbutamol (Albuterol)

This is a short-acting selective beta-2 agonist and has minimal action on the heart.

**Indication:** Asthma, prophylaxis of allergen or exercise-induced bronchospasm.

**Adverse effects and cautions:** Muscle cramps, dizziness, headache, tremor and palpitation. Drugs should be used with caution in hyperthyroidism, hypertension and diabetes mellitus.

**Dose:** By mouth, 4 mg (elderly and sensitive patient initially 2 mg) 3-4 times daily; maximum single dose 8 mg, Child under 2 years 100 micrograms/kg 4 times daily; 2-6 years 1-2 mg 3-4 times daily; 6-12 years 2 mg.

By aerosol inhalation, 100-200 micrograms (1-2 puffs); for persistent symptoms up to 3-4 times daily; Child 100 micrograms (1 puff) increased to 200 micrograms (2 puffs) if necessary.

Prophylaxis in exercise induced bronchospasm, 200 micrograms (2 puffs); Child 100 micrograms (1 puff).

By inhalation of a powder, 200-400 micrograms; for persistent symptoms up to 3-4 times daily; Child 200 micrograms. Prophylaxis in exercise-induced bronchospasm (powder), 400 micrograms; Child 200 micrograms. By inhalation of nebulised solution, adult and CHILD over 18 months, chronic bronchospasm unresponsive to conventional therapy and severe acute asthma, 2.5 mg, repeated up to 4 times daily, increased to 5 mg if necessary, Child 2.5 mg increased to 5 mg if required.

**Preparation Available:**

Salbutamol 2 mg/5ml ,100ml syp	HI	C	RT
Salbutamol 5 mg/ 2.5ml repulse	HI	C	RT
Salbutamol 2.5 mg/ 2.5ml repulse		C	RT
Salbutamol 2 mg/+Bromhexine 4mg/5ml, 100 ml equivalent to Beta-2	HI	C	RT
Salbutamol 100 mcg/puff, 200 MDI	HI	C	RT
Salbutamol 5 mg/ml, 15 ml R/Sol	HI	C	RT

## 2. Salmeterol

It is a long acting selective beta-2 agonist.

**Indication:** Reversible airways obstruction (including nocturnal asthma and prevention of exercise-induced bronchospasm) in patients requiring long term regular bronchodilator therapy, COPD

**Adverse effects and cautions:** See under salbutamol. It can produce paradoxical bronchospasm. It should not be used for the relief of an acute attack.

**Dose:** By inhalation, asthma, 50 micrograms twice daily, up to 100 micrograms twice daily in more severe cases; Child over 4 years, 50 micrograms twice daily. Chronic obstructive pulmonary disease, 50 micrograms twice daily.

## 3. Terbutaline

**Indication:** See under salbutamol.

**Adverse effects and cautions:** See under salbutamol.

**Dose:** By mouth, 2.5-5 mg 2-3 times daily; Child 75 micrograms/kg 3 times daily.

By subcutaneous, intramuscular or slow intravenous injection 250-500 micrograms up to 4 times daily; Child 2- 15 years 10 micrograms/kg to a maximum of 300 micrograms.

By continuous intravenous infusion as a solution containing 3-5 micrograms/ml, 1.5-5 micrograms/minute for 8- 10 hours, reduce dose for children.

**Preparation Available:**

Terbutaline 1.5mg + Bromhexine 4mg/5ml, 60 ml		C	RT
Terbutaline 2.5mg + Bromhexine 8mg/5ml, 100 ml	HI	C	RT

#### 4. Formoterol

Long action beta-2 agonist.

**Indication:** Reversible airway obstruction, nocturnal asthma, prophylaxis of exercise induced bronchospasm. Adverse effects and caution: Nausea, Pruritus, taste disturbances; risk of transient hypokalemia.

#### 5. Levosalbutamol

Levosalbutamol is an (R)-salbutamol attributed for bronchodilator effects. Levosalbutamol and Salbutamol (racemic mixture of (R) and (S) enantiomer of salbutamol) both showed equivalent time –dependent bronchodilator response.

**Indication, Adverse effects and cautions:** See under salbutamol

### 3.3 Corticosteroids

The mode of action seems to be manifold. They decrease vascular permeability, modulation of cytokine and chemokine production.

They do not directly relax airway smooth muscle and thus have little effects on acute bronchoconstriction. Alleviation of symptoms usually occurs 3-7 days after inhalation. Beclomethasone, budesonide and fluticasone are equally effective. Inhaled corticosteroids

are recommended for prophylactic treatment of asthma when patients are using a beta-2 agonist more than 3 times a week or if symptoms disturb sleep more than once a week or if the patient has suffered exacerbations in the last 2 years requiring a systemic corticosteroid or a nebulised bronchodilator.

An acute attack of asthma should be treated with a short course of an oral corticosteroid starting with a high dose.

### 1. Budesonide

**Indication:** Prophylaxis of asthma,

**Adverse effects and cautions:** inhaled corticosteroids have considerably fewer systemic effects than oral corticosteroids. Oropharyngeal candidiasis, cough, adrenal suppression (usually with higher doses of inhaled drug and in children), growth retardation (usually with oral drug and in children), glaucoma (prolonged high dose of inhaled drug), cataract (inhaled drug).

An inhaled corticosteroid should be used cautiously in active or quiescent tuberculosis, autoimmune hepatitis.

**Dose:** By inhalation of nebulised suspension, when starting treatment, during periods of severe asthma and while reducing or discontinuing oral corticosteroid, 1-2 mg twice daily; Child 3 months – 12 years, 0.5-1 mg twice daily. Maintenance is usually half above doses.

**Preparation Available:**

Budesonide 100 mcg MDI
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HI	NA	RT
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Budesonide 200 mcg MDI	HI		
Budesonide 100 mcg R/C,30 Rotacap	HI	NA	RT
Budesonide 200 mcg R/C, 30 Rotacap	HI	NA	RT
Budesonide 400 mcg R/C,30 Rotacap	HI	NA	RT

## 2. Beclomethasone

**Indication:** Prophylaxis of asthma.

**Adverse effects and cautions:** See under budesonide.

**Dose:** By aerosol inhalation, 200 µg twice daily; Child, 50-100 micrograms 2-4 times daily.

**Preparation Available:**

Beclomethasone 100 mcg, 30 Rotacap		C	RT
Beclomethasone 200 mcg, 30 Rotacap	HI	C	RT
Beclomethasone 400 mcg, 30 Rotacap	HI	C	RT
Beclomethasone 200 mcg MDI	HI	C	RT
Beclomethasone 400 mcg MDI		C	RT
Beclomethasone dipropionate 50mcg/ dose unit, 200 Nasal spray	HI	C	RT

## 3. Fluticasone

**Indication:** Prophylaxis of asthma,

**Adverse effects and cautions:** Arthralgia, dyspepsia, nasopharyngitis, headache, bronchitis, sinusitis; not indicated for use as rescue therapy for acute bronchospasm.

**Preparation Available:**

Fluticasone 25 mcg/puff MDI		C	RT
Fluticasone 50 mcg/puff MDI		C	RT
Fluticasone 125 mcg/puff MDI		C	RT



### 3.4 Antimuscarinic Drugs

#### 1. Ipratropium

**Indication:** Reversible airway obstruction, bronchospasm, asthma.

**Adverse effects and cautions:** Dry mouth, headache, constipation, tachycardia.

The drug should be used with caution in patients with acute angle-closure glaucoma and prostatic hyperplasia.

**Dose:** By aerosol inhalation, 20-40 micrograms, 3-4 times daily; Child up to 6 years 20 micrograms 3 times daily, 6-12 years, 20-40 micrograms 3 times daily.

By inhalation of powder 40 micrograms 3-4 times daily; Child under 12 years, not recommended.

**Preparation Available:**

Ipratropium 500 mcg/2 ml respules	HI	B	RT
Ipratropium 400 mcg R/C	HI	B	RT

#### 2. Tiotropium

Long acting antimuscarinic agents inhibit M3-receptors at smooth muscle.

**Indication:** Treatment of COPD, asthma.

**Adverse effects and cautions:** Epistaxis, oropharyngeal candidiasis, taste disturbances; Not for acute use, not a rescue medication, immediate hypersensitivity reactions (eg angioedema, itching, rash); stop treatment immediately.

**Preparation Available:**

Tiotropium 18 mcg R/C	HI	C	RT
Tiotropium 18 mcg/puff MDI		C	RT

## Combination Preparation

### 1. Budesonide and Formoterol

**Indication, Adverse effects and cautions: See under budesonide and formoterol**

Budesonide 100 mcg + Formoterol 6 mcg Inhaler	HI	NA	RT
Budesonide 200 mcg + Formoterol 6 mcg/puff MDI	HI		RT
Budesonide 200 mcg + Formoterol 6 mcg R/C	HI		RT
Budesonide 400 mcg + Formoterol 6 mcg MDI	HI		RT
Budesonide 400 mcg + Formoterol 6 mcg R/C	HI		RT

### 2. Salmeterol and Fluticasone

**Indication, Adverse effects and cautions: See under salmeterol and fluticasone**

Salmeterol 25 mcg + Fluticasone 250 mcg MDI		NA	RT
Salmeterol 50 mcg + Fluticasone 250 mcg R/C	HI		RT
Salmeterol 50 mcg + Fluticasone 500 mcg R/C	HI		RT

### 3. Levosalbutamol and Beclomethasone

**Indication, Adverse effects and cautions: See under levosalbutamol and beclomethasone**

Levosalbutamol 200mcg+Beclomethasone 200 mcg R/C			RT
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Levosalbutamol 100mcg+ Beclomethasone 100 mcg R/C			RT
Levosalbutamol 50 mcg + Beclomethasone 50 mcg MDI			RT

### 3.5 Antitussives (Cough suppressants)

#### 1. Codeine

It increases the cough threshold. The addictive liability associated with codeine is low.

**Indication:** nonproductive cough, acute diarrhoea, mild to moderate pain.

**Adverse effects and cautions:** Nausea, constipation, respiratory depression in sensitive patients or in large doses. The drug should be used with caution in patients with asthma, severe prostatic hypertrophy and hepatic disease.

The drug should be avoided in children less than 1 year.

**Contraindication:** Acute ulcerative colitis, children under 18 years who undergo the removal of tonsils or adenoids for the treatment of obstructive sleep apnoea.

**Dose:** Mild to moderate pain, 30-60 mg every 4 hours when necessary, to a maximum of 240 mg daily. Child 1- 12 years, 3 mg/kg daily in divided doses.

Dry or painful cough 15-30 mg 3-4 times daily, Child 5-12 years, 7.5-15 mg 3-4 times daily.

#### Preparation Available:

Codeine 15 mg Tab	HI	C	RT
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#### 2. Dextromethorphan

The antitussive activity of the drug is about equal to that of codeine. It centrally elevates the threshold for

coughing. Its activity persists for 5-6 hours. The drug produces no analgesia or addiction or CNS depression.

**Indication:** Dry cough.

**Adverse effects and cautions:** Nausea and dizziness.

**Dose:** 10-20 mg every four hours or 30 mg every 6-8 hours; Child, 6-12 years 5-10 mg every 4-8 hours to a maximum of 60 mg in 24 hours, and 2-6 years 2.5-5 mg every 4 hours, to a maximum of 30 mg in 24 hours.

**Preparation Available:** See under combination products

### 3. Levodropropizine

It is an effective antitussive drug in children and adults, with statistically significant better overall efficacy outcomes vs central antitussive drugs (codeine, cloperastine, dextromethorphan)

**Indication:** Peripheral antitussive.

**Adverse effects and cautions:** Nausea, vomiting, headache.

**Preparation Available:**

Levodropropazine 30mg/5ml, 100 ml Syp	HI	D	RT
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### 3.6. Mucolytic Agents

These drugs facilitate expectoration by reducing sputum viscosity and elasticity.

#### 1. Bromhexine

It has been found to improve ventilatory capacity and reduce the frequency of exacerbation in chronic

bronchitis. However, it is not known which patients are most likely to benefit.

**Indication:** Reduction of sputum viscosity in COPD.

**Adverse effects and cautions:** gastrointestinal irritation.

**Dose:** By mouth, 8 to 16 mg three times daily; Child under 5 years 4 mg twice daily, 5-12 years 4 mg four times daily.

## 2. Carbocisteine

**Indication:** Reduction of sputum viscosity in COPD.

**Adverse effects and cautions:** Skin rashes, occasional gastro-intestinal irritation; avoid in first trimester of pregnancy; used with caution in history of peptic ulceration

**Contraindication:** Acute peptic ulceration.

**Dose:** 750 mg 3 times daily initially; then 1.5 g daily in divided doses; Child 2-5 years 62.5-125 mg 4 times daily, 6-12 years 250 mg 3 times daily.

## 3. Ambroxol

**Indication:** All forms of tracheobronchitis, emphysema with bronchitis, chronic inflammatory pulmonary condition.

**Adverse effects and cautions:** occasional GI disturbances.

**Dose:** 750 mg 3 times daily initially; then 1.5 g daily in divided doses; Child 2-5 years 62.5-125 mg 4 times daily, 6-12 years 250 mg 3 times daily.

### 3.7 Expectorants

#### 1. Guaifenesin or Guaifenesin

It reduces the viscosity of secretion by increasing amount of respiratory tract fluid and irritates gastric mucosa.

**Indication:** Cough due to minor throat and bronchial irritation.

**Adverse effects and cautions:** Dizziness, drowsiness, stomach pain, nausea, vomiting; notify health-care practitioner if no improvement within 7 days of self-medication.

**Dose:** Cough, 100 to 400 mg 3 to 4 times a day not exceed 2.4 gm per day.

### 3.8. Leukotriene receptor antagonist

#### 1. Montelukast

**Indication:** Prophylaxis of asthma, symptomatic relief of seasonal allergic rhinitis in patients with asthma.

**Adverse effects:** Abdominal pain, headache, hyperkinesia (in young children), thirst.

**Dose:** Symptomatic relief of seasonal allergic rhinitis in patients with asthma, Child 15–17 years: 10 mg once daily, dose to be taken in the evening, Adult: 10 mg once daily, dose to be taken in the evening.

#### **Preparation Available:**

Montelukast 4 mg Tab		B	RT
Montelukast 10 mg Tab	HI	B	RT

## Chapter 4: Drugs Acting on Central Nervous System

### Analgesics

#### 4.1 Opioid and Antagonists

Opioid analgesics are used to relieve moderate to severe pain particularly of visceral origin. Regular use of a potent opioid may be appropriate for certain cases of chronic non-malignant pain.

Codeine

See under antitussives.

#### 1. Morphine

Peak analgesia occurs within 50-90 minutes following subcutaneous injection, 30-60 minutes after intramuscular injection and 20 minutes after intravenous injection. Analgesia may be maintained for up to 7 hours.

**Indication:** Premedication with anesthetics, chronic pain, pain management in palliative care and Myocardial infarction, cough in terminal disease.

**Adverse effects and cautions:** Respiratory depression, postural hypotension, nausea, vomiting, constipation; caution in those with asthma, hypotension, moderate to severe renal impairment, decreased respiratory reserve.

**Dose:** Acute pain, by subcutaneous or intramuscular injection, 10 mg every 4 hours; Child up to 1 month 150 micrograms/kg, 1-12 months 200 micrograms/kg, 1-5 years 2.5-5 mg, 6-12 years 5-10 mg. By slow intravenous injection  $\frac{1}{4}$ - $\frac{1}{2}$  corresponding intramuscular

dose. Myocardial infarction, by slow intravenous injection (2 mg/minute), 10 mg followed by further 5-10 mg if necessary.

**Preparation Available:**

Morphine 15 mg/ml, 2 ml Inj	HI	C	RT
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## 2. Naltrexone

It is an opioid antagonist. It is much more effective than naloxone by the oral route and has longer duration of action.

**Indication:** treatment of compulsive users of opioids, alcohol dependence after a successful withdrawal.

**Adverse effects and cautions:** Nausea, vomiting, anxiety, and abdominal pain, headache, sleeping difficulty, loss of appetite, diarrhea, constipation, delayed ejaculation, joint and muscle pain.

The drug should be used with caution in hepatic or renal impairment, pregnancy and breast-feeding. Liver function tests should be done before and during treatment.

Naltrexone should be stopped if drinking continues for 4 -6 weeks after starting treatment.

**Contraindication:** In patients currently dependent on opioids, acute hepatitis or liver failure.

**Dose:** 25 mg initially then 50 mg daily; the total weekly dose may be divided and given on 3 days of the week for improved compliance; Child not recommended.

**Preparation Available:**

Naltrexone 50 mg Tab	HI	C	RT
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### 3. Pentazocine

It has analgesic and has both agonist and antagonistic effects. Following intravenous administration, the onset of analgesia occurs within 2-3 minutes, peak analgesia within 15 minutes and the duration of analgesia is about 1 hour.

**Indication:** Moderate to severe pain. It is not recommended in patients with myocardial infarction as it increases work load on the heart.

**Adverse effects and cautions:** Similar to morphine. Euphoria, sedation and nausea occur most frequently but vomiting occurs less frequently than with morphine.

**Contraindication:** See under morphine.

**Dose:** By subcutaneous, intramuscular or intravenous injection, moderate pain, pentazocine 30 mg, severe pain 45 60 mg every 3-4 hours. Children over 1 year, by subcutaneous or intramuscular injection, up to 1 mg/kg, by intravenous injection up to 500 micrograms/kg.

### 4. Pethidine

Pethidine appears to have a more rapid onset (within 10 minutes) and shorter duration of action than morphine. Peak analgesia occurs about 40-60 minutes after subcutaneous administration and 30-50 minutes after intramuscular injection. Analgesia may be maintained for 2-4 hours following subcutaneous or intramuscular administration.

**Indication:** Moderate to severe pain and obstetric analgesia.

**Adverse effects and caution:** Respiratory Depression, Seizures, Drowsiness or sedation.

**Cautions:** See under morphine. It may increase ventricular rate through a vagolytic action, the drug should be used with caution in patients with atrial flutter and other supra ventricular tachycardia.

**Dose:** By subcutaneous or intramuscular injection, 25-100 mg, repeated after 4 hours; Child by intramuscular injection, 0.5-2 mg/kg. By slow intravenous injection 25-50 mg repeated after 4 hours. Obstetric analgesia, by subcutaneous or intramuscular injection, 50-100 mg, repeated 1-3 hours later if necessary; maximum 400 mg in 24 hours.

**Preparation Available:**

Pethidine 50 mg/ml 1 ml Inj	HI	B	RT
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## 5. Tramadol

It produces analgesia by opioid effect and by reuptake inhibition of norepinephrine and serotonin. It is less effective than morphine or pethidine in severe pain. Analgesia begins within an hour of oral dosing and peak analgesia occurs within 2-3 hours. The duration of analgesia is about 6 hours.

**Indication:** Moderate to severe pain, obstetric analgesia, postoperative pain.

**Adverse effects and cautions:** Drowsiness and Dizziness, Nausea and vomiting, Constipation, Withdrawal and dependency.

**Contraindication and cautions:** See under morphine.

**Dose:** By mouth, 50-100 mg not more often than every 4 hours, total of more than 400 mg not usually required. By intramuscular or intravenous injection (over 2-3 minutes) or by intravenous infusion, 50-100 mg every 4-6 hours.

**Preparation Available:**

Tramadol 50 mg Tab	HI	C	RT
Tramadol 100 mg Tab		C	RT
Tramadol 50 mg/ml 1 ml Inj	HI	C	RT

## 6. Butorphanol

**Indication:** Preoperative and pre anaesthesia, labour pain,

**Adverse effects and cautions:** Sedation, dizziness, nasal congestion, nausea or vomiting, anxiety

**Contraindication** and cautions: Opioid dependence, respiratory depression, respiratory failure

**Dose:** By mouth, 50-100 mg not more often than every 4 hours, total of more than 400 mg not usually required. By intramuscular or intravenous injection (over 2-3 minutes) or by intravenous infusion, 50-100 mg every 4-6 hours.

**Preparation Available:**

Butorphanol tartrate 2 mg/ml 1ml Inj		C	CRT
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## 7. Fentanyl

**Indication:** Chronic intractable pain not treated with a strong opioid analgesic, analgesia and enhancement of anaesthesia, breakthrough pain in patients receiving opioid therapy for chronic cancer pain.

**Adverse effects and cautions:** Abdominal pain, asthenia, anorexia, anxiety, appetite change, application site reaction, diarrhoea, dyspepsia, dyspnea, rhinitis, stomatitis, tremor; monitor respiratory depression especially during initiation or following a dose increase  
**Contraindication** and cautions: cerebral tumour, impaired consciousness.

**Preparation Available:**

Fentanyl 50 mcg/ml 2 ml Inj	HI	C	RT
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## 4.2 Non-opioid

### 1. Paracetamol / Acetaminophen

It acts on hypothalamus to produce antipyresis and work peripherally to block pain impulse generation

**Indication:** mild to moderate pain, fever.

**Adverse effects and cautions:** Pruritic maculopapular rash and urticaria, neutropenia and thrombocytopenia; rarely agranulocytosis, Hepatotoxicity.

**Dose:** By mouth, 0.5-1 g every 4-6 hours to a maximum of 4 g daily; child 3 months-1 year 60-120 mg, 1-5 years 120-250 mg, 6-12 years 250-500 mg; these doses may be repeated every 4-6 hours, when necessary (maximum of 4 doses in 24 hours).

By intravenous infusion over 15 minutes, Adult and Child over 50 kg, 1g every 4-6 hours, maximum 4 g daily.

**Preparation Available:**

Paracetamol 500 mg Tab	HI	B	RT
Paracetamol 1 gm/100 ml Inj	HI	B	RT

Paracetamol 150 mg/ml, 2 ml Inj	HI	B	RT
Paracetamol 125 mg Supp	HI	B	RT
Paracetamol 250 mg Supp		B	RT
Paracetamol 500 mg Supp		B	RT
Paracetamol 150 mg/ml 15 ml, Drop	HI	B	RT
Paracetamol 125 mg/5 ml, 30ml, 60 ml Syp	HI	B	RT
Paracetamol 250 mg/5ml Syp			

### Combination Product

#### 1. Paracetamol and Tramadol

**Indication, adverse effects and caution:** See under paracetamol and tramadol

Paracetamol 325 mg + Tramadol 37.5 mg Tab	HI	NA	RT
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#### 2. Paracetamol and Caffeine Indication: Analgesic

**Adverse effects and caution:** Insomnia, restlessness effect occur with caffeine; alcohol consumption increase risk of hepatotoxicity

Paracetamol 500 mg + Caffeine 25 mg Tab	HI	C	RT
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#### 3. Paracetamol and codeine

**Indication, adverse effects and caution:** See under paracetamol and codeine

Paracetamol 500 mg + Codeine 10 mg Tab	HI		RT
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#### 4. Paracetamol and chlorzoxazone

**Indication, adverse effects and caution:** See under paracetamol and chlorzoxazone

Paracetamol 500 mg + Chlorzoxazone 250 mg Tab	HI		RT
Paracetamol 500 mg + Chlorzoxazone 500 mg Tab	HI		RT

#### 5. Paracetamol and Ibuprofen

**Indication, adverse effects and caution:** See under paracetamol and ibuprofen

Paracetamol 325 mg + Ibuprofen 400 mg Tab	HI		RT
Paracetamol 125 mg + Ibuprofen 100 mg/5 ml 60 ml Syp	HI		RT

#### 6. Paracetamol, Chlorpheniramine and Phenylephrine

**Indication, adverse effects and caution:** See under paracetamol, chlorpheniramine and phenylephrine

Paracetamol 500 mg + Chlorpheniramine 4 mg + Phenylephrine 10 mg Tab	HI		RT
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#### 7. Paracetamol, Pheniramine and Phenylephrine

**Indication, adverse effects and caution:** See under paracetamol, chlorpheniramine and phenylephrine

Paracetamol 125 mg + Phenylephrine 5 mg + chlorpheniramine 1mg/5ml, 100 ml syp	HI		RT
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Paracetamol 125 mg + Phenylephrine 2.5 mg + chlorpheniramine 1mg/ml, 15 ml syp	HI		RT
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### 4.3 Antiepileptics

#### 1. Carbamazepine

Its antiepileptic activity is similar to phenytoin.

**Indication:** All forms of epilepsy except absence seizure (petit mal), trigeminal neuralgia, alternative treatment in acute alcohol withdrawal.

**Adverse effects and cautions:** Gastrointestinal disturbances, dizziness, drowsiness, blurred vision, leukopenia and aplastic anaemia, mild transient generalised erythematous rash.

The drug should be used with caution in patients with hepatic impairment and renal impairment. Safe use of drugs during pregnancy has not been established. Cross-sensitivity reported with oxcarbazepine and phenytoin.

**Contraindication:** History of previous bone-marrow depression, AV conduction abnormalities.

**Dose:** Epilepsy, initially 100-200 mg 1-2 times daily, increased slowly to usual dose of 0.8-1.2 g daily in divided doses; in some cases, 1.6 g daily may be needed; Child, daily in divided doses, up to 1 year, 100-200 mg, 1-5 years 200- 400 mg, 5-10 years 400-600 mg, 10-15 years 0.6-1 g.

Trigeminal neuralgia, initially 100 mg 1-2 times daily, increased gradually according to response; usual dose

200 mg 3-4 times daily up to 1.6 g daily in some patients.

**Preparation Available:**

Carbamazepine 100 mg Tab		D	RT
Carbamazepine 200 mg Tab	HI	D	RT
Carbamazepine 300 mg Tab		D	RT
Carbamazepine 400 mg Tab	HI	D	RT
Carbamazepine 400 mg CR	HI	D	RT

**1. Diazepam**

The drug does not abolish the abnormal discharge of the epileptic focus, but it suppresses the spread of seizure activity.

**Indication:** Status epilepticus, convulsions due to poisoning, muscle spasm of varied aetiology, tetanus, anxiety, adjuvant in treatment of alcohol withdrawal

**Adverse effects and cautions:** Apnoea and hypotension (rapid parenteral administration), thrombophlebitis, sedation, drowsiness, ataxia, headache, muscle weakness.

Take with caution in pregnancy, breast-feeding, hepatic and renal impairment.

Facilities for mechanical ventilation should always be at hand and the patient should remain under close observation for at least one hour. The danger of apnoea and hypotension are reduced if injections are administered slowly.

**Dose:** By intravenous injection, 10-20 mg at a rate of 0.5 ml (2.5 mg) per 30 seconds, repeated if necessary after 30-60 minutes; may be followed by intravenous



infusion to maximum 3 mg/kg over 24 hours; Child 200-300 micrograms/kg.

By mouth, anxiety, 2 mg 3 times daily, increased if necessary to 15-30 mg daily in divided doses; elderly (or debilitated) half adult dose.

Insomnia associated with anxiety, 5-15 mg at bedtime.

**Preparation Available:**

Diazepam 2 mg Tab	HI	D	RT
Diazepam 5 mg Tab	HI	D	RT
Diazepam 10 mg Tab	HI	D	RT
Diazepam 5 mg/ml 2 ml Inj	HI	D	RT

## 2. Clobazam

It is a benzodiazepine.

**Indication:** Adjunct in epilepsy, anxiety.

**Adverse effects and cautions:** See under diazepam.

**Dose:** Epilepsy, 20-30 mg daily; maximum 60 mg daily; Child over 3 years, not more than half adult dose. Anxiety, 20-30 mg daily in divided doses or as a single dose at bedtime, increased in severe anxiety (in hospitalised patients) to a maximum of 60 mg daily in divided doses, Elderly 10-20 mg daily.

**Preparation Available:**

Clobazam 5 mg Tab	HI	C	RT
Clobazam 10 mg Tab	HI	C	RT

## 3. Clonazepam

It is a benzodiazepine.

**Indication:** all types of epilepsy, status epilepticus.

**Adverse effects and cautions:** Dizziness, drowsiness,

muscle hypotonia, restlessness, salivary or bronchial hypertension in infants and small children, sexual dysfunction, dependence and withdrawal. The drug should be used with caution in pregnancy and breast-feeding mothers. The drug is contraindicated in respiratory depression, acute pulmonary insufficiency.

**Contraindication:** Coma, current alcohol abuse, respiratory depression.

**Dose:** 1 mg initially at night for 4 nights, increased according to response over 2-4 weeks to usual maintenance dose of 4-8 mg daily to 3-4 divided doses; Child up to 1 year, initially 250 µg increased as above to usual maintenance dose of 0.5-1 mg, 1-5 years, initially 250 micrograms increased as above to 1-3 mg, 5-12 years, initially 0.5 micrograms increased as above to 3-6 mg.

**Preparation Available:**

Clonazepam 0.25 mg Tab	HI	D	RT
Clonazepam 0.5 mg Tab	HI	D	RT

#### 4. Gabapentin

It structurally related to neurotransmitter GABA, but has no effect on GABA binding, uptake or degradation; presence of gabapentin binding sites throughout the brain reported; mechanism for analgesic and anticonvulsant activity unknown. They are not recommended if tonic, atonic, absence or myoclonic seizures are present.

**Indication:** Adjunctive treatment of partial seizures, with and without secondary generalisation.

**Adverse effects and cautions:** Ataxia, dizziness, fatigue, drowsiness, weight gain, diplopia.

The drug should not be withdrawn suddenly (may cause anxiety, insomnia, sweating, pain – taper off over at least 1 week), breast-feeding, renal impairment.

**Dose:** Epilepsy, 300 mg on day 1, then 300 mg twice daily on day 2, then 300 mg 3 times daily on day 3, then increased according to response in steps of 300 mg daily (in 3 divided doses) to a maximum 2.4 g daily; Child 6-12 years 10 mg/kg on day 1, then 20 mg/kg on day 2, then 25-35 mg/kg daily, maintenance 900 mg daily.

**Preparation Available:**

Gabapentin 100 mg Tab	HI	C	RT
Gabapentin 300 mg Tab	HI	C	RT

## 5. Lamotrigine

It inhibits release of excitatory amino acid glutamate and inhibits voltage sensitive sodium channels which stabilise neuronal membranes.

**Indication:** Partial, secondarily generalised tonic-clonic seizures, Lennox-Gastaut syndrome.

**Adverse effects and cautions:** Dizziness, ataxia, blurred or double vision, nausea, vomiting, rash, Stevens- Johnson syndrome. Myoclonic seizures may be exacerbated by lamotrigine and it can cause serious rashes especially in Children; dose recommendations should be adhered to closely.

The drug should be used with caution in pregnancy, breast-feeding, renal or hepatic impairment.

**Dose:** Monotherapy, initially 25 mg daily for 14 days, increased to 50 mg daily for further 14 days, then increased by maximum of 50-100 mg daily every 7-14 days; usual maintenance as monotherapy, 100- 200 mg daily in 1-2 divided doses.

Adjunctive therapy with valproate, initially 25 mg every other day for 14 days then 25 mg daily for further 14 days, thereafter increased by maximum of 25-50 mg daily every 7-14 days; usual maintenance 100-200 mg daily in 1-2 divided doses.

## 6. Oxcarbazepine

The pharmacological effects are by oxcarbazepine and its metabolite monohydroxy metabolite (MHD). It stabilises neuronal membranes by blocking sodium channels.

**Indication:** Monotherapy or adjunct therapy for partial seizures.

**Adverse effects and cautions:** Abdominal pain, nausea, vomiting, headache, drowsiness, ataxia, depression, tremor, diarrhoea, constipation, rash, nystagmus, Stevens-Johnson syndrome.

Oxcarbazepine is not recommended in tonic, atonic, absence or myoclonic seizures due to the risk of seizure exacerbation. The drug should be used with caution in pregnancy, breast-feeding, hepatic or renal impairment, and hypersensitivity to carbamazepine.

**Dose:** Initially 300 mg twice daily increased according to response in steps of up to 600 mg daily at weekly intervals; usual dose ranges 0.6-2.4 g daily in divided

doses; Child over 6 years, 8-10 mg/kg daily in 2 divided doses increased according to response in steps of up to 10 mg /kg daily at weekly intervals.

**Preparation Available:**

Oxcarbazepine 150 mg Tab	HI	C	RT
Oxcarbazepine 300 mg Tab	HI	C	RT
Oxcarbazepine 450 mg Tab	HI	C	RT
Oxcarbazepine 600 mg Tab		C	RT

## 7. Phenobarbitone (Phenobarbital)

**Indication:** All forms of epilepsy except absence seizures, status epilepticus.

**Adverse effects and cautions:** Sedation, drowsiness, vertigo, ataxia, skin rashes, behavioural changes, irritability and impaired learning (in children) and dependence. Rebound seizures may be a problem on withdrawal.

Discontinuation of treatment occasionally induces status epilepticus which is often refractory to other drugs.

**Dose:** By mouth, 60-180 mg at night; Child 5-8 mg/kg daily.

Status epilepticus by intravenous injection (dilute injection 1 in 10 with water for injection) 10 mg/kg, not more than 100 mg/minute.

**Preparation Available:**

Phenobarbitone 30 mg Tab	HI	D	RT
Phenobarbital 60 mg Tab	HI	D	RT
Phenobarbital 200 mg/ml, 1 ml Inj		D	RT

## 8. Phenytoin

It acts by limiting the repetitive firing of action potentials evoked by a sustained depolarisation. It has a low Therapeutic index.

**Indication:** all forms of epilepsy except absence or myoclonic seizures, trigeminal neuralgia.

**Adverse effects and cautions:** Gingival hyperplasia, acne, hirsutism and skin rash.

These adverse effects may occur at therapeutic level. Nystagmus, ataxia, diplopia, sedation, nausea and vomiting occur at high plasma levels.

**Contraindication:** Pregnant women

**Dose:** By mouth, initially 3-4 mg/kg daily or 150-300 mg daily (as a single dose or two divided doses) increased gradually as necessary (plasma monitoring); usual dose 200-500 mg daily; child 4-8 mg/kg daily (1 or 2 doses). Not recommended by intramuscular injection.

### Preparation Available:

Phenytoin 50 mg Tab	HI	D	RT
Phenytoin 100 mg Tab	HI	D	RT
Phenytoin 300 mg Tab	HI	D	RT
Phenytoin 50 mg/ml, 2 ml Inj	HI	D	RT

## 9. Valproate (Valproic Acid and Sodium Valproate)

Valproate is the salt form of valproic acid, which gets converted after oral administration.

**Indication:** All types of epilepsy.

**Adverse effects and cautions:** Nausea and gastric irritation, weight gain, increased appetite,

thrombocytopenia, transient hair loss, oedema, drug induced hepatitis, sedation and drowsiness; Avoid abrupt withdrawal.

Hepatic function should be performed before treatment and at a frequent interval of 2 months for the first six months.

**Contraindication:** Pregnant women (except life threatening emergency), acute porphyrias, mitochondrial disorders, personal or family history of severe hepatic dysfunction.

**Dose:** By mouth-initially, 600 mg daily in divided doses, preferably after food, increasing by 200 mg/day at 3 days' intervals to a maximum of 2.5 g daily in divided doses, usual maintenance 1-2 g daily (20-30 mg/kg daily); Child up to 20 kg (about 4 years), initially 20 mg/kg daily in divided doses, may be increased provided plasma concentration monitored; over 20 kg, initially 400 mg daily in divided doses increased gradually to 20-30 mg/kg daily; maximum 35 mg/kg daily.

**Preparation Available:**

Sodium Valproate 200 mg Tab	HI	D	CT
Sodium Valproate 300 mg Tab	HI	D	CT
Sodium Valproate 500 mg Tab	HI	D	CT
Sodium Valproate + Valproic acid equivalent to Valproic acid 200 mg CR Tab	HI	D	CT
Sodium Valproate + Valproic acid equivalent to valproic acid 300 mg CR Tab	HI	D	CT

Sodium Valproate + Valproic acid equivalent to 500 mg CR Tab	HI	D	CT
Sodium Valproate 200 mg/5ml 100 ml Syp	HI	D	CT
Sodium Valproate 100 mg/ml, 5 ml, Inj	HI	D	RT

## 10. Levetiracetam

Not clear mechanism but may inhibit voltage-dependent N-type calcium channels; may bind to synaptic proteins that modulate neurotransmitter release or facilitate GABA inhibitory transmission.

**Indication:** Monotherapy of focal seizures with or without secondary generalisation, adjunctive treatment of focal seizures, myoclonic and tonic-clonic seizure

**Adverse effects and cautions:** Abdominal pain, aggression, anorexia, anxiety, ataxia, cough, convulsion, dizziness, diarrhoea; monitor the behaviour of patients because of probability of psychiatric reaction.

### Preparation Available:

Levetiracetam 250 mg Tab		C	RT
Levetiracetam 500 mg Tab	HI	C	RT
Levetiracetam 1000 mg Tab	HI	C	RT
Levetiracetam 100 mg/ml 5 ml Inj	HI	C	RT

## 11. Divalproex

It increases inhibitory GABA neurotransmitter and may also inhibit sodium and calcium channels

**Indication:** Complex partial seizures, prophylaxis of migraine headaches, treatment of manic episodes



**Adverse effects and cautions:** Nausea, vomiting, asthenia, headache, and somnolence; used with caution in children, child bearing women, hepatic disorder.

**Preparation Available:**

Divalproex 250 mg Tab ER		D	RT
Divalproex 500 mg Tab ER		D	RT

## 12. Pregabalin

Precise mechanism of action unknown but is a GABA analogue that binds to a subunit of voltage-gated calcium channels in CNS.

**Indication:** Neuropathic pain, generalised anxiety disorder, adjunctive therapy for focal seizures

**Adverse effect and cautions:** Appetite changes, blurred vision, confusion, constipation, diplopia, disturbances in muscle control and movement; use with caution in severe congestive heart failure.

**Preparation Available:**

Pregabalin 25 mg Tab		C	RT
Pregabalin 50 mg Tab		C	RT
Pregabalin 75 mg Tab	HI	C	RT
Pregabalin 150 mg Tab	HI	C	RT

## 13. Topiramate

May inhibit voltage-dependent sodium channel and may enhance GABA neurotransmitter

**Indication:** tonic-clonic seizure, migraine prophylaxis.

**Adverse effects and cautions:** Abdominal pain, aggression, agitation, alopecia, appetite changes, arthralgia, cognitive impairment; avoid in acute

porphyrias- risk of metabolic acidosis, risk of nephrolithiasis.

**Preparation Available:**

Topiramate 25 mg Tab	HI	D	RT
Topiramate 50 mg Tab		D	RT
Topiramate 100 mg Tab	HI	D	RT

## 4.4 Antiparkinsonism Drugs

### 1. Amantadine

Amantadine is a weak dopamine agonist with modest antiparkinsonism effects; it has antiviral activity too.

**Indication:** Parkinson's disease (but drug induced not extrapyramidal symptoms) post-herpetic neuralgia.

**Adverse effects and cautions:** Anorexia, nausea, nervousness, inability to concentrate, insomnia, dizziness, convulsions, hallucinations or feelings of detachment, blurred vision, gastro-intestinal disturbances, and peripheral oedema; rarely leucopenia, rashes.

The drug should be taken with caution in hepatic or renal impairment, congestive heart disease, confused or hallucinatory states. Performance of skilled tasks, like driving, may be affected.

Abrupt withdrawal in Parkinson's disease should be avoided.

**Contraindication:** Breast-feeding, epilepsy, severe renal impairment.

**Dose:** Parkinsonism, 100 mg daily increased after one week to 100 mg twice daily, usually in conjunction with other treatment.

Post-herpetic neuralgia 100 mg twice daily for 14 days, continued for further 14 days if necessary.

## 2. Levodopa and Carbidopa

Levodopa is decarboxylated to dopamine in the brain and carbidopa inhibits the peripheral decarboxylation of levodopa, thus levodopa available for transport to the brain.

**Indication:** Parkinsonism (but not drug induced)

**Adverse effects and cautions:** Anorexia, nausea, postural hypotension, tachycardia, arrhythmias, abnormal involuntary movements, psychiatric effects such as psychosis, depression or hypomania.

The drug should be used with caution in patients with a history of myocardial infarction, history of active peptic ulcer because there is a possibility of upper gastrointestinal haemorrhage.

Periodic evaluation of hepatic, cardiovascular, and renal function is advisable. Safe use of levodopa during pregnancy and in breast-feeding has not been established.

**Contraindication:** Closed-angle glaucoma.

**Dose:** Expressed as levodopa, initially 100 mg 3 times, increased by 50-100 mg daily or alternate days according to response.

**Preparation Available:**

Levodopa 100 mg + Carbidopa 10 mg Tab		C	RT
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Levodopa 100 mg + Carbidopa 25 mg Tab	HI	C	RT
Levodopa 200 mg + Carbidopa 50 mg Tab	HI	C	RT

### 3. Trihexyphenidyl / Benzhexol

It is thought that these agents partially block central (striatal) cholinergic receptors, thereby helping to balance cholinergic and dopaminergic activity in the basal ganglia; salivation may be decreased and smooth muscle may be relaxed.

**Indication:** Parkinsonism, drug induced extrapyramidal symptoms (but not tardive dyskinesia).

**Adverse effects and cautions:** Dry mouth, constipation, dizziness, blurred vision, gastro- intestinal disturbances and less commonly tachycardia.

Trihexyphenidyl should be used with caution in patients with conditions in which anticholinergic effects are undesirable.

**Dose:** 1 mg daily gradually increased; usual maintenance dose 5-15 mg daily in 34 divided doses, Child not recommended.

#### Preparation Available:

Trihexyphenidyl 2 mg Tab	HI	C	RT
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### 1. Citicoline

Citicoline 500 mg Tab	NA	RT
Citicoline 500 mg/2 ml Inj	NA	RT

## 1.5 Anxiolytics

### Benzodiazepine

#### 1. Alprazolam

**Indication:** Short-term use in anxiety, insomnia associated with anxiety.

**Adverse effects and cautions:** See under diazepam.

**Dose:** 0.25 to 0.5 mg three times daily by mouth, increased where necessary up to a total daily dose of 3 mg. In elderly or debilitated patients an initial dose of 0.25 mg twice or thrice daily has been suggested. Children are not recommended.

#### Preparation Available:

Alprazolam 0.25 mg Tab	HI	D	RT
Alprazolam 0.5 mg Tab	HI	D	RT

#### 2. Chlordiazepoxide

**Indication:** Short-term use in anxiety, adjunctive treatment of acute alcohol withdrawal.

**Adverse effects and cautions:** See under diazepam.

**Dose:** Anxiety, 10 mg 3 times daily increased if necessary to 60-100 mg daily in divided doses, elderly (debilitated) half adult dose; child not recommended.

#### Preparation Available:

Chlordiazepoxide 10 mg Tab	HI	C	RT
Chlordiazepoxide 25 mg Tab		C	RT

#### 3. Lorazepam

**Indication:** Short-term use in anxiety, insomnia associated with anxiety

**Adverse effects and cautions:** See under diazepam

**Dose:** By mouth, anxiety, 1-4 mg daily in divided doses; elderly (debilitated) half adult dose; insomnia associated with anxiety 1-2 mg at bedtime.

**Preparation Available:**

Lorazepam 1 mg Tab	HI	D	RT
Lorazepam 2 mg Tab	HI	D	RT

#### 4. Oxazepam

**Indication:** Short-term use in anxiety, insomnia associated with anxiety

**Adverse effects and cautions:** See under diazepam

**Dose:** anxiety- 15-30 mg (elderly or debilitated 10-20 mg) 3-4 times daily; Child not recommended. Insomnia associated with anxiety 15-25 mg (maximum 50 mg) at bedtime; Child not recommended.

#### 5. Zolpidem

It is a non-benzodiazepine hypnotic; has short duration of action

**Indication:** insomnia

**Adverse effects and cautions:** Nausea, vomiting, headache, dizziness, diarrhoea, ataxia, memory disturbances, changes in libido. The drug should be used with caution in depression, hepatic impairment, elderly, renal impairment.

**Contraindication:** Severe hepatic impairment, pregnancy, breast-feeding, acute or severe respiratory depression.

**Dose:** 10 mg at bedtime; elderly 5 mg; Child not recommended.

### Preparation Available:

Zolpidem 5 mg Tab		C	RT
Zolpidem 10 mg Tab	HI	C	RT

## 4.6. Beta-blockers

### 1. Propranolol

**Indication:** Treatment of somatic symptoms.

**Adverse effects and cautions:** See under antianginal beta-blocker.

**Dose:** Propranolol, 40 mg once daily, increased to 40 mg 3 times daily if necessary.

**Preparation Available:** See under antianginal beta-blocker.

## 5.7. Antipsychotics

They are also known as neuroleptics and major tranquillisers. In the short term they are used to calm disturbed patients whatever the underlying psychopathology, which may be schizophrenia, brain damage, mania, toxic delirium, or agitated depression.

### Typical Antipsychotics

They are also called first generation potent D2 blocker and have greater extrapyramidal symptoms. It increases prolactin release (dose related)

### 1. Chlorpromazine

It has a marked effect on Dopamine D2 receptor and Histamine comparison to muscarine and serotonin.

**Indication:** Schizophrenia and other psychosis, mania, short-term adjunctive management of severe anxiety,

intractable hiccup, nausea and vomiting of terminal illness.

**Adverse effects and cautions:** Acute dystonic reactions, increase prolactin (gynaecomastia), hypothermia, obstructive jaundice; take with caution in diabetic patients.

**Dose:** By mouth, schizophrenia and other psychosis, mania, short term adjunctive treatment of severe anxiety, psychomotor agitation, excitement, and violent or dangerously impulsive behaviour, initially 25 mg 3 times daily (or 75 mg at night) adjusted according to response, to usual maintenance dose of 75-300 mg daily (but up to 1 g daily may be required in psychosis); child 1-5 years 0.5 mg/kg every 4-6 hours (maximum 40 mg daily); 6-12 years third to half adult dose (maximum 75 mg daily); elderly, (or debilitated) third to half adult dose.

Intractable hiccup, 25-50 mg 3-4 times daily.

**Preparation Available:**

Chlorpromazine 25 mg Tab	HI	C	RT
Chlorpromazine 50 mg Tab		C	RT
Chlorpromazine 100 mg Tab	HI	C	RT
Chlorpromazine 100 mg Inj	HI	C	RT

## 2. Fluphenazine

**Indication:** Schizophrenia and other psychosis, mania.

**Adverse effects and cautions:** Erythema, inappropriate antidiuretic hormone secretion, pain at injection site, caution with drug that prolong QT-interval.

**Dose:** Maintenance in schizophrenia and other



psychosis, by deep intramuscular injection, into the gluteal muscle, test dose 12.5 mg (6.25 mg in elderly) then after 4-7 days 12.5–100 mg repeated at intervals of 14-35 days, adjusted according to response; Child not recommended.

### 3. Haloperidol

It has higher action dopamine (D2) receptors than muscarinic, histamine and serotonin.

**Indication:** Schizophrenia and other psychosis, mania, short term adjunctive management of psychomotor agitation, excitement and violent or dangerously impulsive behavior.

**Adverse effects and cautions:** Akathisia, dystonia, depression, weight loss; cautions with hypocalcemia, arteriosclerosis, hypokalaemia (does not cause jaundice); strong EPS tendency.

**Dose:** By mouth, schizophrenia and other psychosis, mania, short term adjunctive management of psychomotor agitation, excitement and violent or dangerously impulsive behaviour, initially 1.5-3 mg, 2-3 times daily or 3- 5 mg, 2-3 times daily in severely affected or resistant patients; in resistant schizophrenia up to 30 mg daily may be needed.

Short-term adjunctive management of severe anxiety, adults 500 micrograms twice daily. Intractable hiccup, 1.5 mg 3 times daily adjusted according to response; Child not recommended.

By intramuscular or intravenous injection, 2-10 mg subsequent doses are given every 4-8 hours according

to response to a maximum 18 mg daily; Child not recommended.

**Preparation Available:**

Haloperidol 0.25 mg Tab	HI	C	RT
Haloperidol 1.5 mg Tab	HI	C	RT
Haloperidol 5 mg Tab	HI	C	RT
Haloperidol 5 mg/ml, 1 ml Inj	HI	C	RT

#### 4. **Trifluoperazine**

It antagonises postsynaptic mesolimbic dopamine D2 receptors in the brain.

**Indication:** Schizophrenia and other psychosis, short term management of severe anxiety, severe nausea and vomiting.

**Adverse effects and cautions:** Anorexia, dystonic reactions, muscle weakness; avoid use in children; caution treatment of patients with dementia-related psychosis.

**Contraindication:** CNS depression, comatose states, pheochromocytoma.

**Dose:** Schizophrenia and other psychosis, initially 5 mg twice daily, increased by 5 mg after 1 week, then at intervals of 3 days, according to response; child up to 12 years, initially up to 5 mg daily in divided doses, adjusted according to response, age and body weight.

#### **Combination Products**

##### 1. **Trifluoperazine and Trihexyphenidyl**

**Indication, Adverse effects and cautions:** See under trifluoperazine and trihexyphenidyl

Trifluoperazine 5 mg+Trihexyphenidyl 2 mg Tab	HI	C	RT
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## 2. Haloperidol and Benzehexol

**Indication, Adverse effects and cautions:** See under Haloperidol and trihexyphenidyl/Benzehexol

Haloperidol 1.5 mg + Benzhexol 2 mg Tab	HI		RT
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### Atypical Antipsychotics

They are also called second generation. They have greater specificity for the mesolimbic system and have fewer incidences of extrapyramidal side effects. It has no effect in prolactin release.

#### 1. Risperidone

Risperidone is a dopamine D<sub>2</sub>, 5-HT<sub>2A</sub>, alpha<sub>1</sub>-adrenoceptor, and histamine-1 receptor antagonist.

**Indication:** acute and chronic psychosis, mania.

**Adverse effects and cautions:** Weight gain, hyperprolactinaemia (galactorrhoea, menstrual disturbances, gynaecomastia), priapism, cerebrovascular accident, tachycardia, neutropenia, thrombocytopenia.

The drug should be used with caution in pregnancy, hepatic impairment, and renal impairment.

**Contraindication:** In breast-feeding.

**Dose:** Psychosis, 2 mg in 1-2 divided doses on first day then 4 mg in 1-2 divided doses on second day; usual dose ranges 4-6 mg daily; Elderly (or in hepatic or renal impairment) initially 500 micrograms twice daily increased in steps of 500 micrograms twice daily to 1-2

mg twice daily; Child under 15 years not recommended.

**Preparation Available:**

Risperidone 1 mg Tab	HI	C	RT
Risperidone 2 mg Tab	HI	C	RT
Risperidone 3 mg Tab	HI	C	RT
Risperidone 4 mg Tab	HI	C	RT

## 2. Quetiapine

Quetiapine is a dopamine D<sub>1</sub>, dopamine D<sub>2</sub>, 5-HT<sub>2</sub>, alpha<sub>1</sub>-adrenoceptor, and histamine-1 receptor antagonist.

Indication: Schizophrenia, treatment and prevention of mania and depression in bipolar disorder.

**Adverse effects and cautions:** Asthenia, dyspnoea, tachycardia, agitation, dry mouth, weight gain; caution in cerebrovascular disease, elderly.

**Preparation Available:**

Quetiapine 25 mg Tab	HI	C	RT
Quetiapine 50 mg Tab	HI	C	RT
Quetiapine 100 mg Tab	HI	C	RT
Quetiapine 200 mg Tab		C	RT
Quetiapine 300 mg Tab		C	
Quetiapine 400 mg Tab		C	

## 3. Aripiprazole

Aripiprazole is a dopamine D<sub>2</sub> partial agonist with weak 5-HT<sub>1a</sub> partial agonism and 5-HT<sub>2A</sub> receptor antagonism.

**Indication:** maintenance in schizophrenia, prevention and treatment of mania.

**Adverse effects and cautions:** anxiety, hypersalivation, malaise' caution in cerebrovascular disease, elderly.

**Dose:** 10–15 mg once daily; usual dose 15 mg once daily (max. per dose 30 mg once daily).

**Preparation Available:**

Aripiprazole 5 mg Tab	HI	NA	RT
Aripiprazole 10 mg Tab	HI	NA	RT
Aripiprazole 20 mg Tab	HI	NA	RT

#### 4. Amisulpride

Amisulpride is a selective dopamine receptor antagonist with high affinity for mesolimbic D<sub>2</sub> and D<sub>3</sub> receptors.

**Indication:** Acute psychotic episode in schizophrenia.

**Adverse effects and cautions:** Anxiety, prolactin release increase.

**Dose:** 400–800 mg daily in 2 divided doses, adjusted according to response; maximum 1.2 g per day.

**Preparation Available:**

Amisulpride 50 mg Tab	HI	NA	RT
Amisulpride 100 mg Tab	HI	NA	RT
Amisulpride 200 mg Tab	HI	NA	RT
Amisulpride 400 mg Tab		NA	RT

#### 5. Olanzapine

Olanzapine is a dopamine D<sub>1</sub>, D<sub>2</sub>, D<sub>4</sub>, 5-HT<sub>2</sub>, histaminel and muscarinic-receptor antagonist.

**Indication:** schizophrenia, combination therapy for mania, preventing recurrence in bipolar disorder

**Adverse effects:** arthralgia, hypercholesterolaemia, increased appetite, malaise, oedema; use with caution

in bone-marrow depression, diabetes mellitus (risk of exacerbation or ketoacidosis),

**Contraindication:** Acute myocardial infarction, bradycardia, severe hypotension, unstable angina,

**Dose:** 10 mg daily, adjusted according to response, usual dose 5 – 20 mg daily.

**Preparation Available:**

Olanzapine 2.5 mg Tab	HI	C	RT
Olanzapine 5 mg Tab	HI	C	RT
Olanzapine 7.5 mg Tab	HI	C	RT
Olanzapine 10 mg Tab	HI	C	RT
Olanzapine 15 mg Tab		C	RT
Olanzapine 20 mg Tab		C	RT

#### 4.8. Antidepressants

##### Tricyclic and related drugs

###### 1. Amitriptyline

**Indication:** Depressive illness, nocturnal enuresis.

**Adverse effects and cautions:** Sedation, dry mouth, blurred vision, constipation, postural hypotension, tachycardia; caution in cardiovascular disease, chronic constipation, diabetes, epilepsy; patients for whom excessive anticholinergic activity could be harmful, such as those with benign prostatic hypertrophy or history of urinary retention or angle-closure glaucoma. Safe use of drugs in the third trimester of pregnancy has not been established.

**Contraindication:** Arrhythmia (particularly heart block), manic phase and severe liver disease.

**Dose:** By mouth, depression, initially 75 mg (elderly

and adolescents 30-75 mg) daily in divided doses or as a single dose at bed time increased gradually as necessary to maximum 150-200 mg; Child under 16 years not recommended.

Nocturnal enuresis, CHILD 7-10 years 10 -20 mg, 11-16 years 25-50 mg at night; maximum period of treatment (including gradual withdrawal) 3 months.

**Preparation Available:**

Amitriptyline 10 mg Tab	HI	C	RT
Amitriptyline 25 mg Tab	HI	C	RT
Amitriptyline 75 mg Tab	HI	C	RT

**2. Clomipramine**

**Indication:** Depressive illness, phobic and obsessional states.

**Adverse effects and cautions:** See under amitriptyline.

**Dose:** Depressive illness, initially 10 mg daily, increased gradually as necessary to 30-50 mg daily in divided doses or single dose at bedtime; maximum 250 mg daily; elderly initially 10 mg daily increased carefully over approximately 10 days to 30-75 mg daily; Child not recommended.

Phobic and obsessional states, initially 25 mg daily (Elderly 10 mg daily) increased over 2 weeks to 100-150 mg daily; maximum 250 mg daily; child not recommended.

**Preparation Available:**

Clomipramine 10 mg Tab		C	
Clomipramine 25 mg Tab	HI	C	RT
Clomipramine 50 mg Tab	HI	C	RT

### 3. Imipramine

**Indication:** Depressive illness, nocturnal enuresis.

**Adverse effects and cautions:** See under amitriptyline but it is less sedating.

**Dose:** Depression, initially up to 75 mg daily in divided doses increased gradually to 150-200 mg (up to 300 mg in hospital patients); up to 150 mg may be given as a single dose at bedtime. Elderly initial 10 mg daily, increased gradually to 30-50 mg daily; Child not recommended.

Nocturnal enuresis, Child 7 years 25 mg, 8-11 years 25-50 mg, over 11 years 50-75 mg at bedtime; maximum period of treatment (including gradually withdrawal) 3 months.

#### Preparation Available:

Imipramine 25 mg Tab	HI	D	RT
Imipramine 50 mg Tab	HI	D	RT
Imipramine 75 mg Tab	HI	D	RT

### 4. Mirtazapine

It is different from other TCAs. It is a presynaptic  $\alpha_2$ -antagonist. It increases central noradrenergic and serotonergic neurotransmission.

**Indication:** Major depression.

**Adverse effects and cautions:** Sedation, increased appetite and weight gain, oedema, postural hypotension, convulsions, tremor, abnormal dreams, rash, reversible agranulocytosis, severe hyponatremia.

The drug should be used with caution in pregnancy, breast-feeding, hepatic or renal impairment, epilepsy,



hypotension, history of urinary retention, diabetes mellitus, angle-closure glaucoma.

**Dose:** Initially 15 mg daily at bedtime increased within 2-4 weeks according to response; maximum 45 mg daily as a single dose at bedtime or in 2 divided doses; Child and adolescent under 18 years not recommended.

**Preparation Available:**

Mirtazapine 5 mg Tab		C	RT
Mirtazapine 7.5 mg Tab	HI	C	RT
Mirtazapine 15 mg Tab	HI	C	RT
Mirtazapine 30 mg Tab	HI	C	RT

## 5. Dosulepin or Dothiepin

**Indication:** Depression Illness,

**Adverse effects and cautions:** Dysarthria, extrapyramidal symptoms, tremor; stop treatment if the patient enters a manic phase, dosulepin overdose associated with a relatively high rate of fatality,

**Dose:** Adult: Initially 75 mg daily in divided doses, alternatively initially 75 mg once daily, dose to be taken at bedtime, increased if necessary to 150 mg daily, doses to be increased gradually; up to 225 mg daily in some circumstances (e.g. hospital use).

**Preparation Available:**

Dosulepin 25 mg Tab		C	RT
Dosulepin 75 mg Tab		C	RT

## 4.9. Selective Serotonin Reuptake Inhibitors (SSRIs)

### 1. Fluoxetine

**Indication:** Major depression, bulimia nervosa.

**Adverse effects and cautions:** Gastro-intestinal disturbances, anorexia with weight loss, postural hypotension, taste disturbances, sexual dysfunction, ataxia, urinary retention and frequency.

The drug should be used with caution in epilepsy, cardiac disease, diabetes, angle-closure glaucoma, pregnancy, breast-feeding, children and adolescents.

**Dose:** Major depression, 20 mg once daily increased after 3 weeks if necessary.

Bulimia nervosa, 60 mg once daily; maximum 80 mg once daily; child and adolescent under 18 years not recommended.

**Preparation Available:**

Fluoxetine 10 mg Tab	HI	C	RT
Fluoxetine 20 mg Tab	HI	C	RT

## 2. Escitalopram

**Indication:** Depressive illness, generalised anxiety disorder, panic disorder.

**Adverse effects and cautions:** See under fluoxetine; also postural hypotension, taste disturbance, fatigue.

**Dose:** Depressive illness and generalised anxiety disorder, 10 mg once daily increased if necessary to maximum 20 mg daily; Elderly initially half adult dose, lower maintenance dose may be sufficient; Child and Adolescent under 18 years not recommended.

Panic disorder, initially 5 mg daily increased to 10 mg daily after 27 days, maximum 20 mg daily; Elderly initially half adult dose, lower maintenance dose may

be sufficient; Child and Adolescent under 18 years not recommended.

**Preparation Available:**

Escitalopram 5 mg Tab	HI	C	RT
Escitalopram 10 mg Tab	HI	C	RT
Escitalopram 20 mg Tab	HI	C	RT

### 3. Fluvoxamine

**Indication:** Depressive illness, obsessive-compulsive disorder.

**Adverse effects and cautions:** See under fluoxetine; also palpitation, tachycardia.

**Dose:** Depression, initially 50-100 mg daily in the evening, increased gradually if necessary to maximum 300 mg daily (over 150 mg in divided doses); usual maintenance dose 100 mg daily; Child and Adolescent under 18 years not recommended.

**Preparation Available:**

Fluvoxamine 50 mg Tab	NA	C	RT
Fluvoxamine 100 mg Tab	NA	C	RT

### 4. Paroxetine

**Indication:** Major depressive disorder, generalised anxiety disorder, obsessive-compulsive disorder, panic disorder, socialphobia, generalised anxiety disorder, Post-traumatic stress disorder.

**Adverse effects and cautions:** Asthenia (unusual tiredness or weakness), extrapyramidal reactions, withdrawal features, constipation, diarrhoea,

drowsiness, dryness of mouth, palpitation, myalgia, sexual dysfunction, weight loss or gain.

The drug should be used with caution in patients with neurological impairment, seizures, severe hepatic impairment, severe renal impairment, children and adolescents.

**Contraindication:** History of mania.

**Dose:** Major depression, social anxiety disorder, post-traumatic disorder, generalised anxiety disorder, usually 20 mg each morning (maximum 50 mg, Elderly 40 mg); Child and Adolescent under 18 years not recommended.

Panic disorder, initially 10 mg each morning, increased gradually in steps of 10 mg to usual dose of 40 mg daily; maximum 60 mg daily.

**Preparation Available:**

Paroxetine 10 mg Tab		D	RT
Paroxetine 12.5 mg SR Tab			
Paroxetine 20 mg Tab		D	RT
Paroxetine 40 mg Tab		D	RT
Paroxetine 10 mg SR Tab		D	RT
Paroxetine 20 mg SR Tab		D	RT

## 5. Sertraline

**Indication:** major depressive disorder, panic disorder, obsessive-compulsive disorder, post-traumatic stress disorder in adults.

**Adverse effects and cautions:** Sexual dysfunction (decreased sexual desire or ability, delayed ejaculation is most common), anorexia, breast tenderness or

enlargement, extrapyramidal effects, palpitation, skin rash, drowsiness, dryness of mouth, weight loss, headache.

The drug should be used with caution in patients with hepatic or renal impairment, seizure disorders, neurological impairment, children and adolescents.

**Contraindication:** History of mania.

**Dose:** Major depression initially 50 mg daily, increased if necessary by increments of 50 mg over several weeks to maximum 200 mg daily, usual maintenance dose 50 mg daily, Child and Adolescent under 18 years not recommended.

Post-traumatic stress disorder, initially 25 mg daily, increased after 1 week to 50 mg daily, dose increased in steps of 50 mg over several weeks to maximum 200 mg daily; Child and Adolescent under 18 years not recommended.

**Preparation Available:**

Sertraline 25 mg Tab	HI	C	RT
Sertraline 50 mg Tab	HI	C	RT
Sertraline 100 mg Tab	HI	C	RT

## 1.10. Serotonin and Noradrenaline Reuptake inhibitors (SNRIs)

### 1. Duloxetine

**Indication:** Depressive disorder, anxiety disorder, diabetic neuropathy,

**Adverse effects and cautions:** Abdominal pain, abnormal dreams, anorexia, dizziness, dry mouth; used with caution in bleeding disorders, cardiac

disease, elderly, history of mania, history of seizures, hypertension.

**Preparation Available:**

Duloxetine 20 mg Tab	HI	C	RT
Duloxetine 30 mg Tab	HI	C	RT
Duloxetine 40 mg Tab		C	RT

## 2. Venlafaxine

**Indication:** See under duloxetine

**Adverse effects and cautions:** See under duloxetine

**Preparation Available:**

Venlafaxine 37.5 mg Tab		C	RT
Venlafaxine 75 mg Tab		C	RT

## 4.11 Antimigraine Drugs

### 1. Sumatriptan

Selective 5-HT<sub>1B</sub> and 5-HT<sub>1D</sub> receptor agonist in cranial arteries; vasoconstriction and anti-inflammatory effects

**Indication:** Treatment of acute migraine attacks, cluster headache.

**Adverse effects and cautions:** Chest pain, and tightness (coronary vasoconstriction), drowsiness, hypotension, bradycardia or tachycardia, nausea, vomiting, dizziness.

The drug should be used with caution in pregnancy, breast-feeding, and hepatic impairment.

**Contraindication:** Ischemic heart disease, previous myocardial infarction, coronary vasospasm, uncontrolled or severe hypotension.

Dose: By mouth, 50 mg (some patients may require 100 mg) as soon as possible after onset (patients not responding should not take a second dose for the same attack); dose may be repeated after not less than 2 hours if migraine recurs.

Child and Adolescent under 18 years not recommended.

**Preparation Available:**

Sumatriptan 25 mg Tab	HI	C	RT
Sumatriptan 50 mg Tab	HI	C	RT

## 2. Rizatriptan

Selective 5-HT<sub>1</sub> receptor agonist in cranial arteries; vasoconstriction and anti-inflammatory effects

**Indication:** acute migraine.

**Adverse effects and caution:** Decreased alertness, diarrhoea, drowsiness, dry mouth, dyspnoea, headache; use with caution in coronary artery disease, elderly.

**Contraindication:** Coronary vasospasm, ischaemic heart disease, peripheral vascular disease, previous cerebrovascular accident, myocardial infarction or transient ischaemic attack.

**Preparation Available:**

Rizatriptan 10 mg Tab		C	RT
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## 4.12 Nicotine Dependence

### 1. Bupropion or Amfebutamone

**Indication:** Adjunct to smoking cessation in combination with motivational support.

**Adverse effects and cautions:** Insomnia, dry mouth, gastro-intestinal disturbances, tremor, headache,

dizziness, depression, rash, pruritus, sweating.

The drug should be used with caution in hepatic or renal impairment, elderly.

**Contraindication:** History of seizures, eating disorders, CNS tumour, pregnancy, breast-feeding.

**Dose:** Start 1-2 weeks before target stop date, initially 150 mg daily for 6 days then 150 mg twice daily (maximum single dose 150 mg, maximum daily dose 300 mg; minimum 8 hours between doses); maximum period of treatment 7-9 weeks; discontinue if abstinence not achieved at 7 weeks; Child and Adolescent under 18 years not recommended.

## 4.13 Drugs for Dementia

### 1. Donepezil

Reversible inhibitor of acetylcholinesterase.

**Indication:** Mild to moderate dementia in Alzheimer's disease.

**Adverse effects and cautions:** Abnormal dreams, aggression, agitation, anorexia, diarrhoea; use with caution in asthma, COPD, supraventricular conduction, susceptible to peptic ulcers, antipsychotics

**Dose:** Initially 5 mg once daily for one month then increased if necessary up to 10 mg daily, doses to be given at bedtime.

**Preparation Available:**

Donepezil 5 mg Tab	HI	C	RT
Donepezil 10 mg Tab	HI	C	RT



## Chapter-5: Drugs used in Musculoskeletal and Joint Diseases

### 1.1 Non-Steroidal anti-inflammatory drugs (NSAIDs)

#### 1. Paracetamol

See under CNS preparation non-opioid analgesics

#### 2. Diclofenac

**Indication:** Rheumatic disease, osteoarthritis, acute gout, migraine.

**Adverse effects and cautions:** Gastro-intestinal distress, occasionally gastrointestinal bleeding and gastric ulceration, hepatic damage, interstitial fibrosis associated with NSAIDs can lead to renal failure.

The drug should be used with caution in breast-feeding, renal or cardiac or hepatic impairment.

**Contraindication:** Active GI bleeding, pregnancy, cerebrovascular disease.

**Dose:** By mouth, 75-150 mg daily in 2-3 divided doses, preferably after food.

By deep intramuscular injection into the gluteal muscle, acute exacerbations and post operative, 75 mg once daily (twice daily in severe cases) for a maximum of 2 days.

Ureteric colic, 75 mg then a further 75 mg after 30 minutes if necessary.

#### **Preparation Available:**

Diclofenac 50 mg Tab	HI	C	RT
Diclofenac 75 mg SR Tab	NA	C	RT

Diclofenac 100 mg SR Tab	HI	C	RT
Diclofenac 25 mg/ml, 3 ml Inj	HI	C	RT
Diclofenac 75 mg/ml, 1 ml Inj	HI		
Diclofenac Cream 1%, 30 gm Oint	HI	C	RT

### 3. **Ibuprofen**

**Indication:** Rheumatic disease, musculo-skeletal disorders, post-operative pain, dysmenorrhoea.

**Adverse effects and cautions:** Gastrointestinal irritation, bleeding, rash, pruritus, tinnitus, dizziness, headache, fluid retention, vertigo.

**Contra-Indication:** See under diclofenac.

**Dose:** Initially 1.2-1.8 g daily in 3-4 divided doses preferably after food, increased if necessary to maximum of 2.4 g daily; maintenance dose of 0.6-1.2 g daily may be adequate, Child, 20-30 mg/kg daily in divided doses (juvenile arthritis, up to 40 mg/kg daily), not recommended for children under 5 kg.

### 4. **Indomethacin**

**Indication:** Acute gouty arthritis, rheumatic disease, dysmenorrhoea, musculo-skeletal disorders, closure of ductus arteriosus.

**Adverse effects and cautions:** Abdominal pain, diarrhoea, gastrointestinal haemorrhage, severe headache, dizziness, confusion, depression, psychosis, thrombocytopenia, aplastic anaemia, hypertension and hyperkalaemia; used with caution in breast-feeding, epilepsy and Parkinsonism; Child not recommended.

**Contraindication:** Pregnancy.

**Dose:** Rheumatic disease, 50-200 mg daily in divided

doses, with food; Child not recommended. Acute gout, 150-200 mg daily in divided doses.

Dysmenorrhoea, up to 75 mg daily.

**Preparation Available:**

Indomethacin 25 mg Cap	HI	C	RT
Indomethacin 50 mg Cap	HI	C	RT
Indomethacin 75 mg Cap	HI	C	RT

### 5. Mefenamic Acid

**Indication:** Osteoarthritis, rheumatoid arthritis, dysmenorrhoea, post-operative pain.

**Adverse effects and cautions:** Diarrhoea, rashes, thrombocytopenia, haemolytic anaemia and drowsiness; use with caution in acute porphyrias, allergic disorder, cardiac impairment.

**Dose:** 500 mg 3 times daily preferably after food; Child over 6 months, 25 mg/kg daily in divided doses for not longer than 7 days except in juvenile arthritis.

**Preparation Available:**

Mefenamic acid 100 mg/5 ml, 60 ml Syp		C	RT
Mefenamic acid 250 mg Tab	HI	C	RT
Mefenamic acid 500 mg Tab	HI	C	RT

### 6. Naproxen

**Indication:** See under diclofenac.

**Adverse effects and cautions:** See under diclofenac but it is better tolerated.

**Dose:** 0.5-1 g daily in 2 divided doses; CHILD (over 5 years) juvenile arthritis, 10 mg/kg daily in 2 divided doses.

Acute musculoskeletal disorders and dysmenorrhoea, 500 mg initially, then 250 mg every 6-8 hours as required; Child under 16 years not recommended. Acute gout, 750 mg initially, then 250 mg every 8 hours until attack has passed; Child under 16 years not recommended.

**Preparation Available:**

Naproxen 250 mg Tab	HI	C	RT
Naproxen 500 mg Tab	HI	C	RT
Naproxen 750 mg SR Tab	HI	C	RT

## 7. Piroxicam

**Indication:** Rheumatoid arthritis, osteoarthritis,

**Adverse effects and cautions:** Nausea, diarrhoea, indigestion, upper respiratory infection; use with caution in allergic disorders, cardiac impairment, coagulation defects

**Contraindication:** See under diclofenac.

**Dose:** Rheumatic disease, initially 20 mg daily, maintenance 10-30 mg daily, in single or divided doses. Child (over 6 years), juvenile arthritis, less than 15 kg, 5 mg daily; 16-25 kg, 10 mg; 26-45 kg, 15 mg; over 46 kg, 20 mg.

Acute musculoskeletal disorders, 40 mg daily in single or divided doses for 2 days, then 20 mg daily for 7-14 days.

Acute gout, 40 mg initially, then 40 mg daily in single or divided doses for 4-6 days; Child not recommended.

**Preparation Available:**

Piroxicam 20 mg Tab		C	RT
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**8. Aceclofenac**

Its actions and adverse effects are similar to naproxen.

**Indication:** Rheumatoid arthritis, osteoarthritis and ankylosing spondylitis.

**Adverse effects and cautions:** Allergic disorders, Crohn's diseases may exacerbate, See under naproxen.

**Dose:** 100 mg twice daily; Child not recommended.

**Preparation Available:**

Aceclofenac 100 mg Tab	HI	NA	RT
Aceclofenac 200 mg SR Tab		NA	RT

**9. Nimesulide**

It exhibits relative selectivity for cyclooxygenase-2 inhibition.

**Indication:** See ibuprofen.

**Adverse effects and cautions:** See under ibuprofen.

**Dose:** 200-300 mg daily in divided doses.

**10. Ketorolac**

**Indication:** Headache, analgesic in moderately severe acute pain

**Adverse effects and cautions:** GI pain, nausea, dyspepsia, somnolence **Dose:** 10 mg three to four times daily, not exceed 40 mg per day.

**Preparation Available:**

Ketorolac 10 mg Tab	HI	C	RT
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Ketorolac 30 mg/ml 1 ml Inj	HI	C	RT
Ketorolac 2%, 15 gm Oint		C	RT

### 11. Etoricoxib

**Indication:** pain and inflammation in osteoarthritis, rheumatoid arthritis, ankylosing spondylitis.

**Adverse effects and cautions:** fatigue, ecchymosis, palpitation, influenza like symptoms.

**Dose:** 60 mg once daily, increased if necessary to 90 mg once daily.

#### Preparation Available:

Etoricoxib 60 mg Tab		NA	RT
Etoricoxib 90 mg Tab	HI	NA	RT
Etoricoxib 120 mg Tab		NA	RT

## 5.2 Drugs for Gout treatment

### 1. Allopurinol

It acts by inhibiting synthesis of urates.

**Indication:** Prophylaxis of gout, prophylaxis of hyperuricemia associated with cancer chemotherapy.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, maculo-papular skin rash, rarely exfoliate dermatitis, arthralgia and aplastic anaemia; caution in pregnancy, breast-feeding, hepatic and renal impairment.

**Contraindication:** Not a treatment for acute gout but continues if attack develops when already receiving allopurinol, and treat attack separately.

**Dose:** Initially 100 mg daily as a single dose after food, gradually increased over 1-3 weeks according to the

plasma or urinary uric acid concentration, to about 300 mg daily; Children under 15 years 10-20 mg/kg daily.

**Preparation Available:**

Allopurinol 100 mg Tab	HI	NA	RT
Allopurinol 300 mg Tab	HI	NA	RT

## 2. Colchicine

**Indication:** Acute gout.

**Adverse effects and cautions:** Diarrhoea, nausea, vomiting, abdominal pain, rarely gastro-intestinal haemorrhage, rashes, renal and hepatic damage. Safe use in pregnancy has not been established. The drug should be used with caution in breast-feeding, cardiac or hepatic or renal impairment.

**Dose:** 1 mg initially, followed by 500 micrograms every 4 hours until relief of pain is obtained or vomiting or diarrhoea occurs. The course should not be repeated within 3 days.

**Preparation Available:**

Colchicine 0.5 mg Tab	HI	C	RT
Colchicine 15 mg Tab		C	RT

## 1. Febuxostat

Xanthine oxidase inhibitors

**Indication:** Chronic hyperuricemia in gout.

**Adverse effects and cautions:** Abnormal liver function test, GI disturbances, headache, oedema, rash; use with caution in congestive heart failure, ischaemic heart disease, thyroid disorders, transplant recipients.

**Dose:** Initially 80 mg once daily, if after 2–4 weeks of

initial dose, serum uric acid greater than 6 mg/100 mL then increase dose; increased if necessary to 120 mg once daily.

**Preparation Available:**

Febuxostat 40 mg Tab	HI	C	RT
Febuxostat 80 mg Tab	HI	C	RT

### 5.3 Drugs for Rheumatoid Arthritis

#### 1. Glucosamine

Intermediate in glycosaminoglycan synthesis; sulphate form absorbed better than other.

**Indication:** Symptomatic relief of mild to moderate osteoarthritis.

**Adverse effects and cautions:** Abdominal pain, constipation, diarrhoea, drowsiness, dyspepsia; use with caution in asthma, impaired glucose tolerance.

**Dose:** 1500 mg once daily.

**Preparation Available:**

Glucosamine 500 mg Tab	HI	NA	RT
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#### 2. Hydroxychloroquine

**Indication:** Active rheumatoid arthritis, systemic and discoid lupus erythematosus

**Adverse effects and cautions:** GI disturbances, headache, pruritus, rashes, skin reaction; caution in acute porphyrias, elderly, G6PD deficiency, may aggravate myasthenia gravis, neurological disorders

**Dose:** 200 to 400 mg daily.



### Preparation Available

Hydroxychloroquine 200 mg Tab	HI	C	RT
Hydroxychloroquine 400 mg Tab		C	RT

### 3. Methotrexate

It is a disease-modifying anti-rheumatic drug, inhibits enzyme dihydrofolate reductase essential for purines and pyrimidines synthesis.

**Indication:** Moderate to severe rheumatoid arthritis.

**Adverse effects and cautions:** Myelosuppression, mucositis, loss of appetite, intestinal ulceration and bleeding, diarrhoea, pulmonary oedema, impotence, loss of libido.

The drug should be used with caution in blood disorders (blood count, liver and renal function tests should be performed before starting treatment and repeated weekly), peptic ulceration, pleural effusion.

**Contraindication:** Pregnancy, breast-feeding, active infection, renal or hepatic impairment.

**Dose:** By mouth, 7.5 mg once weekly (as a single dose or divided into 3 doses of 2.5 mg given at intervals of 12 hours), maximum total weekly dose 20 mg.

#### Preparation Available:

Methotrexate 2.5 mg Tab	HI	X	RT
Methotrexate 5 mg Tab	HI	X	RT
Methotrexate 7.5 mg Tab	HI	X	RT
Methotrexate 10 mg Tab	HI	X	RT
Methotrexate 50 mg Inj	HI	X	RT

## 2. Leflunomide

**Indication:** Rheumatoid arthritis,

**Adverse effects and cautions:** Abdominal pain, alopecia, anorexia, asthenia, diarrhoea, dizziness, dry skin, and headache; use with caution in anaemia, history of tuberculosis, leucopenia, thrombocytopenia.

**Contraindication:** Serious infection, severe hypoproteinemia, severe immunodeficiency.

**Dose:** Initially 10 mg once daily for three days then reduced to 10 to 20 mg once daily.

**Preparation Available:**

Leflunomide 10 mg Tab		X	RT
Leflunomide 20 mg Tab		X	RT

## 5.4 Muscle Relaxants

### 1. Chlorzoxazone

It blocks interneuronal conduction in spinal cord and subcortical brain areas by depressing polysynaptic reflexes

**Indication:** Musculoskeletal pain

**Adverse effects and cautions:** Lightheadedness, dizziness, drowsiness, excitement, somnolence, malaise.

### 2. Baclofen

It inhibits synaptic transmission through spinal reflex arcs, via hyperpolarization of primary afferent fibre terminals.

**Indication:** Pain of muscle spasm in palliative care, hiccup due to gastric distension, severe spasticity

**Adverse effects and cautions:** Agitation, anxiety, ataxia, cardiovascular depression, confusion, dry mouth; use with caution in elderly, epilepsy, diabetes, cardiovascular disease.

**Contraindication:** Active peptic ulceration.

**Dose:** 5 -10 mg three times a day.

**Preparation Available:**

Baclofen 10 mg Tab	HI	NA	RT
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### 1. Tizanidine

It increases presynaptic inhibition of motor neurons through alpha-2 adrenergic receptor agonist

**Indication:** Spasticity associated with multiple sclerosis or spinal cord injury or disease.

**Adverse effects and cautions:** Dizziness, drowsiness, dry mouth, fatigue, GI disturbances, hypotension, nausea.

**Dose:** Adult: Initially 2 mg daily, then increased in steps of 2 mg daily in divided doses, increased at intervals of at least 3–4 days and adjust according to response; usual dose up to 24 mg daily in 3–4 divided doses; maximum 36 mg per day.

**Preparation Available:**

Tizanidine 2 mg Tab	HI	C	RT
Tizanidine 4 mg Tab	HI	C	RT

### Miscellaneous Preparation:

Diacerein 50 mg Tab	HI	B	RT
Serratiopeptidase 5 mg Tab	HI	NA	RT
Serratiopeptidase 10 mg Tab	HI	NA	RT

# Chapter-6: Drugs Affecting Allergic Reactions

## 6.1 Antihistamine

### 1. Cetirizine

It is non-sedating antihistamine, causing less psychomotor impairment.

**Indication:** Urticaria, hay fever, insect stings and pruritus.

**Adverse effects and cautions:** Headache, but incidence of sedation and antimuscarinic effects are low. The drug should be used with caution in epilepsy, prostatic hypertrophy and glaucoma. The drug should be avoided in pregnancy and breast-feeding.

**Dose:** Adult and Child over 6 years, 10 mg daily or 5 mg twice daily; CHILD 2-6 years 5 mg daily or 2.5 mg twice daily.

#### Preparation Available:

Cetirizine 5 mg/5ml 30 ml Symp	HI	NA	RT
Cetirizine 10 mg Tab	HI	NA	RT

### 2. Levocetirizine

It is an isomer of cetirizine.

**Indication:** See under cetirizine.

**Adverse effects and cautions:** See under cetirizine.

**Dose:** Adult and Child over 6 years, 5 mg daily.

#### Preparation Available:

Levocetirizine 0.5 mg/ml, 30ml syp	HI	B	RT
Levocetirizine 5 mg Tab	HI	B	RT

### 3. Chlorpheniramine/Chlorphenamine

**Indication:** Symptomatic relief of allergy such as urticaria, hay fever, insect stings and pruritus of allergic origin.

**Adverse effects and cautions:** Headache, anticholinergic effects such as dry mouth, blurred vision and urinary retention. Some patients, especially children may experience paradoxical excitement characterised by restlessness, insomnia, tremors and even seizures.

It should be used with caution in epilepsy, prostatic hypertrophy, urinary retention and glaucoma.

**Dose:** 4 mg every 4-6 hours, maximum 24 mg daily; child 1-2 years 1 mg twice daily, 2-5 years 1 mg every 4-6 hours, maximum 6 mg daily, 6-12 years 2 mg every 4-6 hours, maximum 12 mg daily; Infant not recommended.

#### 1. Fexofenadine

It is a metabolite of terfenadine but lacks the toxic effects of terfenadine.

**Indication:** See under chlorphenamine.

**Adverse effects and cautions:** See under cetirizine.

**Dose:** Allergic rhinitis, 120 mg once daily; Chronic idiopathic urticaria, 180 mg once daily.

#### Preparation Available:

Fexofenadine 30 mg/5ml 60 ml Syrup	HI	C	RT
Fexofenadine 120 mg Tab	HI	C	RT
Fexofenadine 180 mg Tab	HI	C	RT

## 2. Cyproheptadine

It has antihistamine and antiserotonergic properties.

**Indication:** Hay fever, urticarial.

**Adverse effects and cautions:** See under chlorphenamine. Weight gain and increased growth in children have been observed. The drug should be used in pregnancy and breast-feeding only when clearly needed.

**Dose:** Allergy, usual dose 4 mg 3-4 times daily, usual range 4-20 mg daily, maximum 32 mg daily. Child, 2-6 years 2 mg 2-3 times daily maximum 12 mg daily; 7-14 years 4 mg 2-3 times daily, maximum 16 mg daily.

**Preparation Available:**

Cyproheptadine 2 mg/5ml 100 ml Syrup	HI	B	RT
Cyproheptadine 2 mg/5 ml 200 ml syrup	HI	B	RT

## 3. Loratadine

**Indication:** See under cetirizine.

**Adverse effects and cautions:** See under cetirizine.

**Dose:** Adult and Child over 6 years 10 mg daily; CHILD 2-5 years 5 mg daily.

**Preparation Available:**

Loratadine 10 mg Tab	HI	B	RT
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## 4. Promethazine

See under antiemetic drugs.

## 5. Cinnarizine

**Indication:** Relief of symptoms of vestibular disorders such as vertigo, tinnitus, nausea and vomiting in meniere's disease; motion sickness.

**Adverse effects and cautions:** Drowsiness, GI disturbance, dry mouth; avoid in acute porphyrias, use with caution in epilepsy, glaucoma (in children), prostatic hypertrophy (in adults).

**Dose:** Child 5–11 years: 15 mg 3 times a day; Child 12–17 years: 30 mg 3 times a day; Adult: 30 mg 3 times a day.

**Preparation Available:**

Cinnarizine 25 mg Tab	HI	C	RT
Cinnarizine 75 mg Tab	HI	C	RT

**6. Ebastine:**

Ebastine 10 mg Tab	HI	NA	RT
Ebastine 20 mg Tab	HI	NA	RT

**7. Flunarizine:**

**Indication:** Migraine headache, vertigo, antihistamine property

Flunarizine 5 mg Tab	HI	NA	RT
Flunarizine 10 mg Tab	HI	NA	RT

**8. Pheniramine**

**Indication, Adverse effects and cautions:** See under chlorphenamine.

**Dose:** By intramuscular or slow intravenous injection, 25-50 mg.

**Preparation Available:**

Pheniramine 25 mg Tab	HI	C	RT
Pheniramine 22.75 mg/ml 2 ml Inj		C	RT

## 6.2 Sympathomimetics

### 1. Epinephrine/Adrenaline

Epinephrine is a physiological antagonist to histamine and can revert the tissue to normal functioning. It is therefore useful as a life-saving drug in acute emergencies, brought about by histamine release due to allergy or anaphylaxis.

**Indication:** Acute anaphylaxis, angioedema, cardiac arrest.

**Adverse effects and cautions:** Tachycardia, tremor, hypertension, sweating, vomiting, headache.

The drug should be used with caution in hypertension, arrhythmias, diabetes mellitus, heart disease, second stage of labour, cerebrovascular disease.

**Dose:** Anaphylaxis, by intramuscular injection (1:1000 solutions), Child under 6 months 0.05 ml, 6 months – 6 years 0.12 ml, 6-12 years 0.25 ml, Adult 0.5 ml.

**Preparation Available:**

Adrenaline 1:1000 1 ml Inj	HI	NA	RT
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# Chapter-7: Drugs used in Infections

## 7.1 Anthelmintics

### 1. Albendazole

It causes degeneration of cytoplasmic microtubules in intestinal and tegmental cells of intestinal helminths.

**Indication:** Ascaris, pinworm, hookworm, whipworm, strongyloides infection, hydatid disease

**Adverse effects and cautions:** Gastro-intestinal discomfort, headache. The drug should not be used during the first trimester of pregnancy.

**Dose:** The usual dose for adults and children aged 2 years or over with ascariasis, hookworm infections, or trichuriasis is 400 mg in a single dose. In strongyloidiasis, 400 mg is given twice daily for 3 consecutive days; this may be repeated after 3 weeks if necessary.

#### Preparation Available:

Albendazole 200 mg/5 ml, 10 ml Susp		NA	RT
Albendazole 400 mg Tab	HI	NA	RT

### 2. Diethylcarbamazine

**Indication:** Filariasis, tropical pulmonary eosinophilia.

**Adverse effects and cautions:** Anorexia, nausea, headache, vomiting, skin rashes, itching, painful and tender glands, joint pain, swelling of face (especially eyes).

Low doses should be used for initial therapy, especially in onchocerciasis and Loa loa infection to minimise the allergic adverse reactions (due to destruction of the parasites).

**Dose:** Bancroft's filariasis or Loiasis or Onchocerciasis, initially 1 mg/kg and increased gradually over 3 days to 6 mg/kg daily in divided doses for 21 days.

**Preparation Available:**

Diethylcarbamazine 150 mg Tab	HI	X	RT
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**1. Ivermectin**

**Indication:** Lymphatic filariasis.

**Adverse effects and cautions:** Itching, headache, tachycardia, diarrhoea, dizziness, hypotension.

**Dose:** Lymphatic filariasis, by mouth 200 micrograms/kg as a single dose once a year with albendazole.

**Preparation Available:**

Ivermectin 6 mg Tab	HI	C	RT
Ivermectin 12 mg Tab		C	RT

**2. Mebendazole**

**Indication:** Ascaris, hookworm, pinworm, whipworm infection.

**Adverse effects and cautions:** Abdominal pain, diarrhoea and rash. In heavily infected children, roundworms may be expelled through the mouth and nose, since mebendazole kills these worms slowly and causes them to migrate.

The drug should not be given to pregnant women and in children younger than 2 years of age or to patients who have experienced allergic reactions to the drug.

**Dose:** Thread worm, age over 2 years, 100 mg as a single dose; if reinfection occurs second dose may be needed after 2 weeks, Child under 2 years, not

recommended. Roundworm and hookworm, 100 mg twice daily for 3 days.

**Preparation Available:**

Mebendazole 100 mg/5 ml 30 ml Symp	HI	C	RT
Mebendazole 100 mg Tab	HI	C	RT

### 3. Niclosamide

**Indication:** Tapeworm infection

**Adverse effects and cautions:** Nausea, vomiting, abdominal discomfort, anorexia, diarrhoea and pruritus. In *T. solium* infections, effective purging is essential to avoid risk of cysticercosis.

**Dose:** *Taenia solium*- Adult and child over 6 years 2 g as a single dose after a light breakfast or meal followed by a purgative after 2 hours; Child under 2 years 500 mg, 2-6 years 1 g. *T. saginata* and *Diphyllobothrium latum*, as for *T. solium* but half the dose may be taken after breakfast or meal and the remainder 1 hours later followed by a purgative 2 hours after the last dose.

**Preparation Available:**

Niclosamide 500 mg Tab	HI	B	RT
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### 4. Praziquantel

**Indication:** Taeniasis (*T. solium*, *T. saginata*), hymenolepiasis (*H. nana*), diphyllobothriasis (*D. latum*) and cysticercosis (except ocular).

**Adverse effects and cautions:** Nausea, abdominal discomfort, headache, dizziness, drowsiness and rarely urticaria and rectal bleeding. Praziquantel should not be used in the treatment of ocular cysticercosis because

of the danger of inflammatory reactions.

**Dose:** *Taenia solium* 10-20 mg/kg a single dose after a light breakfast. *Hymenolepis nana* 25 mg/kg as a single dose.

### Preparation Available

Praziquantel 600 mg Tab	HI	B	RT
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## 1.2. Antiamoebic and Antigiardial drugs

### 1. Metronidazole

It inhibits nucleic acid synthesis by disrupting DNA and causing strand breakage.

**Indication:** Giardiasis, acute amoebic dysentery, acute oral infections, surgical prophylaxis, *Helicobacter pylori*, *Balantidium coli* and anaerobic bacterial infections

**Adverse effects and cautions:** Metallic taste, nausea, headache, furred tongue, dizziness, vertigo, dark brown urine and reversible peripheral neuropathy. Not recommended during menstruation-some systemic absorption may occur with vaginal gel.

The large dose of drug should be used during pregnancy only when clearly needed. Nursing mothers should not breastfeed during treatment with high doses.

**Dose:** Invasive intestinal amoebiasis, by mouth 800 mg every 8 hours for 5 days, Child 1-3 years 200 mg every 8 hours; 3-7 years 200 mg every 6 hours; 7-10 years 400 mg every 8 hours.

Extra-intestinal amoebiasis (including liver abscess) and symptomless amoebic cyst passers by mouth, 400-800 mg every 8 hours for 5-10 days, child 1-3 years

100-200 mg every 8 hours, 3-7 years 100-200 mg every 6 hours, 7-10 years 200-400 mg every 8 hours.

Giardiasis, by mouth, 2 g daily for 3 days or 400 mg 3 times daily for 5 days; Child 1-3 years 500 mg daily for 3 days, 3-7 years 600-800 mg daily, 7-10 years 1 g daily.

Bacterial vaginosis, by mouth, 400 mg twice daily for 5-7 days or 2 g as a single dose.

**Preparation Available:**

Metronidazole 200 mg Tab	HI	B	RT	Access
Metronidazole 400 mg Tab	HI	B	RT	
Metronidazole 200 mg/5 ml, 60ml Symp	HI	B	RT	
Metronidazole 100 mg/5 ml, 60 ml Symp	HI	B	RT	
Metronidazole 500 mg/100 ml Inj	HI	B	RT	

**2. Tinidazole**

**Indication, Adverse effects and cautions:** Similar to metronidazole.

**Dose:** Anaerobic infections, by mouth, 2 g initially, followed by 1 g daily or 500 mg twice daily, usually for 5-6 days.

Bacterial vaginosis and acute ulcerative gingivitis, a single 2 g dose. Intestinal amoebiasis, 2 g daily for 2-3 days; child 50-60 mg/kg daily for 3 days. Amoebic involvement of liver, 1.5-2 g daily for 3-6 days; Child 50-60 mg/kg daily for 5 days.

Urogenital trichomoniasis and giardiasis, single 2 g

dose; Child single dose of 50-75 mg/ kg (repeated once if necessary).

**Preparation Available:**

Tinidazole 500 mg Tab	HI	C	RT	Access
Tinidazole 1 gm Tab	HI	C	RT	

**3. Diloxanide Furoate**

**Indication:** asymptomatic cyst passers and extra intestinal amoebiasis (together with tissue amoebicide). The drug is not reliably effective alone in the treatment of acute amoebic dysentery.

**Adverse effects and cautions:** Vomiting, pruritus, flatulence and urticaria. The drug should be avoided in pregnancy and breast-feeding.

**Dose:** 500 mg every 8 hours for 10 days. Child 20 mg/ kg daily in 3 divided doses.

**4. Ornidazole**

It has activity against intestinal and liver amoebiasis, lambliasis and vaginal trichomoniasis. The ornidazole has longer half life and fewer side effects compared to metronidazole.

Ornidazole 500 mg Tab	HI	X- 1 <sup>st</sup> Trimester used with caution in 2 <sup>nd</sup> & 3 <sup>rd</sup> Trimester	RT	Access
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Ornidazole 500 mg/100 ml Inj	HI		RT	
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## Combination Products

### 1. Metronidazole and Diloxanide Furoate

**Indication, adverse effects and caution:** See under Metronidazole and Diloxanide Furoate

#### Preparation Available:

Metronidazole 100 mg + Diloxanide Furoate 125 mg/ 5 ml, 60ml Susp	HI	Not Recommended	RT
Metronidazole 400 mg + Diloxanide 500 mg Tab	HI		RT

### 1.3. Antifungal Drugs

#### 1. Amphotericin/Amphotericin B

**Indication:** Intestinal candidiasis, oral and perioral infections, kalazar

**Adverse effects and cautions:** Chills, fever, vomiting, headache, hypokalemia, neurological disorders including diplopia, convulsions, peripheral neuropathy and anaphylactoid. Hepatic and renal function tests, and plasma electrolyte monitoring is required.

**Dose:** By intravenous infusion, systemic fungal infections, initial test dose of 1 mg over 20-30 minutes then 250 micrograms/kg daily, maximum (severe infections) 1.5 mg/kg daily or on alternate days.

#### Preparation Available:

Amphotericin B 50 mg/vial Inj	HI	B	FT
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## 2. Fluconazole

It inhibits ergosterol synthesis through P-450 dependent enzymes, and inhibits cell membrane formation.

**Indication:** Mucosal candidiasis (except genital), vaginal candidiasis, tinea infections, prevention of fungal infections in immunocompromised patients.

**Adverse effects and cautions:** Diarrhoea, headache, nausea, rash

The drug should be avoided in pregnancy and breastfeeding. The drug should be used with caution in renal impairment or liver impairment.

**Dose:** Vaginal candidiasis, by mouth 150 mg single dose. Mucosal candidiasis (except genital), 50 mg daily (100 mg daily in unusually difficult infections) given for 7-14 days. Tinea infections (pedis, corporis, cruris, versicolor and dermal) 50 mg daily for 2-4 weeks (up to 6 weeks in Tinea pedis).

### Preparation Available:

Fluconazole 50 mg/5ml, 35 ml Susp	HI	D	RT
Fluconazole 150 mg Tab	HI	D	RT
Fluconazole 200 mg Tab	NA	D	RT

## 3. Itraconazole

It inhibits ergosterol synthesis through P-450 dependent enzymes, and inhibits cell membrane formation.

**Indication:** Vulvovaginal candidiasis, oral or esophageal candidiasis.

**Adverse effects and cautions:** Abdominal pain, diarrhoea, headache, dizziness, rash, Stevens-Johnson



syndrome, menstrual disorder, hypokalaemia. The drug should be used with caution in pregnancy, breast-feeding, and renal impairment.

**Dose:** By mouth, oropharyngeal candidiasis, 100 mg daily (200 mg daily in AIDS or neutropenia) for 15 days. Vulvovaginal candidiasis, 200 mg twice daily for 1 day.

**Preparation Available:**

Itraconazole 100 mg Tab	HI	C	RT
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#### 4. Griseofulvin

**Indication:** Dermatophyte infections, Tinea capitis

**Adverse effects and cautions:** Nausea, vomiting, headache, heartburn, photosensitivity and skin rashes. Malformations have been reported in experimental animals with high doses.

**Dose:** 500 mg daily in divided doses or as a single dose, in severe infection dose may be doubled, reducing when response occurs; Child, 10 mg/kg daily in divided doses or as a single dose.

**Preparation Available:**

Griseofulvin 250 mg Tab	HI	X	RT
Griseofulvin 500 mg Tab	HI	X	RT

#### 5. Terbinafine

**Indication:** Dermatophyte infections, Tinea pedis, Tinea corporis, cutaneous candidiasis

**Adverse effects and cautions:** Abdominal discomfort, anorexia, arthralgia, diarrhoea, dyspepsia: use with caution in autoimmune disease, psoriasis (risk of exacerbation).

**Dose:** Dermatophyte infections, 250 mg once daily for 6 weeks to 3 months.

**Preparation Available:**

Terbinafine 250 mg Tab	HI	B	RT
Terbinafine HCl 1%, 10 gm oint	NA	B	RT

## 6. Voriconazole

**Indication:** Invasive aspergillosis, serious infections caused by *Scedosporium* spp. *Fusarium* spp., or invasive fluconazole-resistant *Candida* spp. (including *C. krusei*).

**Adverse effects and cautions:** Abdominal pain, acute renal failure, agitation, alopecia, anaemia, anxiety, asthenia, blood disorders, headache, dizziness; cautions in history of QT interval prolongation, risk of pancreatitis, symptomatic arrhythmias.

**Dose:** By mouth, Adult (body-weight up to 40 kg): Initially 200 mg every 12 hours for 2 doses, then 100 mg every 12 hours, increased if necessary to 150 mg every 12 hours.

Adult (body-weight 40 kg and above): Initially 400 mg every 12 hours for 2 doses, then 200 mg every 12 hours, increased if necessary to 300 mg every 12 hours. By IV, Adult: Initially 6 mg/kg every 12 hours for 2 doses, then 4 mg/kg every 12 hours; reduced if not tolerated to 3 mg/kg every 12 hours; for max. 6 months.

**Preparation Available:**

Voriconazole 200 mg Tab	NA	D	RT
Voriconazole 200 mg Inj	NA	D	RT

## 7.4. Antimalarial Drugs

### 1. Chloroquine

**Indication:** Chemoprophylaxis and treatment of malaria, rheumatoid arthritis, lupus erythematosus.

**Adverse effects and cautions:** Epigastric discomfort, anorexia, nausea, vomiting, pruritus and headache. Long term daily treatment may cause reversible visual disturbance.

**Dose:** Malaria prophylaxis, 300 mg base once weekly starting one week before entering the malaria area and continued for 4 weeks after leaving.

Malaria treatment (presumptive and clinically suspected), 600 mg base along with 45 mg primaquine  
Malaria treatment (radical cure in relapsing malaria), 600 mg base followed by 300 mg base after 6 hours, then 300 mg base for 2 days along with 15 mg primaquine for 5 days. Child 10 mg base/kg for first 2 days, then 5 mg base/kg for third day.

#### Preparation Available:

Chloroquine 250 mg Tab	HI	C	RT
Chloroquine 500 mg Tab	NA	C	RT

## 7.5 Antibacterials

### Beta lactam and related medicines

#### Penicillins

##### 1. Amoxicillin

It is a broad spectrum ampicillin derivative inhibits cell wall mucopeptide biosynthesis

**Indication:** Susceptible infections (including UTI, Otitis media, sinusitis, uncomplicated community

acquired pneumonia, salmonellosis, oral infections), skin structure infections, H. pylori eradication in combination with metronidazole and omeprazole/lansoprazole or in combination with clathromycin and esomeprazole/lansoprazole/omeprazole/pantoprazole/rabeprazole.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea and rash occur less frequently than with ampicillin.

**Dose:** By mouth, 250 mg every 8 hours, doubled in severe infections; CHILD up to 10 years, 125 mg every 8 hours, doubled in severe infections. Otitis media, 1 g every 8 hours; CHILD 40 mg/kg daily in 3 divided doses (maximum 3 g daily) Dental abscess, 3g repeated after 8 hours; UTI, 3 g repeated after 10-12 hours.

By intravenous injection or infusion, 500 mg every 8 hours increased to 1 g every 6 hours; Child 50-100 mg/kg daily in divided doses.

**Preparation Available:**

Amoxicillin 100 mg/ml 10 ml D.	NA	B	RT	Access
Amoxicillin 125 mg/5 ml, 60 ml D.Syp	HI	B	RT	Access
Amoxicillin 125 mg DT	HI	B	RT	Access
Amoxicillin 125 mg/5 ml, 90 ml Susp	HI	B	RT	
Amoxicillin 250 mg DT	HI	B	RT	Access
Amoxicillin 500 mg Tab	HI	B	RT	Access

## 2. Ampicillin

**Indication:** Susceptible infections (including bronchitis, UTI, otitis media, sinusitis, uncomplicated community acquired pneumonia, salmonellosis), endocarditis, listeria meningitis.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea and rash have been reported more frequently; caution in lymphocytic leukaemia, cytomegalovirus (increased risk of erythematous rashes), There is evidence of partial cross-reactivity between penicillins and cephalosporins.

**Dose:** By intramuscular injection or intravenous injection or infusion, 500 mg every 4-6 hours; higher dose in meningitis. Child under 10 years, any route, half adult dose.

### Preparation Available:

Ampicillin 250 mg Inj	NA	B	RT	Access
Ampicillin 500 mg Inj	NA	B	RT	
Ampicillin 1 gm Inj	NA	B	RT	

## 3. Cloxacillin

**Indication:** Exclusively for infection caused by or suspected of being caused by penicillinase-producing staphylococci. Benzyl penicillin is more active against other susceptible bacteria.

**Adverse effects and cautions:** See under benzyl penicillin.

**Dose:** By mouth, Adult 500 mg 4 times daily, doubled in severe infection; by intramuscular injection, 250 mg

every 4-6 hours, doubled in severe infection; by slow intravenous injection or intravenous infusion, 1-2 g every 6 hours; Child up to 2 years, quarter adult dose; Child 2-10 years, half adult dose.

**Preparation Available:**

Cloxacillin 125 mg Tab	NA	B	RT	Access
Cloxacillin 250 mg Tab	HI	B	RT	Access
Cloxacillin 500 mg Tab	HI	B	RT	Access
Cloxacillin 500 mg Inj	HI	B	RT	Access
Cloxacillin 125 mg/5ml 100 ml Syp	HI	B	RT	Access

**4. Flucloxacillin**

Acid-stable penicillinase resistant penicillins

**Indication:** Infections due to beta-lactamase producing staphylococci including otitis externa; adjunct in pneumonia, impetigo, osteomyelitis, staphylococcal endocarditis, surgical prophylaxis.

**Adverse effects and cautions:** See under benzylpenicillin. It also produces gastro-intestinal disturbances.

**Dose:** By mouth, 250-500 mg every 6 hours, at least 30 minutes before food; Child under 2 years, quarter adult dose, 2-10 years half adult dose.

By intramuscular injection, 250-500 mg every 6 hours; Child under 2 years' quarter adult dose, 2-10 years half adult dose.

**Preparation Available:**

Flucloxacillin 250 mg Tab	NA	B	RT	Access
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Flucloxacillin 500 mg Tab	HI	B	RT	
Flucloxacillin 500 mg Inj	HI	B	RT	
Flucloxacillin 125 mg/5 ml 100 ml D.Syp	HI	B	RT	

### 5. Phenoxymethylpenicillin/Penicillin V

**Indication:** Streptococcal tonsillitis and pharyngitis including scarlet fever, Streptococcal or pneumococcal sinusitis and otitis media; erysipelas, rheumatic fever and bacterial endocarditis prophylaxis.

Because of unpredictable variation in absorption and compliance it is not appropriate for the treatment of syphilis.

**Adverse effects and cautions:** See under benzyl penicillin. Dose: 250-500 mg every 6 hours; Child, every 6 hours up to 1 year 62.5 mg, 1-5 years 125 mg, 6-12 years 250 mg.

#### **Preparation Available:**

Penicillin V 250 mg Tab	HI	B	RT	Access
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### 6. Benzylpenicillin/ Penicillin G

**Indication:** Endocarditis, pneumonia, otitis media, meningococcal meningitis and streptococcal infections.

**Adverse effects and cautions:** Hypersensitivity, acute anaphylactic reactions, angioedema.

Less common hypersensitivity includes serum sickness, eosinophilia, neutropenia and diarrhoea.

**Dose:** By intramuscular or by slow intravenous injection or by infusion, 2.4-4.8 g daily in 4 divided doses.

### Preparation Available:

Benzyl Penicillin 0.5 M IU Inj	HI	B	RT	Access
Benzylpenicillin 1 M IU Inj	HI	B	RT	

### 7. Benzathine Benzylpenicillin

**Indication:** Group a streptococcal respiratory infection, rheumatic fever prophylaxis, syphilis

**Adverse effects and cautions:** Maculopapular eruptions, exfoliative dermatitis, urticaria, pseudomembranous colitis; for deep IM administration only not for IV use.

**Dose:** By intramuscular injection, rheumatic fever prophylaxis, Adult and Child over 30 kg, 1,200,000 units monthly; Child under 30 kg 600 000 units every 3-4 weeks.

Early syphilis, 2 400 000 units as single dose in two sites, Late syphilis (more than one-year duration), 2 400 000 units weekly for 3 weeks.

### 8. Piperacillin

Broad spectrum penicillin

**Indication:** Used mainly in neutropenic/immunocompromised patients having serious gram – ve infections and burns, pseudomonas infections.

**Adverse effects and cautions:** Rash, hemolytic anaemia, injection site pain.

**Dose:** IV 3-4 g/dose in 4 to 6 hour; IM 2-3 g/dose in 6 to 12 hour.



### Combination Products:

Ampicillin 100 mg + Cloxacillin 50mg/ ml, 10 ml Drop	NA	B	RT	Not Recommended
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### Cephalosporins

#### First Generation

##### 1. Cefazolin

**Indication:** Mild infection with gram positive cocci and bacilli (except enterococcus).

**Adverse effects and cautions:** See under cefaclor.

In patients with impaired renal function, doses-and/ or frequency of administration of cefazolin must be modified.

**Dose:** By intramuscular injection or intravenous injection or infusion 0.5-1g every 6-12 hours.

#### Preparation Available:

Cefazolin 500 mg Inj	HI	B	RT	Access
Cefazolin 1 gm Inj	HI	B	RT	

##### 2. Cephalexin/Cefalexin

**Indication:** Susceptible infections due to sensitive gram -ve and gram +ve bacteria, anaerobes

**Adverse effects and cautions:** Abdominal pain, agitation, anaemia, angioedema; adjust dose in severe renal insufficiency; prolong use is associated with fungal or bacterial superinfection.

**Dose:** 250 mg every 6 hours or 500 mg every 8-12 hours increased to 1-1.5g every 6-8 hours for severe infections; Child 25 mg/kg daily in divided doses,

doubled for severe infections, maximum 100 mg/kg daily; or under 1 year, 125 mg every 12 hours; 1-5 years, 125 mg every 8 hours; 6-12 years, 250 mg every 8 hours.

Prophylaxis of recurrent urinary-tract infection, Adult 125 mg at night.

**Preparation Available:**

Cephalexin 125 mg/5 ml D.Syp	HI	B	RT	Access
Cephalexin 500 mg Tab	NA	B	RT	

### 3. Cefadroxil

**Indication:** Susceptible infections due to sensitive gram -ve and gram +ve bacteria, soft-tissue infection.

**Adverse effects and cautions:** Nausea, vomiting, rash, urticaria; caution in renal impairment.

**Dose:** 0.5-g twice daily for patients over 40 kg; skin, soft tissue and simple UTI 1 g daily. Children under 1 year, 25 mg/kg daily in divided doses; 1 -6 years, 250 mg twice daily, over 6 years, 500 mg twice daily.

**Preparation Available:**

Cefadroxil 250 mg Tab	HI	B	RT	Access
Cefadroxil 500 mg Tab	HI	B	RT	
Cefadroxil 125 mg/5 ml 30 ml D	HI	B	RT	
Cefadroxil 250 mg/5 ml 30 ml D.Syp	NA	B	RT	

## Second Generation

### 1. Cefuroxime

It is administered both orally and intramuscularly or intravenously.

**Indication:** Infection due to gram +ve and -ve bacteria, active against H. influenza, N. gonorrhoeae, E. coli, klebsiella spp, Streptococcus pneumonia, pyrogens.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, eosinophilia; use with caution in patient with history of colitis, renal impairment or seizure disorders.

**Dose:** By mouth, 250 mg twice daily in most infections including mild to moderate RTI. UTI, 125 mg twice daily, doubled in pyelonephritis. Gonorrhoea, 1 g as a single dose.

By intramuscular or intravenous injection or infusion 750 mg every 6-8 hours, 1.5 g every 6-8 hours in severe condition. Child, 60 mg/kg daily in 3-4 divided doses.

Surgical prophylaxis, 1.5 g by intravenous injection at induction; may be supplemented with 750 mg intramuscularly or intravenously 8, 16 and 24 hours later for high risk procedures.

**Preparation Available:**

Cefuroxime 250 mg Tab	HI	B	RT	Watch
Cefuroxime 500 mg Tab	HI	B	RT	
Cefuroxime 125 mg/5 ml 30 ml Susp	NA	B	RT	
Cefuroxime 750 mg Inj	NA	B	RT	
Cefuroxime 1.5 gm Inj	NA	B	RT	

## 2. Cefaclor

**Indication:** See under cefuroxime.

**Adverse effects and cautions:** Urticaria, pruritus, rash, fever, joint pain, exfoliative dermatitis, Anaphylaxis occurs rarely, nausea, vomiting, diarrhoea, disturbances

in liver enzymes levels and rarely thrombocytopenia or neutropenia.

Cephalosporins have cross allergenicity with penicillins (about 10% cases).

Prolonged use of cephalosporins may result Pseudomonas, Enterococci or Candida superinfections

**Dose:** Child over one month, 20 mg per kg daily in 3 divided doses, doubled for severe infections, maximum 1g daily.

**Preparation Available:**

Cefaclor 125 mg/5 ml 30 ml D.syp	HI	B	RT	Watch
Cefaclor 50 mg/ml 10 ml D.	NA	B	RT	
Cefaclor 25 mg/ml D.	NA	B	RT	

**Third Generation**

**1. Cefpodoxime**

**Indication:** Susceptible organism bacteroides fragilis, clostridium perfringens, E. coli, H. influenza, Klebsiella spp, N. gonorrhoeae, staphylococci, Group A beta-hemolytic streptococci

**Adverse effects and cautions:** Rash, dermatitis, nausea, vomiting, diarrhoea, vaginal infection; caution similar to cefaclor

**Dose:** Upper respiratory-tract infections, 100 mg twice daily (200 mg twice daily in sinusitis); Child 15 days- 6 months 4 mg /kg every 12 hours, 6 months- 2 years 40 mg every 12 hours, 3-8 years 80 mg every 12 hours, over 9 years 100 mg every 12 hours.

Uncomplicated urinary-tract infections, 100 mg twice daily (200 mg twice daily in uncomplicated upper urinary tract infections); Uncomplicated gonorrhoea, 200 mg as a single dose.

**Preparation Available:**

Cefpodoxime 100 mg Tab	NA	B	RT	Watch
Cefpodoxime 200 mg Tab	HI	B	RT	
Cefpodoxime 50 mg/5ml 60 ml D.Syp	HI	B	RT	
Cefpodoxime 100 mg/5ml 30 ml D.Syp	NA	B	RT	

**2. Cefixime**

**Indication:** See under cefpodoxime, uncomplicated gonorrhoea

**Adverse effects and cautions:** See under cefpodoxime

**Dose:** Adult and Child over 10 years, 200-400 mg daily in 1-2 divided doses, Child over 6 years 8 mg/kg in 1-2 divided doses. Gonorrhoea: 400 mg as a single dose.

**Preparation Available:**

Cefixime 50 mg/5 ml 60 ml D.Syp	HI	B	RT	Watch
Cefixime 100 mg/5 ml 60 ml D.Syp	NA	B	RT	
Cefixime 100 mg Tab	HI	B	RT	
Cefixime 200 mg Tab	HI	B	RT	
Cefixime 400 mg Tab	HI	B	RT	

**3. Cefotaxime**

**Indication:** See under cefpodoxime, uncomplicated gonorrhoea, surgical prophylaxis

**Adverse effects and cautions:** See under cefpodoxime

**Dose:** By IM or IV 1g every 12 hours; severe infections, 2 g every 6 hours, exceptionally, for life threatening infection due to organism less sensitive to cefotaxime, up to 12 g daily in 3-4 divided doses. Gonorrhoea 500 mg as a single dose. Neonate, 50 mg/kg daily 2-4 divided doses, in severe infections 150-200 mg/kg daily; Child, 100-150 mg/kg daily 2-4 divided doses, in severe infections, up to 200 mg/kg daily.

**Preparation Available:**

Cefotaxime 125 mg Inj	NA	B	RT	Watch
Cefotaxime 250 mg Inj	HI	B	RT	
Cefotaxime 500 mg Inj	HI	B	RT	
Cefotaxime 1 gm Inj	HI	B	RT	

#### 4. Ceftazidime

**Indication:** See under cefotaxime, differs from other third generation having stronger activity on pseudomonas.

**Adverse effects and cautions:** See under cefotaxime.

**Dose:** Pseudomonas lung infection in cystic fibrosis, adult with normal renal function 100-150 mg/kg daily in 3 divided doses; Child up to 150 mg/kg daily (maximum 6 g daily) in 3 divided doses; intravenous route recommended for children.

Urinary tract and less severe infections, 0.5-1 g every 12 hours.

Surgical prophylaxis, prostatic surgery, 1 g at induction of anaesthesia repeated if necessary when catheter removed.

**Preparation Available:**

Ceftazidime 500 mg Inj	NA	B	RT	Watch
Ceftazidime 1 gm Inj	HI	B	RT	

**5. Ceftriaxone**

Longer duration of action.

**Indication:** See under cefotaxime.

**Adverse effects and cautions:** See under cefotaxime

**Dose:** By deep intramuscular injection, or by intravenous injection over 2-4 minutes, or by intravenous infusion, 1g daily as a single dose; 2-4 g daily as a single dose in severe infection; intramuscular doses over 1g divided between more than one site.

Uncomplicated gonorrhoea, by deep intramuscular injection, 250 mg as a single dose.

Surgical prophylaxis, by deep intramuscular injection or by intravenous injection over 2-4 minutes, 1 g as a single dose at induction; colorectal surgery, by deep intramuscular injection over 2-4 minutes or by intravenous infusion, 2g at induction, intramuscular doses over 1 g divided between more than one site.

Endocarditis (in combination with other antibacterials), by intravenous infusion, 2-4 g daily.

**Preparation Available:**

Ceftriaxone 125 mg Inj	NA	B	RT	Watch
Ceftriaxone 250 mg Inj	HI	B	RT	
Ceftriaxone 500 mg Inj	HI	B	RT	
Ceftriaxone 1 gm Inj	HI	B	RT	

## 6. Cefoperazone

**Indication:** Treatment of pelvic infections, urinary-tract infections, bone and joint infections, differs from other third generation having stronger activity on pseudomonas.

**Adverse effects and cautions:** See under cefotaxime.

**Dose:** By intramuscular or intravenous injection, 1-2 g (base) every 12 hours.

**Preparation Available:**

Cefoperazone 1 gm Inj	NA	B	RT	Watch
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## 7. Cefditoren

**Indication:** H. influenzae, H. parainfluenzae, S. pneumoniae, M. catarrhalis; pharyngitis/tonsillitis, skin infections (S. aureus, S. pyogenes).

**Adverse effects and cautions:** See under cefotaxime.

**Dose:** By mouth 200 – 400 mg two times a day.

**Preparation Available:**

Cefditoren 400 mg Tab	NA	B	RT	Watch
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## Fourth Generation

### 1. Cefepime

**Indication:** Greater coverage against gram +ve and -ve organism, Bacteroids spp, Enterobacter spp, E. coli, H. influenzae, Klebsiella spp, proteus mirabilis, pseudomonas spp, S. aureus, S. pyogenes.

**Adverse effects and cautions:** Positive coombs test without haemolysis, rash, diarrhoea, hypophosphatemia, elevated alanine aminotransferase.

**Dose:** By intravenous injection, 2 g every 12 hours.



### Preparation Available:

Cefepime 250 mg Inj	NA	B	FT	Watch
Cefepime 500 mg Inj	NA	B	FT	
Cefepime 1 gm Inj	NA	B	FT	

## Carbapenem

### 1. Imipenem

**Indication:** Aerobic and anaerobic Gram-positive and Gram-negative infections; surgical prophylaxis, hospital-acquired septicaemia, polymicrobial infections including septicaemia, complicated UTI; not active against methicillin-resistant staphylococcus aureus and enterococcus faecium.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, taste disturbances, hearing loss, anaphylactic reactions, blood disorders, seizure.

The safety of drugs in breast-feeding has not been established.

**Dose:** By deep intramuscular injection, mild to moderate infections, 500-750 mg every 12 hours. By intravenous infusion, 1-2 g daily in 3-4 divided doses, CHILD 3 months and older 60 mg/kg (maximum 2 g) daily in 4 divided doses.

Surgical prophylaxis, by intravenous infusion, 1 g at induction repeated after 3 hours.

### 2. Meropenem

**Indication:** aerobic and anaerobic Gram-positive and negative infections, exacerbations of chronic lower RTI in cystic fibrosis, meningitis, endocarditis, can be used

in CNS infection due to less seizure inducing potential.

**Adverse effects and cautions:** See under imipenem.

**Dose:** Meningitis, 2 g every 8 hours; Child 3 months-12 years 40 mg/kg every 8 hours.

**Preparation Available:**

Meropenem 125 mg Inj	NA	B	RT	Reserves
Meropenem 250 mg Inj	NA	B	RT	
Meropenem 500 mg Inj	HI	B	RT	
Meropenem 1 gm Inj	HI	B	RT	

### 3. Cilastatin

Cilastatin inactivates the kidney enzyme responsible for Imipenem partial inactivation. The Meropenem is stable in kidney enzymes thus can be given without Cilastatin.

## Combination Products

### 1. Imipenem and Cilastin

**Indication, Adverse effects and cautions:** See under Imipenem and Cilastin

Imipenem 500 mg + Cilastatin 500 mg Inj	HI	C	RT	Reserves
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## Beta lactamase inhibitors

### 1. Clavulanic acid

Semisynthetic acid isolated from streptomycetes itself has no significant antibacterial activity but by inactivating the beta-lactamases, it makes the combination active against beta-lactamase producing bacteria that are resistant. It gets inactivated after binding to the enzyme.

Adverse effects are the same as for penicillin and cephalosporin alone.

## 2. Sulbactam

Sulbactam is a penicillanic acid sulfone that inactivates beta-lactamase enzymes. Its oral absorption is inconsistent thus preferably given parenterally.

## 3. Tazobactam

Tazobactam is a penicillanic acid sulfone derivative and beta-lactamase inhibitor with antibacterial activity. This drug is used in conjunction with beta-lactamase susceptible penicillins to treat infections caused by beta- lactamase producing organisms.

### Combination Products

#### 1. Amoxicillin and Clavulanic Acid

**Indication, Adverse effects and cautions:** See under amoxicillin and clavulanic acid

Amoxicillin 250 mg + Clavulanic acid 125 mg Tab	HI	B	RT	Access
Amoxicillin 500 mg + Clavulanic acid 125 mg Tab	HI	B	RT	
Amoxicillin 875 mg + Clavulanic acid 125 mg Tab	NA	B	RT	

Amoxicillin 200 mg + Clavulanic acid 28.5 mg/5 ml 30 ml D.Syp	HI	B	RT	
Amoxycillin 1 gm + Clavulanic acid 0.2 gm Inj	HI	B	RT	
Amoxicillin 200 mg + Clavulanic acid 28.5 mg/5 ml 60 ml Susp	HI	B	RT	
Amoxicillin 125 mg + Clavulanic acid 31.25 mg/5 ml 30 ml D.Syp	NA	B	RT	
Amoxicillin 400 mg + Clavulanic acid 57 mg/5 ml 30 ml D.Syp	NA	B	RT	

## 2. Piperacillin and Tazobactam

**Indication, Adverse effects and cautions:** See under piperacillin and tazobactam

Piperacillin 1 gm + Tazobactam 0.125 gm Inj	NA	NA	RT	Watch
Piperacillin 2 gm + Tazobactam 0.25 gm Inj	HI	NA	RT	
Piperacillin 4 gm + Tazobactam 0.5 gm Inj	HI	NA	RT	

## 7.6. Sulphonamides and Trimethoprim

### 1. Sulfamethoxazole and Trimethoprim

It blocks two consecutive steps in nucleic acid biosynthesis.

**Indication:** Uncomplicated lower urinary tract

infection, bacterial prostatitis, exacerbation of chronic bronchitis due to H. influenzae and Strep. Pneumoniae, acute otitis media in children and acute maxillary sinusitis in adults due to H. influenzae and Strep. Pneumonia, Pneumocystis carinii pneumonia.

**Adverse effects and cautions:** Nausea, vomiting, rashes, drug fever, erythema multiforme of Stevens-johnson type, leucopenia, granulocytopenia, glossitis, stomatitis, megaloblastic anaemia and crystalluria.

Treatment should be immediately stopped if a rash or other manifestation of hypersensitivity occurs. The drug should not be used during pregnancy and the drug should be used with caution in nursing mothers. Premature and infants less than 6 weeks should not be prescribed, as it may lead to jaundice.

**Dose:** By mouth, 960 mg every 12 hours, Child every 12 hours, 6 weeks to 5 months 120 mg; 6 months to 5 years, 240 mg; 6-12 years, 480 mg.

### Preparation Available:

Sulfamethoxazole 200 mg + Trimethoprim 40 mg/ 5 ml Susp	HI	D	RT	Access
Sulfamethoxazole 400 mg + Trimethoprim 80 mg Tab	HI	D	RT	
Sulfamethoxazole 100 mg + Trimethoprim 20 mg Tab	HI	D	RT	
Sulfamethoxazole 800 mg + Trimethoprim 160 mg Tab	HI	D	RT	

## 7.7. Quinolones

### First Generation

#### 1. Ciprofloxacin

**Indication:** Uncomplicated and complicated urinary tract infections, acute and chronic prostatitis, infective chronic airway disease, typhoid fever and gonorrhoea.

**Adverse effects and cautions:** Nausea, vomiting, pancreatitis, tachycardia, hypotension, tinnitus, sweating; use with caution in patients with epilepsy or history of epilepsy, hepatic or renal impairment, pregnancy and breast-feeding.

**Dose:** By mouth, respiratory tract infections, 250-500 mg twice daily; Urinary-tract infections, 250-500 mg twice daily (100 mg twice daily for 3 days in acute uncomplicated cystitis in women). Gonorrhoea, 500 mg as a single dose; chronic prostatitis, 500 mg twice daily for 28 days.

By intravenous infusion (over 30-60 minutes) 200-400 mg twice daily. Urinary-tract infections 100 mg twice daily, gonorrhoea, 100 mg as a single dose. Children are not recommended but when benefit outweighs risk, by mouth 10-30 mg/kg daily in 2 divided doses or by intravenous infusion 8-16 mg/kg daily in 2 divided doses.

#### Preparation Available:

Ciprofloxacin 250 mg Tab	HI	C	RT	Watch
Ciprofloxacin 500 mg Tab	HI	C	RT	
Ciprofloxacin 200 mg/100 ml Inj	HI	C	RT	

## 2. Norfloxacin

**Indication:** Uncomplicated urinary-tract infections, prophylaxis in recurrent urinary-tract infections, chronic prostatitis.

**Adverse effects and cautions:** See under ciprofloxacin

**Dose:** Urinary-tract infections, 400 mg twice daily for 7-10 days (for 3 days in uncomplicated lower urinary- tract infections). Chronic relapsing urinary tract infections, 400 mg twice daily for up to 12 weeks; may be reduced to 400 mg once daily if adequate suppression within the first 4 weeks.

Chronic prostatitis, 400 mg twice daily for 28 days.

### Preparation Available:

Norfloxacin 400 mg Tab	HI	C	RT	Watch
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## 3. Ofloxacin

**Indication:** Uncomplicated urinary-tract infections, acute or chronic prostatitis, infective chronic airway disease and gonorrhoea.

**Adverse effects and cautions:** See under ciprofloxacin

**Dose:** By mouth, urinary-tract infections, 200-400 mg daily preferably in the morning, increased if necessary in upper urinary-tract infections to 400 mg twice daily. Lower respiratory-tract infections, 400 mg daily preferably in the morning, increased if necessary to 400 mg twice daily.

By intravenous infusion (over at least 30 minutes for each 200 mg), complicated urinary-tract infection, 200 mg daily. Lower respiratory-tract infections, 200 mg twice daily. Septicaemia, 200 mg twice daily.

Severe or complicated infections, dose may be increased to 400 mg twice daily.

**Preparation Available:**

Ofloxacin 50 mg/5 ml, 30ml Susp	HI	C	RT	Watch
Ofloxacin 50 mg/5 ml, 60ml Susp	NA	C	RT	
Ofloxacin 100 mg DT	HI	C	RT	
Ofloxacin 200 mg Tab	HI	C	RT	
Ofloxacin 400 mg Tab	HI	C	RT	
Ofloxacin 200 mg/100 ml Inj	HI	C	RT	

**Second Generation**

**1. Levofloxacin**

**Indication:** Chronic prostatitis, urinary-tract infections, exacerbation of chronic bronchitis, community acquired pneumonia, skin and soft tissue infections.

**Adverse effects and cautions:** See under ciprofloxacin. It also causes tachycardia, hypotension, hypoglycaemia, and pneumonitis.

**Dose:** Urinary-tract infections, 250 mg daily for 7-10 days (for 3 days in uncomplicated cases). Exacerbation of chronic bronchitis, 250-500 mg daily for 7-10 days. Chronic prostatitis, 500 mg once daily for 28 days.

Community-acquired pneumonia: 500 mg once or twice daily for 7-14 days. Skin and soft tissue infections, 250 mg daily or 500 mg once or twice daily for 7-14 days.

By intravenous infusion (over at least 60 minutes for 500 mg), the community acquired pneumonia, 500 mg once or twice daily.

Complicated urinary-tract infections, 250 mg daily, increased in severe infections.



### Preparation Available:

Levofloxacin 250 mg Tab	NA	C	RT	Watch
Levofloxacin 500 mg Tab	HI	C	RT	
Levofloxacin 750 mg Tab	HI	C	RT	
Levofloxacin 500 mg/100 ml Inj	HI	C	RT	

## 2. Moxifloxacin

**Indication:** Sinusitis, community acquired pneumonia, exacerbation of chronic bronchitis, complicated skin and soft-tissue infections.

**Adverse effects and cautions:** Angina, arrhythmias, constipation, flatulence, gastritis, sweating, palpitation; use with caution in significant bradycardia or acute myocardial ischemia, photosensitivity reaction may occur, avoid excessive sunlight; superinfection on prolong use.

**Dose:** Sinusitis 400 mg once daily, Community-acquired pneumonia 400 mg daily for 7 to 14 days.

### Preparation Available:

Moxifloxacin 400 mg Tab	HI	C	RT	Watch
Moxifloxacin 400 mg, 100ml Inj	HI	C	RT	

## 7.8 Tetracyclines

### 1. Doxycycline

**Indication:** Susceptible infections (eg. Chlamydia, rickettsia and mycoplasma), UTI, acne, syphilis, papulopustular facial rosacea, anthrax, prophylaxis of malaria.

**Adverse effects and cautions:** Anorexia, anxiety, dry mouth, flushing, fungal superinfection (when used for

periodontitis), tinnitus; phototoxicity may occur with prolonged use

**Dose:** Acne, 100 mg daily for 6-12 weeks or longer.

Early syphilis, 100 mg twice daily for 14 days; late latent syphilis 200 mg twice daily for 28 days. Non-gonococcal urethritis, 100 mg twice daily for 7 days.

Anthrax (treatment or post-exposure prophylaxis), 100 mg twice daily; Child (only if alternative antibacterial cannot be given) 5 mg/kg daily in 2 divided doses (maximum 200 mg daily).

**Preparation Available:**

Doxycycline 100 mg Tab	HI	D	RT	Access
Doxycycline 100 mg Inj	HI	D	RT	

## 7.9 Aminoglycoside

### 1. Gentamicin

**Indication:** urinary tract infections due to Pseudomonas, meningitis and other CNS infections, septicaemia and neonatal sepsis, endocarditis (with other antibiotics), surgical prophylaxis.

**Adverse effects and cautions:** Vestibular damage, reversible nephrotoxicity and respiratory paralysis. Monitoring of blood levels of gentamicin is advisable because both nephrotoxicity and ototoxicity are seen when higher doses are used, particularly in neonates, elderly and renal impaired patients.

Gentamicin should not be used during pregnancy except when essential.

**Contraindication:** Myasthenia gravis (may impair neuromuscular transmission).

**Does:** By intramuscular or by slow intravenous injection over at least 3 minutes or by intravenous infusion, 3-5 mg/kg daily (in divided doses every 8 hours).

**Preparation Available:**

Gentamicin 20mg/ml 2 ml Inj	NA	D	RT	Access
Gentamicin 40 mg/ml 2 ml Inj	HI	D	RT	

## 2. Amikacin

**Indication:** Serious Gram-negative infections resistant to gentamicin.

**Adverse effects and cautions:** See under gentamicin but it affects auditory function more than vestibular.

**Dose:** For adults and children the equivalent of 15 mg of amikacin per kg body-weight daily in 2 divided doses every 12 hours by intramuscular or slow intravenous injection or infusion, up to a maximum of 1.5 g daily in adults; Child 15 mg/kg daily in 2 divided doses; Neonate loading dose of 10 mg/kg then 15 mg/kg daily in 2 divided doses.

**Preparation Available:**

Amikacin 100 mg Inj	HI	D	RT	Access
Amikacin 250 mg Inj	HI	D	RT	
Amikacin 500 mg Inj	HI	D	RT	

## 3. Tobramycin

**Indication:** Septicaemia, meningitis and other CNS infections, chronic pseudomonas aeruginosa infection.

**Adverse effects and cautions:** Malaise, rhinitis, tinnitus, ototoxicity, nephrotoxicity, neurotoxicity,

**Dose:** Adult: 3 mg/kg daily in 3 divided doses; increased if necessary up to 5 mg/kg daily in 3-4

divided doses, increased dose used in severe infection; dose to be reduced back to 3 mg/kg daily as soon as clinically indicated.

**Preparation Available:**

Tobramycin 20 mg Inj	NA	C	CRT	Watch
Tobramycin 60 mg Inj	NA	C	CRT	
Tobramycin 80 mg Inj	NA	C	CRT	

### 7.10 Macrolides

The macrolides have an antibacterial spectrum that is similar but not identical to that of penicillin; they are thus an alternative in penicillin-allergic patients.

#### 1. Azithromycin

**Indication:** Respiratory-tract infections, otitis media, skin and soft tissue infections, non-gonococcal urethritis, multidrug resistant typhoid; greater action on gram negative organism than erythromycin

**Adverse effects and cautions:** Abdominal discomfort, diarrhoea, nausea, vomiting, pancreatitis, constipation, headache, drowsiness; cautions in electrolyte disturbances (predisposition to QT interval prolongation), may aggravate myasthenia gravis.

The drug should be used in pregnancy and breast-feeding if adequate alternatives are not available.

**Contraindication:** Hepatic impairment.

**Dose:** 500 mg once daily for 3 days; Child over 6 months, 10 mg/kg once daily for 3 days. Non-gonococcal urethritis, 1 g as a single dose. Typhoid, 500 mg once daily for 7 days.

### Preparation Available:

Azithromycin 100mg/5ml, 15 ml Susp	HI	B	RT	Watch
Azithromycin 200 mg/5 ml, 15 ml Susp	HI	B	RT	
Azithromycin 500 mg Inj	HI	B	RT	
Azithromycin 250 mg Tab	HI	B	RT	
Azithromycin 500 mg Tab	HI	B	RT	

## 2. Erythromycin

**Indication:** Alternative to penicillin in hypersensitive patients, syphilis, nongonococcal urethritis, chronic prostatitis, diphtheria and whooping cough prophylaxis, acne vulgaris.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, skin rashes and fever. Cholestatic hepatitis is caused primarily by erythromycin estolate and rarely by erythromycin stearate or ethylsuccinate; caution in history of liver disease.

**Dose:** Age over 8 years, 250-500 mg every 6 hours; Child up to 2 years 125 mg every 6 hours, 2-8 years 250 mg every 6 hours, doses doubled for severe infections. Acne, 500 mg twice daily for 3 months reduced to 250 mg twice daily for a further 3 months. Early syphilis, 500 mg 4 times daily for 14 days.

Uncomplicated non-gonococcal urethritis, 500 mg twice daily for 14 days.

### Preparation Available:

Erythromycin 125 mg/5 ml, 60 ml Susp	HI	B	RT	Watch
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Erythromycin 500 mg Tab	HI	B	RT	
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### 3. Clarithromycin

It is an erythromycin derivative with slightly greater activity than the parent compound.

**Indication:** Respiratory-tract infections, mild to moderate skin and soft tissue infections, otitis media, H. pylori eradication, Lyme disease.

**Adverse effects and cautions:** See under erythromycin; also tooth and tongue discolouration, headache, smell and taste disturbances.

The drug should be used in pregnancy and breast-feeding if potential benefit outweighs risk.

**Dose:** 250 mg every 12 hours for 7 days (severe infection, 500 mg every 12 hours for up to 14 days); CHILD, mg /kg twice daily.

#### Preparation Available:

Clarithromycin 250 mg Tab	HI	C	RT	Watch
Clarithromycin 500 mg Tab	HI	C	RT	

### 4. Roxithromycin

Semisynthetic macrolide derived from erythromycin.

**Indication:** ENT infections, Genitourinary tract infections, pneumonia, skin infections

**Adverse effects and cautions:** Weakness, dizziness, diarrhoea, rashes, nausea, vomiting; use with caution in pregnancy, lactation, hepatic impairment.

## Preparation Available:

Roxithromycin 150 mg Tab	HI	B	RT	Watch
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## 7.11 Lincosamides

### 1. Clindamycin

Clindamycin is active against Gram-positive cocci, including streptococci and penicillin-resistant staphylococci, and also against many anaerobes, especially *Bacteroides fragilis*. It is well concentrated in bone and excreted in bile and urine.

**Indication:** Methicillin-resistant *Staphylococcus aureus* (MRSA) in bronchiectasis, bone and joint infections, and skin and soft-tissue infections, Erysipelas or cellulitis in penicillin-allergic patients (alternative to macrolides)

**Adverse effects and cautions:** Abdominal discomfort, antibiotic associated colitis, diarrhoea, eosinophilia, jaundice; abscess, induration, pain and thrombophlebitis on parenteral use; avoid in acute porphyrias.

**Dose:** By mouth Child: 3–6 mg/kg 4 times a day (max. per dose 450 mg) Adult: 150–300 mg every 6 hours; increased if necessary up to 450 mg every 6 hours if required, increased dose used in severe infection.

By IM or IV or infusion Adult: 0.6–2.7 g daily in 2–4 divided doses; increased if necessary up to 4.8 g daily, increased dose used in life threatening infection, single doses above 600 mg to be administered by intravenous infusion only, single doses by intravenous infusion not to exceed 1.2 g.

### Preparation Available:

Clindamycin 150 mg Tab	HI	B	RT	Access
Clindamycin 300 mg Tab	HI	B	RT	
Clindamycin 600 mg Tab	NA	B	RT	
Clindamycin 150 mg/ml, 4 ml Inj	HI	B	RT	
Clindamycin 150 mg/ml 2 ml Inj	HI	B	RT	

## 7.12 Glycopeptide

### 1. Vancomycin

It Inhibits cell wall synthesis through glycopeptides polymerization blockage.

**Indication:** prophylaxis and treatment of endocarditis, aerobic and anaerobic gram positive bacteria including multi resistant staphylococci.

**Adverse effects and cautions:** nephrotoxicity including renal failure, ototoxicity, nausea, chills, fever, severe hypotension, shock; cardiac arrest (on rapid infusion) rapid infusion of the drug should be avoided.

The drug should be used in pregnancy if potential benefit outweighs risk.

**Dose:** By intravenous infusion, 500 mg every 6 hours or 1 g every 12 hours. Elderly over 65 years, 500 mg every 12 hours or 1 g once daily. Neonate up to 1 week, 15 mg/kg initially then 10 mg/kg every 12 hours; 1-4 weeks, 15 mg/kg initially then 10 mg/kg every 8 hours; CHILD over 1 month, 10 mg/kg every 6 hours.



### Preparation Available:

Vancomycin 500 mg Inj	HI	C	RT	Watch
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## 2. Teicoplanin

Indications: See under vancomycin.

**Adverse effects and cautions:** Rash, bronchospasm, anaphylaxis, headache, rigours. The drug should be used with caution in pregnancy, renal or liver impairment.

**Dose:** By intramuscular injection or by intravenous injection or infusion, initially 400 mg (for severe infections initially 400 mg every 12 hours for 3 days) then 200 mg daily. Child over 2 months by intravenous injection or infusion, 10 mg/kg every 12 hours for 3 days, subsequently 6 mg/kg daily.

### Preparation Available:

Teicoplanin 200 mg Inj	NA	B	RT	Watch
Teicoplanin 400 mg Inj	NA	B	RT	

## 7.13 Monobactams

### 1. Aztreonam

It inhibits cell wall synthesis by binding to penicillin binding proteins.

**Indications:** Gram negative aerobic bacteria including *Pseudomonas aeruginosa*, *N. Meningitides*, *H. Influenza*; effective against *N. Gonorrhoeae* but not against concurrent chlamydial infection.

**Adverse effects and cautions:** Rash, bronchospasm, asthenia, neutropenia; dose reduction required in renal impairment; prolong use result superinfection colitis.

**Dose:** Adult: 1 g every 8 hours, alternatively 2 g every 12 hours, single doses over 1 g intravenous route only.

**Preparation Available:**

Aztreonam 500 mg Inj	NA	B	CRT	Reserves
Aztreonam 1 gm Inj	NA	B	CRT	

### 7.14 Polymyxins

Colistimethate sodium / Colistin colistimethate sodium / Colistin / Polymyxin E

It hydrolyzes to colistin in vitro or in vivo, which damages bacterial cytoplasmic membranes.

Indications: Gram negative infections resistant to other antibacterials including those caused by *Pseudomonas aeruginosa*, *Acinetobacter baumannii* and *Klebsiella pneumoniae*.

**Adverse effects and cautions:** Rash, bronchospasm, asthenia, neutropenia; dose reduction required in renal impairment; prolong use result superinfection colitis.

**Dose:** Adult (body-weight up to 60 kg): 50 000–75 000 units/kg daily in 3 divided doses, to be administered into a totally implantable venous access device when giving via slow intravenous injection.

Adult (body-weight 60 kg and above): 1–2 million units every 8 hours, to be administered into a totally implantable venous access device when given via slow intravenous injection; maximum 6 million units per day.

**Preparation Available:**

Colistimethate 1 M IU Inj	HI	C	RT	Reserves
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Colistimethate 2 M IU Inj	HI	C	RT	
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### 1. Polymyxin B

**Indications:** Gram negative infection, multidrug resistant gram negative infection

**Adverse effects and cautions:** Dizziness, paresthesia, tingling of extremities and tongue; discontinue if the creatinine level increased.

**Dose:** Susceptible infection, 2.5 to 5 mg/kg/day divided 6 to 12 hourly not to exceed 5 mg/kg/day.

**Preparation Available:**

Polymyxin B 500000 IU Inj	NA	B	FT	R
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### Miscellaneous

#### 1. Chloramphenicol

**Indications:** Life threatening infections particularly those caused by H. influenzae

**Adverse effects and cautions:** Blood disorders, depression, diarrhoea, dry mouth, erythema multiforme, glossitis, headache, nausea, optic neuritis; avoid repeated courses and prolonged treatment.

**Dose:** Adult: 12.5 mg/kg every 6 hours, in exceptional cases dose can be doubled for severe infections such as septicaemia and meningitis, providing high doses reduced as soon as clinically indicated.

#### Linezolid

It acts by inhibiting protein synthesis through binding to ribosomal subunit. Resistance to linezolid can develop

with prolonged treatment or if the dose is less than that recommended.

**Indications:** active against Gram-positive bacteria including methicillin-resistant *Staphylococcus aureus* (MRSA), and glycopeptides resistant enterococci; not active against common Gram-negative organisms.

**Adverse effects and cautions:** Diarrhoea, eosinophilia, headache, nausea, taste disturbances, vomiting; use with caution in acute confusional states, bipolar depression, carcinoid tumour, history of seizures, thyrotoxicosis.

**Dose:** Adult: 600 mg every 12 hours usually for 10–14 days (maximum duration of treatment 28 days).

**Preparation Available:**

Linezolid 600 mg Tab	HI	C	RT	Reserve
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## 2. Nitrofurantoin

It inactivates ribosomal proteins and other macromolecules that interfere with metabolism and cell wall synthesis.

**Indication:** Acute and chronic UTI, Genito-urinary surgical prophylaxis.

**Adverse effects and cautions:** Nausea, vomiting, diarrhoea, haemolytic anaemia in individuals with G-6 PD deficiency, allergic manifestations such as chills, fever, leucopenia, cholestatic jaundice and peripheral neuropathy. The drug should not be used in acute pyelonephritis, infants less than 3 months old and known hypersensitive to nitrofurantoin. The drug has been used safely in pregnancy.

**Dose:** Acute uncomplicated infection, 50 mg every 6 hours with food for 7 days; Child over 3 months, 3 mg/kg daily in 4 divided doses.

Severe chronic recurrent infection, 100 mg every 6 hours with food for 7 days (dose reduced or discontinued if severe nausea).

**Preparation Available:**

Nitrofurantoin 50 mg Tab	HI	B	RT	Access
Nitrofurantoin 100 mg Tab	HI	B	RT	

## 7.15 Antiviral

### 1. Acyclovir / Aciclovir

**Indication:** Herpes infections.

**Adverse effects and cautions:** Gastrointestinal disturbances, rashes, increase in blood urea and creatinine, headache and fatigue.

The drug should be used with caution in renal impairment, elderly (risk of neurological reaction)

**Dose:** Herpes simplex, treatment, 200 mg (400 mg in the immunocompromised or if absorption is impaired) 5 times daily, usually for 5 days; Child under 2 years, half adult dose, over 2 years, adult dose.

Herpes simplex, prevention of recurrence, 200 mg 4 times daily or 400 mg twice daily possibly reduced to 200 mg 2 or 3 times daily and interrupted every 6-12 months.

Varicella and Herpes zoster, treatment, 800 mg 5 times daily for 7 days; Child, varicella, 20 mg/kg (max. 800 mg) 4 times daily for 5 days or under 2 years 200 mg

4 times daily, 2-5 years 400 mg 4 times daily, over 6 years 800 mg 4 times daily.

**Preparation Available:**

Acyclovir 200 mg Tab	HI	B	RT
Acyclovir 400 mg Tab	HI	B	RT
Acyclovir 800 mg Tab	HI	B	RT
Acyclovir 200 mg/5 ml Susp		B	RT
Acyclovir 250 mg/10 ml Inj	HI	B	RT

**Abacavir**

It inhibits HIV-1 reverse transcriptase by competing with dGTP as substrate, inhibit replication.

**Indication:** HIV infection in combination with other antiretroviral drugs.

**Adverse effects and cautions:** Nausea, vomiting, fatigue, diarrhoea; caution in hepatic impairment

**Dose:** 600 mg daily in 1 to 2 divided doses.

## Chapter-8: Drugs used in the disorder of Endocrine system

### 8.1 Drugs for Antidiuretic hormone disorders

#### 1. Vasopressin

**Indication:** Pituitary diabetes insipidus, initial control of esophageal variceal bleeding

**Adverse effects and cautions:** Nausea, vomiting, abdominal cramps, belching, fluid retention, sweating, tremor, constriction of coronary arteries and desire to defecate; use with caution in patients with asthma, heart failure, pregnancy and renal disease.

**Contraindication:** In vascular disease (especially disease of coronary arteries).

**Dose:** By subcutaneous or intramuscular injection, diabetes insipidus, 5-20 units every four hours. By intravenous infusion, initial control of variceal bleeding 20 units over 15 minutes.

### 8.2. Drugs for Corticosteroid responsive conditions

#### 1. Dexamethasone

**Indication:** Suppression of inflammatory and allergic disorder, mild to severe croup, congenital adrenal hyperplasia (under expert supervision).

**Adverse effects and cautions:** Hypertension, sodium retention, potassium loss, muscle weakness, diabetes, osteoporosis, dyspepsia, increased susceptibility to and severity of infection. Mental disturbance includes euphoria, psychosis, depression, aggravation of epilepsy. Peptic ulceration can lead to haemorrhage or perforation.

**Dose:** By mouth usual range 0.5-10 mg daily; Child 10-100 micrograms/kg daily.

By intramuscular injection or slow intravenous injection or infusion initially 0.5-24 mg; Child 0.2-0.4 mg/kg daily Cerebral oedema by intravenous injection, 10 mg initially, then 4 mg by intramuscular injection every 6 hours as required for 2-4 days, then gradually reduced and stopped over 5-7 days.

**Preparation Available:**

Dexamethasone 0.5 mg Tab	HI	C	RT
Dexamethasone 4 mg Tab	HI	C	RT
Dexamethasone 4 mg/ml 2 ml Inj	HI	C	RT

**2. Betamethasone**

**Indication:** suppression of inflammatory and allergic disorder, congenital adrenal hyperplasia.

**Adverse effects and cautions:** indigestion, increase appetite, nervousness; See under dexamethasone Dose: By mouth, usual range 0.5-5 mg daily.

**3. Deflazacort**

**Indication:** Suppression of inflammatory and allergic disorder.

**Adverse effects and cautions:** cushingoid appearance, weight increased, increased appetite, cough

**Dose:** By mouth Child 1 month–11 years: 0.25–1.5 mg/kg once daily or on alternate days; increased if necessary up to 2.4 mg/kg daily (max. per dose 120 mg in emergency situations); Child 12–17 years: 3–18 mg once daily or on alternate days; increased if



necessary up to 2.4 mg/kg daily (max. per dose 120 mg in emergency situations).

**Preparation Available:**

Deflazacort 6 mg Tab	NA	NA	RT
Deflazacort 30 mg Tab	NA	NA	RT
Deflazacort 6 mg/5ml, 30 ml Susp	NA	NA	RT

#### 4. Hydrocortisone

**Indication:** Thyrotoxic crisis, adrenocortical insufficiency in Addison's disease, acute hypersensitivity.

**Adverse effects and cautions:** Phosphate ester associated with pain and paraesthesia and See under dexamethasone.

**Dose:** By intramuscular injection or slow intravenous injection or infusion, 100 to 500 mg, 3-4 times in 24 hours or as required; child by slow intravenous injection up to 1 year 25 mg, 1-5 year 50 mg, 6-12 years 100 mg.

**Preparation Available:**

Hydrocortisone 100 mg Inj	HI	C	RT
Hydrocortisone 200 mg Inj		C	RT

#### 5. Prednisolone

**Indication:** Rheumatic arthritis, multiple sclerosis, acute exacerbation of COPD.

**Adverse effects and cautions:** See under dexamethasone.

**Dose:** By mouth, initially up to 10-20 mg daily (severe disease, up to 60 mg daily), preferably taken in the morning after breakfast or food; can often be reduced within a few days but may need to be continued for several weeks or months.

Maintenance, usual range, 2.5-15 mg daily, but higher doses may be needed; cushingoid side effects increasingly likely with doses above 7.5 mg daily.

**Preparation Available:**

Prednisolone 2.5 mg Tab	HI	C	RT
Prednisolone 5 mg Tab	HI	C	RT
Prednisolone 10 mg Tab	HI	C	RT
Prednisolone 20 mg Tab	HI	C	RT
Prednisolone 40 mg Tab	HI	C	RT

## 6. Methylprednisolone

**Indication:** Suppression of inflammatory and allergic disorders, cerebral oedema associated with malignancy, treatment of graft rejection, acute exacerbations of multiple sclerosis.

**Adverse effects and cautions:** See under dexamethasone.

**Dose:** By mouth, usual range 2-40 mg daily.

By intramuscular injection or slow intravenous injection or infusion, initially 100-500 mg.

**Preparation Available:**

Methylprednisolone 1 gm Inj	HI	C	CRT
Methylprednisolone 500 mg Inj	HI	C	CRT
Methylprednisolone 125 mg Inj	HI	C	CRT
Methylprednisolone 80 mg, 2 ml Inj Sup.	HI	C	CRT
Methylprednisolone 40 mg, 1ml Inj Sup	HI	C	CRT
Methylprednisolone 4 mg Tab	HI	C	RT
Methylprednisolone 8 mg Tab	HI	C	RT

## 7. Triamcinolone

**Indication:** Suppression of inflammatory and allergic disorders.

**Adverse effects and cautions:** See under dexamethasone.

**Dose:** Adult: 40 mg (max. per dose 100 mg), repeated if necessary, dose given for depot effect, to be administered into gluteal muscle; repeated at intervals according to patient's response.

## 8.3 Drugs for Diabetes Mellitus

### Alpha Glucosidase inhibitors

#### 1. Acarbose

It delays the digestion and absorption of starch and sucrose.

**Indication:** Diabetes mellitus inadequately controlled by diet or by diet with oral antidiabetic drugs  
**Adverse effects and cautions:** Abdominal pain, flatulence, diarrhoea, jaundice; use with caution with insulin and sulfonylureas (enhanced hypoglycaemia).

**Contraindication:** Pregnancy, breast-feeding, hepatic impairment, severe renal impairment.

**Dose:** Initially, 50 mg daily increased to 50 mg 3 times daily then increased if necessary after 6-8 weeks to 100 mg 3 times daily; maximum 200 mg 3 times daily; age under 18 years not recommended.

### Preparation Available:

Acarbose 50 mg Tab	HI	B	RT
Acarbose 25 mg Tab	HI	B	RT

## 2. Voglibose

**Indication, Adverse effects and cautions:** Similar to acarbose.

### Preparation Available:

Voglibose 0.2 mg Tab	HI	B	RT
Voglibose 0.3 mg Tab	HI	B	RT

## Biguanides

### 1. Metformin

Metformin decreases gluconeogenesis and increases peripheral utilisation of glucose; since it acts only in the presence of endogenous insulin it is effective only if there are some residual functioning pancreatic islet cells.

**Indication:** Type 2 diabetes mellitus.

**Adverse effects and cautions:** Anorexia, nausea, vomiting, diarrhoea, metallic taste and lactic acidosis (rarely).

**Contraindication:** Renal impairment, hepatic impairment, recent myocardial infarction, ketoacidosis,

**Dose:** Age over 10 years, initially 500 mg with breakfast for at least 1 week then 500 mg every 12 hours with or after food for at least 1 week, maximum 2 g daily in divided doses.

### Preparation Available:

Metformin 1 gm Tab	HI	NA	RT
Metformin 1 gm SR Tab	NA		RT
Metformin 850 mg Tab	HI		RT
Metformin 850 mg SR Tab	NA		RT
Metformin 500 mg Tab	HI		RT
Metformin 500 mg SR Tab	NA		RT

### Dipeptidyl Peptidase-4 Inhibitors

#### 1. Sitagliptin

It increases insulin secretion and lower glucagon secretion.

**Indication:** Type 2 diabetes mellitus as monotherapy or in combination.

**Adverse effects and cautions:** GI disturbances, nasopharyngitis, pain, peripheral oedema, upper respiratory infection; take with caution to history of heart failure; dose modification in renal and hepatic impairment Dose: 100 mg once daily.

#### Preparation Available:

Sitagliptin 25 mg Tab	HI	B	RT
Sitagliptin 50 mg Tab	HI	B	RT
Sitagliptin 100 mg Tab	HI	B	RT

#### 2. Tenzeligliptin

**Indication, Adverse effects and cautions:** See under sitagliptin.

#### Preparation Available:

Tenzeligliptin 20 mg Tab	NA	B	RT
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## **Sodium Glucose co-transporter-2 Inhibitors. (SGLT-2 Inhibitors):**

### **1. Empagliflozin**

**Indication:** Medication used to manage type 2 diabetes and reduce the risk of cardiovascular problems in adults with heart failure or cardiovascular disease.

**Adverse effect and Cautions:** Urinary Tract Infection, Genital Infection, Increased Urination, Diabetic ketoacidosis. Used with caution in patients with renal impairment.

**Contraindication:** Should not be used in patients having eGFR less than 30ml/min. Type-1 diabetes as it increases the risk of Diabetic ketoacidosis.

**Dose:** Type-2 DM: 10 mg once daily in the morning, if needed and tolerated may be increased up to 25 mg once daily.

**Heart Failure:** 10 mg once in the morning.

**Chronic Kidney Disease:** 10 mg once in the morning.

### **Preparation Available**

Empagliflozin 10 mg	HI	D	RT
Empagliflozin 25 mg	HI	D	

## **Meglitinides**

### **1. Repaglinide**

It stimulates insulin release.

**Indication:** Type 2 diabetes mellitus.

**Adverse effects and cautions:** Diarrhoea, constipation, abdominal pain, nausea, vomiting; use with caution in myocardial infarction, infection, coma, during surgery, renal impairment.

**Contraindication:** Ketoacidosis, pregnancy, breast-feeding, severe hepatic impairment.

**Dose:** Initially 500 micrograms within 30 minutes before main meals, adjusted according to response at intervals of 1-2 weeks; age under 18 years not recommended.

**Preparation Available**

Repaglinide 1 mg Tab	HI	NA	RT
Repaglinide 2 mg Tab	HI	NA	RT

**Sulfonylureas**

It increases insulin release, decreases hepatic glucose production and increases insulin receptor sensitivity.

**1. Glibenclamide**

**Indication:** Type 2 diabetes mellitus.

**Adverse effects and cautions:** Hypoglycaemia, nausea, vomiting, diarrhoea and constipation;

**Dose:** Initially 5 mg daily (Elderly patient 2.5 mg), adjusted according to response; maximum 15 mg daily; taken with breakfast or meal.

**Preparation Available:**

Glibenclamide 5 mg Tab	HI	C	RT
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**2. Gliclazide**

**Indication:** Type 2 diabetes mellitus.

**Adverse effects and cautions:** See under glibenclamide.

**Dose:** Initially, 40-80 mg daily, adjusted according to response; up to 160 mg as a single dose, with breakfast or meal; higher doses divided; maximum 320 mg daily.

### Preparation Available:

Gliclazide 40 mg Tab	HI	NA	RT
Gliclazide 80 mg Tab	HI	NA	RT

### 3. Glimepiride

**Indication:** Type 2 diabetes mellitus.

**Adverse effects and cautions:** See under glibenclamide.

**Dose:** Initially, 40-80 mg daily, adjusted according to response; up to 160 mg as a single dose, with breakfast or meal; higher doses divided; maximum 320 mg daily.

### Preparation Available:

Glimepiride 1 mg Tab	HI	C	RT
Glimepiride 2 mg Tab	HI	C	RT
Glimepiride 3 mg Tab	HI	C	RT
Glimepiride 4 mg Tab	HI	C	RT

### 4. Glipizide

**Indication, Adverse effects and cautions:** See under glibenclamide.

**Dose:** Initially 2.5-5 mg daily, adjusted according to response; maximum 20 mg daily, up to 15 mg may be given as a single dose before breakfast or meal.

### Preparation Available:

Glipizide 5 mg Tab	HI	C	RT
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## Thiazolidinediones

### 1. Pioglitazone

It improves target cell response to insulin; decreases hepatic gluconeogenesis.

Indications: Type 2 diabetes mellitus.



**Adverse effects and cautions:** Peripheral oedema, headache, anaemia, weight gain, dizziness, impotence; use with caution in hepatic impairment, renal impairment.

**Contraindication:** Hepatic impairment, pregnancy, breast-feeding and history of heart failure.

**Dose:** Initially 15-30 mg once daily increased to 45 mg once daily according to response.

**Preparation Available:**

Pioglitazone 15 mg Tab	HI	NA	RT
Pioglitazone 30 mg Tab	HI		RT

**Insulin**

Properties of Insulin Preparations

Types	Added Protein	Species Source	Onset of action (Hr)	Peak (Hr)	Duration of Action (Hr)
Short					
Regular soluble (Crystalline)	None	Human	0.5-0.7	1.5-4	5-8
Rapid					
Lispro	None	Human analog	0.25	0.5-1.5	2-5
Aspart	None	Human analog	0.25	0.6-0.8	3-5
Glulisine	None	-	-	0.5-1.5	1-2.5
Intermediate					
NPH (Isophane)	Protamine	Human	1-2	6-12	18-24
Lente	None	Human	1-2	6-12	18-24
Slow/Long					
Ultralente	None	Human	4-6	16-18	20-36
Protamine zinc	Protamine	-	4-6	14-20	24-36

Glargine	None	Human	2-5	5-24	18-24
Detemir	None	-	1-2	4-14	6-24

### Short acting

They are administered to mimic the prandial (mealtime) release of insulin, and they are usually not used alone but, rather, along with longer-acting insulin to assure proper glucose control. Insulin lispro is usually administered 15 minutes prior to a meal or immediately following a meal, whereas glulisine can be taken either 15 minutes before a meal or within 20 minutes after starting a meal. Insulin aspart must be administered just prior to the meal. All of the rapid-acting formulations are suitable for intravenous administration, although regular insulin is most commonly used when the intravenous route is needed. Insulin lispro, insulin aspart, and insulin glulisine may also be used in external insulin pumps.

#### 1. Human regular insulin

Insulin (regular) is a clear solution prepared from zinc-insulin crystals dissolved usually in a buffer at neutral pH. Short-acting insulin (i.e., regular or soluble) usually should be injected 30 to 45 minutes before meals. After intravenous injection, there is a rapid fall in the blood glucose concentration, which usually reaches a nadir in 20 to 30 minutes. The 30- to 60-minute onset of action requires proper timing of premeal regular insulin, which is difficult for most patients. When metabolic conditions are stable, regular insulin usually is given subcutaneously in combination with an intermediate- or long-acting preparation.

**Indication:** Diabetic ketoacidosis, diabetes mellitus.

**Adverse effects and cautions:** Hypoglycaemia localised allergic reactions, fat hypertrophy at injection sites.

**Dose:** By subcutaneous, intramuscular or intravenous injection, according to the patient's requirements.

**Preparation Available:**

Human Regular Insulin 40 IU/ml 10 ml Inj	NA	NA	FT
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### **Rapid acting**

#### **Insulin Lispro**

Insulin lispro is a rapid-acting, recombinant DNA-derived insulin human analog that is structurally identical to insulin human except for transposition of the natural sequence of lysine and proline on the B chain of the molecule. Because it can be injected shortly before eating (0–15 minutes), lispro, and all rapid-acting insulins, provide patients greater flexibility in lifestyle. These insulins lower 2-hour postprandial blood glucose levels, and decrease the risk for late postprandial and nocturnal hypoglycemia compared with regular insulin formulations. Because lispro has a shorter duration of action than regular insulin, hyperglycemia and ketosis may occur more rapidly if insulin delivery is inadvertently interrupted.

**Indication:** Diabetes mellitus.

**Adverse effects and cautions:** See under soluble/regular insulin

**Dose:** By subcutaneous injection, immediately before meals or when necessary shortly after meals, according to requirements. By intravenous injection or infusion according to requirements

### **Insulin Aspart**

Insulin aspart is a rapid-acting insulin analog that differs from human insulin by substitution of aspartic acid at B28. Insulin aspart is approved for use in paediatric patients, age 6 and older. Insulin aspart controls postprandial glucose excursions similar to insulin lispro. Its absorption and activity profile is similar to insulin lispro and more reproducible than regular insulin.

**Indication:** diabetes mellitus

**Adverse effects and cautions:** See under soluble insulin.

**Dose:** By subcutaneous injections, Adult and Child over 6 years, according to requirements.

### **Intermediate acting**

#### **1. NPH (Neutral protamine hagedorn or Isophane)**

NPH insulin is a suspension of insulin in a complex with zinc and protamine in a phosphate buffer. Intermediate-acting insulins usually are given either once a day before breakfast or twice a day. Its duration of action is less than that of protamine zinc insulin. After subcutaneous injection, proteolytic tissue enzymes degrade the protamine to permit absorption of insulin. It will not give control of diabetes throughout

the 24 hours by itself, but it is of value when combined with soluble insulin. Biphasic insulin preparations (containing soluble insulin and isophane or insulin aspart or insulin lispro) are available and given two to four times daily for insulin replacement in patients with type 1 diabetes.

**Indication:** diabetes mellitus.

**Adverse effects and cautions:** See under soluble insulin.

**Dose:** By subcutaneous injection, according to the patient's requirements.

## **Long acting**

### **1. Insulin Glargine**

Insulin glargine has a slow onset of action (1–1.5 hours) and achieves a maximum effect after 4–5 hours. This maximum activity is maintained for 11–24 hours or longer. Once injected, insulin glargine (which is a clear solution with a pH of 4.0) precipitates at physiological pH forming a depot that releases insulin slowly over 24 hours. and insulin glargine should not be mixed with other insulin. Separate syringes must be used to minimise the risk of contamination and subsequent loss of efficacy. Combination of glargine with sulfonylureas and/or metformin can reduce both fasting (basal) and postprandial glucose levels. It should be noted that the use of a long-acting basal insulin alone will not control postprandial glucose elevations in insulin-deficient type 1 or type 2 DM.

**Adverse effects and cautions:** See under soluble insulin.

**Dose:** By subcutaneous injections, Adult and Child over 6 years, according to requirements.

**Preparation Available:**

Glargine 100 IU/ml 10ml Inj	HI	NA	FT
Glargine 100 IU/ml 3 ml Cartridge	HI		FT

**Combination Insulin**

Products that contain premixed NPH and regular insulin in a fixed ratio of 70:30 are available from Lilly as Humulin 70/30 and Novo Nordisk as Novolin 70/30. Lilly also makes a premixed formulation in a 50:50 ratios (Humulin 50/50). Additional premixed formulations are available wherein both insulin lispro and insulin aspart have been co-crystallized with protamine to create intermediate-acting insulin similar to NPH. Humalog Mix 75/25 and Humalog Mix 50/50 (Lilly) are products with lispro protamine and insulin lispro in a fixed ratio of 75:25 and 50:50, respectively. Novolog Mix 70/30 (Novo Nordisk) is aspart protamine and insulin aspart in a fixed ratio of 70:30. These premixed insulins are available for patients who have difficulty measuring and mixing insulins and are dosed twice daily. These insulins are compatible when mixed together and retain their individual pharmacodynamic profiles.

Regular/Isophane mixture 30/70 40 IU/ ml 10 ml Vial	HI		FT
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Regular/Isophane mixture 30/70 Cartridge	HI		FT
Regular/NPH mixture 50/50 Cartridge	HI		FT
Insulin protamine/insulin aspart protamine mixture 30/70 vial	HI		FT
Insulin protamine/insulin aspart protamine mixture 30/70 Cartridge	HI		FT
Insulin protamine/insulin aspart protamine mixture 50/50 vial	HI		FT
Insulin protamine/insulin aspart protamine mixture 50/50 Cartridge	HI		FT
Insulin lispro /Insulin NPL (Neutral Protamine lispro) mixture 25/75	NA		FT
Insulin NPL/Insulin mixture 50/50 Cartridge	HI		FT
Insulin Lispro/ insulin lispro protamine 50:50 equivalent to humalog mix cartridge with pen Inj	HI		

## Combination Products

### 1. Metformin and Glimepiride

**Indication, Adverse effects and cautions:** See under Metformin and Glimepiride

Metformin 500 mg + Glimepiride 1 mg Tab	HI	NA	RT
Metformin 1000 mg + Glimepiride 1 mg Tab	HI		RT
Metformin 500 mg + Glimepiride 2 mg Tab	HI		RT

Metformin 1000 mg + Glimepiride 2 mg Tab	HI		RT
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## 2. Metformin and Sitagliptin

**Indication, Adverse effects and cautions:** See under Metformin and Sitagliptin

Metformin 500 mg + Sitagliptin 50 mg Tab	HI	NA	RT
Metformin 1000 mg + Sitagliptin 50 mg Tab	HI		RT
Metformin 1000 mg + Sitagliptin 100 mg Tab	HI		RT
Metformin 850 mg + Sitagliptin 50 mg Tab	HI		RT

## 3. Metformin and Linagliptin

**Indication, Adverse effects and cautions:** See under Metformin and linagliptin

Metformin 1000 mg + Linagliptin 2.5 mg Tab	HI	NA	RT
Metformin 500 mg + Linagliptin 2.5 mg Tab	HI		RT
Metformin 850 mg + Linagliptin 2.5 mg Tab	HI		RT

## 8.4 Sex Hormones

### Androgen

#### 1. Danazol

It suppresses the pituitary ovarian axis by inhibition of pituitary gonadotropin output.



**Indication:** Endometriosis, fibrocystic breast disease, hereditary angioedema.

**Adverse effects and cautions:** Mild hirsutism, decreased breast size, acne, weight gain, oedema, cholestatic jaundice, dizziness, headache, fatigue and tremor; use with caution in migraine, seizure disorder, cardiac or renal dysfunction.

**Contraindication:** Abnormal genital bleeding of unknown aetiology, pregnancy.

**Dose:** Endometriosis, initially 400 mg daily in upto 4 divided doses, adjusted according to response. Menorrhagia, 200 mg daily, usually for 3 months. Benign breast cyst, 300 mg daily usually for 3 months. Gynaecomastia, 400 mg daily in divided doses for 6 months (adolescents 200 mg daily, increased to 400 mg daily if no response after 2 months).

**Preparation Available:**

Danazol 50 mg Tab	HI	X	RT
Danazol 100 mg Tab	HI	X	RT
Danazol 200 mg Tab	NA	X	RT

## 2. Oestrogens

Ethinylestradiol / Ethinylestradiol

It acts similar to oestradiol, development and maintenance of female reproductive system.

**Indication:** Short-term treatment of symptoms of oestrogen, osteoporosis prophylaxis, menstrual disorder, palliative treatment of prostate cancer.

**Adverse effects and cautions:** Nausea and vomiting; weight gain, jaundice, rashes, depression, headache,

breast enlargement and tenderness, withdrawal bleeding; Impotence and gynaecomastia in men; use with caution in risk factors for venous thromboembolism, arterial disease, history of severe depression.

**Contraindication:** Pregnancy, history of arterial and venous thrombosis, transient cerebral ischaemic attacks, migraine.

**Dose:** Menopausal symptoms, 10-50 micrograms daily. Prostate cancer (palliative) 0.15-1.5 mg daily.

**Preparation Available:**

Ethinylestradiol 50 mcg Tab	NA	X	RT
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### 3. **Conjugated estrogen**

It replaces endogenous estrogen; important for development and maintenance of female reproductive system **Indication:** menopausal symptoms, osteoporosis prophylaxis, female hypogonadism, palliative care in prostate cancer.

**Adverse effects and cautions:** Abdominal bloating, abdominal cramp, headache, breast tenderness, back pain.

**Contraindication:** History of breast cancer, arterial thromboembolic disease.

**Dose:** Menopausal symptoms, 0.625-1.25 mg daily.

**Preparation Available:**

Conjugated estrogen 0.625 mg Tab	HI	X	RT
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## **Progestogens**

### 1. **Progesterone**

**Indication:** Infertility due to luteal phase, premenstrual syndrome, dysfunctional uterine bleeding **Adverse**

**effects and cautions:** Acne, alopecia, bloating, breast tenderness, change in libido, depression, dizziness, drowsiness; use with caution in cardiac dysfunction, diabetes (glucose tolerance can decrease), hypertension. **Dose:** Premenstrual syndrome, 200–800 mg daily, doses above 200 mg to be given in 2 divided doses, for premenstrual syndrome start on day 12–14 and continue until onset of menstruation (but not recommended); rectally if barrier methods of Contraception are used, in patients who have recently given birth or in those who suffer from vaginal infection or recurrent cystitis.

**Preparation Available:**

Progesterone 100 mg Tab	NA	B	RT
Progesterone 200 mg Cap	HI	B	RT

## 2. Norethisterone

It inhibits secretion of gonadotropins from pituitary gland, prevents follicular maturation and ovulation.

**Indication:** Contraceptive, endometriosis, premenstrual syndrome, postponement of menstruation.

**Adverse effects and cautions:** More virilising effects and the greater possibility of liver disturbances and jaundice, urticaria, gastrointestinal disturbances, oedema, weight gain, breast discomfort and irregular menstrual cycles; use with caution in patients with conditions that might be aggravated by fluid retention (cardiac or renal dysfunction, or epilepsy or hypertension), diabetes, impaired liver function.

**Contraindication:** Pregnancy and patients with genital or breast cancer.

**Dose:** Endometriosis, 10-15 mg daily starting 5th day of cycle for 4-6 months (increased if spotting occurs to 20-25 mg daily, reduced once bleeding has stopped). Postponement of menstruation, 5 mg 3 times daily starting 3 days before anticipated onset (menstruation occurs 2- 3 days after stopping).

**Preparation Available:**

Norethisterone 5 mg Tab	HI	X	RT
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### 3. Dydrogesterone

It is an analogue of the naturally occurring progesterone and does not cause virilisation.

**Indication:** Endometriosis, dysfunctional uterine bleeding, dysmenorrhoea, amenorrhoea.

**Adverse effects and cautions:** See under norethisterone.

**Dose:** Endometriosis, 10 mg 2-3 times daily from 5th to 25th day of cycle or continuously.

Dysfunctional uterine bleeding, 10 mg twice daily (together with an oestrogen) for 5-7 days to arrest bleeding; 10 mg twice daily (together with day of cycle to prevent bleeding. than oestrogen) from 11th to 25 Dysmenorrhoea, 10 mg twice daily from 5 to 25 days of cycle.

Amenorrhoea, 10 mg twice daily from 11th to 25th day of cycle with oestrogen therapy from 1<sup>st</sup> to 25th day of cycle.

Hormone replacement therapy, with continuous oestrogen therapy, 10 mg daily from 15-28 days of each 28-day hormone replacement therapy (HRT) cycle

### Preparations Available:

Dydrogesterone 10 mg Tab	NA	NA	RT
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#### 4. Hydroxyprogesterone

This is a derivative of progesterone. It is more potent than progesterone and has a longer duration of action (7-14 days).

**Indication:** Amenorrhoea, dysfunctional uterine bleeding, induction of menses, prevention of preterm labour.

**Adverse effects and cautions:** See under norethisterone.

**Dose:** Amenorrhoea or dysfunctional uterine bleeding, by intramuscular injection, 375 mg. Induction of menses, intramuscular injection 125-250 mg on day 10 of the menstrual cycle.

#### Preparation Available:

Hydroxyprogesterone 250 mg Inj	NA	NA	RT
Hydroxyprogesterone 500 mg Inj			RT

#### 5. Levonorgestrel

It is a second generation progesterone and active isomer of norgestrel and has twice its potency. It inhibits ovulation by negative feedback mechanism on hypothalamus. Hormonal emergency Contraception is less effective than insertion of an intrauterine device.

**Indication:** Emergency Contraceptive.

**Adverse effects and cautions:** Nausea, low abdominal pain, headache, dizziness, menstrual irregularities.

**Dose:** Contraceptive, by subdermal implantation, set of 2 capsules, each containing 750 micrograms of

levonorgestrel inserted preferably on the first day of cycle.

Emergency Contraceptive, 1.5 mg as a single dose as soon as possible after sex (preferably within 12 hours but not later than after 72 hours).

## 6. Medroxyprogesterone

This is a derivative of progesterone and has less androgenic activity.

**Indication:** Contraceptive (long acting), secondary amenorrhoea, dysfunctional uterine bleeding, mild to moderate endometriosis.

**Adverse effects and cautions:** See under norethisterone; menstrual irregularities are common, and infertility may persist for many months after cessation of treatment.

**Dose:** For Contraception, by deep intramuscular injection, 150 mg within first 5 days of cycle or within first 5 days after parturition (delay until 6 weeks after parturition if breast-feeding); for long-term Contraception, repeated every 3 months.

Dysfunctional uterine bleeding and secondary amenorrhoea, by mouth, 2.5-10 mg daily for 5-10 days beginning on 16-21 days of cycle, repeated for 2 cycles in dysfunctional uterine bleeding and 3 cycles in secondary amenorrhoea. Mild to moderate endometriosis, 10 mg 3 times daily for 90 consecutive days, beginning on day 1 of cycle.

### Preparation Available:

Medroxyprogesterone 10 mg Tab	HI	NA	RT
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Medroxyprogesterone 150 mg/ml, 1ml Inj			RT
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## 7. Desogestrel

It is a third generation of progesterone and a derivative of norgestrel.

**Indication:** Contraception.

**Adverse effects and cautions:** Breast discomfort, changes in libido, depression, disturbance of appetite, dizziness, headache, menstrual irregularities, nausea, vomiting; use with caution in active trophoblastic disease, arterial disease, functional ovarian cyst, history of jaundice in pregnancy

**Contraindication:** acute porphyria, history of breast cancer, undiagnosed vaginal bleeding, severe arterial disease.

## Anti-oestrogens

### 1. Clomiphene / Clomifene

It is a nonsteroidal compound with oestrogenic and anti oestrogenic properties. Mechanism in stimulating ovulation is unknown but is believed to be related to its anti-oestrogenic properties. It occupies oestrogen receptors in hypothalamus, thereby causing increased secretion of LH and FSH resulting in maturation of ovarian follicles and development of corpus luteum.

**Indication:** an ovulatory infertility in females

**Adverse effects and cautions:** Ovarian enlargement or cyst formation, vasomotor symptoms such as hot flushes, transient blurring of vision, diplopia, abdominal

or pelvic discomfort, nausea, vomiting, heavier menses, breast discomfort, weight gain, endometriosis and headache; use with caution in uterine fibroids, ectopic pregnancy.

**Contraindication:** Liver disease or abnormal uterine bleeding. The drug is Contraindicated during pregnancy, ovarian cyst.

**Dose:** 50 mg daily for 5 days, starting within about 5 days of onset of menstruation (preferably on 2nd day) or at any time if cycles have ceased; second course of 100 mg daily for 5 days may be given in absence of ovulation; most patients who are going to respond will do so to first course; 3 courses should constitute adequate therapeutic trial, long term cyclical therapy not recommended.

**Preparation Available:**

Clomiphene 50 mg Tab	NA	NA	RT
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## Antiprogestins

### 1. Mifepristone

**Indication:** Medical termination of intrauterine pregnancy of up to 63 days' gestation, labour induction in foetal death in utero where prostaglandin or oxytocin inappropriate.

**Adverse effects and cautions:** Uterine Contractions, vaginal bleeding (sometimes severe), nausea, vomiting, rash, dizziness, headache; use with caution in hepatic or renal impairment, breast-feeding, asthma, mothers aged over 35 years.



**Contraindication:** Suspected ectopic pregnancy, uncontrolled severe asthma.

**Preparation Available:**

Mifepristone 200 mg Tab	HI	X	RT
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**Combination Oral Contraceptive Pills (COC)**

The mode of action is as follows:

Oestrogen inhibits secretion of FSH via negative feedback on the anterior pituitary, and thus suppresses development of the ovarian follicle.

Progesterone inhibits secretion of LH and thus prevents ovulation; it also makes the cervical mucus less suitable for the passage of sperm

Oestrogen and progesterone act in concert to alter the endometrium in such a way as to discourage implantation.

**Caution:** Cigarette smoking during oral Contraceptive use increases the risk of serious adverse cardiovascular effects. This risk increases with age and with heavy smoking ( $\geq 15$  cigarettes daily) and is markedly greater in women  $>35$  years of age. Women who use oral Contraceptives should be strongly advised not to smoke.

## Adverse effects:

Estrogenic effects	Progestogenic effects	Androgenic effects
<p>Nausea</p> <p>Increased breast size (ductal and fatty tissue)</p> <p>Cyclic weight gain owing to fluid retention</p> <p>Leukorrhoea</p> <p>Cervical eversion or ectopy</p> <p>Hypertension</p> <p>Rise in cholesterol concentration in gallbladder bile</p> <p>Growth of leiomyomata</p> <p>Telangiectasia</p> <p>Hepatocellular adenomas or hepatocellular cancer (rare)</p> <p>Cerebrovascular accidents (rare)</p> <p>Thromboembolic complications including pulmonary emboli (rare)</p> <p>Stimulation of breast neoplasia (exceedingly rare) (Most pills with &gt;50 mcg of ethinyl estradiol do not produce troublesome estrogen-mediated side effects or complications.)</p>	<p>Both the estrogenic and the progestational components of oral contraceptives may contribute to the development of the following adverse effects:</p> <p>Breast tenderness</p> <p>Headaches</p> <p>Hypertension</p> <p>Myocardial infarction (rare)</p>	<p>All low-dose combined pills suppress a woman's production of testosterone, which has a beneficial effect on acne, oily skin, and hirsutism. The progestin component may have androgenic as well as progestational effects:</p> <p>Increased appetite and weight gain</p> <p>Depression, fatigue, tiredness</p> <p>Decreased libido and/or enjoyment of intercourse</p> <p>Acne, oily skin</p> <p>Increased breast tenderness or breast size</p> <p>Increased low-density lipoprotein (LDL) cholesterol levels</p> <p>Decreased high-density lipoprotein (HDL) cholesterol levels</p> <p>Decreased carbohydrate tolerance; increased insulin resistance</p> <p>Pruritus</p>

## Preparation Available

### 1. Desogestrel and Ethinyl Estradiol

Desogestrel 0.15 mg + Ethinylestradiol 0.03 mg Tab	NA	X	RT
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### 2. Ethinyl Estradiol and Norgestrel

Adverse effects: edema, weakness, amenorrhea, breakthrough bleeding

Ethinyl Estradiol 0.05 mg + Norgestrel 0.5 mg Tab		X	
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### 3. Ethinylestradiol and Levonorgestrel

Ethinylestradiol 0.03 mg + Levonorgestrel 0.15 mg Tab		NA	
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### 4. Ethinylestradiol and Levonorgestrel

Ethinyl Estradiol 0.02 mg + Levonorgestrel 0.1 mg Tab		NA	
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## Gonadotropins

### 1. Human chorionic gonadotropin; HCG

It mimics the action of luteinising hormone (LH), which is obtained from the urine of pregnant women.

**Indication:** Treatment of infertility in women.

**Adverse effects and cautions:** Headache, tiredness, mood changes, multiple pregnancy; use with caution in cardiac or renal impairment, epilepsy, asthma, migraine.

**Dose:** By subcutaneous or intramuscular injection, according to the patient's response.

### Preparation Available:

Human chorionic Gonadotropin 10000 IU Inj	X	FT
Human Chorionic Gonadotropin 5000 IU Inj		FT

### Anabolic Steroid

#### 1. Alendronate / Alendronic acid

**Indication:** Treatment of postmenopausal osteoporosis, treatment of osteoporosis in men, prevention and treatment of corticosteroid-induced osteoporosis in postmenopausal women not receiving hormone replacement therapy.

**Adverse effects and cautions:** Abdominal distension, abdominal pain, constipation, diarrhoea, dyspepsia, flatulence, headache, esophageal reactions, regurgitation

**Dose:** 10 mg daily, alternatively 70 mg once daily.

#### Preparation Available:

Alendronate 70 mg Tab	HI	NA	RT
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### 8.5 Thyroid and Antithyroid drugs

#### Thyroid Hormones

##### 1. Levothyroxine / Thyroxine

The principal pharmacological effect of exogenous thyroid hormones is to increase the metabolic rate of body tissues.

**Indication:** Hypothyroidism.

**Adverse effects and cautions:** Palpitation, tachycardia, diarrhoea, cardiac arrhythmias, tremor, weight loss,

sweating, insomnia, angina pain and increased appetite; use with caution and in reduced dosage in patients with angina pectoris or other cardiovascular disease including hypertension, diabetes mellitus, pregnancy and breast-feeding.

**Contraindication:** Thyrotoxicosis.

**Dose:** The initial dose should not exceed 50-100 micrograms daily, preferably before morning meal or breakfast, or 25-50 micrograms in elderly patients or those with cardiac disease, increased by 50 micrograms at intervals of at least 3-4 weeks. Neonate up to 1 month a daily dose of 5-10 micrograms/kg; Child over 1 month initially 5 micrograms/kg, adjusted in steps of 25 micrograms every 2-4 weeks until mild toxic symptoms appear then reduce dose slightly.

**Preparation Available:**

Levothyroxine 12.5 mcg Tab	HI	A	RT
Levothyroxine 25 mcg Tab	HI	A	RT
Levothyroxine 50 mcg Tab	HI	A	RT
Levothyroxine 75 mcg Tab	HI	A	RT
Levothyroxine 100 mcg Tab	HI	A	RT

## Antithyroid Drugs

### 1. Carbimazole

It inhibits the formation of thyroid hormones by interfering with incorporation of oxidised iodine into tyrosine residues of thyroglobulin and coupling of iodotyrosine residues to form iodothyronines.

**Indication:** Hyperthyroidism.

**Adverse effects and cautions:** Rashes, nausea, headache, arthralgia, agranulocytosis and pruritus.

The patient should be asked to report sore throat; WBC count should be performed if there is clinical evidence of infection; use with caution in pregnancy, breast-feeding and liver disorders.

**Dose:** 15-40 mg daily in divided doses, until patient becomes euthyroid (usually 4-8 weeks), then reduced to a maintenance dose of 5-15 mg for 12-18 months.

**Preparation Available:**

Carbimazole 5 mg Tab	HI	D	RT
Carbimazole 10 mg Tab	NA	D	RT

## 2. Propylthiouracil

**Indication:** See under carbimazole.

**Adverse effects and cautions:** See under carbimazole. The drug may cause thrombocytopenia, aplastic anaemia, hypoprothrombinemia and bleeding.

**Dose:** 200-400 mg daily and maintained on this dose until the patient becomes euthyroid, the dose may then be gradually reduced to maintenance of 50 to 150 mg daily.

# Chapter-9: Drugs used in Anaesthesia

## General anaesthetics

### 9.1 Inhalational Anaesthetics

#### 1. Halothane

**Indication:** Major surgery with oxygen or nitrous oxide-oxygen mixture

**Adverse effects and cautions:** Nausea, vomiting, fall in blood pressure, bradycardia, shivering (heat loss due to peripheral vasodilatation) and hepatitis, risk of severe hepatotoxicity; Use of halothane may cause excessive bleeding during caesarean section and post-partum haemorrhage.

**Dose:** Using a special calibrated vaporiser, induction increased gradually to 2-4% in oxygen or nitrous oxide-oxygen; child 1.5-2%; maintenance, 0.5-2%.

#### 2. Isoflurane

**Indication:** Major surgery with oxygen or nitrous oxide-oxygen mixture.

**Adverse effects and cautions:** Depression of white cell formation, hypoxia, megaloblastic anaemia, neurological toxic effects; Hepatotoxicity is smaller than halothane.

**Dose:** Using a special calibrated vaporiser, induction, increased gradually from 0.5 % to 3%, in oxygen or nitrous oxide-oxygen. Maintenance, 1-2.5% in nitrous oxide-oxygen; an additional 0.5 -1% may be required when given with oxygen alone. Caesarean section, 0.5-0.75% in nitrous oxide-oxygen.

### Preparation Available:

Isoflurane 100 ml Sol	NA	NA	CT
Isoflurane 250 ml sol	NA	NA	CT

#### 1. Sevoflurane

**Indication:** Major surgery with oxygen or nitrous oxide-oxygen mixture

**Adverse effects and cautions:** cardiac arrest, dystonia, leucopenia, torsade de pointes, urinary retention.

### 9.2 Intravenous Anaesthetics

#### 1. Diazepam

See under chapter 4 antiepileptics.

#### 2. Ketamine

It is a NMDA receptor antagonist, shorter acting and less toxic. It is used mainly for paediatric anaesthesia. Ketamine produces a somnolent state in which some patients appear to be awake but dissociated from their environment, unresponsive to pain, and having no recall. Somatic pain appears to be more effectively blocked than visceral pain.

**Indication:** Induction and maintenance of anaesthesia for minor surgical or diagnostic procedures; Diagnostic manoeuvres and procedures not involving intense pain

**Adverse effects and cautions:** Tachycardia, hallucinations, nightmares, increased salivation, increased arterial pressure. The incidence of delirium and hallucinations are much less significant in children. In 2 mg per kg dose given intravenously or 10 mg/kg



dose intramuscularly, a feeling of dissociation becomes apparent in about 15 seconds; unconsciousness occurs in about 50 seconds and lasts for 10-15 minutes. Ketamine causes transient depression of the respiratory centre. It causes an increase of systolic and diastolic blood pressure and heart rate.

**Contraindication:** Epilepsy, hypertension and in patients with increased intracranial pressure.

**Dose:** By intramuscular injection, short procedures, initially 6.5-13 mg/kg (10 mg/kg usually produces 12-25 minutes of surgical anaesthesia).

Diagnostic manoeuvres and procedures not involving intense pain, initially 4 mg /kg. By intravenous injection over at least 60 seconds, short procedures, initially 1-4.5 mg/kg (2 mg/kg usually produces 5-10 minutes of surgical anaesthesia).

**Preparation Available:**

Ketamine 50 mg/ml, 2 ml Inj	HI	NA	RT
Ketamine 500 mg/ 10 ml Inj	HI	NA	RT

### 3. Propofol

**Indication:** Induction and maintenance of anaesthesia, sedation for surgical and diagnostic procedures.

**Adverse effects and cautions:** Bradycardia, hypotension, apnoea, involuntary muscle movements, nausea, vomiting, hiccups; use with caution in pregnancy.

**Contraindication:** For sedation of ventilated children and adolescents under 17 years.

**Dose:** Induction of anaesthesia, by intravenous infusion

or injection, 1.5-2.5 mg/kg (less in those over 55 years) at a rate of 20-40 mg every 10 seconds; Child over 8 years 2.5 mg/kg.

Maintenance of anaesthesia, by intravenous injection, 25-50 mg repeated according to response or by intravenous infusion, 4-12 mg/kg/hour; Child over 3 years, by intravenous infusion, 9-15 mg/kg/hour.

Sedation for surgical and diagnostic procedures, initially by intravenous injection over 1-5 minutes, 0.5-1 mg/kg; maintenance, by intravenous infusion, 1.5-4.5 mg/kg/hour.

**Preparation Available:**

Propofol 1 %, 20 ml Inj	HI	B	RT
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**2. Thiopental /Thiopentone sodium**

**Indication:** Induction of general anaesthesia, anaesthesia of short duration in minor surgical procedures.

**Adverse effects and cautions:** Arrhythmias, cough, laryngeal spasm, myocardial depression, rash. The amount of drugs administered should be reduced in patients with liver disease; use with caution in pregnancy.

Extravasation should be avoided.

**Contraindication:** Porphyria and breast-feeding.

**Dose:** By intravenous injection, in fit premedicated adult, initially 100-150 mg (4- 6 ml of 2.5% solution) over 10-15 seconds, repeated if necessary according to response after 30-60 seconds; or up to 4 mg/kg; Child induction 2-7 mg/kg.

## 9.3 Local Anaesthetics

### 1. Bupivacaine

It has a slow onset and long duration of action. It is suitable for epidural analgesia in labour and lumbar epidural blockade.

**Indication:** Local infiltration, peripheral nerve block, epidural block, sympathetic block.

**Adverse effects and cautions:** Headache, bradycardia, hypotension, cardiac arrhythmias, cardiac arrest, anxiety, restlessness, tremor, dizziness, respiratory arrest, hypersensitivity reactions manifested by oedema, status asthmaticus or anaphylactoid reaction; use with caution in severely debilitated patients, liver disease, renal impairment, pregnancy, impaired cardiac condition, myasthenia gravis and severe shock.

**Dose:** Adjusted according to site of operation and response of patient, local infiltration, 0.25% (up to 60 ml). Peripheral nerve block 0.25% (maximum 60 ml), 0.5% (maximum 30 ml)

Epidural block surgery, lumbar, 0.5% (maximum 20 ml); caudal, 0.5% (maximum 30 ml); labour, lumbar, 0.25-0.5% (maximum 12 ml of either).

#### **Preparation Available:**

Bupivacaine 0.5 % Inj		C	RT
Bupivacaine 0.5 % + Dextrose 80 mg Inj	HI	C	RT

### 2. Lignocaine / Lidocaine

**Indication:** See under bupivacaine

**Adverse effects and cautions:** See under bupivacaine

**Dose:** Adjusted according to site of operation and

response of patient. Infiltration, by injection, maximum dose 200 mg (or 500 mg with solution which also contains adrenaline). Maximum dose of adrenaline 500 µg. Nerve blocks with adrenaline 1 in 200,000, 1% to a maximum of 40 ml

Surface anaesthesia, usual strength 4% for mouth, throat and upper gastrointestinal tract maximum 200 mg. Surface anaesthesia of urethra, 4% solution, maximum 400 mg.

**Preparation Available:**

Lignocaine 2 % , 30 ml Inj	HI	B	RT
Lignocaine 2 % , 30 gm Gel	HI	B	RT
Lignocaine 2 % with Adrenaline Inj	HI	NA	RT
Lignocaine 15 % Spray	HI	B	RT
Lidocaine 5% + Dextrose 2ml Inj	NA	B	

**9.4 Anaesthesia adjuvants**

**1. Glycopyrrolate / Glycopyrronium bromide**

**Indication:** Control of muscarinic side-effects of neostigmine in reversal of nondepolarizing neuromuscular block, premedication at induction, excessive respiratory secretions in palliative care

**Adverse effects and cautions:** Dry mouth, dry skin, flushing, blurred vision, flushing; use with caution in hepatic impairment, autonomic neuropathy.

**Dose:** Premedication, by intramuscular or intravenous injection, 200-400 micrograms, or 4-5 micrograms/kg to a maximum of 400 micrograms; Child, by intramuscular or intravenous injection 4-8 micrograms/kg to a maximum of 200 micrograms; intraoperative

use, by intravenous injection, as for premedication. For control of muscarinic side effects of neostigmine in reversal of competitive neuromuscular block, by intravenous injection 10-15 micrograms/kg with 50 micrograms/kg neostigmine; Child 10 micrograms/kg with 50 micrograms/kg neostigmine.

**Preparation Available:**

Glycopyrrolate 0.2 mg, 1 ml Inj	HI	B	RT
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**2. Atracurium**

It is a non-depolarising muscle relaxant. It is metabolised by a non-enzymatic mechanism which is independent of liver and kidney function, thus it can be used in hepatic or renal impairment. It causes histamine release. It has an intermediate duration of action.

**Indication:** Neuromuscular blockade during intensive care.

**Adverse effects and cautions:** Tachycardia, hypertension; use with caution in pregnancy, breast-feeding and liver impairment, renal impairment; avoid in myasthenia gravis.

**Dose:** Surgery or intubation, Age over 1 month, by intravenous injection, initially 300-600 micrograms/kg; maintenance, by intravenous injection, 100-200 micrograms/kg as required or by intravenous infusion, 5- 10 micrograms /kg/minute.

**Preparation Available:**

Atracurium 50 mg Inj		C	FT
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### 3. Neostigmine

It reverses the effects of the non-depolarising muscle relaxant drugs such as pancuronium, vecuronium but prolong the action of depolarizing muscle relaxant drugs succinylcholine.

**Indication:** reversal of nondepolarizing block, myasthenia gravis.

Adverse effects and caution: increased salivation, increased bronchial secretion, sweating, diarrhoea, abdominal pain; use with caution in pregnancy, breast-feeding, epilepsy, renal impairment, bradycardia.

**Contraindication:** In recent intestinal or bladder surgery, after suxamethonium/Succinylcholine

**Dose:** Reversal of nondepolarizing neuromuscular blockade, by intravenous injection over 1 minute, 50-70 micrograms/kg (maximum 5 mg) after or with atropine sulphate 0.6-1.2 mg.

Myasthenia gravis, by subcutaneous or intramuscular injection, neostigmine methylsulphate 1- 2.5 mg at suitable intervals throughout day (usual total daily dose 5-20 mg); Neonate 50-250 micrograms every 4 hours half hour before foods, Child 200-500 micrograms as required.

#### Preparation Available:

Neostigmine 2.5 mg + Glycopyrrolate 0.5 mg Inj		RT
Neostigmine 2.5 mg/ml 5 ml Inj	HI	RT

### 4. Vecuronium

It is a non-depolarising muscle relaxant and has a shorter duration of action (20-30 minutes). It does not

produce histamine release and lacks cardiovascular effects.

**Indication:** muscle relaxation.

**Adverse effects and cautions:** Rarely bronchospasm, hypotension, tachycardia, pruritus; use with cautions in pregnancy, breast-feeding, hepatic impairment.

**Contraindication:** In myasthenia gravis, dehydrated or severely ill patients.

**Dose:** By intravenous injection, intubation, 80-100 micrograms/kg; maintenance 20-30 micrograms/kg according to response; Neonate and Infant up to 4 months, initially 10-20 micrograms/kg then incremental doses to achieve response; Child over 5 months, as adult dose.

**Preparation Available:**

Vecuronium 4 mg Inj	HI	C	RT
Vecuronium 10 mg Inj	HI	C	RT

### 3. Rocuronium

It is a non-depolarising muscle relaxant and produces its effects within 2 minutes. It has minimal cardiovascular effect and produces mild vagolytic activity at high doses.

**Indication:** See under atracurium.

**Adverse effects and cautions:** See under atracurium.

**Dose:** For intubation, age over 1 month, by intravenous injection, initially, 600 micrograms/kg; maintenance by intravenous injection, 150 mcg/kg (elderly 75-100 micrograms/kg) or maintenance by intravenous infusion, 300-600 micrograms/kg/hour. Intensive care,

by intravenous injection, initially 600 micrograms/kg; maintenance by intravenous infusion, 300-600 micrograms/kg/hour for the first hour, then adjusted according to response.

**Preparation Available:**

Rocuronium 10 mg/ml 5 ml Inj	HI	C	FT
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**4. Succinylcholine / suxamethonium**

It is the only depolarising muscle relaxant. Succinylcholine has a rapid onset (1 minute) and short duration (2-6 minutes). The flaccid paralysis is preceded by transient muscle fasciculations; especially visible over cheeks and abdomen. Paralysis then develops over arm, neck and leg muscles. Weakness of respiratory muscles follows.

**Indication:** Depolarising muscle relaxation.

**Adverse effects and cautions:** Tachycardia, postoperative muscle pain, nodal and ventricular arrhythmias; Prolonged muscle paralysis may occur in patients with low or atypical plasma pseudocholinesterase enzymes; use with caution in pregnancy, severe trauma, breastfeeding.

**Contraindication:** In severe liver disease (including low plasma cholinesterase), severe burns.

**Dose:** By intravenous injection, initially, 1 mg/kg, maintenance, usually 0.5 -1 mg/kg at 5-10 minutes' intervals; Neonate and Infant 2 mg/kg; Child over 1 year, 1 mg/kg.

**Preparation Available:**

Succinylcholine 50 mg/ml, 10 ml Inj	HI	NA	FT
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## 5. Midazolam

Recovery is faster than from diazepam. Midazolam is associated with marked sedation when high doses are given intravenously or used with certain other drugs.

**Indication:** Premedication, sedation of patient receiving intensive care, status epilepticus.

**Adverse effects and cautions:** Apnea, decrease respiratory rate, drowsiness, nausea, vomiting,

**Contraindication:** CNS depression, compromised airway, severe respiratory depression

**Dose:** Premedication, by deep intramuscular injection, 70-100 micrograms/kg (elderly 25-50 micrograms/kg) 20- 60 minutes before induction; child 1-15 years 80-200 micrograms/kg.

Induction, by slow intravenous injection with premedication 150-200 micrograms/kg (Elderly 100-200 micrograms/kg); without premedication, 300-350 micrograms/kg (Elderly 150-300 micrograms/kg); doses increased in steps not greater than 5 mg every 2 minutes; maximum 600 micrograms/kg; child over 7 years 150 micrograms/kg.

### Preparation Available:

Midazolam 1 mg/ml 5 ml Inj	HI	NA	RT
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## 6. Diazepam

See under antiepileptic

## 7. Atropine

See under antispasmodic

# Chapter-10: Drugs Affecting Nutrition and Blood

## 10.1 Antianemics

### 1. Iron

#### 2. Ferrous Salt

**Indication:** Iron deficiency anaemia.

**Adverse effects and cautions:** diarrhoea or constipation, nausea, epigastric pain and heart burn.

Ferrous Fumarate: 200 mg of ferrous fumarate contains 65 mg of elemental iron.

Ferrous Gluconate: 300 mg of ferrous gluconate contains 35 mg of iron.

Ferrous Succinate: 100 mg of ferrous succinate contains 35 mg of iron.

Ferrous Sulphate: 300 mg of ferrous sulphate contains 60 mg of elemental iron and 200 mg of

Ferrous sulphate, dried 200 mg of ferrous sulphate contains 65 mg of elemental iron.

**Dose:** Prophylaxis, elemental iron 65 to 70 mg daily. Treatment, elemental iron 130 to 140 mg daily, in divided doses.

### 3. Iron Dextran

It is recommended only when oral administration has been found unsatisfactory or impossible. It contains 5% w/v of iron.

**Indication:** Iron deficiency anaemia.

**Adverse effects and cautions:** Nausea, vomiting, abdominal pain, arthralgia, fever, urticaria, pain,

anaphylactoid reactions, headache and hypotension; use with caution in pregnancy and patients with hepatic or renal impairment.

**Contraindication:** Allergic disorders including asthma, infection and active rheumatoid arthritis.

**Preparation Available:**

Iron Dextran 5 % Inj		C	RT
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#### 4. Iron Sucrose:

Type of iron that is administered intravenously and is commonly used for patients who cannot tolerate oral iron supplements or have chronic kidney disease. It is known for having fewer side effects compared to other intravenous iron formulations.

**Indication:** Iron Deficiency anaemia

**Adverse Effect and Cautions:** Injection site Reaction, Allergic Reaction, Chest pain, rapid or irregular heartbeat, low or high blood pressure. Use caution in pregnancy, cardiovascular disease and liver impairment.

**Preparation Available:**

Iron Sucrose 100 mg Inj	HI		
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## 10.2 Vitamins

### 1. Vitamin B12

**Indication:** Pernicious anaemia and other macrocytic anaemia.

**Adverse effects and cautions:** Rarely diarrhoea, itching, urticaria, headache, nausea.

**Dose:** Cyanocobalamin, by mouth, vitamin B12 deficiency of dietary origin, 50-150 micrograms

or more daily taken between meals, Child 25-50 micrograms twice daily.

By intramuscular injection, initially 1 mg repeated 10 times at intervals of 2-3 days, maintenance 1 mg every month.

Hydroxocobalamin, pernicious anaemia and other macrocytic anaemias without neurological involvement, by intramuscular injection, initially 1 mg repeated 5 times at intervals of 2 days, then 1 mg every 3 months; Child dosage as for adults.

## 2. Folic Acid

**Indication:** Folic acid deficiency anaemia, prevention of neural tube defects in pregnancy.

**Adverse effects and cautions:** Rarely rash, itching and bronchospasm.

It should not be given in cases of undiagnosed megaloblastic anaemia without vitamin B12 as there is risk of precipitating subacute combined degeneration of the spinal cord.

**Dose:** Initially, 5 mg daily for 4 months; maintenance, 5 mg every 1-7 days depending on underlying disease; Child up to 1 year, 500 micrograms/kg daily, over 1 year as adult dose.

Prevention of neural tube defects, 400-500 micrograms daily before conception and during the first 12 weeks of pregnancy.

### Preparation Available:

Folic acid 5 mg Tab	HI	A	RT
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## 10.3 Plasma substitutes

### 1. Human Albumin / Albumin solution

It is prepared from whole blood, contains soluble proteins and electrolytes but no clotting factors, blood group antibodies or plasma cholinesterases. The protein contains at least 95% albumin.

**Indication:** Severe hypoalbuminemia associated with low plasma volume and generalised oedema where salt and water restriction with plasma volume expansion are required, adjunct in the treatment of hyperbilirubinemia by exchange transfusion in newborn, acute or subacute loss of plasma volume (burns, trauma, and pancreatitis).

**Adverse effects and cautions:** Hypersensitivity reactions (including anaphylaxis) with nausea, vomiting, increased salivation, hypotension, fever; use with caution to patients with history of cardiac or circulatory diseases.

**Contraindication:** Severe anaemia, cardiac failure.

#### Preparation Available:

Human albumin 20 % 100 ml Inj	HI	C	FT*
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### 2. Polygeline

It is a gelatin (hydrolysed collagen) with an average molecular weight 30000. 3.5% solution of polygeline (gelatin) derivative, average molecular weight 30 000), along with appropriate amounts of Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>2+</sup> and Cl<sup>-</sup> in 500 ml bottles is usually available.

**Indication:** Plasma volume substitute in the initial treatment of hypovolemic shock due to haemorrhage, burns peritonitis, pancreatitis, rush injuries; fluid

replacement in plasma exchange, isolated organ perfusion.

**Adverse effects and cautions:** See under dextran; increased risk of hyper-sensitivity; it contains calcium ion therefore use with caution in cardiac glycoside treating patients.

**Dose:** By intravenous infusion, initially 500-1000 ml of a 3.5% solution.

**Preparation Available:**

Polygeline 17.5gm, 500 ml Inj	NA	NA	CT
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## 10.4 Vitamins and Related Drugs

### 1. Ascorbic acid / Vitamin C

It is water soluble and found in fruits especially citrus, tomatoes and leafy green vegetables. Deficiency of this vitamin leads to scurvy. It has a low renal threshold and any excess above the plasma saturation level is rapidly excreted in the urine.

**Indication:** Prevention and treatment of scurvy.

**Adverse effects and cautions:** nausea, vomiting, headache, heartburn and with large doses diarrhoea.

**Dose:** Prophylactic, 25-75 mg daily; therapeutic, not less than 250 mg daily in divided doses.

**Preparation Available:**

Vitamin C 500 mg Tab	HI	A	RT
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### 2. Cholecalciferol (Vitamin D3)

Vitamin D<sub>3</sub>, through its active metabolite, 1,25(OH)<sub>2</sub>D<sub>3</sub>, also plays an important role in maintaining calcium homeostasis by enhancing intestinal calcium

absorption, PTH-induced mobilisation of calcium from bone, and calcium reabsorption in the kidney.

**Indication:** Prevention and treatment of vitamin D deficiency.

**Adverse effects and cautions:**

**Dose:** 400 IU daily for prevention and 800 IU daily for treatment

**Preparation Available:**

Cholecalciferol 60 k IU Sachet		A	RT
Cholecalciferol 400 IU/ml Drop		A	RT
Cholecalciferol 60 k IU Cap	HI	A	RT

### 3. Alphacalcidol (1 alpha-hydroxycholecalciferol)

1-alpha hydroxycholecalciferol is a synthetic vitamin D3 analog that is already hydroxylated in the 1 alpha position and is rapidly converted by 25-hydroxylase to 1,25 dihydroxycholecalciferols.

**Indication:** Prevention of vitamin D deficiency in renal or cholestatic liver disease, patients with renal impairment requiring vitamin D therapy.

**Adverse effects and cautions:**

**Dose:** Adult: Initially 1 microgram daily, dose to be adjusted to avoid hypercalcaemia; maintenance 0.25–1 microgram daily

### 4. Calcitriol (1,25-dihydroxycholecalciferol)

It is a potent metabolite to the active form of vitamin D, which in turn controls the reabsorption of calcium by kidney, controls the intestinal absorption of dietary calcium; decreases excessive serum phosphate levels,

bone resorption and parathyroid level.

**Indication:** Renal osteodystrophy, established postmenopausal osteoporosis.

**Adverse effects and cautions:**

**Dose:** Renal osteodystrophy, initially 250 nanograms daily, adjusted in steps of 250 nanograms every 2–4 weeks if required; usual dose 0.5–1 microgram daily.

**Preparation Available:**

Calcitriol 0.25 mcg 1 gm Pow	HI	C	RT
Calcitriol 60k Inj		C	CRT
Calcitriol 0.03% w/w 15 gm Oint		C	CRT

### 1. Nicotinamide (Vit B3)

It is water soluble and found in yeast, meat, milk, fish, eggs and green vegetables. It is preferred to nicotinic acid as it does not cause vasodilatation.

**Indication:** Treatment of pellagra, hyperlipidemia.

**Adverse effects and cautions:** Very rarely cause flushing, pruritus, nausea, vomiting, tachycardia and diarrhoea.

**Dose:** Adult up to 500 mg daily in divided doses.

### 2. Pyridoxine (Vitamin B6)

**Indication:** Deficiency states causing peripheral neuritis, patients on antituberculous therapy with isoniazid, premenstrual syndrome, idiopathic sideroblastic anaemia.

**Adverse effects and cautions:** Nausea, headache and paraesthesia.



**Dose:** Deficiency states, 20-50 mg up to 3 times daily. Isoniazid neuropathy, prophylaxis 10 mg daily, therapeutic, 50 mg three times daily. Premenstrual syndrome, 50-100 mg daily.

**Preparation Available:**

Pyridoxine 10 mg Tab	HI	A	RT
Pyridoxine 100 mg Tab	HI	A	RT

**3. Riboflavin (Vitamin B2)**

It is water soluble and found in vegetables, milk, meat and eggs. Deficiency causes angular stomatitis and other cutaneous manifestations.

**Indication:** Prophylaxis and treatment of deficiency.

**Adverse effects and cautions:** Non-toxic, large doses may cause yellow discolouration of urine.

**Dose:** Treatment, Adult and Child up to 30 mg daily in divided doses. Prophylaxis, Adult and Child, 1-2 mg daily

**4. Thiamine (Vitamin B1)**

It is water soluble and obtained from whole grains, peas, beans, yeast and meat. Steaming or exposure to moist heat reduces the thiamine content of the foods. Deficiency of this vitamin causes beri-beri.

**Indication:** Beri-beri (dry/wet), Wernicke's encephalopathy.

**Adverse effects and cautions:** Non-toxic but may cause allergic reactions, sweating, weakness, feeling of warmth and tingling.

**Dose:** Mild chronic deficiency, 10-25 mg daily severe deficiency, 200-300 mg daily.

**Preparation Available:**

Thiamine HCl 200 mg/2ml Inj	NA	A	RT
Thiamine 100 mg Tab	HI	A	RT

**5. Tocopherol (Vitamin E)**

**Indication:** Vitamin E deficiency because of malabsorption in congenital or hereditary chronic cholestasis, malabsorption in cystic fibrosis.

**Adverse effects and cautions:** Usually non-toxic, however large doses may cause diarrhoea, dizziness, headache and intestinal cramps.

**Preparation Available:**

Vitamin E 200 mg Cap		A	RT
Vitamin E 400 mg Cap	HI	A	RT
Vitamin E 600 mg Cap		A	RT

**10. Retinol (Vitamin A)**

The natural vitamin A is a fat soluble oily liquid present in dairy products such as milk, butter, cream, fish liver oils and eggs. Deficiency of vitamin A is associated with xerophthalmia and increased susceptibility to infections.

**Indication:** Prevention and treatment of vitamin A deficiency, prevention of complications of diarrhoea and measles in children.

**Adverse effects and cautions:** Hypervitaminosis A on excessive administration; use with caution in pregnancy and breast-feeding.

## 11. Isotretinoin / 13-Cis-Retinoic Acid

**Indication:** Topical treatment of mild to moderate acne.

**Adverse effects and cautions:** Anaemia, arthralgia, dryness of eye, dryness of lips, dryness of nasal mucosa, epidermal fragility, hematuria, headache, myalgia, raised blood glucose concentration.

**Contraindication:** Hyperlipidaemia, hypervitaminosis A, avoid blood donation during treatment and for at least 1 month after treatment, dry eye syndrome.

**Dose:** Initially 500 micrograms/kg daily in 1–2 divided doses, increased if necessary to 1 mg/kg daily for 16–24 weeks, repeat treatment course after a period of at least 8 weeks if relapse after first course; maximum 150 mg/kg per course.

### Preparation Available:

Isotretinoin 10 mg Tab	HI	NA	RT
Isotretinoin 20 mg Tab	HI	NA	RT

## 1. Cyanocobalamin (Vitamin B12)

**Indication:** Pernicious anaemia, nutritional supplementation,

**Adverse effects and cautions:** Headache, nasopharyngitis, arthralgia, dizziness

## 2. Methylcobalamin

It is an active coenzyme of vitamin B12. It supports the methionine synthetase reaction which is essential for normal metabolism of folate.

**Indication:** Diabetic neuropathy.

**Adverse effects and cautions:** Stomach upset.

**Preparation Available:**

Methylcobalamin 1500 mcg Tab	HI		RT
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## 10.5 Minerals

### 1. Calcium

The daily requirement varies with age and is greater in childhood, pregnancy, lactation and old age. In osteoporosis, a calcium intake which is double the recommended daily amount reduces the rate of bone loss.

**Indication:** Hypocalcemia and tetany, osteoporosis,

**Adverse effects and cautions:** Constipation, bradycardia, cardiac arrhythmia, hypotension and irritation after parenteral administration.

**Dose:** 1-2 g between meals; Acute hypocalcemia, by slow intravenous injection, Adult 1-2 g.

Percentage of Calcium in Various Salts

Calcium Salt	Elemental Calcium Percentage
Calcium Carbonate	40
Tricalcium phosphate (Calcium phosphate, Tribasic)	39
Calcium Chloride	27
Dibasic calcium phosphate dihydrate	23
Calcium Citrate	21
Calcium lactate	13
Calcium gluconate	9
Calcium Acetate	25.3

## 2. Calcium Acetate

**Indication:** Hyperphosphatemia in end stage renal failure (on dialysis) Dose: 475 to 950 mg to be taken with breakfast and with snacks, 0.95 – 2.85 g to be taken with main meals and

0.95 – 1.9 gm to be taken with supper, dose to be adjusted according to serum phosphate concentration; maximum 6.65 gm per day

### Preparation Available:

Calcium Acetate 667 mg Tab	HI	C	RT
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## 3. Calcium Dobesilate

**Indication:** Diabetic retinopathy, symptoms of haemorrhoidal attack, chronic venous disease

### Preparation Available:

Calcium Dobesilate 500 mg Tab	HI	C	RT
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## 1. Calcium Gluconate

**Indication:** Hypocalcaemia

### Preparation Available:

Calcium Gluconate 10 % w/v, 10 ml Inj	HI	C	RT
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## 2. Zinc

Zinc supplements should not be given unless there is good evidence of deficiency (hypoproteinemia spuriously lowers plasma-zinc concentration). Zinc deficiency can occur as a result of inadequate diet or malabsorption; excessive loss of zinc can occur in trauma, burns, and protein-losing conditions.

**Indication:** Zinc supplementation in zinc losing conditions

**Adverse effects and cautions:** Dyspepsia, abdominal pain, headache, nausea, vomiting, gastritis; use with caution in acute renal failure.

## 10.6 Amino Acids and derivatives

### 1. Levocarnitine / Carnitine

**Indication:** Primary carnitine deficiency due to inborn errors of metabolism, secondary carnitine deficiency in haemodialysis patients

**Adverse effects and cautions:** Abdominal pain, body odour, diarrhoea, nausea, vomiting

**Preparation Available:**

Levocarnitine 500 mg Tab		B	RT
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### 2. L arginine L aspartate

Oral L-Ornithine-L-aspartate is a safe, well-tolerated treatment with a good compliance rate and a beneficial therapeutic effect in patients with cirrhosis and stable, overt, chronic hepatic encephalopathy.

**Preparation Available:**

L ornithine L aspartate 500 mg Tab		NA	RT
L ornithine L aspartate 5 gm, 10 ml Inj	HI		RT

## 10.7 Intravenous fluids and electrolytes

### 1. Ringer Lactate

It is also called Hartmann's solution for injection and compound sodium lactate intravenous infusion. It

contains sodium chloride 0.6%, sodium lactate 0.25%, potassium chloride 0.04%, calcium chloride 0.027%.

**Indication:** For prophylaxis, and replacement therapy, requiring the use of sodium chloride and lactate with minimal amounts of calcium and potassium.

**Adverse effects and cautions:** Oedema, metabolic alkalosis, reactions including fever, infection at the site of injection, venous thrombosis or phlebitis and extravasation.

Sodium lactate should be used with extreme caution in patients with congestive heart failure or other oedematous or sodium-retaining conditions, in patients with renal impairment, hypertension, pulmonary oedema, toxæmia of pregnancy.

**Preparation Available:**

Ringer Lactate 500 ml Glass Bottle	HI	C	RT
Ringer Lactate 500 ml Nipple Head Plastic Bottle	HI	C	RT
Ringer Lactate 500 ml Plastic Euro Head	HI	C	RT
Ringer Lactate 1000 ml Plastic head	HI	C	RT
Ringer Lactate 1000 ml nipple Head Plastic Bottle	HI	C	RT

## 2. Dextrose

**Indication:** To restore glucose concentration in hypoglycemia.

**Adverse effects and cautions:** Hyperosmolarity, infection at the site of injection; use with caution in patient with overt or known subclinical diabetes

mellitus or with carbohydrate intolerance for any reason.

**Preparation Available:**

Dextrose 5 % 500 ml Plastic Bottle Inj	HI	C	RT
Dextrose 5 % 500 ml Euro Head Inj	HI	C	RT
Dextrose 5 % 1000 ml Euro Head Inj	HI	C	RT
Dextrose 10 % 500 ml Euro Head Inj	HI	C	RT
Dextrose 10 % 1000 ml Euro Head Inj	HI	C	RT
Dextrose 10 % 1000 ml Plastic bottle Inj	HI	C	RT
Dextrose 10 % 500 ml Plastic bottle Inj	HI	C	RT
Dextrose 25 % 25 ml Inj	HI	C	RT
Dextrose 50 % 25 ml Inj	HI	C	RT

**3. Sodium Chloride / Normal Saline**

**Indication:** Electrolyte imbalance, wound irrigation, oral hygiene.

**Adverse effects and cautions:** Reaction (because of contamination) including fever, infection at the site of injection, venous thrombosis or phlebitis, and extravasation. Excessive administration of sodium chloride may result in hypernatremia and large amounts of chloride may cause a loss of bicarbonate with an acidifying effect. Sodium chloride should be used with extreme caution, if at all, in patients with congestive heart failure or other oedematous or sodium retaining conditions, in patients with impaired renal function, hypertension, pulmonary oedema, toxæmia of pregnancy.

**Preparation Available:**

Sodium Chloride 0.9 % 100 ml Inj	HI	NA	RT
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Sodium Chloride 0.9 % 1000 ml Plastic head Inj	HI		RT
Sodium Chloride 0.9 % 1000 ml Euro head Inj	HI		RT
Sodium Chloride 0.9 % 500 ml glass bottle Inj	HI		RT
Sodium Chloride 0.9 % 500 ml Plastic Bottle Inj	HI		RT
Sodium Chloride 1000 ml Inj	HI		RT
Sodium Chloride 0.9 % 3 Ltr Inj	HI		RT
Sodium Chloride 0.9 % 500 ml Inj Ecohead	HI		RT

### 1. Sodium Chloride and Dextrose

It contains 0.9 % sodium chloride and 5 % Dextrose

**Indication:** Fluid and electrolyte replacement.

**Adverse effects and cautions:** See under sodium chloride

#### **Preparation Available:**

Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Euro head Inj	HI	C	RT
Sodium Chloride 0.9 % + Dextrose 5 % 1000 Euro head ml Inj	HI	C	RT
Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Nipple head Inj	HI	C	RT
Sodium Chloride 0.9 % + Dextrose 5 % 1000 ml Nipple head In	HI	C	RT
Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Glass Bottle Inj	HI	C	RT

Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Glass Bottle Inj	HI	C	RT
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## 2. Potassium chloride

**Indication:** Treatment of potassium depletion since the chloride ion is required to correct hypochloremia which frequently accompanies potassium deficiency.

**Adverse effects and cautions:** Hyperkalemia, nausea, vomiting, diarrhoea, and abdominal discomfort. Pain at the site of injection and phlebitis may occur during intravenous administration; use with caution in patients with cardiac disease, renal impairment.

Potassium supplements concentration should not usually exceed 3.2 g (43mmol/litre). Initial potassium replacement should not be given with glucose; glucose may cause a further decrease in the plasma potassium concentration.

### Preparation Available:

Potassium Chloride 1.5gm/15 ml, 200 ml solution	NA	RT
Potassium Chloride 150 mg/ml 10 ml Inj	NA	RT

## 3. Sodium Bicarbonate **Indication: metabolic acidosis.**

**Adverse effects and cautions:** Metabolic alkalosis, sodium and water retention when given in large doses or to patients with renal insufficiency. Serum potassium concentration may decrease during bicarbonate therapy; use with caution in patients with congestive

heart failure or other oedematous conditions; in patients with impaired renal function, toxæmia of pregnancy. Periodic laboratory determinations of the patient's acid-base status are recommended to minimise the risk of overdose.

**Contraindication:** Metabolic or respiratory alkalosis, hypocalcaemia.

**Preparation Available:**

Sodium Bicarbonate 75 mg/ml 10 ml Inj	HI	C	RT
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#### 4. Multi Electrolyte

This preparation consists of potassium chloride, dibasic potassium phosphate, magnesium chloride, sodium acetate, dextrose. These are used in electrolyte imbalance or as supplements.

Multi Electrolyte 500 ml Inj			RT
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#### 5. Magnesium sulphate

**Indication:** Emergency treatment of serious arrhythmias, hypomagnesemia maintenance, prevention and treatment of seizure recurrence in eclampsia, continuing respiratory deterioration in anaphylaxis

**Adverse effects and cautions:** Arrhythmia, coma, confusion, drowsiness, flushing of skin, hypomagnesemia associated side-effects-hypotension, loss of tendon reflexes, muscle weakness, respiratory depression, thirst, vomiting.

**Dose:** Prevention of seizures in pre-eclampsia, By IV Adult: Initially 4 g, to be given over 5–15 minutes,

followed by (by intravenous infusion) 1 gram/hour for 24 hours, if seizure occurs, additional dose of 2 g by intravenous injection to be administered.

Emergency treatment of serious arrhythmias, By IV  
Adult: 2 g, to be given over 10-15 minutes.

**Preparation Available:**

Magnesium 50 mg/ml Inj, 2 ml Inj	HI		RT
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**Combination Products**

**1. Ferrous sulphate and Folic Acid**

**Indication, Adverse effects and cautions:** See under Ferrous Sulphate and Folic Acid

Ferrous sulphate 60 mg + Folic Acid 0.4mg	HI	NA	RT
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**2. Ferrous fumarate, Folic acid and Docusate sodium**

**Indication, Adverse effects and cautions:** See under Ferrous Fumarate, Folic acid and Docusate sodium

Ferrous Fumarate + Folic acid			RT
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**3. Vitamin B-complex and combination products**

Vitamin B complex refers to all water soluble vitamins except vitamin C.

**Indication, Adverse effects and cautions:** See under respective vitamins.

Generally, Biotin indications are brittle fingernails, diabetes, alopecia; Pantothenic acid indication is neurodegeneration. Lysine has been used in alternative medicine as a possibly effective aid in treating cold

sores due to herpes simplex. Other uses not proven with research have included canker sores, diabetes, stress, and for athletic performance improvement.

**Preparation Available:**

B-complex Cap	HI	A	RT
Vitamin B-complex + zinc Cap	HI	A	RT
Vitamin B-complex Inj,2 ml	HI	A	RT

**4. Iron and Folic acid**

**Indication, Adverse effects and cautions:** See under Iron and Folic acid

Iron Polymaltose 100m g + folic acid 1mg		A	
Iron + folic acid 15 ml Haematinics Drop		A	

**5. Haematinic and vitamin C**

Haematinic refers to medicine that increases haemoglobin content of the blood i.e metallic ions (iron, cobalt, zinc), vitamin B12, folic acid and erythropoietin.

**Indication, Adverse effects and cautions:** See under Iron, folic acid, vit B6, vit B12 and Vit c.

Ferrous + Folic acid + vit B12 + vit B6 + vit C Cap	NA	NA	RT
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**6. Multivitamin and combinations**

Multivitamin refers to Vit A, B, C, D3, E, B1, B2, B6, B12, Calcium Pantothenate and Folic Acid.

**Indication, Adverse effects and cautions:** See under respective vitamin

Multivitamin Tab		A	RT
Multivitamin 15 ml Drop		A	RT
Multivitamin 200 ml Syp		A	RT
Multivitamin + Zinc 200 ml Syp	HI	A	RT
Multivitamin Inj		A	RT

## 7. Miscellaneous Preparations

Collagen Pow			RT
B-Protein 200 gm Pow			RT
Pregnancy Protein Pow			RT
Lactobacillus 50 M spores Cap			RT
Lactobacillus Probiotic Pow			RT
Lactobacillus probiotic syp 5 gm/50 ml			RT
Silymarin 70 mg Tab			RT
Silymarin 140 mg Tab			RT
Trypsin + chymotrypsin 100000 IU Tab			RT
Trypsin + chymotrypsin 200000 IU Tab			RT

# Chapter-11: Drugs acting on Genito-urinary System

## Obstetrics

### 11.1 Labour induction

#### 1. Misoprostol

It is a prostaglandin which is used as a low-dose vaginal tablet.

**Indication:** Induction of labour, medical termination of pregnancy of up to 63 days gestation.

**Adverse effects and cautions:** Uterine hyperstimulation, uterine rupture, foetal distress, diarrhoea, abdominal pain, rashes, dizziness; use with caution in hypertension. Oxytocin should not be started for 6 hours following administration of vaginal dose.

**Contraindication:** Placenta praevia, major cephalopelvic disproportion, foetal malpresentation, foetal distress, history of caesarean section, multiple pregnancy.

**Dose:** Induction of labour, by vagina, 25 micrograms repeated after 6 hours if necessary, if still no response increase to 50 micrograms every 6 hours for up to 4 doses.

Medical termination of intrauterine pregnancy of up to 63 days gestation, by mouth mifepristone 200 mg as a single dose, followed 36-48 hours later (unless abortion already complete) by misoprostol 800 micrograms by vagina and individual observed for at least 6 hours (or until bleeding or pain at acceptable level) with follow-up visit 10-15 days later to verify complete expulsion

(if treatment fails, it is essential that pregnancy be terminated by another method).

**Preparation Available:**

Misoprostol 50 mcg Tab	NA	X	RT
Misoprostol 100 mcg Tab	NA	X	RT
Misoprostol 200 mcg Tab	HI	X	RT

**2. Dinoprostone / PGE2**

**Indication:** Cervical ripening, pregnancy termination

**Adverse effects and cautions:** Warm feeling in vagina, abnormal uterine contractions, Dose: cervical ripening, 2.5 ml in cervical canal using catheter, may repeat after 6 hr.

**Contraindication:** History of major uterine operation

**Preparation Available:**

Dinoprostone Gel		NA	FT
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**1. Oxytocin**

**Indication:** Induction of labour, incomplete or inevitable or missed abortion, prevention and treatment of postpartum and post-abortion haemorrhage.

**Adverse effects and cautions:** Nausea, vomiting, high dose cause violent uterine contractions leading to rupture, foetal distress, asphyxia and death, arrhythmias, rashes, water intoxication and anaphylactoid reactions; use with caution in hypertension, abnormal presentation, previous caesarean section, caudal block anaesthesia.

**Contraindication:** Mechanical obstruction to delivery, severe pre-eclamptic toxemia, foetal distress, hypertonic uterine contraction and placenta praevia.



**Dose:** By slow intravenous infusion, induction of labour and augmentation of labour in hypotonic uterine inertia, a solution containing 1 unit per litre, 0.001-0.002 units/minute, increased at intervals of at least 30 minutes, until a maximum of 3-4 contractions occur every 10 minutes, maximum rate 0.02 units/ minute. Incomplete, inevitable or missed abortion, by slow intravenous infusion, 5 units followed if necessary, by intravenous infusion, 0.02-0.04 units/minute.

Prevention of postpartum haemorrhage after delivery of anterior shoulder, by slow intravenous infusion, 5 units. Treatment of post-postum haemorrhage, by slow intravenous injection, 5-10 units.

**Preparation Available:**

Oxytocin 5 IU/ml 1 ml Inj	HI	X	FT
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**11.2 Postpartum Haemorrhage**

**1. Carboprost**

It is a prostaglandin F2a analogue.

**Indication:** Postpartum haemorrhage due to uterine atony in patients unresponsive to ergometrine and oxytocin; use with caution in glaucoma, asthma, hypertension, hypotension, diabetes, epilepsy, uterine scars.

**Adverse effects and cautions:** Hypertension, bronchospasm, nausea, vomiting, diarrhoea, hyperthermia and flushing, pulmonary oedema.

**Contraindication:** Untreated pelvic infection, cardiac, renal, pulmonary or hepatic disease.

**Dose:** By deep intramuscular injection, 250 micrograms, repeated if necessary at intervals of 1½ hours (in severe

cases the interval may be reduced but should not be less than 15 minutes); total dose should not exceed 2 mg.

**Preparation Available:**

Carboprost 250 mcg/ml Inj	HI	C	FT
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## 2. Methylergometrine

**Indication:** Prevention and treatment of postpartum and postabortal haemorrhage.

**Adverse effects and cautions:** Nausea, vomiting, abdominal pain, dizziness, transient hypertension, chest pain and tachycardia; use with caution in cardiac disease, hypertension, hepatic and renal impairment, multiple pregnancy.

The drug is contraindicated for induction of labour, first and second stage of labour, severe cardiac disease, severe cardiac and renal impairment, severe hypertension and eclampsia.

**Dose:** Prevention and treatment of post-partum haemorrhage, by intramuscular injection, 200 micrograms when the anterior shoulder is delivered or immediately after birth.

Excessive uterine bleeding, by slow intravenous injection, 250-500 micrograms when the anterior shoulder is delivered.

**Preparation Available:**

Methylergometrine 200 mcg/ml Inj	NA	X	CRT
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## 11.3 Uterine Relaxants (Tocolytics)

### 1. Isoxsuprine

**Indication:** To inhibit premature labour

**Adverse effects and cautions:** Transient flushing, hypotension, tachycardia, rashes and gastrointestinal disturbances. Maternal pulmonary oedema and foetal tachycardia have been reported following intravenous administration in premature labour.

It should not be administered parenterally to patients with heart disease or severe anaemia.

It should not be given where there is premature detachment of the placenta or immediately postpartum, nor should be used for premature labour if there is infection.

**Contraindication:** Isoxsuprine is contraindicated following recent arterial haemorrhage.

**Dose:** To arrest premature labour, by intravenous infusion, 200-300 micrograms per minute, adjust according to the patient's response, until control is achieved. Prophylaxis, by month, 40-80 mg daily.

**Preparation Available:**

Isoxsuprine 10 mg Tab	NA	RT
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## 11.4 Bladder and Urinary disorders

### Urinary frequency, enuresis and incontinence

#### 1. Flavoxate

It's an antimuscarinic drug with some non-specific direct relaxant effect on smooth muscle. **Indication:** Urinary frequency and incontinence, urgency, dysuria, bladder spasm due to catheterization.

**Adverse effects and cautions:** Fatigue and vertigo; See under atropine and hyoscine

**Dose:** 200 mg 3 times daily; Child under 12 years not recommended

### Preparation Available:

Flavoxate 200 mg tab	HI	B	RT
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## 2. Oxybutynin

**Indication:** Relief of symptoms in patients with uninhibited neurogenic or reflex neurogenic bladder

**Adverse effects and cautions:** Dry mouth, constipation, somnolence, nausea, flushing

### Preparation Available:

Oxybutynin 2.5 mg Tab	HI	B	RT
Oxybutynin 5 mg Tab	HI	B	RT

## 3. Solifenacin

**Indication:** Urinary frequency, urinary urgency, urinary incontinence

**Adverse effects and cautions:** GI reflux, oedema,

**Dose:** 5 mg once daily, increased if necessary to 10 mg once daily

## Urinary retention

### 1. Prazosin

Prazosin is a selective alpha1-blocking drug.

**Indication:** Hypertension, benign prostatic hyperplasia

**Adverse effects and cautions:** Postural hypotension, dizziness, headache, palpitation, drowsiness, priapism. The drug should be used with caution in pregnancy, renal or hepatic impairment. The first dose of the drug may cause collapse due to hypotension.

**Contraindication:** Congestive heart failure, history of micturition syncope and postural hypotension

**Dose:** 500 micrograms 2-3 times daily for 3-7 days, the initial dose on retiring to bed at night; increased to 1 mg 2-3 times daily for further 3-7 days.

**Preparation Available:**

Prazosin 2.5 mg XL Tab	HI	C	RT
Prazosin 5 mg XL Tab	HI	C	RT

## 2. Tamsulosin

It blocks alpha- 1a receptors in smooth muscle of the prostate, decreasing bladder neck and urethral resistance.

**Indication:** Benign prostatic hyperplasia.

**Adverse effects and cautions:** See under prazosin

**Contraindication:** See under prazosin

**Dose:** 400 micrograms daily as a single dose.

**Preparation Available:**

Tamsulosin 0.2 mg Tab	HI	NA	RT
Tamsulosin 0.4 mg Tab	HI	NA	RT

## 3. Alfuzosin

It is a selective alpha-1 receptor.

**Indication:** Benign prostatic hyperplasia.

**Adverse effects and cautions:** Chest pain, flushes, angioedema, asthenia, blurred vision, drowsiness, erectile disorders (including priapism). Discontinue if angina worsen, concomitant antihypertensives.

**Contraindication:** See under prazosin.

**Dose:** 2.5 mg 3 times a day; maximum 10 mg per day.

**Preparation Available:**

Alfuzosin 10 mg Tab	HI	NA	RT
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#### 4. Finasteride

It selectively inhibits type 1 and 2 isoforms of 5 alpha reductases and suppresses serum dihydrotestosterone level.

**Indication:** Benign prostatic hyperplasia, male-pattern baldness.

**Adverse effects and cautions:** Impotence, decreased libido, breast tenderness and enlargement, rash.

**Contraindication:** Children, women and adolescents.

**Dose:** 5 mg daily; review treatment after 6 months.

**Preparation Available:**

Finasteride 5 mg Tab	HI	X	RT
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#### 5. Dutasteride

It selectively inhibits type 1 and 2 isoforms of 5 alpha reductases and suppresses serum dihydrotestosterone level.

**Indication:** Benign prostatic hyperplasia.

**Adverse effects and cautions:** Impotence, decreased libido, breast disorder, ejaculation disorder

**Contraindication:** Children, women.

**Dose:** 0.5 mg daily.

### Urological pain

#### 1. Disodium Hydrogen Citrate

It is an acidic salt of citric acid which is used as an acid regulator and sequestrant to treat stomach cramps and flatulence.

Disodium Hydrogen Citrate 100 ml Syp	HI		RT
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## Chapter-12: Drugs Acting on the Skin

### 13.1 Antifungal Drugs

#### 1. Clotrimazole

**Indication:** Tinea pedis, T. cruris, T. corporis, T. versicolor, cutaneous candidiasis, vaginal candidiasis.

**Adverse effects and cautions:** Rarely erythema, edema, pruritus, urticaria and mild burning with vaginal tablets. Contact with eyes and mucous membranes should be avoided.

**Dose:** Apply 2-3 times daily.

#### Preparation Available:

Clotrimazole 100 mg Pess	HI	B	RT
Clotrimazole 100 gm D.Pow		B	RT
Clotrimazole 1% w/v 15 gm Oint	HI	B	RT
Clotrimazole lotion, 15 ml	HI	B	RT
Clotrimazole 1% w/v Soap		B	RT

#### 2. Luliconazole

**Indication:** Tinea corporis, Tinea cruris, tinea pedis.

**Adverse effects and cautions:** local irritation, dermatitis.

#### Preparation Available:

Luliconazole 1 %, 15 gm Oint	HI	NA	RT
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#### 3. Ketoconazole

**Indication:** Vaginal and vulva candidiasis, fungal skin infection, seborrhoeic dermatitis and dandruff.

**Adverse effects and cautions:** Local irritation, burning sensation, erythema, itching.

### Preparation Available:

Ketoconazole 2 % w/v 15 gm Oint	HI	C	RT
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### 4. Terbinafine

**Indication:** Dermatophyte infections of the nails, cutaneous candidiasis.

**Adverse effects and cautions:** Burning, contact dermatitis, dryness, exfoliation, irritation.

**Dose:** Apply 1 to 2 times a day.

### Preparation Available:

Terbinafine 1% w/w 10 gm Oint	HI	B	RT
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### 5. Miconazole

**Indication:** Fungal skin infections, fungal nail infections, otitis externa.

**Adverse effects and cautions:** Local irritation, burning sensation, maceration.

### Preparation Available:

Miconazole 2 % w/v 15 gm Oint	HI	C	RT
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### 6. Butenafine

**Indication:** Ringworm, jock itch, pityriasis.

**Adverse effects and cautions:** Burning, stinging.

### Preparation Available:

Butenafine 1 %, 15 gm Oint	HI	C	RT
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### 7. Tolnaftate

**Indication:** Tinea pedis, T. cruris, T. corporis, T. versicolor infection.



**Adverse effects and cautions:** Slight skin irritation; avoid contact with the eyes.

## 13.2 Antibacterial Drugs

### 1. Neomycin

**Indication:** Prophylaxis of skin infection in minor injury, corticosteroid responsive dermatoses with infection.

**Adverse effects and cautions:** Sensitisation (cross sensitivity with other aminoglycosides may occur).

### 2. Metronidazole and allied combinations

**Indication:** Acute inflammatory exacerbation of rosacea, malodorous fungating tumours.

**Adverse effects and cautions:** Sensitisation (cross sensitivity with other aminoglycosides may occur).

**Dose:** Apply twice daily for 8 weeks.

#### Preparation Available:

Metronidazole 1 % Gel, 20 gm Gel		A	RT
Metronidazole 1 % + Chlorhexidine 1 % + Lignocaine 2 %, 10 gm Oint	HI		RT

### 3. Polymyxin B

**Indication:** Bacterial skin infections, *Pseudomonas aeruginosa*.

**Adverse effects and cautions:** Rarely hypersensitivity to topical application; toxic parenterally.

### 4. Bacitracin

**Indication:** Topically alone or in combination with other anti-infectives for the treatment of superficial skin infection caused by susceptible organisms.

**Adverse effects and cautions:** Hypersensitivity reactions, when used in combination with topical anti-infective including bacitracin, may mask the clinical signs of bacterial, fungal or viral infections, or may suppress hypersensitivity reactions to the antibiotics or any other ingredients in the formulations.

## 5. Mupirocin

**Indication:** Bacterial skin infections particularly those caused by gram +ve organism (except pseudomonal infections), MRSA colonisation elimination.

**Adverse effects and cautions:** Burning sensation, local reactions, pruritus, rash, urticarial.

**Dose:** Apply up to 3 times a day for up to 10 days.

**Preparation Available:**

Mupirocin 2 % w/w, 5 gm Oint	HI	NA	RT
Mupirocin 2 % w/w, 10 gm Oint		NA	RT

## 6. Gentamicin

**Indication:** Active against aerobic Gram -ve bacteria and some Gram +ve bacteria.

**Adverse effects and cautions:** Erythema and pruritus; overgrowth of non-susceptible organisms including fungi.

**Preparation Available:**

Gentamicin 0.2 % 15 gm Oint	HI	D	RT
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## 7. Silver Sulfadiazine

**Indications:** Gram-negative infections, infections in burn wounds, infected ulcer and pressure sores

**Adverse effects and cautions:** Rashes, burning or itching, allergic reaction; It should be used with caution in hepatic or renal impairment.

**Contraindication:** Pregnancy, breast-feeding and neonates.

**Dose:** Apply daily or more frequently if very exudative.

**Preparation Available:**

Silver sulfadiazine 1 % 25 gm Oint	HI	C	RT
Silver Sulfadiazine 1 % 200 gm Oint		C	RT

## 8. Fusidic acid

**Indication:** Staphylococcus skin infection, impetigo, sycosis barbae, paronychia, erythrasma.

**Adverse effects and cautions:** Rashes, eczema, pruritus but frequency not defined.

**Preparation Available:**

Fusidic acid 2 % w/w, 10 gm Oint	HI	NA	RT
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## 9. Clindamycin

**Indications:** Acne vulgaris, bacterial vaginosis, Gardnerella vaginali.

**Adverse effects and cautions:** Dryness, oiliness, erythema, peeling, burning, itching; systemic absorption of clindamycin has been demonstrated following topical use, discontinue immediately if significant diarrhoea occurs.

**Preparation Available:**

Clindamycin 1 % w/v 15 gm Gel	HI	B	RT
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## 10 Clarithromycin

**Indication:** Skin structure infections

Clarithromycin 1%, 15 gm oint	NA	C	RT
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## 11. Framycetin

**Indication:** Bacterial skin infection.

**Adverse effects and cautions:** Rashes, itching, sensitization.

## 13.3 Antiviral Drugs

### 1. Acyclovir/Aciclovir

**Indication:** Herpes simplex infections (local treatment).

**Adverse effects and cautions:** Dryness of skin, erythema, itching of skin, transient burning; avoid contact with eye.

**Dose:** By topical application Herpes simplex (cream or eye ointment) every 4 hours (5 times daily) for at least 3 days after complete healing.

### Preparation Available

Acyclovir 5% w/w, 5 gm Oint	NA	B	RT
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## 13.4 Drugs for skin inflammatory conditions

### 1. Beclomethasone / Beclometasone

**Indication:** Severe inflammatory skin disorders such as eczema, psoriasis.

**Adverse effects and cautions:** See under hydrocortisone.

### 2. Betamethasone

**Indication:** Similar to beclomethasone.

**Adverse effects and cautions:** Skin atrophy, burning, dry skin, allergic dermatitis; use more than 100 gm per week of 0.1 % preparation likely to cause adrenal suppression.

**Preparation Available:**

Betamethasone 0.1 % 10 gm Oint	HI	NA	RT
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### 3. Clobetasol

**Indication:** Scalp psoriasis, recalcitrant eczema.

**Adverse effects and cautions:** Skin atrophy, burning, striae, erythema, numbness, stinging.

**Contraindication:** In viral, fungal or tubercular skin lesions, ophthalmic use

**Preparation Available:**

Clobetasol 0.05 % 10 gm Oint	HI		RT
Clobetasol 0.05 % 30 gm Oint	HI		RT

### 4. Fluocinolone

**Indication:** Eczema, psoriasis, pruritic dermatoses, atopic dermatitis.

**Adverse effects and cautions:** Skin atrophy, striae, burning, papules, pustules.

**Contraindication:** Herpex, TB, chronic use interferes with paediatric growth.

**Preparation Available:**

Fluocinolone 0.1 mg/ml 30 ml Lot	NA		RT
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### 5. Fluticasone

**Indication:** Eczema, psoriasis, atopic dermatitis.

**Adverse effects and cautions:** Pruritus, dryness, skin irritation, telangiectasia.

**Contraindication:** Skin atrophy, perioral dermatitis, rosacea, ophthalmic use.

**Preparation Available:**

Fluticasone 0.05 % 10 gm Oint	NA	C	RT
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## 6. Hydrocortisone

**Indication:** Eczema, nappy rash, atopic dermatitis.

**Adverse effects and cautions:** Skin atrophy, striae, acne form lesions, itching, pigmentation changes.

**Contraindication:** Underlying infection, ophthalmic use.

**Preparation Available:**

Hydrocortisone 0.5%, 10 gm Oint		C	
Hydrocortisone 1%, 10 gm Oint	HI	C	RT

## 7. Mometasone

**Indication:** Eczema unresponsive to less potent corticosteroid, psoriasis, dermatosis.

**Adverse effects and cautions:** Burning, itching, pruritus, rosacea.

**Preparation Available:**

Mometasone 0.1% w/w, 15 gm Oint	HI	C	RT
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## 8. Halobetasol

**Indication:** Eczema unresponsive to less potent corticosteroid, psoriasis, dermatosis

**Adverse effects and cautions:** Burning, itching, pruritus, rosacea.

### Preparation Available:

Halobetasol 0.05% w/w, 10 gm Oint	HI	NA	RT
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### 9. Calamine

Calamine has protectant and astringent properties.

**Indication:** Eczema, itching, skin irritation.

**Adverse effects and cautions:** Rash, redness, pus or other signs of infection.

### Preparation Available:

Calamine 8%, 100 ml Lot	HI		RT
Calamine 8%, 300 ml Lo	HI		RT

### 10. Calcitriol

**Indication:** Eczema, itching, skin irritation

**Adverse effects and cautions:** Rash, redness, pus or other signs of infection.

### Preparation Available:

Calcitriol 0.3 % w/v 15 gm Oint	NA	C	CRT
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### 11. Tacrolimus

Tacrolimus is a calcineurin inhibitor.

**Indication:** Atopic eczema, facial, flexural or genital psoriasis.

**Adverse effects and cautions:** Burning sensation, pruritus, skin erythema, application site infections,

### Preparation Available:

Tacrolimus 0.03 % 10 gm Oint	HI	C	RT
Tacrolimus 0.1 % 10 gm Oint	NA	C	RT

## 12. Triamcinolone

**Indication:** Topical inflammatory dermatoses.

**Adverse effects and cautions:** Skin atrophy, striae, acne form lesions, pigmentation changes

**Preparation Available:**

Triamcinolone 0.1 % Oint, 5 gm	NA	C	RT
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## 13. Conjugated estrogen

**Indication:** Atrophic vaginitis, kraurosis vulvae.

**Adverse effects and cautions:** Headache, pelvic pain, vulvovaginal disorder.

**Preparation Available:**

Conjugated estrogen 1 mg Vaginal cream, 14 gm	HI	X	RT
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Suitable quantities of corticosteroid preparations to be prescribed for specific areas of the body

Area of Body	Creams and Ointments
Face and neck	15 to 30 gm
Both hands	15 to 30 gm
Scalp	15 to 30 gm
Both arms	30 to 60 gm
Both legs	100 gm
Trunk	100 gm
Goins and genitalia	15 to 30 gm
These amounts are usually suitable for an adult for a single daily application for 2 weeks	

## 13.5 Drugs affecting skin differentiation and proliferation

### 1. Benzoyl Peroxide **Indication:** acne vulgaris

**Adverse effects and cautions:** Skin irritation, may bleach hair and clothing; avoid contact with eyes,



mouth and mucous membranes, excessive exposure to sunlight.

**Dose:** Apply 1-2 times daily preferably after washing with soap and water.

**Preparation Available:**

Benzoyl Peroxide 2.5%, 20 gm Gel	NA		RT
Benzoyl Peroxide 5%, 20 gm Gel	HI		RT

## 2. Coal Tar

Keratolytic agent, elicit antiseptic and antibacterial

**Indication:** Psoriasis, chronic atopic eczema, seborrhoeic dermatitis, dandruff

**Adverse effects and cautions:** Skin irritations, photosensitivity. It may stain skin, hair and fabric.

**Contraindication:** presence of infection, broken skin or inflamed skin, scalp,

**Dose:** Apply 1-3 times daily starting with low strength preparations.

**Preparation Available:**

Coal Tar 2 % Oint	NA	C	RT
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## 3. Salicylic acid

It has potent keratolytic action when applied topically to the skin.

**Indication:** Warts and calluses, acne

**Adverse effects and cautions:** Local irritation, salicylism on excessive application or treatment of large areas; use with caution in significant peripheral neuropathy; avoid contact with eyes, mouth and mucous membranes.

**Contraindication:** In children under 2 years, broken or inflamed skin.

**Preparation Available:**

Salicylic acid 10 % 10 gm Oint	HI	C	RT
Salicylic acid 20 % 15 gm Oint	HI	C	RT
Salicylic acid 40 % 15 gm Oint	HI	C	RT

#### 4. Tretinoin

It inhibits microcomedo formation, decreases cohesiveness of keratinocytes in sebaceous follicles which allow easy removal; has anti-inflammatory properties

**Indication:** Acne vulgaris, facial wrinkles.

**Adverse effects and cautions:** Excessive dryness, erythema, scaling, pruritus, hyper/hypo-pigmentation.

**Contraindication:** In sunburn.

**Preparation Available:**

Tretinoin 0.025 % w/v 20 gm Gel	HI	D	RT
Tretinoin 0.05 % w/v 20 gm Gel	HI	D	RT

#### 5. Adapalene

It binds to a specific retinoic acid nuclear receptor and modulates cellular differentiation.

**Indication:** Acne vulgaris.

**Adverse effects and cautions:** Dryness, erythema, scaling, pruritus; avoid eye, lips and mucous membrane.

**Preparation Available:**

Adapalene 0.1 % 15 gm Gel	NA		RT
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## 6. Selenium

It may block the enzyme responsible for epithelial tissue growth; reducing corneocyte production

**Indication:** Tinea versicolor, dandruff, seborrhea.

**Adverse effects and cautions:** Transient stinging, burning, lethargy, alopecia or hair discoloration; avoid use in eye, oral, anal or intravagina; Because of the risk of systemic toxicity, selenium sulphide should not be applied to damaged skin; Safety of drug in under 5 years has not been established.

## 13.6 Scabicides and pediculicides

### 1. Lindane / Gamma benzene hexachloride

Lindane stimulate nervous system, resulting in seizures and death of parasites.

**Indication:** Scabies, pediculosis.

**Adverse effects and cautions:** Local irritation, contact dermatitis.

Avoid contact with the face, eyes, mucous membranes and urethral meatus; use with caution in infants and small children since the potential for CNS toxicity (ataxia, clonic and tonic seizures, restlessness etc), is greater in this age group.

**Dose:** Scabies, apply over the whole body, omitting head and neck, wash off using cool water after 24 hours, repeat if necessary after 7 days. Pediculosis, lotion or cream is applied, washed off after 8-12 hours.

### Preparation Available:

Gamma Benzene Hexachloride 1 % 100 ml Lot	HI	RT
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## 2. Permethrin

It acts as a neurotoxic agent by depolarizing nerve cell membranes of parasites.

**Indication:** Scabies, Head lice and Nits.

**Adverse effects and cautions:** Local irritations, rashes, itching; avoid contact with eyes, inflamed or broken skin.

**Dose:** Scabies and body lice, apply cream over the whole body and wash off after 8-12 hours; if hands washed with soap within 8 hours of application for treating scabies, treat again. Head lice, apply lotion to clean damp hair and rinse after 10 minutes.

**Preparation Available:**

Permethrin 5 % Lot	HI	B	RT
Permethrin 1 % Soap	NA	B	RT

## 13.7 Depigmenting and pigmenting agents

### 1. Hydroquinone

It produces reversible depigmentation of skin by inhibiting enzymatic oxidation of tyrosine.

**Indication:** Melasma, solar lentigines.

**Adverse effects and cautions:** Burning, allergic dermatitis.

## 13.8 Drugs used for Hair conditions

### 1. Minoxidil

It stimulates direct hair follicle epithelial growth.

**Indication:** Androgenetic alopecia.

**Adverse effects and cautions:** Local irritation, headache, hypertrichosis (but frequency not defined);

avoid contact with broken, infected shaved or inflamed skin, avoid contact with eyes, mouth, mucous membranes.

**Contraindication:** Pheochromocytoma.

**Preparation Available:**

Minoxidil 4 % Sol	NA	C	RT
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### 13.9 Superficial thrombophlebitis

#### 1. Heparin

Heparin prevents blood clot and benzyl nicotinate acts as vasodilators.

**Indication:** Thrombophlebitis, bruising.

**Preparation Available:**

Heparin Oint, 15 gm	HI		RT
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### 13.10 Analgesics Drugs

#### 1. Aceclofenac

**Indication, Adverse effects and cautions:** See under musculoskeletal and joint disease chapter

Aceclofenac gel	NA		RT
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#### 2. Diclofenac and allied combinations

**Indication, Adverse effects and cautions:** See under musculoskeletal and joint disease chapter

Diclofenac 1 % Oint	HI	NA	RT
Diclofenac 15 % + Linseed oil 3 % + Menthol 5 % + Methyl Salicylate 10 % 30 gm Gel	HI		RT

#### 4. Ketorolac

**Indication, Adverse effects and cautions:** See under musculoskeletal and joint disease chapter

Ketorolac 2 % Oint	NA	C	RT
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### 13.11 Antiseptics and Disinfectants

#### 1. Povidone-iodine

**Indication:** Skin disinfection particularly minor wounds and infections.

**Adverse effects and cautions:** Skin stain, iodine burn, sensitisation to iodine; Povidone iodine should be avoided in neonates; avoid regular use in thyroid disorder patients.

**Preparation Available:**

Povidone Iodine 10 % 15 gm Oint	NA	B	RT
Povidone Iodine 5 % 50 ml gm Sol	HI	B	RT
Povidone Iodine 5 % w/w 15 gm oint	HI	B	RT
Povidone Iodine 1 % 100 ml Garg	HI	D	RT
Povidone Iodine vaginal Pess	HI		

#### 2. Chlorhexidine

**Indication:** Skin infection due to candida spp., oral mucositis, gingivitis, topical sanitizer.

**Adverse effects and cautions:** Increased tartar on teeth, irritation, sensitization, allergic reaction.

**Preparation Available:**

Chlorhexidine 4 % w/v Oint	NA	B	RT
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#### 3. Potassium Permanganate

**Indication:** Cleansing and deodorising suppurating eczematous reactions and wounds.

**Adverse effects and cautions:** Skin irritation.

**Preparation Available:**

Potassium Permanganate Powder, 30 gm	HI		CT
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### 13.12 Miscellaneous Preparations

Coconut Oil 100 ml Oil	NA		CT
Sunscreen 40 SPF Cream			CT
Sunscreen 50 SPF Cream			CT

### Combination Products

#### 1. Adapalene and Clindamycin

**Indication, Adverse effects and cautions:** See under adapalene and Clindamycin

Adapalene 0.1 % + Clindamycin 1% 15 gm Gel	HI		CT
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#### 3. Allantoin, Hydrocortisone, Lignocaine and zinc oxide **Indication:** Haemorrhoids

#### 4. Betamethasone and Gentamicin

**Indication, Adverse effects and cautions:** See under betamethasone and gentamicin.

#### 5. Betamethasone and Salicylic acid

**Indication, Adverse effects and cautions:** See under betamethasone and salicylic acid.

#### 6. Clobetasol and Salicylic acid

**Indication, Adverse effects and cautions:** See under betamethasone and salicylic acid.

Clobetasol 0.05 % + Salicylic acid 3 % 15 gm Oint	HI	C	CT
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### 7. Clobetasol and Gentamicin

**Indication, Adverse effects and cautions:** See under clobetasol, gentamicin and miconazole.

Clobetasol 0.05 % + Gentamicin 0.1 % Oint	HI		CT
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### 8. Clotrimazole and Beclomethasone

**Indication, Adverse effects and cautions:** See under clotrimazole and betamethasone.

Clotrimazole 1 % + Beclomethasone 0.025 % Oint	NA	NA	CT
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### 10. Neomycin, Polymyxin B and Bacitracin

**Indication, Adverse effects and cautions:** See under Neomycin, Polymyxin B and Bacitracin.

Neomycin 3400 IU + Polymyxin B 5000 IU + Bacitracin 400 IU 5 gm Oint	HI		CT
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### 11. Fusidic acid and Betamethasone

**Indication, Adverse effects and cautions:** See under Fusidic acid and Betamethasone.

Fusidic acid 20 mg + Betamethasone 1.2 mg Oint	HI	NA	CT
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### 12. Fusidic acid and Hydrocortisone

**Indication, Adverse effects and cautions:** See under Fusidic acid and Hydrocortisone.

Fusidic acid 20 mg + Hydrocortisone 10 mg Oint	HI		CT
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### 13. Halobetasol and Fusidic acid

**Indication, Adverse effects and cautions:** See under Halobetasol and Fusidic acid.

Halobetasol 0.05 % + Fusidic acid 2% 30 gm	NA		CT
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### 14. Halobetasol and Gentamicin

**Indication, Adverse effects and cautions:** See under Halobetasol and Gentamicin.

Halobetasol 0.05 % + Gentamicin 0.1% 30 gm Oint	HI		CT
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### 15. Halobetasol and Salicylic acid

**Indication, Adverse effects and cautions:** See under Halobetasol and Salicylic acid.

Halobetasol 0.05 % + Salicylic acid 3% 30 gm Oint	NA		CT
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### 16. Hydroquinone, Tretinoin and Fluticasone

**Indication, Adverse effects and cautions:** See under Hydroquinone, Tretinoin and Fluticasone.

Hydroquinone 2 % + Tretinoin 2% + Fluticasone 0.05 % Oint	HI		CT
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### 19. Coal tar and Salicylic acid

**Indication, Adverse effects and cautions:** See under Coal tar and salicylic acid.

Coal tar 0.4 % + Salicylic acid 3 % Shampoo	NA		CT
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## 20. Clotrimazole and Selenium

**Indication, Adverse effects and cautions:** See under Clotrimazole and Selenium.

Clotrimazole 1 % + Selenium 2.5 % Shampoo	NA		CT
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# Chapter-13: Drugs acting on the Ophthalmic and ENT

## 14.1 Drugs for Eye

### 14.1.1 Anti-bacterial drugs

#### 1. Chloramphenicol

It is usually bacteriostatic in action, but may be bactericidal in high concentrations or against highly susceptible organisms.

**Indication:** Superficial infections of the eye.

**Adverse effects and cautions:** Itching or burning.

Topical corticosteroids, when used in combination with chloramphenicol may mask the clinical signs of bacterial, fungal or viral infections, or may suppress hypersensitivity reactions to the antibiotic or other ingredients in the formulations. They should not be prescribed for undiagnosed 'red eye'.

**Preparation Available:**

Chloramphenicol 0.5 % w/v E/D	HI	NA	CT
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#### 2. Ciprofloxacin

**Indication:** Superficial bacterial infections, corneal ulcers.

**Adverse effects and cautions:** Corneal staining, local burning and itching, lacrimation, photophobia.

**Dose:** Corneal ulcer, eye drops, day 1 apply every 15 minutes for 6 hours then every 30 minutes, day 2 apply every hour, days 3-14 apply every 4 hours (maximum duration of treatment 21 days).

Apply ointment throughout day and night; apply 1.25 cm ointment every 12 hours for 2 days then every 4 hours for the next 12 days.

**Preparation Available:**

Ciprofloxacin 0.3 % w/v E/D	HI	NA	RT
Ciprofloxacin 0.3 % w/v E/O	HI	NA	RT

### 3. Ofloxacin

**Indication:** See under ciprofloxacin.

**Adverse effects and cautions:** Photophobia, nausea, headache, dizziness. The drug should not be used for more than 10 days.

**Dose:** See under ciprofloxacin.

**Preparation Available:**

Ofloxacin 0.3 % w/v E/D	NA	NA	RT
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### 4. Gentamicin

**Indication:** Superficial infections of the eye including Pseudomonas.

**Adverse effects and cautions:** Transient irritation, burning, itching.

The use of gentamicin may result in overgrowth of nonsusceptible organisms including fungi. Cross-allergenicity among the aminoglycosides has been demonstrated.

**Preparation Available:**

Gentamicin 0.3 % w/v 5 ml E/D	NA	NA	RT
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## 5. Tobramycin

**Indication:** Superficial infections of the eye.

**Adverse effects and cautions:** Transient irritation, lacrimation, conjunctival erythema, oedema of eye, itching.

**Preparation Available:**

Tobramycin 0.3 % w/v E/D	NA	NA	RT
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## 6. Gatifloxacin

**Indication:** Bacterial Conjunctivitis.

**Adverse Drug Reaction:** Lacrimation, Eye lid swelling, Red Eye.

**Preparation Available:**

Gatifloxacin 0.3% 5ml Eye Ointment	HI	NA	RT
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## 7. Moxifloxacin

**Indication:** Bacterial Conjunctivitis.

**Adverse Drug Reaction:** Dry Eye.

**Preparation Available:**

Moxifloxacin 0.5 % Eye Drop	HI	NA	RT
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### 14.1.2 Anti-inflammatory drugs

#### 1. Dexamethasone

**Indication:** Short term local treatment of eye inflammation, macular oedema following either branch retinal vein occlusion or central retinal vein occlusion.

**Adverse effect and cautions:** Blurred vision, posterior capsular cataract, glaucoma, secondary infection; intraocular pressure check in prolonged use patients.

**Contraindication:** Acute, untreated purulent bacterial, viral or fungal infections.

### Preparation Available:

Dexamethasone 0.1% + Chloramphenicol 0.5% eye Drop	NA	NA	RT
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### 2. Beclomethasone

**Indication:** Local treatment of inflammation.

**Adverse effects and cautions:** See under dexamethasone.

**Dose:** Apply eye drops every 1-2 hours until controlled then reduce frequency.

### 3. Fluorometholone

**Indication:** Local treatment of inflammation.

**Adverse effects and cautions:** Mild Burning Sensation.

#### Preparation Available:

Fluorometholone 0.1% Eye Drop	HI	NA	RT
Fluorometholone 0.1% + Neomycin 0.35% 5ml eye drop	HI	NA	RT

### 4. Flurbiprofen

**Indication:** Ocular inflammation.

**Adverse Drug Reaction:** Ocular Hyperaemia.

#### Preparation Available:

Flurbiprofen 0.03% 5ml Eye Drop	HI	NA	RT
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## 14.1.3 Mydriatics

### 1. Atropine

**Indication:** Refraction procedures in children up to 5 years of age, uveitis to prevent posterior synechia.

**Adverse effects and cautions:** Local irritation, raised intraocular pressure, dermatitis, systemic effects manifested by flushing, dryness of the skin and blurred vision etc.

**Contraindication:** Known or suspected angle closure glaucoma.

**Preparation Available:**

Atropine 1 % E/D	HI	NA	RT
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## 2. Homatropine

**Indication:** Mydriasis and Cycloplegia for Refraction, Dilatation of pupil

**Adverse effects and cautions:** Blurred Vision, Photophobia

**Contraindication:** Narrow angle glaucoma

**Preparation Available:**

Homatropine 2% Eye Drop	NA	NA	RT
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### 14.1.4 Antiglaucoma

#### 1. Acetazolamide

It inhibits carbonic anhydrase, hence reducing the formation of hydrogen and bicarbonate in aqueous humour and the water secreted with it, resulting in a fall in the intraocular pressure.

**Indication:** Open angle glaucoma, angle-closure glaucoma.

**Adverse effects and cautions:** anorexia, nausea, vomiting paresthesia, hypokalaemia, drowsiness, depression, rashes, blood disorders manifested by aplastic anaemia, thrombocytopenia or leucopenia,

lectrolyte balance should be maintained in patients receiving acetazolamide. Respiratory acidosis may be precipitated or increased in patients with severe loss of respiratory capacity.

**Preparation Available:**

Acetazolamide 250 mg Tab	HI	NA	RT
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**14.1.5 Miscellaneous**

1. Polyvinyl alcohol and povidone

**Indication:** Lubricant to relieve dry eyes, temporary relief of burning, irritation and discomfort

**Preparation Available:**

Polyvinyl alcohol 14 mg + Povidone 6 mg E/D	HI	NA	RT
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**Combination Products**

**1. Neomycin, Bacitracin and Polymyxin B**

**Indication:** Infection caused by bacteria

**Adverse effects and cautions;** Mild eye irritation, blurred vision.

**Preparation Available:**

Neomycin 0.35 % + Fluorometholone 0.1% 5ml Eye Drop	HI	NA	RT
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**2. Ciprofloxacin and Dexamethasone**

**Indication and Adverse effects and cautions;** See under ciprofloxacin and dexamethasone

Ciprofloxacin 0.5 % + Dexamethasone 0.1 % E/Er/D	HI	NA	RT
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### 3. Polymyxin B, Chloramphenicol and Dexamethasone

**Indication, Adverse effects and cautions:** See under Polymyxin B, Chloramphenicol and Dexamethasone

Polymyxin B 10000 IU + Chloramphenicol 10 mg + Dexamethasone 1 mg E/O	HI	NA	RT
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### 4. Carboxymethylcellulose

**Indication:** Dry Eye.

**Adverse effects and cautions:** Vision may be temporarily blurred when this product is first used.

**Preparation Available:**

Carboxymethylcellulose 0.5% 10ml Eye Drop	HI	NA	RT
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### 4. Olopatadine

**Indication:** Allergic Conjunctivitis.

**Adverse effects and cautions:** Swelling of eye lid.

**Preparation Available:**

Olopatadine 0.1% Eye Drop 5ml	NA	NA	RT
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### 4. Ketorolac

**Indication:** Itchy eyes caused by allergies.

**Adverse effects and cautions:** Change in vision.

**Preparation Available:**

Ketorolac 0.4% 5ml Eye Drop 5ml	HI	C	RT
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## 14.2 Drugs for Ear

### 14.2.1 Antibacterial drugs

#### 1. Chloramphenicol + Benzocaine

**Indication:** Bacterial infection in otitis externa.

**Adverse effects and cautions:** Sensitivity reaction.

**Preparation Available:**

Chloramphenicol 5 % w/v + Benzocaine 1% Er/D	NA	NA	RT
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#### 2. Ciprofloxacin

**Indication:** Acute otitis externa due to pseudomonas aeruginosa or staphylococcus aureus.

**Adverse effects and cautions:** Ear pruritus, fungal ear superinfection, application site pain, headache.

**Preparation Available:**

Ciprofloxacin 0.3 % + Dexamethasone phosphate 0.1% Er/D	HI	C	RT
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#### 3. Gentamicin

**Indication:** Bacterial infection in otitis externa.

**Adverse effects and cautions:** Local sensitivity reaction.

**Preparation Available:**

Gentamicin 0.3 % w/v 5 ml Er/D	NA	C	RT
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### 14.2.2 Antifungal drugs

#### 1. Clotrimazole

It is applied as a 1 % solution in polyethylene glycol.

**Indication:** Fungal infection in otitis externa.

**Adverse effects and cautions:** Occasionally skin irritation or sensitivity.

### 14.2.3 Anti-inflammatory Drugs

#### 1. Prednisolone

**Indication:** Eczematous inflammation in otitis externa

**Adverse effects and cautions:** Local sensitivity reactions; avoid untreated infection and not to be used for prolonged periods.

**Dose:** Apply 2 to 3 drops every 2 to 3 hours and frequency to be reduced when relief obtained.

**Preparation Available:**

Prednisolone 1 % 5 ml Er/D		C	RT
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### 14.2.4 Removal of Earwax

#### 1. Sodium bicarbonate

**Indication:** Removal of earwax.

**Adverse effects and cautions:** Dryness of ear canal.

**Preparation Available:**

Sodium bicarbonate 34 mg/ml 10 ml Er/D		C	RT
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### 14.2.5 Meniere's disease

#### 1. Betahistine

**Indication:** Vertigo, tinnitus and hearing loss associated with meniere's disease.

**Adverse effects and cautions:** GI disturbances, headache, rashes, pruritus; caution in pheochromocytoma.

### Preparation Available:

Betahistine 8 mg Tab	HI	C	RT
Betahistine 16 mg Tab	HI	C	RT

### Combination Products

#### 1. Chloramphenicol and Benzocaine

**Indication, Adverse effects and cautions;** See under Chloramphenicol and Benzocaine

Chloramphenicol 5 % + Benzocaine 1 % Er/D	NA		RT
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#### 2. Benzocaine, Paradichlorobenzene and Turpentine oil

**Indication, Adverse effects and cautions;** Paradichlorobenzene works as insecticide, disinfectant and turpentine oil works for aching muscle; See under benzocaine

Paradichlorobenzene 2 % + Benzocaine 2.7 % + Turpentine oil 15 % Er/D	NA	NA	RT
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#### 3. Clotrimazole, Lignocaine and chloramphenicol

**Indication, Adverse effects and cautions;** See under Chloramphenicol and Benzocaine

Clotrimazole 1% + Lignocaine 2% + Chloramphenicol 5 % 10 ml Er/D	NA	NA	RT
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#### 4. Betamethasone and Neomycin

**Indication:** Eczematous inflammation in otitis externa.  
**Adverse effects and cautions;** Local sensitivity, avoid prolonged use.

**Contraindication:** Perforated tympanic membrane.

**Preparation Available**

Neomycin 05 % + Betamethasone 0.1 % Er/E/D	HI	NA	RT
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**14.3 Nasal Decongestant**

**1. Oxymetazoline Indication: nasal congestion**

**Adverse effects:** Insomnia, headache, burning, sneezing, local irritation; prolong used may cause rebound congestion of the nasal mucosa and chemical rhinitis.

**Dose:** 0.05% solution, 2-3 drops into each nostril 2-3 times daily when required, maximum duration 7 days. 0.025% solution, Child over 3 months, 1-2 drops into each nostril 2 times a day, morning and evening; dosage has not been established for children below 3 months of age, maximum duration 7 days.

**Preparation Available:**

Oxymetazoline 0.025 % w/v N/D	HI	C	RT
Oxymetazoline 0.05 % w/v N/D		C	RT
Oxymetazoline 0.01 % w/v N/S		C	RT

**2 Xylometazoline Indication: nasal congestion**

**Adverse effects:** See oxymetazoline

**Preparation Available**

Xylometazoline 0.01 % w/v N/S	NA	C	RT
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**3. Phenylephrine**

**Indication:** Nasal congestion associated with acute or chronic rhinitis, common cold, sinusitis.

**Adverse effects and cautions:** Increased heart rate,

palpitation, tremors, ventricular premature Contractions and hypertension. The drug should be used with caution in patients with diabetes, hypertension, ischaemic heart disease, hepatic impairment, renal impairment.

The safety of the drug in pregnancy and lactation has not been established.

**Dose:** By mouth, 5 mg 3-4 times a day.

**Preparation Available:** also See under combination products.

Phenylephrine Inj	NA		RT
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#### 4. Naphazoline

**Indication:** Nasal congestion.

**Adverse effects and cautions:** Burning, stinging, sneezing, dryness; overdose may cause rebound congestion

#### 14.4 Miscellaneous

##### 1. Fluticasone

**Indication:** Nasal congestion, sneezing, runny nose and itchy or water eyes caused by seasonal or year-round allergies.

**Adverse effects and cautions:** Nasal ulceration, nasal septal perforation, impaired wound healing

**Dose:** Two spray in each nostril once daily.

**Preparation Available:**

Fluticasone 50 mcg N/S	NA		RT
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## 2. Beclomethasone

**Indication:** Allergic rhinitis, nasal polyps.

**Adverse effects and cautions:** Nasal pharyngeal irritation, headache, nausea, lightheadedness

**Preparation Available:**

Beclomethasone 50 mcg N/S			RT
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## Combination Products

### 1. Salbutamol and Bromhexine

**Indication, Adverse effects and cautions:** See under salbutamol and bromhexine

Salbutamol 2 mg + Bromhexine 4 mg, 100 ml Symp			RT
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### 2. Terbutaline and Bromhexine

**Indication, Adverse effects and cautions:** See under terbutaline and bromhexine

Terbutaline 1.5 mg + Bromhexine 4 mg, 60 ml Symp			RT
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### 3. Terbutaline, Bromhexine and Guaiphenesin

**Indication, Adverse effects and cautions:** See under terbutaline, bromhexine and Guaiphenesin

Terbutaline 2.5 mg + Bromhexine 8 mg + Guaifenesin 100 mg + Menthol 5mg / 5 ml Symp			RT
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### 4. Phenylephrine and Naphazoline

**Indication, Adverse effects and cautions:** See under Phenylephrine and Naphazoline

Phenylephrine 0.12 % + Naphazoline 0.05% w/v 10 ml N/S			RT
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### 5. Bromhexine, Phenylephrine and Chlorpheniramine

**Indication, Adverse effects and cautions:** See under Bromhexine, Phenylephrine and Chlorpheniramine

Bromhexine + Phenylephrine + Chlorpheniramine Syp			RT
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## 14.5 Drugs for Oropharynx

### 1. Benzocaine

**Indication:** As anaesthetic in bronchoscopy, proctoscopy; mucositis, pharyngitis.

**Adverse effects and cautions:** Burning, erythema, pruritus, contact dermatitis.

**Preparation Available:**

Benzocaine 20 % Gel	NA	C	RT
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### 2. Lignocaine / Lidocaine

**Indication:** For dentistry and otorhinolaryngology.

**Adverse effects and cautions:** Burning, erythema .

**Preparation Available:**

Lignocaine 10 % Garg	NA		RT
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### 3. Choline Salicylates and allied preparations

**Indication:** Mild oral and perioral lesions.

**Adverse effects and cautions:** Salicylate poisoning in children if frequently used. The drug should not be applied to dentures, leave at least 30 minutes before re-



insertion of denture.

**Dose:** Apply ½ inch of gel with gentle massage not more often than every 3 hours; Child over 4 months, ¼ inch of gel not more often than every 3 hours.

**Preparation Available:**

Choline Salicylate 8.7 % Dental Gel	NA		CT
Choline Salicylate 9% + Benzalkonium chloride 0.02% lignocaine HCL 2% Oint	NA		CT
Choline Salicylate 8.7 % + Tannic acid 10 % + Benzalkonium 0.01 % Oint			CT

#### 4. Benzydamine

**Indication:** Radiation associated mucositis, acute pharyngitis, painful inflammatory condition of oropharynx.

**Adverse effects and cautions:** Burning, stinging sensation, numbness.

**Preparation Available:**

Benzydamine 0.15 % w/v 100 ml Garg			RT
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#### 14.6 Miscellaneous Preparation:

Potassium nitrate 5 % + Sodium monofluorophosphate 0.7 % 100 gm Gel			CT
Hiora 150 ml MW			CT
Hiora K 150 ml MW			CT

## Chapter-14: Immunological Drugs

### 15.1 Diagnostic agents

#### 1. Iohexol

It is also known as Iopamidol, Ioversol, Metrizamide. It allows for radiographic visualisation through the opacification of vessels and anatomical structures in the path of flow of the Contrast media.

**Indication:** CT scanning of the body, excretory urography.

#### Preparation Available:

Iohexol 300 mg, 50 ml Inj	HI	NA	RT
Iohexol 300 mg, 100 ml Inj	HI		
Iohexol 350 mg, 50 ml Inj	HI		
Iohexol 350 mg, 100 ml Inj	HI		

#### 2. Polyethylene glycol and electrolyte

**Indication:** PEG and Electrolyte solution cleanse the colon before certain medical test eg colonoscopy, bariumenema X-ray exam or colon surgery.

#### Preparation Available:

PEG and Electrolyte Pow	HI	C	RT
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### 15.2 Sera and Immunoglobulin

#### 1. Anti-D Immunoglobulin

**Indication:** To rhesus-negative women for prevention of Rh<sub>0</sub>(D) sensitization following the birth of a rhesus positive infant, and sometimes after abortion.

**Adverse effects and cautions:** Dyspnea, anaphylaxis, hypotension, urticaria; use with caution in immunoglobulin A deficiency.

**Dose:** Following abortion or birth of rhesus-positive infant, 500 units immediately or within 72 hours; for transplacental bleed in excess of 5 ml foetal red cells, extra 100-125 units per ml foetal red cells.

Following any potentially sensitising episode (e.g. stillbirth) up to 20 weeks' gestation 250 units per episode (after 20 weeks, 500 units) immediately or within 72 hours.

Following Rho (D) incompatible blood transfusion, 100-125 units per ml transfused rhesus-positive red cells.

**Contraindication:** Treatment of idiopathic thrombocytopenia purpura in rhesus negative patients.

**Preparation Available:**

Anti-D 300 mcg Inj	NA	C	FT
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## 2. Immunosuppressant

### 1. Mycophenolate Mofetil:

Immunosuppressant medication used to prevent rejection following organ transplantation and to treat autoimmune conditions such as Crohn's disease and lupus.

**Adverse Effect and Cautions:** Stomach Pains, Diarrhoea, Acne or Skin Rash. Used caution in patients with hepatic impairment and lactating mother.

**Dose:** In crohn's disease, started initially with 500 mg twice daily (1 gm Daily total), Maintained with 1-2 gm

daily, may be increased up to 3 gm based on patient condition and tolerability.

**Contraindication:** Patient with severe untreated Infection, hypersensitivity patient, Breast feeding women.

**Preparation Available:**

Mycophenolate Mofetil 500 mg	HI	D	RT
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## 15.3 Vaccines

### 1. Hepatitis B Vaccine

A single course of hepatitis B vaccine with a single booster 5 years after the primary course may be sufficient to maintain immunity. Immunisation takes up to six months to confer adequate protection. The deltoid muscle is the preferred site of injection in adults and older children; the anterolateral thigh is the preferred site in infants and children; the buttock must not be used because vaccine efficacy is reduced. The subcutaneous route is used for patients with bleeding disorder.

**Indication:** Immunisation against Hepatitis-B infection,

**Dose:** By intramuscular injection, 3 doses of 1 ml, the second 1 month and the third 6 months after the first dose.

Child birth to 15 years 3 doses of 0.5 ml,

Infants born to HBsAg positive mothers, 4 doses of 0.5 ml, first dose at birth with hepatitis B immunoglobulin injection (separate site), second 1 month, the third 2 months and the fourth 12 months after the first dose.

### Preparation Available:

Hepatitis-B Vaccine 20 mcg Inj	NA		FT
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## 2. Rabies Vaccines

**Indication:** Pre-exposure prophylaxis, pre-exposure prophylaxis booster dose

**Adverse effects:** Paresis.

**Dose:** Pre-exposure prophylaxis, by deep subcutaneous or intramuscular injection in the deltoid region, 1 ml on days 0, 7 and 28; also booster doses every 2-3 years.

Post-exposure, by deep subcutaneous or intramuscular injection, 1 ml on days 0, 3, 7, 14, and 30 days.

### Preparation Available:

Rabies vaccine Inj	HI		FT
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## 3. Tetanus Toxoid

This is a single monovalent type of vaccine and is available as an adsorbed vaccine. It should not be given more frequently than five years since the last booster dose.

**Indication:** Selective immunisation against tetanus.

**Dose:** Primary immunisation, 0.5 ml by intramuscular injection followed after 4 weeks by a second dose and after a further 6 months by a third dose; 2 reinforcing doses of 0.5 ml the first at least 1 year after and second at least One year later.

Unimmunised pregnant women 0.5 ml by intramuscular injection followed after at least 4 weeks by a second dose.

**Preparation Available:**

Tetanus toxoid 0.5 ml	HI	C	FT
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**4. Influenza vaccine**

This is inactivated quadravalent influenza vaccine.

**Indication:** Prophylaxis of influenza (commonly called flu)

**Dose:** 0.5 ml for influenza prophylaxis CDC recommends that everyone aged 6 months and older receive an annual influenza vaccination.

**Preparation available:**

Influenza vaccine 0.5 ml, Inj	HI	C	FT
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**5. Pneumococcal Vaccine**

**Indication:** Prevention of pneumonia and invasive disease caused by streptococcus pneumoniae.

**Dose:** 0.5 ml (1 dose PCV13 followed by 1 dose PPSV23 at least 1 year later), repeat the regimen when aged  $\geq 65$  years.

**Preparation available:**

Pneumococcal Vaccine 0.5 ml, Inj	HI	C	FT
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## Chapter-15: Drugs Used in Poisoning

### How to identify poisoning?

Sign	Probable poisoning case
Pinpoint pupils	<ul style="list-style-type: none"><li>• May be seen in opioid, mushroom, organophosphorus insecticide or other cholinergic poisoning.</li><li>• May be a sign of pontine hemorrhage.</li></ul>
Fixed dilated pupils	<ul style="list-style-type: none"><li>• May be seen in atropine, tricyclic antidepressants, antihistamines poisoning .</li></ul>
Hypotension	<ul style="list-style-type: none"><li>• Severe poisoning with CNS depressants.</li></ul>
Hypertension	<ul style="list-style-type: none"><li>• Sympathomimetic or CNS stimulating agents poisoning.</li></ul>
Irregular heart beat	<ul style="list-style-type: none"><li>• Acute poisonings (tricyclic antidepressants, antipsychotics, antihistaminics).</li></ul>
Hypothermia	<ul style="list-style-type: none"><li>• Especially seen in overdose of barbiturates or phenothiazines.</li></ul>
Hyperthermia	<ul style="list-style-type: none"><li>• Especially seen in overdose of CNS stimulants</li></ul>

Patient looks drunk	<ul style="list-style-type: none"> <li>• May be sign of hypoglycemic state.</li> <li>• Consider all hypnotics, sedatives and antipsychotics.</li> </ul>
Metabolic acidosis	<ul style="list-style-type: none"> <li>• Especially in salicylate poisoning.</li> </ul>

## Prevention of absorption and active elimination of drugs

### i. Skin decontamination

### ii. Gastric lavage

**Activated charcoal:** - Activated charcoal can bind many poisons in gastro-intestinal system thereby reduce their absorption. It may be effective up to 1 hour after ingestion of poison, sooner the better. It is particularly useful for the prevention of absorption of poisons which are toxic in small amounts e.g. antidepressants. Repeated dose of activated charcoal enhance the elimination of some drugs e.g. carbamazepine, dapsone, phenobarbital, quinine, theophylline etc. after they have been absorbed.

#### **Adverse effects and cautions:**

- Black stools, vomiting.
- Vomiting should be treated with an anti-emetic since it may reduce the efficacy of charcoal treatment.



- The drug should not be used for poisoning with corrosives, alcohols, DDT, malathion, iron, lithium and petroleum distillates.
- The drug should be used with caution in drowsy or comatosed patients and reduced gastro-intestinal motility.

**Dose:** Reduction of absorption 50 g, repeated if necessary; Child under 12 years 25 g.  
Active elimination, 50 g initially then 50 g every 4 hours.

### **Risk Assessment Based Approach Poisoning Resuscitation (ABCDE)**

Airway	Breathing	Circulation	Detect and correct	Emergency antidote administration
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#### **Detect and correct:**

<b>Detection</b>	<b>Correction</b>
<b>Hypoglycemia</b>	<ul style="list-style-type: none"> <li>• Check for blood glucose level in patients with altered mental status</li> <li>• Treat if level &lt;4.0 mmol/L: 50 ml 50% dextrose IV.</li> </ul>
<b>Seizures</b>	<ul style="list-style-type: none"> <li>• Usually generalized.</li> <li>• IV benzodiazepines are first-line.</li> <li>• Barbiturates are second-line therapy.</li> <li>• Pyridoxine in case of seizures secondary to isoniazid.</li> </ul>

<b>Hyper/ hypothermia</b>	<ul style="list-style-type: none"> <li>• By covering patient with blanket (hypothermia)</li> <li>• By maintaining temperature of room with A.C or Cooler (hyperthermia).</li> </ul>
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### **Risk assessment**

Agent	Dose	Time since ingestion	Clinical features and course	Patient factors
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#### **Patient factors:**

- Weight
- Co-morbidities

#### **Supportive care and monitoring**

- Initial period of close observation and monitoring in emergency.
- Maintain ABC; correct metabolic, fluid and electrolyte imbalances.

#### **Investigations**

- Screening-12-lead ECG.
- Drug levels in body fluids.

#### **Decontamination and enhanced elimination**

#### **Antidotes**

#### **Disposition**

#### **Common poisoning cases and their managements**

##### **1. Organophosphorus insecticide poisoning**

#### **Management**

- Resuscitation, supportive care and monitoring.
- Skin decontamination.
- Activated charcoal usually not useful.
- Antidote.

### **Pralidoxime (2-PAM)**

**Indication:** In all patients with evidence of organophosphate poisoning or nerve agent, anticholinesterase overdose (donepezil, rivastigmine, galantamine, neostigmine, physostigmine).

**Contraindication:** In poisoning with carbamate, poisoning with organophosphorus without anticholinergic activity.

#### **Dose:**

- Administer initial 2 g in 100 ml NS IV over 20 minutes.
- Then continue an infusion of 0.5 g/hour (6 g in 500 ml NS at 42 ml/hour) for at least 24 hours.
- Although clinical evidence of OP poisoning recurs, infusion is recommended for further 24 hrs.

#### **Preparation Available:**

Pralidoxime 500 mg inj	HI	C	R.T
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#### **Atropine**

**Indication:** OP Poisoning, Carbamate Poisoning.

**Contraindication:** Myasthenia Gravis, Paralytic Ileus, Prostatic Enlargement, Reflux Oesophagitis, Pyloric Stenosis.

**Dose:****Adult:**

- Inject 1.8-3mg IV bolus and double the dose every 3-5 minutes depend upon response.
- Continue atropinization until clear chest with no wheeze, dry armpit, dilated pupil, SBP>80 mm Hg, HR>80 bpm, pupil no longer pinpoint is achieved.
- Followed by maintenance dose: 10-20% of total initial dose given/hr though iv infusion.
- Child: 20-30 mcg/kg initially with same procedure as mentioned above.

**Preparation Available:**

Atropine sulphate 0.6mg/ml 1ml	HI	C	R.T
Atropine sulphate 0.6mg/ml 10ml	HI	C	R.T

**2. Paracetamol poisoning****Toxic dose:**

- Single dose as low as 7.5 g in adults or 150 mg/kg in a child can cause severe hepatocellular necrosis and less frequently renal tubular necrosis.
- Risk of hepatotoxicity is predicted by plotting a serum PCM level in Rumack Matthew nomogram.
- Serum paracetamol levels in excess of 200 mg/liter at 4 hours and 25 mg/L at 16 hours post ingestion often results in hepatotoxicity.

**Management:**

- Resuscitation, supportive care and monitoring
- Decontamination
- Activated charcoal may help if victim presents within first hr of overdose.

**Antidotes****N-acetylcysteine (NAC)/ Acetylcysteine****Indication:** Paracetamol Overdose, Pulmonary Disease**Caution:** Rashes and Anaphylaxis**Dose:**

- Administer IV 150 mg/kg in 200 ml of 5% dextrose over 15 min.
- Followed by 50mg/kg in 500 ml of 5% dextrose over 4 hours.
- Followed by 100 mg/kg in 1 liter of 5% dextrose over 16 hours.

**Preparation Available:**

Acetylcysteine 600mg tab	HI	B	R.T
Acetylcysteine 200mg/ml 10ml inj	HI	B	R.T

**3. Opioid poisoning:****Dextropropoxyphene**

- 10 mg/kg likely to cause symptoms like delirium and seizures.
- 20 mg/kg may cause CNS depression, seizures and cardiac dysrhythmias.

## **Tramadol**

- Doses >500 mg may cause seizures in adults. The risk of seizures increases in a dose-dependent fashion.
- Deaths occur after ingestion of 3-5 g.
- Implicated in serotonin syndrome.

## **Pethidine**

- The maximum dose should not exceed 600 mg per 24 hours.
- For IV dose is usually 25-50 mg every 3-4 hr as needed.

## **Management:**

- Initial resuscitation and supportive care.
- Carefully monitor respiratory rate, GCS and oxygen saturation.
- Ventricular dysrhythmias in dextropropoxyphene intoxication,
- Resuscitation includes serum alkalization by the administration of IV bolus sodium bicarbonate.

## **Antidote:**

### **Naloxone**

**Indication:** Overdose of opioids, reversal of postoperative respiratory depression.

**Contraindication:** Hypersensitivity.

### **Dose:**

### **Adult:**

- Administer initial 100 mcg IV bolus dose or 400 mcg IM or SC if IV route is not possible. Larger initial doses may use in non-opioid-dependent patient.
- Follow 100 mcg IV every 30-60 secs until spontaneous respiration is re-established
- Follow the naloxone infusion rate at 2/3rd of the initial dose given/ hour.
- Monitor the patient for evidence of opioid withdrawal and titrate the infusion according to clinical response.

**Child:**

- Administer at rate 10 mcg/kg
- Followed by 100 mcg/kg if there is no response.

**Preparation available:**

Naloxone 0.4mg/ml 1ml Inj	HI	B	R.T
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## Chapter-16: Drug Interactions.

Drug	Effects
<b>Drug interaction of Anticholinergic drugs</b>	
Anticholinergic drugs +H1 blockers/tricyclic antidepressants(tcas)/phenothiazines	Anticholinergic side effect.
Atropine+Levodopa	Decrease bioavailability of levodopa (pharmacokinetic effect).
Atropine+ Tetracyclines	Increase bioavailability of tetracyclines (pharmacokinetic effect).
Atropine +Digoxin	Increases absorption of digoxin (pharmacokinetic effect).
<b>Drug interaction of skeletal muscle relaxants</b>	
Non depolarizing blockers(d-tubocuraine,pancuronium)+antibiotics(amino glycosides)	Increases the effect of non depolarizing blockers (synergistic effect).
Non depolarizing blockers+tetracyclines	Increases the effect of non depolarizing blockers (synergistic effect).
Non depolarizing blockers+clindamycin	Increases the effect of non depolarizing blockers (synergistic effect).
Non depolarizing blockers+thiazide /loop diuretics	Hypokalaemia.



Succinylcholine + Thiopentone (chemically incompatible in vitro)	(Precipitate) ppt when mixed in same syringe (in vitro interaction).
Non depolarizing blockers + Ether	Increase the effect of non depolarizing blockers (synergistic effect).
Fluorinated anaesthetics (isoflurane, desflurane & sevoflurane) + Non depolarizing blockers	Potentiates the effect of non depolarizing blockers.
Succinylcholine+halothane	Malignant hyperthermia in genetically susceptible individuals.
<b>Drug interaction of adrenaline</b>	
Adrenaline +beta blockers	Hypertensive crisis and cerebral haemorrhage.
<b>Drug interaction of Beta blockers</b>	
Beta blockers (propranolol) + verapamil	Additive cardiac depressant or even cardiac arrest.
beta blockers + insulin/ sulphonylurea	delay recovery from hypoglycaemia.
Cholestyramine & colestipole+ Beta blockers	Interfere with absorption of beta blockers (pharmacokinetic effect).
Propranolol+Lignocaine	Decreases clearance of lignocaine (pharmacokinetic effect).
Propranolol+ NSAIDS	Decreases antihypertensive effect of beta blockers.

Propranolol+chlorpromazine	Increases bioavailability of chlorpromazine (pharmacokinetic effect).
<b>ACE inhibitors</b>	
ACE inhibitors + Pottassium sparing diuretics	Can cause dangerous hyperkalaemia.
ACE inhibitor +Heparin	Additive effect.
ACE inhibitors + Trimethoprim	Serious hyperkalaemia.
ACE Inhibitor +Allopurinol	Increase risk of leukopenia and serious infections.
ACE inhibitors+Lithium	Lithium toxicity (pharmacokinetic effect).
ACE inhibitors + NSAIDS	Reduce antihypertensive effect.
ACE inhibitors + Thiazides	Increases antihypertensive effect.
<b>Drug interaction of ARB blockers</b>	
ARB blockers + Potassium sparing diuretics	Can cause dangerous hyperkalaemia.
<b>Drug interaction of Nitrates</b>	
Nitrates+ B-blockers(propranolol)	Additive effect.
Nifedipine+ B-blocker	Additive effect.
CCBS + Nitrates	Additive effect.
Nitrates+ CCBS + Nitrates	Additive effect.
Sildenafil/ Tadalafil + Nitrates	Can cause sudden death.
<b>Drug interaction of Digoxin</b>	

Cholestyramine/ colestipol+ Digoxin	Decrease digoxin absorption (pharmacokinetic effect).
Beta blocker / verapamil + Digoxin	Increase the risk of bradycardia.
Thiazide+ loop diuretics + Digoxin	Potentiate digoxin toxicity.
Calcium + Digoxin	Potentiate digoxin toxicity.
Digoxin +Sympathomimetic/ succinylcholine	Chances of cardiac arrhythmias.
<b>Drug interaction of Quinidine</b>	
Quinidine +beta blockers/ verapamil//potassiumsalt	Cardiac arrest.
Drug interaction of amiodarone	
Amiodarone+Beta bolockers/verapamil	Additive dipressant action.
Amiodarone +digoxin	Increases serum digoxin level (pharmacokinetic effect).
Amiodarone + Warfarin	Potentiates the effect of warfarin (synergistic effect).
Amiodarone +Quinidine/ procainamide	Increases serum concentration of quinidine & procainamide.
<b>Drug interaction of Adenosine</b>	
Adenosine+ Methylxanthines	Methylxanthines antagonize the effect of adenosine(antagonistic effect).

Adenosine+dipyridamole	Potentiates the action of adenosine(synergistic effect).
<b>Drug interaction of Hypolipedemics drugs</b>	
Statins+Cyclosporine/erythromycin/azoles(except parastatins)	Increases risk of myopathy(pharmacokinetic effect).
Fibrates+Warfarin/Oral hypoglycemic drugs	Potentiates the effect of warfarin and oral hypoglycemic drugs(synergistic effect).
Gemfibrozil+Statins	Increases the risk of myopathy.
drug interaction of niacin	
Niacin+warfarin	Potentiates the effect of warfarin(synergistic effect).
<b>Drug interaction of frusemide</b>	
Frusemide/thiazide+Digoxin	Toxicity of digoxin.
Frusemide + Aminoglycosides	Increases ototoxicity.
Frusemide+ NSAIDS	Decreases the antihypertensive effect of loop diuretics/ thiazides(antagonistic effect).
Frusemide/thiazide+Lithium	Lithium toxicity.
Frusemide/chlorthalidone+ Amiloride	Synergistic effect.
<b>Drug interaction of barbiturates</b>	

Barbiturates+Oral contraceptives+Oral anticoagulants/oral hypoglycemics	Decreases effectiveness of co-administered drugs(pharmacokinetic effect).
<b>Drug interaction of Procainamide</b>	
Procaine +Sulphonamides	Reduces the effect of sulphonamides(antagonistic effect).
<b>Drug interaction of Anti-epileptics drugs</b>	
Carbamazepine+Oral contraceptive pills	Reduces the effect of both drugs(pharmacokinetic effect).
Phenitoin+oc pills/steroids/ vitamin D/Thiophylline	Reduces the effectiveness of co-administered drugs(pharmacokinetic effect).
Phenitoin +Carbamazepine	Reduce the plasma concentration of both drugs(pharmacokinetic effect).
Chloramphenicol/ warfarin+Phenitoin	Phenitoin toxicity(pharmacokinetic effect).
Carbamazepine+Phenitoin/ Phenobarbitone/Sodium valporate/oc pill/ Carbamazepine***	Reduces the effect of co-administered drugs(pharmacokinetic effect).
Erythromycin + Carbamazepine	Carbamazepine toxicity (pharmacokinetic effect).

Phenobarbitone+OC pills/ warfarin/griseofulvin/ Theophylline	Reduces the effect of co-administered drugs(pharmacokinetic effect).
Ethosuximide +Valporate	Increases plasma concentration of ethosuximide (pharmacokinetic effect).
Sodium valporate+Phenytoin	Phenytoin toxicity.
Sodium vaporate+ Phenobarbitone	Increases plasma concentration of phenobarbitone (pharmacokinetic effect).
Sodium valporate+ Carbamazepine	Increases incidence of teratogenicity.
<b>Drug interaction of L-dopa</b>	
L-dopa+ MAO inhibitor	May precipitate hypertensive crisis (pharmacokinetic effect).
L-dopa+pyridoxime	Reduce therapeutic effect of l-dopa(antagonistic effect).
L-dopa +Antihypertensive agent`	Worsening of postural hypotension.
L-dopa+ Metoclopramide	Causes drug induced parkinsonism (pharmacodynamic effect).
<b>Drug interaction of Lithium carbonates</b>	
Lithium + Thiazide/ frusemide	Lithium toxicity.

Lithium+Haloperidol	Potentiates eps of haloperidol.
<b>Drug interaction of Triptans</b>	
Triptan +Ergot preparation	Should not be co-administered.
<b>Drug interaction of NSAIDS</b>	
NSAIDS+ Glucocorticoids	Potentiates of GI complications (nausea,vomiting,dyspepsia, ulceration & GI bleeding.
NSAIDS+ Oral anticoagulants	Potentiates the effect of oral anticoagulants (pharmacokinetic effect).
NSAIDS + Oral hypoglycemic agent	Potentiates the effect of oral hypoglycemic agent(pharmacokinetic effect).
NSAIDS + Methotrexate	Potentiates the effect of methotrexate (pharmacokinetic effect).
Piroxicam+ Lithium	Lithium toxicity(pharmacokinetic effect).
<b>Drug interaction of Probenid</b>	
Probencaid+ Beta lactum antibiotics	Increases plasma concertration of beta lactam antiboitics(pharmacokinetic effect).

<b>Drug interaction of Allopurinol</b>	
Allopurinol+ 6-mercaptopurine	Increases the effect of 6- mercaptopurine (pharmacokinetic effect).
Allopurinol+ Theophylline	Increase the effect of theophylline(synergistic effect).
<b>Drug interaction of Methylxanthines</b>	
Sympathomimetics + Methylxanthines	Potentiates the effect of sympathomimetics (synergistic effect).
	Broncodilation(beneficial effect).
	Cardiac stimulation(harmful effect).
Phenytoin/rifampicin/ phenobarbitone + theophylline	Decreases the effect of theophylline (pharmacokinetic effect).
Cimetidine/Ciprofloxacin/ Erythromycin+Theophylline	Potentiates the effect of theophylline (pharmacokinetic effect).
<b>Drug interaction of Metoclopramide</b>	
Metoclopramide+ Levodopa	Reduces the effect of levodopa (antagonistic effect).
Metoclopramide+ Diazepam	Increase the absorption of diazepam(pharmacokinetic effect).



Metoclopramide + Digoxin	Reduce the absorption of digoxin(pharmacokinetic effect).
<b>Drug interaction of PPIs</b>	
Omeprazole+ Phenytoin/ Warfarin/Diazepam	Inhibit the metabolismof co-administered drug (pharmacokinetic effect).
PPIs+ Itraconazole/iron salts	Decrease the bioavailability of administered drugs (pharmacokinetic effect).
Cimetidine+Phenytoin/ Digoxin/Theophyllin/ Warfarin/Propranolol	Increase plasmaconcentration of co-administered drug (pharmacokinetic effect).
Sucralfate+ Digoxin/ Tetracyclines/ Ketoconazole/ Fluoroquinolone	Reduce the absorption of co-administered drug (pharmacokinetic effect).
Antacid+Iron/ Tetracycline/ Fluoroquinolone/ Ketoconazole	Rreduce the absorption of co-administered drug (pharmacokinetic effect).
<b>Drug interaction of Warfarin</b>	
Warfarin+ Cholestyramine	Reduce bioavailability of warfarin(pharmacokinetic effect).
Oral anticoagulants + Barbiturates/ carbamazepine/rifampicin	Decreases anticoagulants effect (pharmacokinetic effect).
Warfarin+ Phenytoin/ sulphonamide	Enhance anticoagulant effect(pharmacokinetic effect).

Warfarin+Erythromycin/ Metronidazole	Increase anti coagulant effect(pharmacokinetic effect).
Warfarin + Tetracyclines	Potentiate warfarin effect.
Warfarin+ Cefoperazone/ Ceftriaxone	Sever bleedind can occur.
Warfarin+Aspirin/other NSAIDs	Potentiate warfarin effect(pharmacokinetic effect).
<b>Drug interaction of OC pills</b>	
Rifampin/Phenytoin/ Carbamazepine+OC pill	Contraceptive failure.
Oral contraceptives+ Albendazole	Potentiate teratogenicity.
Oral contraceptives+ Tetracyclines/Ampicillin	Contraceptive failure.
<b>Drug interaction of Antibiotics.</b>	
Salicylates+ Insulin	Potentiate insulin secretion (synergistic effect).
Sulphonylurea+ Salicylates/ Sulphonamide	Severe hypoglycaemia (pharmacokinetic effect).
Rifampicin/ Phenobarbitone+ Sulphonylurea	Potentiate the effect of sulphonylurea (pharmacokinetic effect).
Warfarin/ Sulphonamide + sulphonylurea	Severe hypoglycaemia (pharmacokinetic effect).
Sulphonamide+phenytoin/ methotrexate/oral anticoagulant/oral hypoglycaemic agent	Potentiate the effect of co- administered drug (pharmacokinetic effect).

Ciprofloxacin+ theophylline/warfarin	Increase the plasma concentration of theophylline and warfarin (pharmacokinetic effect).
NSAIDs +Fluoroquinolone	Potentiate the CNS effect of fluoroquinolones.
Probenecid+ Penicillin	Enhance therapeutic efficacy of beta lactum (synergistic effect).
Tetracyclines+Dairy products/ Antacids/ Sucralfate/ Zinc salts	Reduce absorption of tetracyclines (pharmacokinetic effect).
Chloramphenicol+ Warfarin /Phenytoin//Rifabutin/ Anti retroviral protease inhibitors	Increase plasma concentration of co- administered drug (pharmacokinetic effect).
Erythromycin / clarithromycin+ cisapride / astemizole/terfenadine	Precipitate fetal ventricular arrhythmias.
Erythromycin / clarithromycin+ Theophylline/ Carbamazepine/valproate/ warfarin/ Digoxin/ Cyclosporine	Potentiate co- administered drugs effect (pharmacokinetic effect).
Isoniazid+ Phenytoin/ carbamazepine/Warfarin	Inhibits the metabolism of co- administered drugs (pharmacokinetic effect).
Pyridoxin + Isoniazid	Reduce the risk of peripheral neuritis.
Rifampin+ Oral contraceptives	Contraceptive failure (pharmacokinetic effect).

Rifampin + Oral anticoagulant/ oral antidiabetic/ /Non nucleoside reverse transcriptase inhibitors (nrrits)	Reduce plasma level of co-administered drugs (pharmacokinetic effect).
<b>Drug interaction of Antifungal drugs</b>	
Ketoconazole+ Sulphonylurea	Hypoglycaemia .
Ketoconazole + Phenytoin	Phenytoin toxicity.
Ketoconazole+ Cyclosporine	Potentiates nephrotoxicity.
Ketoconazole+ Warfarin	Increase risk of bleeding.
Ketoconazole+ Terfenadine	Fetal ventricular arrhythmias.
<b>Drug interaction of Anti-viral drugs</b>	
Acyclovir + Theophylline	Reduce the clearance of theophylline (pharmacokinetic effect).
Zidovudine + Paracetamol	Reduce the clearance of theophylline (pharmacokinetic effect).
Zidovudine + Azoles	Zidovudine toxicity (pharmacokinetic effect).
Zidovudine + Stavudine	Should not be co-administered.
<b>Drug interaction of Anti-malarial drugs</b>	
Pyrimethamine + Sulphadoxine	Supra additive effect.

## Chapter-17: Nursing Consideration

S.N.	Drugs	Classifications	Nursing considerations
1.	Paracetamol	Non opioid analgesics	<ul style="list-style-type: none"><li>• Assess pain and/ or fever before and after administration to evaluate effectiveness.</li><li>• Administer IV over 15 minutes as prescribed; avoid rapid infusion.</li><li>• Monitor liver function tests (LFTs), especially in patients with liver disease or high-dose use.</li><li>• Check for hypersensitivity to paracetamol or excipients and discontinue if any reaction occurs.</li><li>• Ensure total daily dose does not exceed 4 grams, including other paracetamol-containing medications.</li><li>• Educate patients to avoid concurrent paracetamol products to prevent overdose.</li></ul>

2.	Ketorolac	NSAIDs	<ul style="list-style-type: none"> <li>• Assess pain prior to and after administration</li> <li>• Therapy should always be given initially by the IM or IV route; then use the oral route as a continuation of parenteral therapy</li> <li>• Stay well-hydrated to prevent renal failure</li> <li>• Assess for signs of GI bleeding</li> <li>• Assess for skin rash</li> <li>• Monitor BUN, serum creatinine, CBC, and liver function tests</li> <li>• Do not administer before any major surgery</li> <li>• Do not administer to clients who are allergic to aspirin or other NSAIDs</li> </ul>
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3.	Morphine	Opioid Analgesics	<ul style="list-style-type: none"> <li>• Monitor blood pressure prior to administration. Hold if systolic BP &lt; 100 mm Hg or 30 mm Hg below baseline.</li> <li>• Monitor patient's respiratory rate prior to administration.</li> <li>• Reassess pain after administration of morphine.</li> <li>• Monitor for respiratory depression and hypotension frequently up to 24 hours after administration of morphine.</li> <li>• Place call light signal close to patient. Accompany patient if need to get out of bed to minimize risk of falls.</li> </ul>
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4.	<a href="#">Lidocaine/ lignocaine</a>	<b>Anesthetics</b>	<ul style="list-style-type: none"> <li>• Check BP and cardiac monitor prior to administration of lidocaine.</li> <li>• For stable patients, doses should be given slow IV push at 25 mg/minute.</li> <li>• Monitor blood pressure and cardiac monitor during therapy with lidocaine.</li> <li>• Assess neurological and respiratory status frequently for signs of toxicity.</li> <li>• When treating a patient for ventricular dysrhythmias with lidocaine, an IV infusion (drip) must be started soon after the bolus or serum level will drop below therapeutic range and ventricular dysrhythmias will return.</li> <li>• Therapeutic serum level is 1.5 – 5 mcg/ml.</li> <li>• If patient appears upset or agitated, consider lidocaine toxicity. If toxicity is evident, simply discontinue IV infusion—serum levels drop in 10-20 minutes.</li> </ul>
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5.	Insulin	<b>Rapid-Acting Insulin</b> Insulin lispro (Humalog) insulin aspart (Novolog) inhaled insulin (Afreeza)	<ul style="list-style-type: none"> <li>• Administer within 15 minutes before a meal or immediately after a meal`</li> <li>• Afreeza is contraindicated in clients with asthma or COPD</li> </ul>
		<b>Short-Acting Insulin</b> regular insulin (Humulin R) regular insulin (Novolin R)	<ul style="list-style-type: none"> <li>• Administer 30 minutes before a meal</li> </ul>
		<b>Intermediate - Acting Insulin</b>  NPH or insulin Isophane (Humulin N) NPH or insulin Isophane (Novolin N)	<ul style="list-style-type: none"> <li>• Administer once or twice daily</li> <li>• Only administer subcutaneously</li> <li>• Gently roll or invert vial/pen several times to resuspend the insulin before administration</li> </ul>

	<p><b>Combination:</b>  <b>Intermediate</b>  - Acting/  <b>Rapid-Acting</b></p> <ul style="list-style-type: none"> <li>• Humalog Mix 50/50</li> </ul> <p>Humalog Mix 75/25</p> <p>Novolog Mix 70/30</p> <p>*First number is % of intermediate-acting insulin; second number is % of rapid-acting insulin</p>	<ul style="list-style-type: none"> <li>• Administer twice daily, 15 minutes before a meal or immediately after a meal</li> <li>• Only administer subcutaneously</li> <li>• Gently roll or invert vial/pen several times to resuspend the insulin before administration</li> </ul>
	<p><b>Combination:</b>  <b>Intermediate-Acting/Short -Acting</b></p> <p>Humulin Mix 70/30</p> <ul style="list-style-type: none"> <li>• Novolin Mix 70/30</li> </ul>	<ul style="list-style-type: none"> <li>• Administer twice daily, 30-45 minutes before a meal</li> <li>• Only administer subcutaneously</li> <li>• Gently roll or invert vial/pen several times to resuspend the insulin before administration</li> <li>• Do not mix with other insulin</li> </ul>

		<b>Long-Acting Insulin</b> <ul style="list-style-type: none"> <li>insulin glargine (Lantus)</li> <li>insulin detemir (Levemir)</li> </ul>	<ul style="list-style-type: none"> <li>Administer once daily (sometimes dose is split and administered twice daily)</li> <li>Only administer subcutaneously</li> <li>Do not mix with other insulin</li> </ul>
6.	Diazepam	<b>Benzodiazepines</b>	<ul style="list-style-type: none"> <li>Boxed Warning: Concomitant use of benzodiazepines and opioids may result in profound sedation, respiratory depression, coma, and death</li> <li>May cause paradoxical effect in children</li> </ul>
7.	Lithium	<b>Antimanic</b>	<ul style="list-style-type: none"> <li>Monitor for signs of lithium toxicity</li> <li>Monitor serum lithium and sodium levels</li> <li>Contraindicated in renal and cardiovascular disease and in dehydration</li> </ul>

8.	Phenytoin	<b>Anticonvulsant</b>	<ul style="list-style-type: none"> <li>• Careful cardiac monitoring is needed during and after administering intravenous phenytoin</li> <li>• For IV infusions, an in-line filter (0.22 to 0.55 microns) should be used. Cannot be given with D5W due to precipitate formation and no faster than 50 mg/minute in adults</li> <li>• Monitor serum drug levels</li> <li>• Contraindicated for clients with heart block</li> <li>• Use cautiously in clients with hepatic or renal impairment</li> <li>• Taper dose; do not stop abruptly</li> </ul>
9.	Levetiracetam	<b>Anticonvulsant</b>	<ul style="list-style-type: none"> <li>• Taper dose; do not stop abruptly or seizures may occur</li> <li>• Monitor plasma levels for pregnant women</li> <li>• Use cautiously if renal impairment</li> </ul>
10.	Amantadine	<b>Anti-Parkinson Agent, Antiviral</b>	<ul style="list-style-type: none"> <li>• Monitor renal function</li> <li>• Monitor mental state</li> <li>• Assess blood pressure</li> </ul>

11.	Amiodarone	Antiarrhythmic Class 3	<ul style="list-style-type: none"> <li>• Monitor blood pressure and apical pulse prior to administration.</li> <li>• Cardiac monitor should be used on patients receiving Amiodarone therapy.</li> <li>• Baseline chest x-ray and pulmonary function test is recommended before beginning PO therapy.</li> <li>• Baseline assessments should be checked of liver function and thyroid function.</li> <li>• Initial therapy should be implemented under hospital precautions with access to advanced life support.</li> <li>• Monitor serum level frequently.</li> <li>• Encourage patient to wear sunglasses for photosensitivity.</li> <li>• Encourage patient to wear protective clothing and sunscreen when outdoors.</li> <li>• Caution patient/ family about using OTC herbal products (e.g., St. John's wart, Echinacea).</li> <li>• Patient should obtain ophthalmic exam regularly.</li> </ul>
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12.	Diltiazem	Antiarrhythmic Class 4	<ul style="list-style-type: none"> <li>• Check blood pressure, heart rate, and cardiac monitor prior to administering Diltiazem.</li> <li>• Assess baseline renal (BUN, Cr) and liver function (AST, ALT) lab tests.</li> <li>• Monitor for signs of heart failure (e.g., pulmonary edema, weakness, and dyspnea).</li> <li>• Provide analgesic for headache.</li> <li>• Use caution during position changes to prevent orthostatic hypotension.</li> </ul>
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13.	Adenosine	Antiarrhythmic	<ul style="list-style-type: none"> <li>• Monitor blood pressure and apical pulse prior to administration.</li> <li>• Cardiac monitor should be used on patients receiving adenosine IV boluses.</li> <li>• Flush IV port with flush solution (e.g., normal saline) immediately after IV bolus.</li> <li>• Use only clear solutions; discard unused medication.</li> <li>• Warn patient of possibility of transient warmth and flushing of skin immediately following injection.</li> <li>• Warn other staff that ECG may show transient episode of asystole.</li> <li>• Assess for bronchospasms following administration of medication.</li> </ul>
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14.	Digoxin	<b>Cardiac Glycoside</b>	<ul style="list-style-type: none"> <li>• Monitor blood pressure and apical pulse prior to administration.</li> <li>• Cardiac monitor should be used on patients receiving digoxin, especially loading doses.</li> <li>• Monitor serum digoxin levels closely, especially if receiving antibiotic therapy.</li> <li>• Monitor serum electrolytes, especially potassium.</li> <li>• Check for toxicity if visual or GI disturbances occur.</li> <li>• If DIGOXIN TOXICITY occurs with DYSRHYTHMIAS,             <ol style="list-style-type: none"> <li>1) Discontinue any digitalis medications and any potassium depleting diuretics.</li> <li>2) Check serum potassium level.</li> <li>3) Phenytoin or lidocaine can be used as antidysrhythmic medications [Do Not Use Quinidine or Amiodarone.].</li> <li>4) Atropine can be used for bradycardias or AV blocks.</li> <li>5) Fab antibody agents (Digibind®) can be administered carefully intravenously.</li> </ol> </li> <li>• Avoid electrical cardioversion if patient is receiving digoxin unless condition is life-threatening. Then use lower doses (10-20 joules).</li> <li>• Emphasize to patient the importance of taking digoxin as prescribed at regular intervals and not missing doses.</li> <li>• Do not breast feed while taking digoxin.</li> </ul>
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15.	Nitroglycerin	Anti-angina nitrates	<ul style="list-style-type: none"> <li>• Check blood pressure and pulse before each administration of NTG– blood pressure can drop precipitously after a single dose. Hold dose if systolic BP &lt; 90 mm Hg or more than 30 mm Hg below baseline.</li> <li>• NTG is highly unstable and should be stored in light resistant container in cool environment (not the refrigerator).</li> <li>• If SL tablets are not bitter, they have probably lost their potency.</li> <li>• Tolerance occurs during continuous administration of NTG; blood vessels do not respond as well to NTG. Therefore, patches or topical ointments are removed for 12 hours every day to reduce tolerance.</li> <li>• Acute chest pain is treated with either SL tablets or spray or with IV infusion of NTG.</li> <li>• Maintenance therapy to prevent angina is managed with topical applications or sustain-released oral medication.</li> <li>• Intravenous infusion of NTG requires special glass bottles and IV tubing (regular plastic tubing will absorb 40-80% of NTG).</li> <li>• Do not discontinue NTG intravenous infusion abruptly– it may result in precipitous rebound hypertension, angina, or coronary artery vasospasms.</li> <li>• Acetaminophen is generally given PO for relief of headache secondary to NTG therapy.</li> </ul>
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16.	Furosemide	<b>Loop Diuretic</b>	<ul style="list-style-type: none"> <li>• Assess blood pressure</li> <li>• Monitor electrolytes (potassium)</li> <li>• Promote potassium-rich diet</li> <li>• Assess renal function</li> <li>• Assess for dehydration and intake and output</li> <li>• Monitor daily weight</li> </ul>
17.	Esmolol		<ul style="list-style-type: none"> <li>• Monitor blood pressure and apical pulse prior to administration.</li> <li>• Cardiac monitor should be used on patients receiving esmolol therapy.</li> <li>• Monitor IV injection site closely for signs of inflammation.</li> </ul>

18.	Heparin	<b>Anticoagulant</b>	<ul style="list-style-type: none"> <li>• Do not mix IV line with any other medications. There is a long list of incompatibilities.</li> <li>• Protamine sulfate is the antidote for overly anticoagulated dose of heparin. (1 gm protamine inactivates 100 units heparin).</li> <li>• Heparin drip should be continuous. <i>Do not interrupt a heparin drip for any other drug or IV therapy.</i> Short half-life: If infusion is turned off, therapeutic effect can be lost.</li> <li>• Only routes of administration are IV or SQ (does not absorb PO; <i>IM causes hematoma</i>)</li> <li>• Risk of bleeding increases. Screen patients for contraindications.</li> <li>• To reduce risk of hemorrhage, dosage must be monitored closely and adjusted according to aPTT levels.</li> <li>• Monitor with activated partial thromboplastin time (aPTT) which normally is around 40 seconds.</li> <li>• Therapeutic goal for aPTT is 1.5 – 2 (normal level = 60 – 80 seconds).</li> <li>• Draw blood for aPTT 30 minutes before SQ or intermittent doses of heparin.</li> <li>• Does not cross placental barrier during pregnancy or pass into breast milk during lactation.</li> <li>• Monitor injection sites for signs of hematoma.</li> <li>• Apply direct pressure to venipuncture sites for longer durations (e.g., 3 minutes).</li> <li>• Low molecular weight heparin (e.g., enoxaparin) is preferred for unstable angina and NSTEMI over unfractionated heparin.</li> </ul>
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19.	Enoxaparin	<b>Anticoagulant</b>	<ul style="list-style-type: none"> <li>• Monitor periodically CBC for blood counts.</li> <li>• Assess urine and stool for signs of blood.</li> <li>• Monitor injection sites for signs of hematoma.</li> <li>• Apply direct pressure to venipuncture sites for longer durations (e.g., 3 minutes).</li> <li>• Low molecular weight heparin (e.g., enoxaparin) is preferred for unstable angina and NSTEMI over unfractionated heparin.</li> </ul>
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20.	Acetylsalicylic acid (aspirin) Clopidogrel	<b>Antiplatelet</b>	<ul style="list-style-type: none"> <li>• Do not administer Clopidogrel to ACS patients if CABG is planned within 5 – 7 days. [Controversial evidence about this warning!]</li> <li>• Platelet function and bleeding time return to baseline in 7 – 10 days.</li> <li>• Monitor patient for signs of thrombotic thrombocytopenic purpura (low platelet count, neuro symptoms, renal dysfunction, and fever).</li> <li>• Monitor for signs and symptoms of bleeding (urine, stool, hematoma, epistaxis, petechiae).</li> <li>• May cause elevation of serum liver enzymes—establish baseline enzymes and bilirubin levels.</li> </ul>
21.	Theophylline	Xanthine	<ul style="list-style-type: none"> <li>• Avoid caffeine</li> <li>• Requires evaluation of therapeutic blood level to prevent toxicity</li> <li>• Administer this medication in the morning, if possible, due to potential CNS stimulation</li> </ul>

22.	Atropine	Muscarinic Antagonist	<ul style="list-style-type: none"> <li>• Monitor apical pulse prior to administration.</li> <li>• Cardiac monitor should be used on patients receiving atropine IV boluses.</li> <li>• Doses of 0.5 mg or less may result in paradoxical slowing of heart rate.</li> <li>• Eye preparations generally used only for procedures and have only localized effects on optic muscles. Chronic use of eye preparations may result in systemic anticholinergic symptoms which may be hazardous in infants and children.</li> <li>• Atropine can be administered via endotracheal tube in dose of 2-3 mg diluted in 10 ml H<sub>2</sub>O, but intraosseous route is preferred over endotracheal tube if IV access cannot be achieved.</li> <li>• Older adults and debilitated patients may be more vulnerable to CNS disturbances from atropine.</li> <li>• Monitor temperature in infants and children for "atropine fever".</li> <li>• Measures to relieve dry mouth: adequate fluid hydration, oral hygiene (don't use alcohol based mouthwashes), ice chips, sugarless gum, or hard candies to suck on.</li> <li>• Avoid driving or operating heavy machinery while under the influence of atropine.</li> <li>• Reduce lighting to decrease photophobia.</li> <li>• Monitor GI motility (BMs and flatus) and urine output while patient is receiving atropine.</li> <li>• Atropine is a common pre-operative agent, and can be given IM, SC, PO, or IV.</li> </ul>
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23.	Tamsulosin	Alpha-1 Antagonist	<ul style="list-style-type: none"> <li>• Avoid using with other alpha-blockers</li> <li>• Assess and monitor orthostatic blood pressure, especially after first dose</li> </ul>
24.	Dobutamine	Beta-1 Agonist	<ul style="list-style-type: none"> <li>• Monitor blood pressure and cardiac rhythm continuously during therapy.</li> <li>• Hemodynamic monitoring of all parameters is recommended during Dobutamine therapy.</li> <li>• Correct hypovolemia with fluid resuscitation prior to Dobutamine therapy.</li> <li>• Tolerance has been noted during continuous or prolonged infusions.</li> <li>• Check IV drug calculations carefully. Double-check calculations with another nurse or pharmacist.</li> <li>• Weigh patient daily in order to maintain accurate dose calculations.</li> </ul>

25.	Metoprolol	Beta-1 Antagonist	<ul style="list-style-type: none"> <li>• Monitor blood pressure and apical pulse prior to administration.</li> <li>• Cardiac monitor should be used on patients receiving Metoprolol IV boluses.</li> </ul>
26.	Magnesium sulphate	electrolyte	<ul style="list-style-type: none"> <li>• Check serum magnesium level prior to administration.</li> <li>• Cardiac monitor should be used on patients receiving MgSO<sub>4</sub> intravenously.</li> <li>• Have injectable form of calcium gluconate available to reverse paralyzing effects of magnesium sulfate.</li> <li>• Blood pressure may drop if MgSO<sub>4</sub> is administered too rapidly.</li> <li>• Check blood pressure and pulse every 10-15 minutes during therapy.</li> <li>• Normal serum plasma level of MgSO<sub>4</sub> is 1.8 – 3.0 mEq/L. Respiratory paralysis occurs at 12-15 mEq/L. Cardiac arrest occurs at 25 mEq/L.</li> <li>• Assess patellar reflexes hourly to monitor for evidence of toxicity.</li> <li>• Monitor hourly urine output.</li> <li>• Do not breast feed while receiving MgSO<sub>4</sub>.</li> </ul>



27.	Epinephrine	Catecholamine	<ul style="list-style-type: none"> <li>• 1:10,000 equals 1 mg/10 ml (for IV pushes or neonatal umbilicus line)</li> <li>• 1:1,000 equals 1 mg/1 ml (for SC or IM injections)</li> <li>• Epinephrine may exacerbate chest pain, hypertension, and Tachydysrhythmias.</li> <li>• Contact lenses should be removed prior to instilling eye drops.</li> <li>• Patients should be monitored for heart rate, cardiac rhythm, and blood pressure frequently if an IV drip is to be infused.</li> <li>• Never interrupt an intravenous infusion of medication to administer an IVPB or other medication.</li> <li>• Extravasation of epinephrine may cause tissue necrosis to skin. Therefore, monitor IV site every hour. Have <b>phentolamine</b> close to the bedside of the patient.</li> <li>• B-adrenergic blocking agents will block the actions of epinephrine on the heart.</li> </ul>
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28.	Norepinephrine	Catecholamine	<ul style="list-style-type: none"> <li>● Monitor blood pressure and apical pulse continuously during norepinephrine therapy.</li> <li>● Cardiac monitor should be used on patients receiving norepinephrine IV infusions.</li> <li>● Defibrillator and resuscitation cart should be close by during infusion.</li> <li>● Titrate infusion rate to maintain systolic BP at 80 – 100 mg Hg.</li> <li>● Assess patient frequently for headache, chest pain, or other signs of toxicity.</li> <li>● Do not mix other medications in IV line with norepinephrine drip.</li> <li>● Extravasation of norepinephrine may cause tissue necrosis to skin. Therefore, monitor IV site every hour. Have phentolamine close to the bedside of the patient.</li> </ul>
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29.	Dopamine	Catecholamine	<ul style="list-style-type: none"> <li>• <b>Pre-Administration:</b> Correct hypovolemia with fluid resuscitation before starting dopamine infusion.</li> <li>• <b>Monitoring:</b></li> <li>• Check blood pressure, pulse, and peripheral pulses every 15 minutes.</li> <li>• Monitor hourly urine output.</li> <li>• Use a cardiac monitor during infusion.</li> <li>• <b>Notify Physician:</b> If any of the following occur: <ul style="list-style-type: none"> <li>• Oliguria</li> <li>• Tachydysrhythmias</li> <li>• Diastolic pressure rises, reducing pulse pressure</li> <li>• Hypotension persists at max dose (20 mcg/kg/min)</li> <li>• Signs of peripheral ischemia (purple or cold extremities, diminished pulses)</li> </ul> </li> <li>• <b>Patient Weight:</b> Weigh daily to adjust infusion dose accurately.</li> <li>• <b>Infusion Calculation:</b> Double-check drip rates and doses with another nurse or pharmacist.</li> <li>• <b>IV Site:</b> Do not use the same IV site for other infusions.</li> <li>• <b>Extravasation Risk:</b> Monitor IV site every hour for signs of infiltration; have phentolamine on hand for potential tissue necrosis.</li> </ul>
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30.	Quinidine	Anti-arrhythmic	<ul style="list-style-type: none"> <li>• <b>Pre-Administration:</b> Check apical pulse, BP, and cardiac monitor before giving quinidine.</li> <li>• <b>Monitoring:</b> Regularly check blood pressure, QRS duration, and QT interval. Notify physician if QRS widens &gt;50%.</li> <li>• <b>Serum Levels:</b> Maintain quinidine levels between 2–5 mcg/ml.</li> <li>• <b>Administration:</b> Take oral quinidine with a full glass of water on an empty stomach; take with food if GI symptoms occur.</li> <li>• <b>Baseline Tests:</b> Obtain baseline cardiac rhythm strip, CBC, liver/renal function tests, and BP.</li> <li>• <b>Thromboembolism Risk:</b> Watch for symptoms of thromboembolism (sudden chest pain, dyspnea, CVA) during atrial fibrillation conversion.</li> </ul>
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31.	Vasopressin	ADH	<ul style="list-style-type: none"> <li>• <b>Vital Signs:</b> Monitor blood pressure hourly during IV infusion.</li> <li>• <b>Urine Output:</b> Check urine output and specific gravity.</li> <li>• <b>Signs of Chest Discomfort/TIA:</b> Assess for angina or TIA, watch for life-threatening conditions.</li> <li>• <b>Anginal Episodes:</b> Administer nitroglycerin if angina or ischemia occurs during IV infusion.</li> <li>• <b>Fluid Balance:</b> Monitor for dehydration or overhydrating, especially in children and the elderly.</li> <li>• <b>IV Infusion:</b> Prefer central venous line for IV infusion.</li> <li>• <b>Peripheral IV Sites:</b> Monitor for infiltration; extravasation may cause tissue necrosis. Have phentolamine nearby.</li> <li>• <b>Alternative Treatment:</b> Use desmopressin (DDAVP) for diabetes insipidus, given nasally with less vasopressor effect.</li> </ul>
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32.	<b>1st-generation:</b> cephalexin cefazolin <b>2nd-generation:</b> cefprozil <b>3rd-generation:</b> ceftriaxone <b>4th-generation:</b> cefepime <b>5th-generation:</b> ceftolozane	Cephalosporin	<ul style="list-style-type: none"> <li>• Check for allergies, including if allergic to penicillin</li> <li>• Dosage adjustment if renal impairment</li> <li>• Use with caution with seizure disorder</li> <li>• IV: Reconstitute drug with sterile water or normal saline per manufacturer instructions; shake well until dissolved. Inject into large vein or free-flowing IV solution over 3-5 minutes</li> <li>• Drug interaction: Anticoagulants</li> </ul>
	Ampicillin		<ul style="list-style-type: none"> <li>• Culture infected area before treatment; reculture area if response is not as expected.</li> <li>• Check IV site carefully for signs of thrombosis or drug reaction.</li> <li>• Do not give IM injections in the same site; atrophy can occur. Monitor injection sites.</li> </ul>

33.	Meropenem	Carbapenems	<ul style="list-style-type: none"> <li>• Route: IV</li> <li>• Check for allergies, including penicillin and cephalosporin</li> <li>• Dosage adjustment if renal impairment</li> <li>• Use with caution with seizure disorder or renal dysfunction</li> </ul>
34.	Levofloxacin	<b>Fluor quinolones</b>	<ul style="list-style-type: none"> <li>• Check for allergies</li> <li>• Infuse 500 mg or less over 60 minutes and doses of 750 mg over 90 minutes</li> <li>• Dosage adjustment if renal or hepatic impairment</li> <li>• Use cautiously if history of seizures</li> <li>• Boxed Warning: Fluor quinolones have been associated with disabling and potentially irreversible serious adverse reactions, including the following: <ul style="list-style-type: none"> <li>• Tendinitis and tendon rupture</li> <li>• Peripheral neuropathy</li> <li>• Central nervous system effects</li> <li>• Exacerbation of muscle weakness in clients with myasthenia gravis</li> </ul> </li> </ul>

35.	Amikacin/ Gentamicin	Aminoglycosides	<ul style="list-style-type: none"> <li>• C&amp;S, renal function, and vestibule cochlear nerve function before therapy.</li> <li>• Monitor peak and trough levels.</li> <li>• Trough levels before next dose, peak 1 hour after IM or after IV infusion.</li> <li>• Periodic serum creatinine, BUN, and complete urinalysis.</li> <li>• Daily renal function tests for treatment &gt;10 days, weekly audiograms, and vestibular tests.</li> <li>• Monitor serum creatinine or creatinine clearance frequently in renal impairment, neonates, or older adults.</li> <li>• High trough (&gt;8 mg/mL) or peak (&gt;30–35 mg/mL) levels may indicate toxicity.</li> <li>• Watch for tinnitus, hearing loss, dizziness, vertigo, nystagmus, or ataxia.</li> <li>• Report auditory symptoms or vestibular disturbances promptly.</li> </ul>
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36..	Tetracycline	<b>Tetracycline</b>	<ul style="list-style-type: none"> <li>• Assess patients for signs of infection and monitor for efficacy of treatment.</li> <li>• Monitor liver and renal function tests regularly.</li> <li>• Obtain cultures prior to starting therapy and monitor for signs of pseudomembranous colitis, diarrhea, nausea, vomiting, and rash.</li> </ul>
37.	Acyclovir	Antivirals: Antiherpes	<ul style="list-style-type: none"> <li>• Reconstitute and dilute as per guidelines.</li> <li>• Administer over <math>\geq 1</math> hour to prevent nephrotoxicity.</li> <li>• Ensure adequate fluid intake to minimize renal damage.</li> <li>• Check for phlebitis or infiltration.</li> <li>• Regularly assess BUN and creatinine.</li> <li>• Monitor for confusion, tremors, or seizures.</li> </ul>

38.	Amphotericin B	Antifungals	<ul style="list-style-type: none"> <li>• Check for allergies</li> <li>• Route: IV</li> <li>• Reconstitute and dilute as directed on packaging</li> <li>• Administer slowly over several hours initially and monitor VS every 30 minutes; may require premedication</li> <li>• Therapy may require several months</li> <li>• Alert: Different amphotericin B preparations aren't interchangeable</li> <li>• Caution if renal impairment</li> <li>• Boxed Warning: Don't use to treat noninvasive forms of fungal disease in clients with normal neutrophil counts</li> </ul>
39.	Metronidazole	<b>Antiprotozoal- Antibacterial</b>	<ul style="list-style-type: none"> <li>• Check for allergies</li> <li>• Don't give by IV push. Infuse over 30 to 60 minutes</li> <li>• Use cautiously with hepatic impairment, blood dyscrasias, or CNS diseases</li> </ul>

40.	Vancomycin	<b>Miscellaneous Antibacterial: Glycopeptides</b>	<ul style="list-style-type: none"> <li>• Check for allergies</li> <li>• Route: IV but for C-diff may be administered PO or rectally as an instilled enema</li> <li>• Obtain culture prior to administering first dose</li> <li>• Dosage adjustment is required for renal impairment</li> <li>• Monitor trough levels</li> <li>• IV should be administered in a diluted solution over a period of 60 minutes or more to avoid rapid-infusion-related reactions</li> </ul>
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41.	Ondansetron	<b>5-HT<sub>3</sub> receptor antagonist</b>	<ul style="list-style-type: none"> <li>• Administer Ondansetron 30 minutes before chemotherapy or radiation therapy for optimal effectiveness.</li> <li>• For IV administration, inject slowly over 2-5 minutes or dilute in a compatible IV solution.</li> <li>• Monitor for QT prolongation signs and symptoms, especially in high-risk patients.</li> <li>• Assess for signs of serotonin syndrome when combined with other serotonergic medications.</li> <li>• Monitor for and document the effectiveness of antiemetic therapy.</li> </ul>
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## Chapter-18: Important Information from Drug Bulletin of Nepal (DBON) Vol. 35

Drugs	Comments
Levothyroxine	Risk of vertigo.
Paracetamol	Risk of toxic epidermal necrosis.
Nitrofurantoin	Risk of pulmonary and hepatic ADR.
Sitagliptin	Potential risk of fatigue.
Etoposide	Risk of electrolyte imbalance.
Mercaptopurine	Potential risk of hypoglycemia.
Zinc acetate	Risk of gastric ulcer.
Propofol	Medication error that could potentially lead to life threatening cases.
Rivastigimine	Risk of QT prolongation.
Progestrone	Risk of meningioma.
Valproate	Potential risk of neurodevelopmental disorder (NDDs) in children after paternal exposure.
Atorvastatin	Risk of erectile dysfunction.
Azithromycin	Risk of fetal heart rhythms.
Folic Acid	Risk of constipation .
Ketamine	Risk of severe liver and uro-nephrological damage.

## **Chapter-19: Anti-Microbial Stewardship.**

Antimicrobial resistance occurs when microorganism no longer respond to antimicrobial resistance. As a result of drug resistance, antibiotic become ineffective and infections become impossible to treat.

### **Antimicrobial stewardship**

Antimicrobial resistance is increasing however antimicrobial drug development is slowing; antimicrobial stewardship is of the utmost important as away to optimize the use of antimicrobials to prevent the development of resistance.

Antimicrobial stewardship has been defined as the optimal selection, dosage and duration of antimicrobial treatment that results in the best clinical outcome for the treatment or prevention of the infection, with the minimal impact on subsequent resistance.

### **4Ds of optimal Antimicrobial Stewardship Programme:**

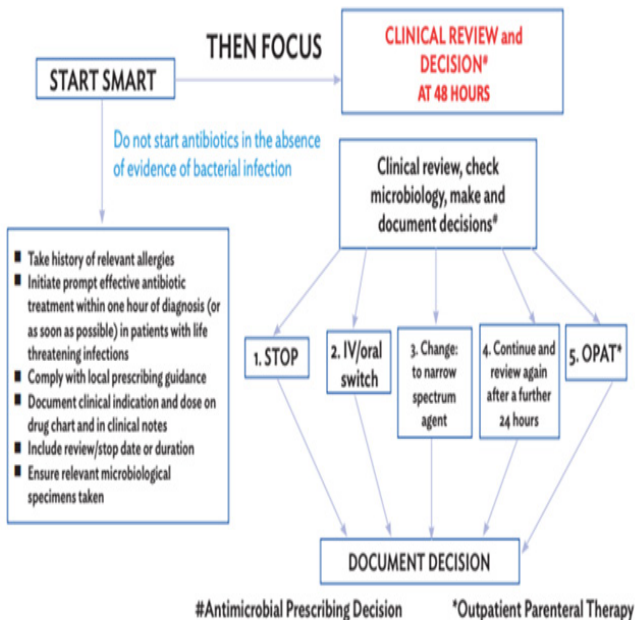
1. Right drug
2. Right dose
3. De-escalation to pathogen directed therapy
4. Right duration of therapy

### **Goals of Antimicrobial Stewardship Programme:**

1. The first goal is to work with healthcare practitioners to help each patient receive the most appropriate antimicrobial with the correct dose and duration.
2. The second goal is to prevent the antimicrobial overuse, misuse and abuse.
3. The third goal is to minimize the development of resistance

# Antimicrobial stewardship

Right Drug, Right Dose, Right Time, Right Duration..  
.....Every patient.



Source: Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI), Department of Health, UK

Fig: Antimicrobial Stewardship initiation

The use of the fixed-dose combinations of multiple broad-spectrum antibiotics listed here is not evidence-based, nor recommended in high-quality international guidelines. WHO does not recommend their use in clinical practice.

<b>List of Not Recommended Antibiotics.</b>
Acetylspiramycin/Metronidazole
Amikacin/Cefepime
Amoxicillin/Bacillus Coagulans/Cloxacillin
Amoxicillin/Bacillus Coagulans/Dicloxacillin
Amoxicillin/Clavulanic Acid/Lactic Ferments
Amoxicillin/Clavulanic Acid/Lactobacillus Acidophilus
Amoxicillin/Clavulanic Acid/Nimesulide
Amoxicillin/Cloxacillin
Amoxicillin/Cloxacillin/Lactic Acid
Amoxicillin/Cloxacillin/Lactobacillus Acidophilus/Serrapeptase
Amoxicillin/Cloxacillin/Lactobacillus Lactis
Amoxicillin/Cloxacillin/Serrapeptase
Amoxicillin/Dicloxacillin
Amoxicillin/Dicloxacillin/Saccharomyces Boulardii
Amoxicillin/Flucloxacillin
Amoxicillin/Flucloxacillin/Lactobacillus Acidophilus
Amoxicillin/Metronidazole
Amoxicillin/Pivsulbactam
Amoxicillin/Sulbactam
Ampicillin/Bacillus Coagulans/Cloxacillin
Ampicillin/Cloxacillin
Ampicillin/Cloxacillin/Lactobacillus Acidophilus
Ampicillin/Cloxacillin/Saccharomyces Boulardii
Ampicillin/Dicloxacillin
Ampicillin/Dicloxacillin/Lactobacillus Acidophilus
Ampicillin/Flucloxacillin



Ampicillin/Lidocaine/Sulbactam
Ampicillin/Oxacillin
Ampicillin/Sultamicillin
Ascorbic Acid/Metamizole Sodium/Penicillin G /Streptomycin
Azithromycin/Cefixime
Azithromycin/Cefixime/Lactobacillus Acidophilus
Azithromycin/Cefpodoxime Proxetil
Azithromycin/Fluconazole/Secnidazole
Azithromycin/Levofloxacin
Azithromycin/Ofloxacin
Benzyl Penicillin/Streptomycin
Bromelains/Doxycycline/Lactobacillus Reuteri/ Lactobacillus Rhamnosus/Ornidazole
Bromhexine/Sulfamethoxazole/Trimethoprim
Cefaclor/Clavulanic Acid
Cefadroxil/Clavulanic Acid
Cefadroxil/Trimethoprim
Cefalexin/Trimethoprim
Cefdinir/Clavulanic Acid
Cefepime/Sulbactam
Cefepime/Tazobactam
Cefixime/Cefpodoxime Proxetil
Cefixime/Clavulanic Acid
Cefixime/Clavulanic Acid/Lactobacillus Acidophilus
Cefixime/Cloxacillin
Cefixime/Cloxacillin/Lactobacillus Acidophilus
Cefixime/Dicloxacillin
Cefixime/Lactobacillus Acidophilus/Ofloxacin
Cefixime/Levofloxacin
Cefixime/Linezolid
Cefixime/Moxifloxacin
Cefixime/Ofloxacin

Cefixime/Ornidazole
Cefoperazone/Sulbactam
Cefoperazone/Tazobactam
Cefotaxime/Sulbactam
Cefpodoxime Proxetil/Clavulanic Acid
Cefpodoxime Proxetil/Cloxacillin/Lactobacillus Acidophilus
Cefpodoxime Proxetil/Dicloxacillin
Cefpodoxime Proxetil/Dicloxacillin/Lactobacillus Acidophilus
Cefpodoxime Proxetil/Levofloxacin
Cefpodoxime Proxetil/Ofloxacin
Cefpodoxime Proxetil/Sulbactam
Ceftazidime/Sulbactam
Ceftazidime/Tazobactam
Ceftazidime/Tobramicin
Ceftibuten/Clavulanic Acid
Ceftriaxone/Sulbactam
Ceftriaxone/Tazobactam
Ceftriaxone/Vancomycin
Cefuroxime Axetil/Clavulanic Acid
Cefuroxime Axetil/Linezolid
Cefuroxime Axetil/Sulbactam
Cefuroxime/Clavulanic Acid
Cefuroxime/Sulbactam
Chloramphenicol/Tetracycline
Ciprofloxacin/Metronidazole
Ciprofloxacin/Ornidazole
Ciprofloxacin/Tinidazole
Doxycycline/Tinidazole
Erythromycin/Sulfamethoxazole/Trimethoprim
Erythromycin/Trimethoprim
Fosfomycin/Trimethoprim
Gatifloxacin/Ornidazole

Kanamycin/Penicillin G
Levofloxacin/Metronidazole
Levofloxacin/Ornidazole
Meropenem/Sodium/Sulbactam
Meropenem/Sulbactam
Metronidazole/Norfloxacin
Metronidazole/Spiramycin
Metronidazole/Tetracycline
Mezlocillin/Sulbactam
Ofloxacin/Ornidazole
Oleandomycin/Tetracycline
Piperacillin/Sulbactam
Rifampicin/Trimethoprim
Sulfadiazine/Sulfamethoxazole/Trimethoprim

## Annex-1: Approved List of Drugs Available in Hospital Pharmacy

S.N	Name of Drugs	Unit
1	Acyclovir 200 mg	Tab
2	Acarbose 25 mg	Tab
3	Acarbose 50 mg	Tab
4	Aceclofenac 100 mg	Tab
5	Aceclofenac 200 mg SR	Tab
6	Acetazolamide 250 mg	Tab
7	Acyclovir 200mg/5ml 100 ml Susp	Bott
8	Acyclovir 250mg/10 ml Inj	Vial
9	Acyclovir 3% eye Ointment 5 gm	Phile
10	Acyclovir 400 mg	Tab
11	Acyclovir 800mg	Tab
12	Acyclovir BP 5% w/w 5 gm Oint	Phile
13	Adapalene 0.1 % + Clindamycin 1% 10 gm Gel	Phile
14	Adapalene 0.1% w/w 15 gm Gel	Phile
15	Adenosine 3mg/ml 2ml Inj	Amp
16	Adrenaline 1mg/mL, 1:1000 solution Inj	Amp
17	Albendazole 200 mg/5mL, 10 mL Susp	Bott
18	Albendazole 400 mg	Tab
19	Alendronate Sodium 70 mg	Tab
20	Alfuzosin 10 mg	Tab
21	Allopurinol 100 mg	Tab
22	Allopurinol 300 mg	Tab
23	Aluminium hydroxide 500mg + Magnesium hydroxide (500mg + 500mg)/10 ml, 170 ml Susp eq. to Normogel	Bott
24	Alpha Amylase + Papain 15 ml Drop equivalent to Neopeptine	Bott
25	Alprazolam 0.25 mg	Tab
26	Alprazolam 0.5 mg	Tab

27	Aluminium Hydroxide 300 mg +Magnesium Aluminium Silicate 50mg+Magnesium Hydroxide 25mg+Simethicone 25mg	Tab
28	Aluminum hydroxide 300 mg+ Magnesium 150 mg + Simethicone 125 mg+ Oxetacaine 10 mg, 200 ml Susp equivalent to Tricaine MPS	Bott
29	Amikacin 100 mg Inj	Vial
30	Amikacin 250mg Inj	Vial
31	Amikacin 500mg Inj	Vial
32	Aminophylline 100 mg Tab	Tab
33	Aminophylline 250 mg, 10 ml Inj	Amp
34	Amiodarone 100 mg	Tab
35	Amiodarone 150mg, 3ml Inj	Amp
36	Amiodarone 200 mg	Tab
37	Amisulpride 100 mg	Tab
38	Amisulpride 200 mg	Tab
39	Amisulpride 400 mg	Tab
40	Amisulpride 50 Mg	Tab
41	Amitriptyline 10 mg	Tab
42	Amitriptyline 25 mg	Tab
43	Amitriptyline 75 mg	Tab
44	Amlodipine 10 mg	Tab
45	Amlodipine 2.5 mg	Tab
46	Amlodipine 5 mg	Tab
47	Amorolfine cream 0.25%w/w 30 gm cream	Phile
48	Amoxicyllin125 mg/5 mL 90 ml Dry syrup	Bott
49	Amoxycillin 100mg/ml 10 ml Drop	Bott
50	Amoxycillin 125 mg + Clavulanic acid 31.25 mg/5ml 30 ml with distilled water D/Syp	Bott
51	Amoxycillin 125 mg DT	Tab
52	Amoxycillin 200 mg + Clavulanic acid 28.5mg/5ml in 30 ml with distilled water D/Syp	Bott
53	Amoxycillin 250 mg DT	Tab

54	Amoxycillin 250mg + Clavulanic Acid 125 mg	Tab
55	Amoxycillin 400 mg + Clavulanic acid 57 mg/5ml in 30 ml with distilled water D/Syp	Bott
56	Amoxycillin 500mg	Cap
57	Amoxycillin 500mg + Clavulanic Acid 125mg	Tab
58	Amoxycillin 875 mg + Clavulanic acid 125 mg	Tab
59	Amoxycilline 1gm + Clavulanic acid 0.2gm Inj	Vial
60	Amphotericine B 50mg Inj	Vial
61	Ampicillin 100 mg + Cloxacillin 50 mg/ml 10 ml Drop	Bott
62	Ampicillin 1gm+Sulbactam 500mg Inj	Vial
63	Ampicillin 250 mg Inj	Vial
64	Ampicillin 500 mg Inj	Vial
65	Anti D immunoglobulin 300 mcg	Vial
66	Anti Rabies vaccine Injr	Phile
67	Apremilast 10 mg	Tab
68	Apremilast 30 mg	Tab
69	Aripiprazole 10 mg	Tab
70	Aripiprazole 20 mg	Tab
71	Aripiprazole 5 mg	Tab
72	Aspirin 150 mg	Tab
73	Aspirin 300 mg	Tab
74	Aspirin 75 mg	Tab
75	Atemoxetin 10 mg	Tab
76	Atomoxetine 25 mg	Tab
77	Atomoxetine 40 mg	Tab
78	Atenolol 25 mg	Tab
79	Atenolol 25mg + Amlodipine 2.5 mg	Tab
80	Atenolol 25mg + Amlodipine 5 mg	Tab
81	Atenolol 50 mg	Tab
82	Atenolol 50 mg + Amlodipine 5 mg	Tab
83	Atenolol 50 mg + Hydrochlorothiazide 12.5 mg	Tab
84	Atenolol 50mg + Chlorthalidone 12.5 mg	Tab

85	Atorvastatin 10 mg	Tab
86	Atorvastatin 20 mg	Tab
87	Atorvastatin 40 mg	Tab
88	Atorvastatin 5 mg	Tab
89	Atracurium 50 mg Inj	Amp
90	Atropine Sulphate 0.6 mg/ ml 1 ml Inj	Amp
91	Atropine Sulphate 0.6 mg/ml 10 ml Inj	Amp
92	Atropine Sulphate 1% 5 ml Eye drop	Phile
93	Azathioprine 50 mg	Tab
94	Azithromycin 100 mg/5 mL 15 ml Susp	Bott
95	Azithromycin 200 mg/5mL 15 ml Susp	Bott
96	Azithromycin 250mg	Tab
97	Azithromycin 500 mg Inj	Vial
98	Azithromycin 500mg	Tab
99	Aztreonam 1gm Inj	Vial
100	Aztreonam 500 mg Inj	Vial
101	Bacitracin 250IU + Neomycin 3.5 mg + Polymyxin B 5000IU 10 gm Powder	Phile
102	Baclofen 10 mg	Tab
103	Beclomethasone 100 mcg, 30 Rotacap	Phile
104	Beclomethasone 200 mcg MDI	Phile
105	Beclomethasone 200 mcg, 30 Rotacap	Phile
106	Beclomethasone 400 mcg MDI	Phile
107	Beclomethasone 400 mcg, 30 Rotacap	Phile
108	Beclomethasone dipropionate 50 mcg/dose unit, 200 doses Nasal Spray	Phile
109	Benzocaine 20 % 15 gm Gel	Phile
110	Benzoic acid 6% + salicylic acid 3% 30 gm Oint	Phile
111	Benzoyl peroxide 2.5 % 20 gm Gel	Phile
112	Benzoyl peroxide 5 % 20 gm Gel	Phile
113	Benzydamine 0.15%w/v 100 ml Mouth Wash	Bott
114	Benzyl Penicillin 10 lakh units Inj	Vial

115	Benzyl Penicillin 5 lakh units Inj	Vial
116	Betahistine 16 mg	Tab
117	Betahistine 8 mg	Tab
118	Betamethasone 0.1%, 10 gm Oint	Phile
119	Biophasic Isophane insulin equivalent to wosulin 30:70 vial Inj	Phile
120	Biphasic Isophane insulin equivalent to mixtard 30:70 Cartridge Inj	Phile
121	Biphasic Isophane insulin equivalent to mixtard 50:50 Cartridge Inj	Phile
122	Bisacodyl 10 mg	Tab
123	Bisacodyl 10 mg Suppository	Pcs
124	Bismuth iodoform 15mg paste	Phile
125	Bisoprolol 10 mg	Tab
126	Bisoprolol 2.5 mg	Tab
127	Bisoprolol 5 mg	Tab
128	Brimonidine 0.2% + Timolol 0.5 % Eye Drop	Phile
129	Budesonide 100 mcg + Formoterol 6 mcg Inhaler	Phile
130	Budesonide 100 mcg MDI	Phile
131	Budesonide 100 micrograms, 30 Rotacap	Phile
132	Budesonide 200 mcg + Formoterol 6 mcg MDI	Phile
133	Budesonide 200 mcg + Formoterol 6mcg 30 Rotacap	Phile
134	Budesonide 200 mcg MDI	Phile
135	Budesonide 200 micrograms, 30 Rotacap	Phile
136	Budesonide 400 mcg + Formoterol 6 mcg MDI	Phile
137	Budesonide 400 mcg + Formoterol 6 mcg Rotacap	Phile
138	Budesonide 400 micrograms, 30 Rotacap	Phile
139	Bupivacaine 0.5% Plain Inj(Sterile Ampoule)	Amp
140	Bupivacaine 0.5% with Dextrose 80 mg, Heavy Inj (Sterile Ampoule)	Amp
141	Butenafine Hydrochloride 1% 15 gm Oint	Phile
142	Butorphanol tartrate 2mg/ml 1 ml Inj	Amp



143	Caffeine citrate injection 20mg/ml ,3 ml eq. to Apnicaf	Phile
144	Caffeine citrate oral solution 20mg/ml ,1.5 ml eq. to Apnicaf	phile
145	Caffeine 25 mg + Paracetamol 500mg	Tab
146	Calamine Lotion 100 ml Lotion	Phile
147	Calamine Lotion 30 ml Lotion	Phile
148	Calcitriol 0.25 mcg	Sachet
149	Calcitriol 0.3%w/w 15 gm Oint	Phile
150	Calcitriol 600000 IU Inj	Amp
151	Calcium acetate 667 mg	Tab
152	Calcium Carbonate 500 mg + Vitamin D3 250 mg	Tab
153	Calcium Dobesilate 500 mg	Tab
154	Calcium Gluconate 10% w/v, 10 ml Inj	Amp
155	Calcium Phosphate 400 + vit D3 200 IU/10 ml 170 ml Susp	Bott
156	Carbamazepine 100 mg	Tab
157	Carbamazepine 200 mg	Tab
158	Carbamazepine 300 mg	Tab
159	Carbamazepine 400 mg	Tab
160	Carbamazepine 400mg CR	Tab
161	Carbimazole 10 mg	Tab
162	Carbimazole 5 mg	Tab
163	Carboprost 250 mcg/ml ,ml Inj	Amp
164	Carboxymethylcellulose 0.5 % 10 ml Eyedrop	Phile
165	Carvedilol 12.5 mg	Tab
166	Carvedilol 3.125 mg	Tab
167	Carvedilol 6.25 mg	Tab
168	Cefaclor 125mg/5ml, 30 ml D/Syp	Bott
169	Cefaclor 25 mg/ml Drop	Bott
170	Cefaclor 50 mg/ml 10 ml Drop	Bott
171	Cefadroxil 125mg/5ml, 30ml D/Syp	Bott
172	Cefadroxil 250mg	Tab

173	Cefadroxil 250mg/5ml, 30ml D/Syp	Bott
174	Cefadroxil 25mg/ml Drop	Bott
175	Cefadroxil 500mg	Tab
176	Cefazolin 1gm Inj	Vial
177	Cefazolin 500 mg Inj	Vial
178	Cefditoren 400 mg	Tab
179	Cefepime 1gm Inj	Vial
180	Cefepime 250 mg Inj	Vial
181	Cefepime 500 mg Inj	Vial
182	Cefixime 100 mg	Tab
183	Cefixime 100 mg/5 mL 60 ml D/Syp	Bott
184	Cefixime 200mg	Tab
185	Cefixime 400 mg	Tab
186	Cefixime 50 mg/5 mL, 60ml D/Syp	Bott
187	Cefoperazone 1 gm Inj	Vial
188	Cefotaxime 125mg Inj	Vial
189	Cefotaxime 1gm Inj	Vial
190	Cefotaxime 250mg Inj	Vial
191	Cefotaxime 500 mg Inj	Vial
192	Cefpodoxime 100mg	Tab
193	Cefpodoxime 200mg	Tab
194	Cefpodoxime 50 mg/5 mL, 60ml D/Syp	Bott
195	Cefpodoxime 100 mg/5 ml, 30ml D/Syp	Bott
196	Ceftazidime 1gm Inj	Vial
197	Ceftazidime 500 mg Inj	Vial
198	Ceftriaxone 1 gm Inj	Vial
199	Ceftriaxone 125 mg Inj	Vial
200	Ceftriaxone 250 mg Inj	Vial
201	Ceftriaxone 500 mg Inj	Vial
202	Cefuroxime 250 mg	Tab
203	Cefuroxime 500 mg + Clavulanic acid 125 mg	Tab
204	Cefuroxime 500mg	Tab

205	Cefuroxime sodium 1.5 gm Inj	Vial
206	Cefuroxime sodium 750 mg Inj	Vial
207	Cephalexin 125 mg/5ml 30ml D/Syp	Bott
208	Cephalexin 500 mg	Tab
209	Cetirizine 5 mg/5ml 30 ml Syp	Bott
210	Cetirizine 5 mg/5ml 60 ml Syp	Bott
211	Cetirizine 10 mg	Tab
212	Charcoal activated 250mg	Cap
213	Charcoal activated powder 10gm/sachet	Sachet
214	Chloramphenicol +Polymyxin B + Dexamethasone Eye ointment 5 gm	Phile
215	Chloramphenicol 0.5% + Dexamethasone 0.1% Eyedrop	Phile
216	Chloramphenicol 0.5% 10 ml Eyedrop	Phile
217	Chloramphenicol 5% + Benzocaine 1% 5 ml Ear drop	Phile
218	Chloramphenicol 5mg +Polymyxin B 5000 IU + Dexamethasone 1 mg, 5 ml Eye/Ear drop	Phile
219	Chlordiazepoxide 10 mg	Tab
220	Chlordiazepoxide 25 mg	Tab
221	Chlorpheniramine 10 mg Inj	Phile
222	Chlorhexidine + Lignocaine + Metronidazole Oinment 10 gm	Phile
223	Chlorhexidine 0.2% 100 ml Mouth Wash	Bott
224	Chlorhexidine 4% 15 gm Oint	Phile
225	Chloroquine 250 mg	Tab
226	Chloroquine 500 mg	Tab
227	Chlorpheniramine 2mg/5ml+Phenylephrine 5mg/ 5ml, 15 ml paediatric drop eq.to Solvincold af	Bott
228	Chlorpheniramine 2mg/ml +Phenylephrine 2.5mg/ml, 15 ml paediatric drop eq.to Alex drop	Bott
229	Chlorpheniramine 4 mg	Tab

230	Chlorpheniramine 4mg+ Ammonium chloride 135 mg+ Menthol 1 mg+ Sod citrate 55 mg 100 ml Syrup equivalent to Vasodryl	Bott
231	Chlorpromazine 100 mg	Tab
232	Chlorpromazine 100 mg Inj	Phile
233	Chlorpromazine 25 mg	Tab
234	Chlorpromazine 50 mg	Tab
235	Chlorpropamide 100 mg	Tab
236	Chlorpropamide 250 mg	Tab
237	Cholecalciferol 400 IU/ml 30 ml Syrup equivalent to DV 400	Bott
238	Cholecalciferol 60000 IU	Cap/ Tab
239	Cholecalciferol 60000 IU	Sachet
240	Choline Salicylate +Benzalkonium chloride 10 ml gel	Phile
241	Cinnarizine 25 mg	Tab
242	Ciprofloxacin 0.3 %+ Dexamethasone phosphate 0.1 % 5 ml Eye/Ear drop	Phile
243	Ciprofloxacin 0.3% 5 gm Eye Oint	Phile
244	Ciprofloxacin 0.3% 5 ml Eye drop	Phile
245	Ciprofloxacin 200mg, 100ml Inj	Phile
246	Ciprofloxacin 250 mg	Tab
247	Ciprofloxacin 500 mg	Tab
248	Citicoline 500 mg, 2 ml Inj	Amp
249	Citicoline 500 mg	Tab
250	Clarithromycin 1 % 15 gm Oint	Phile
251	Clarithromycin 250mg	Tab
252	Clarithromycin 500 mg	Tab
253	Clindamycin 150 mg	Tab
254	Clindamycin 150 mg/ml, 4ml Inj	Amp
255	Clindamycin 150mg/ml, 2ml Inj	Amp
256	Clindamycin 300 mg	Tab

257	Clindamycin 600 mg	Tab
258	Clindamycin phosphate 1%, 15 gm Cream	Phile
259	Clobazam 10 mg	Tab
260	Clobazam 5 mg	Tab
261	Clobetasol 0.05% + Gentamicin 0.1% 20 gm Cream	Phile
262	Clobetasol 0.05% + Salicylic acid 3% 15 gm Cream	Phile
263	Clobetasol Propionate 10 gm Cream	Phile
264	Clobetasol Propionate 30 gm Cream	Phile
265	Clomiphene Citrate 50 mg	Tab
266	Clomipramine 10 mg	Tab
267	Clomipramine 25 mg	Tab
268	Clomipramine 50 mg	Tab
269	Clonazepam 0.25 mg	Tab
270	Clonazepam 0.5 mg	Tab
271	Clonidine 100 mcg	Tab
272	Clopidogrel 75 mg	Tab
273	Clotrimazole + Beclomethasone dipropionate 10 gm Cream	Phile
274	Clotrimazole 1% + Selenium 2.5% 100 ml Shampoo	Phile
275	Clotrimazole 1 % w/v Soap	Phile
276	Clotrimazole 1% w/v + Lignocaine 2% w/v 10 ml Ear Drop	Phile
277	Clotrimazole 1% w/w 15 gm Cream	Phile
278	Clotrimazole 100 gm Dusting Powder	Phile
279	Clotrimazole 100 mg pessary	Tab
280	Clotrimazole Lotion (Topical )15 ml	Phile
281	Clotrimazole 100 mg + Metronidazole 500 mg + Lactic acid bacillus 150 million Tab(8 tab/pkt)	Strip
282	Cloxacillin 125 mg	Tab/ Cap
283	Cloxacillin 125 mg/5 ml 100 ml Symp	Bott

284	Cloxacillin 250mg	Tab/ Cap
285	Cloxacillin 500 mg	Tab/ Cap
286	Cloxacillin 500 mg Inj	Vial
287	Clozapine 100 mg	Tab
288	Clozapine 200 mg	Tab
289	Clozapine 25 mg	Tab
290	Clozapine 50 mg	Tab
291	Coal Tar 0.4%w/v + Salicylic acid 3 % w/v 100ml Shampoo	Phile
292	Coconut oil 100 ml	Phile
293	Codeine 15 mg	Tab
294	Colchicine 0.5 mg	Tab
295	Colistimethate 1 Million IU Inj	Vial
296	Colistimethate 2 Million IU Inj	Vial
297	Clobetasol propionate 0.05%w/w+ salicylic acid 3%w/w, 30 gm Oint	Phile
298	Combi Pack of Mifepristone+Misoprostol (200 mcg+200 mcg)	Strip
299	Conjugated estrogen 0.625 mg	Tab
300	Conjugated estrogen vaginal Ointment 14 gm equivalent to Premarin	Phile
301	Controlled Release Tablets Of Sodium Valproate +Valproic acid 300 mg	Tab
302	Controlled Release Tablets Of Sodium Valproate +Valproic acid 500 mg	Tab
303	Controlled Release Tablets Of Sodium Valproate +Valproic acid 200 mg	Tab
304	Cyproheptadine 2mg/5ml 100ml Sy	Bott
305	Cyproheptadine 2mg/5ml 200ml Sy	Bott
306	Danazol 100mg	Cap
307	Danazol 200 mg	Cap

308	Danazol 50 mg	Cap
309	Darbepoetin alfa injection 25mcg	Phile
310	Darbepoetin alfa injection 40mcg	Phile
311	Deflazacort 30 mg	Tab
312	Deflazacort 6 mg	Tab
313	Deflazacort 6 mg/5ml, 30 ml Syp	Bott
314	Desvenlafaxine 50 mg	Tab
315	Dexamethasone 0.5 mg	Tab
316	Dexamethasone 4 mg	Tab
317	Dexamethasone 8mg, 2 ml Inj	Vial
318	Dexmedetomidine 100 mcg/ml, 1 ml	Amp
319	Dextromethorphan 10 mg + Phenylephrine 5 mg + Triprolidine 1.25 mg/5ml 100 ml Syp	Bott
320	Dextromethorphan 15mg+Chlorpheniramine 1mg + Phenylephrine 5mg/5ml 100 ml Syp equivalent to Pulmarin	Bott
321	Dextromethorphan 7.5mg+Chlorpheniramine 1 mg /5ml ,50 ml syrup equivalent to Vasodryl paediatric	Bott
322	Dextrose 10% 1000ml Euro head Inj	Phile
323	Dextrose 10% 1000ml Plastic bottle Inj	Phile
324	Dextrose 10% 500ml Euro head Inj	Phile
325	Dextrose 10% 500ml Plastic bottle Inj	Phile
326	Dextrose 25% 20 ml Inj	Amp
327	Dextrose 5% 1000ml Euro Head Inj	Phile
328	Dextrose 5% 1000ml Plastic Bottle Inj	Phile
329	Dextrose 5% 500ml Euro head Inj	Phile
330	Dextrose 5% 500ml Plastic Bottle Inj	Phile
331	Dextrose 50% 20 ml Inj	Amp
332	Diacerein 50 mg	Tab
333	Diazepam 10 mg	Tab
334	Diazepam 10 mg Inj	Amp

335	Diazepam 2 mg	Tab
336	Diazepam 5 mg	Tab
337	Diclofenac 100 mg SR	Tab
338	Diclofenac 50 mg	Tab
339	Diclofenac 75 mg, 3 ml Inj	Amp
340	Diclofenac 75 mg/ml 1 ml equivalent to dynapar	Amp
341	Diclofenac Cream 30 gm	Phile
342	Diclofenac Sodium 75 mg SR	Tab
343	Dicyclomine 10 mg	Tab
344	Dicyclomine 10mg/5ml, 30ml Syp	Bott
345	Dicyclomine 20 mg	Tab
346	Digoxin 0.125 mg	Tab
347	Digoxin 0.25 mg	Tab
348	Digoxin 0.5 mg Inj	Amp
349	Diltiazem 120 mg XR	Tab
350	Diltiazem 30 mg	Tab
351	Diltiazem 90 mg XR	Tab
352	Dinoprostone 0.5 mg Gel	Phile
353	Disodium Hydrogen Citrate 100ml Syp	Bott
354	Divalproex sodium 250 mg ER	Tab
355	Divalproex sodium 500 mg ER	Tab
356	Dobutamine 250 mg Inj	Amp
357	Domperidone 10 mg	Tab
358	Domperidone 5mg/5ml, 30ml Susp	Bott
359	Domperidone MDT 10 mg	Tab
360	Donepezil 10 mg	Tab
361	Donepezil 5 mg	Tab
362	Dopamine 200 mg Inj	Amp
363	Dorzolamide 2% 5 ml Eye drops	Phile
364	Dosulepin 25 mg	Tab
365	Dosulepin 75 mg	Tab
366	Doxophylline 400 mg Tab	Tab



367	Doxophylline 200 mg	Tab
368	Doxycycline 100 mg inj	Phile
369	Doxycycline 100mg	Cap
370	Drotaverine 40 mg	Tab
371	Drotaverine 40 mg, 2ml Inj	Amp
372	Drotaverine 80 mg	Tab
373	Drotaverine Syrup	Phile
374	Dry Powder Inhaler equivalent to Revolizer Machine	Phile
375	Duloxetine 20 mg	Tab
376	Duloxetine 30 mg	Tab
377	Duloxetine 40 mg	Tab
378	Dydrogesterone 10 mg	Tab
379	Ebastine 10 mg	Tab
380	Ebastine 20 mg	Tab
381	Empaglifozin 10 mg	Tab
382	Empaglifozin 25 mg	Tab
383	Enalapril 10 mg	Tab
384	Enalapril 2.5 mg	Tab
385	Enalapril 5 mg	Tab
386	Enoxaparin 40 mg Inj	Phile
387	Enoxaparin 60 mg Inj	Phile
388	Entecavir 0.5 mg	Tab
389	Ergometrine 0.5 mg Inj	Amp
390	Erythromycin 125mg/5ml 60 ml Susp	Bott
391	Erythromycin 500 mg	Tab
392	Erythropoietin 2000 IU Inj	Phile
393	Erythropoietin 4000 IU Inj	Phile
394	Erythropoietin 6000 IU Inj	Phile
395	Escitalopram 10 mg	Tab
396	Escitalopram 20 mg	Tab
397	Escitalopram 5 mg	Tab
398	Esmolol 100 mg, 10 ml Inj	Vial

399	Esomeprazole 20 mg	Tab
400	Esomeprazole 40 mg	Tab
401	Esomeprazole 40 mg (with sodium bicarbonate as buffer)	Tab
402	Esomeprazole 40 mg Inj	Vial
403	Etamsylate 500 mg	Tab
404	Ethamsylate 500 mg Inj	Vial
405	Ethinylestradiol + Levonorgestrel (0.03 mg+0.15mg) equivalent to ovarl-L	Tab
406	Ethinylestradiol + Norgestrel (0.05mg + 0.5 mg) equivalent to ovarl-G	Tab
407	Ethinylestradiol 50 mcg	Tab
408	Etophylline 115mg + Theophylline 35mg Tab	Tab
409	Etoricoxib 120 mg	Tab
410	Etoricoxib 60 mg	Tab
411	Etoricoxib 90 mg	Tab
412	Evening Primrose oil 1000 mg softgel capsule	Cap
413	Ezetimibe 10 mg	Tab
414	Famotidine 40 mg	Tab
415	Febuxostat 40 mg	Tab
416	Febuxostat 80 mg	Tab
417	Fenofibrate 160 mg	Tab
418	Fenofibrate 200 mg	Tab
419	Fentanyl 100 mcg Inj	Amp
420	Ferric ammonium citrate 220 mg + Folic acid 0.5 mg + Pyridoxine 1.5 mg +Cyanocobalamine 4.5 mcg ,200 ml syrup, equivalent to Ferrofoliac	Bott
421	Ferrous Ascorbate + Folic acid	Cap
422	Ferrous Fumarate + Folic acid	Cap
423	Ferrous sulphate 60mg elemental iron	Tab
424	Fexofenadine 120 mg	Tab
425	Fexofenadine 180 mg	Tab

426	Fexofenadine 30 mg/5mL, 60mL Susp	Bott
427	Finasteride 5 mg	Tab
428	Flavoxate 200 mg	Tab
429	Flucloxacillin 125mg/5ml, 100ml D/Syp	Bott
430	Flucloxacillin 250mg	Cap
431	Flucloxacillin 500 mg Inj	Vial
432	Flucloxacillin 500mg	Cap
433	Fluconazole 150mg	Tab/ Cap
434	Fluconazole 200 mg	Tab/ Cap
435	Fluconazole 50mg/5ml 35ml Suspension	Phile
436	Fludrocortisone 100 mcg	Tab
437	Flumazenil Injection	Amp
438	Flunarizine 10 mg	Tab
439	Flunarizine 5 mg	Tab
440	Fluocinolone 0.1 mg/ml 30 ml Lotion	Phile
441	Fluocinolone Acetonide 0.025% w/w 20 gm Oint	Phile
442	Fluorometholone 0.1 % + Neomycin 0.35 % 5 ml Eye drops	Phile
443	Fluorometholone 0.1 % 5 ml Eye drops	Phile
444	Fluoxetine 10 mg	Tab
445	Fluoxetine 20 mg	Tab
446	Flurbiprofen 0.03% 5 ml Eye drop	Phile
447	Fluticasone 125 mcg/puff MDI	Phile
448	Fluticasone 25 mcg/puff MDI	Phile
449	Fluticasone 50 micrograms/puff MDI	Phile
450	Fluticasone propionate 10gm Oint	Phile
451	Fluvoxamine 100 mg	Tab
452	Fluvoxamine 50 mg	Tab
453	Folic acid 5 mg	Tab

454	Framycetin sulfate 1 % 30 gm Oint	Phile
455	Fresh human placenta extract 0.25% 20 gm Gel	Phile
456	Fungal diastase 50 mg + Pepsin 10 mg 100ml Syp	Bott
457	Fungal diastase 50 mg + Pepsin 10 mg 200ml Syp	Bott
458	Furosemide 20 mg	Tab
459	Furosemide 20mg, 2ml Inj	Amp
460	Furosemide 40 mg	Tab
461	Furosemide 40 mg + Amiloride 5 mg	Tab
462	Fusidic acid 2% w/w 10 gm Oint	Phile
463	Fusidic acid 20 mg + Betamethasone 1.2 mg, 10 gm Oint	Phile
464	Fusidic acid 20 mg + Hydrocortisone 10 mg, 10 gm Oint	Phile
465	Gabapentin 100 mg	Tab/ Cap
466	Gabapentin 300 mg	Tab/ Cap
467	Gadoteric Acid 27.932 gm/100ml ,10 ml inj	Phile
468	Gadoteric Acid 27.932 gm/100ml ,20 ml inj	Phile
469	Gamma benzene hexachloride 1% + Cetrimide 0.1 %, 100 ml Lotion	Phile
470	Gamma benzene hexachloride 1% w/w, 100 ml Lotion	Phile
471	Gatifloxacin 0.3 % 5 ml Eye drop	Phile
472	Gentamicin 0.2 % 15gm Oint	Phile
473	Gentamicin 0.3%w/w 5ml E/Er.Drop	Phile
474	Gentamicin 20mg, 2ml Inj	Vial
475	Gentamicin 40mg/ml, 2 ml Inj	Vial
476	Glibenclamide 5 mg	Tab
477	Gliclazide 40 mg	Tab

478	Gliclazide 80 mg	Tab
479	Glimepiride 1 mg	Tab
480	Glimepiride 2 mg	Tab
481	Glimepiride 3 mg	Tab
482	Glimepiride 4 mg	Tab
483	Glipizide 5 mg	Tab
484	Glucosamine 500 mg	Tab
485	Glyceryl Trinitrate (Nitroglycerine) 5mg/ ml,5ml Inj	Amp
486	Glyceryl Trinitrate 0.5 mg Sublingual Tablet	Tab
487	Glyceryl Trinitrate 400 mcg Meter Dose Spray	Phile
488	Glycopyrrolate 0.2mg, 1 ml Inj	Amp
489	Granisetron 1 mg	Tab
490	Granisetron 1mg 1 ml Inj	Amp
491	Granisetron 1mg/ml, 10ml Syb	Bott
492	Griseofulvin 250 mg	Tab
493	Griseofulvin 500 mg	Tab
494	Halobetasol 0.05% w/w + Fusidic acid 2% w/w 30g Oint	Phile
495	Halobetasol 0.05% w/w + Gentamicin 0.1% 30 g Oint	Phile
496	Halobetasol 0.05% w/w + Salicylic acid 3% 30g Oint	Phile
497	Halobetasol 0.05% w/w 10 g Oint	Phile
498	Haloperidol 0.25 mg	Tab
499	Haloperidol 1.5 mg	Tab
500	Haloperidol 1.5 mg + Benzhexol 2 mg	Tab
501	Haloperidol 5 mg	Tab
502	Haloperidol 5 mg + Trihexyphenidyl 2 mg	Tab
503	Haloperidol 5mg, 1 ml Inj	Amp
504	Hand sanitizer with Nozzle Spray 100 ml Solution	Bott

505	Heparin 25000 IU, 5ml Inj	Vial
506	Heparin 25000 IU, 5ml Inj	Vial
507	Heparin Ointment equivalent to Thrombophob 20 gm	Phile
508	Herbal product equivalent to Cystone	Bottle
509	Homatropine 2% Eye drop 5ml	Phile
510	Human albumin 20 % 100 ml Inj	Phile
511	Human Chorionic Gonadotropin 10000 IU Inj	Amp
512	Human Chorionic Gonadotropin 5000 IU Inj	Amp
513	Hydrochlorothiazide 12.5 mg	Tab
514	Hydrochlorothiazide 12.5 mg + Ramipril 5 mg	Tab
515	Hydrochlorothiazide 25 mg	Tab
516	Hydrocortisone 0.5 % w/w 10 gm Cream	Phile
517	Hydrocortisone 1 % w/w 10 gm Cream	Phile
518	Hydrocortisone 100 mg Inj	Vial
519	Hydrocortisone 200 mg Inj	Vial
520	Hydrogen peroxide 20 % Solution 100 ml	Phile
521	Hydroquinone 2.0% w/w +Tretinoin + 0.025% w/w, Mometasone Furoate + 0.1% w/w 15gm Oint	Phile
522	Hydroquinone 4% 30 gm Oint	Phile
523	Hydroxychloroquine 200 mg	Tab
524	Hydroxychloroquine 400 mg	Tab
525	Hydroxyprogesterone caproate 250 mg Inj	Amp
526	Hydroxyprogesterone caproate 500 mg Inj,2ml	Amp
527	Hydroxypropyl Methylcellulose 0.3 % 10 ml Eye drop	Phile
528	Hyoscine Butyl bromide 10 mg	Tab
529	Hyoscine butyl bromide 20 mg	Tab
530	Hyoscine Butylbromide 20mg, 1ml Inj	Amp
531	Ibuprofen 100 mg + Paracetamol 162.5 mg/5ml 60 ml Syp eq.to Flexon	Bott
532	Ibuprofen 200 mg	Tab

533	Ibuprofen 400 mg	Tab
534	Imipenem 500 mg + Cilastatin 500 mg Inj	Vial
535	Imipramine 25 mg	Tab
536	Imipramine 50 mg	Tab
537	Imipramine 75 mg	Tab
538	Indomethacin 25mg	Tab
539	Indomethacin 50mg	Tab
540	Indomethacin 75 mg	Tab
541	Influenza vaccine 15mcg, 0.5ml (equivalent to influvac) Inj	Phile
542	Inj Benzathine Penicillin 12 lakh units	Vial
543	Inj Sodum Bicarbonate 75mg/ml in 25 ml	Amp
544	Insulin aspart/Insulin aspart protamine equivalent to novomix 30:70 Cartridge with Pen Inj	Phile
545	Insulin aspart/Insulin aspart protamine equivalent to novomix 30:70 Vial Inj	Phile
546	Insulin aspart/Insulin aspart protamine equivalent to novomix 50:50 cartridge with Pen Inj	Phile
547	Insulin aspart/Insulin aspart protamine equivalent to novomix 50:50 Vial Inj	Phile
548	Insulin Glargine 100 IU/ml, 10 ml Vial	Phile
549	Insulin Glargine 100 IU/ml,3ml Cartridge with Pen Inj	Phile
550	Insulin Glulisine 30/70 cartridge Inj	Phile
551	Insulin lispro/insulin lispro protamine 25:75 equivalent to humalog mix 25 Cartridge with pen Inj	Phile
552	Insulin lispro/insulin lispro protamine 50:50 equivalent to humalog mix 50 Cartridge with pen Inj	Phile
553	Insulin needle	pcs
554	Insulin Regular 100 IU/ml, 3ml 1 cartridge with pen Inj	Phile
555	Iobitridol 300 mg/100 ml inj	Bottle
556	Iobitridol 300 mg/50 ml inj	Bottle

557	Iobitridol 350 mg/100 ml inj	Bottle
558	Iobitridol 350 mg/50 ml inj	Bottle
559	Iodinated contrast media equivalent to urografin 60% 20 ml Inj	Amp
560	Iodinated contrast media equivalent to urografin 76% 20 ml Inj	Amp
561	Iohexol 300mg, 100 ml Inj	Phile
562	Iohexol 300mg, 50 ml Inj	Phile
563	Iohexol 350mg, 100 ml Inj	Phile
564	Iohexol 350mg, 50 ml Inj	Phile
565	Ipratropium bromide 400 mcg, 30 Rotacap	Phile
566	Ipratropium bromide 500 mcg, 2ml Respules	Phile
567	Irbesartan 150 mg	Tab
568	Irbesartan 300 mg	Tab
569	Iron + Folic acid 15 ml Haematinics Drop eq. to Ferrofolac	Bott
570	Iron Dextran equivalent to iron 50mg, 1 ml Inj	Amp
571	Iron polymaltose 100 mg + Folic acid 1 mg	Tab
572	Iron Sucrose 100 mg Inj	Phile
573	Isabgol husk Powder	Phile
574	Isoflurane 100ml Solution	Phile
575	Isoflurane 250ml Solution	Phile
576	Isoprenaline 1 mg Inj	Amp
577	Isoprenaline 2 mg Inj	Amp
578	Isoproterenol 10 mg	Tab
579	Isosorbide Dinitrate 10 mg	Tab
580	Isosorbide Dinitrate 20 mg	Tab
581	Isosorbide Dinitrate 5 mg	Tab
582	Isosorbide mononitrate 10 mg	Tab
583	Isosorbide mononitrate 20 mg	Tab
584	Isosorbide mononitrate 5 mg	Tab
585	Isosorbide mononitrate XL 30 mg	Tab



586	Isotretinoin 10 mg	Cap
587	Isotretinoin 20 mg	Cap
588	Isoxsuprine Hydrochloride 10 mg	Tab
589	Itopride 50 mg	Tab
590	Itraconazole 100 mg	Cap
591	Ivermectin 12 mg	Tab
592	Ivermectin 6 mg	Tab
593	Ketamine 500 mg/10 ml Inj	Phile
594	Ketamine 50mg/ml 2ml Inj	Amp
595	Ketoconazole 2% + Zinc Pyrithione 1 % 100 ml Solution	Phile
596	Ketoconazole 2% w/w 15g Oint	Phile
597	Ketorolac 0.04% 5 ml Eye drop	Phile
598	Ketorolac 10 mg	Tab
599	Ketorolac 2 % 15 gm Oint	Phile
600	Ketorolac 30mg, 1ml Inj	Amp
601	Labetalol 20mg, 4ml Inj	Amp
602	Lactic acid bacillus 50 million+Bacillus Mesentericus 1 million + Clostridium Butyricum 2 million +Clostridium Butyricum 2 million equivalent to Bifilac	Tab
603	Lactulose 3.35 gm/5ml 100ml Susp	Bott
604	Lactulose 3.35 gm/5ml 200ml Susp	Bott
605	Lansoprazole 30 mg	Tab
606	Leflunomide 10 mg	Tab
607	Lefluamide 20 mg	Tab
608	Leuprolide Acetate 3.75 mg Injection	Vial
609	Levetiracetam 1000 mg	Tab
610	Levetiracetam 100mg/ml 5 ml Inj	Vial
611	Levetiracetam 250 mg	Tab
612	Levetiracetam 500 mg	Tab
613	Levocarnitine 500 mg	Tab

614	Levocetirizine 2.5 mg/5ml 30 ml Symp	Bott
615	Levocetirizine 5 mg	Tab
616	Levocetirizine-5mg+Montelukast Sodium-10mg	Tab
617	Levodopa 100 mg + Carbidopa 10 mg	Tab
618	Levodopa 100 mg +Carbidopa 25 mg	Tab
619	Levodopa 200 mg +Carbidopa 50 mg	Tab
620	Levodropropizine 30 mg/5 ml 100ml Symp	Bott
621	Levofloxacin 250 mg	Tab
622	Levofloxacin 500 mg	Tab
623	Levofloxacin 500 mg, 100 ml Inj	Phile
624	Levofloxacin 750mg	Tab
625	Levosaltbutamol 200mcg+ Beclomethasone 200 mcg Rotacap	Phile
626	Levosaltbutamol 50 mcg + Beclomethasone 50 mcg MDI	Phile
627	Levosaltbutamol100 mcg+ Beclomethasone 100 mcg Rotacap	Phile
628	Levothyroxine 12.5 mcg	Tab
629	Levothyroxine 25 mcg	Tab
630	Levothyroxine 37.5 mcg	Tab
631	Levothyroxine 50 mcg	Tab
632	Levothyroxine 75 mcg	Tab
633	Levothyroxine 88 mcg	Tab
634	Levothyroxine100 mcg	Tab
635	Lidocaine 5 % + dextrose 2 ml Inj	Phile
636	Lignocaine 15 % Spray Topical	Phile
637	Lignocaine 2% 30 gm Gel	Phile
638	Lignocaine 2% 30 ml Injection	Phile
639	Lignocaine 2% with adrenaline Inj	Phile
640	Linagliptin 5 mg	Tab
641	Linezolid 600 mg	Tab

642	Liquid paraffin 3.75 ml + Milk of magnesia 11.25 ml 200ml Symp	Bott
643	Lithium 300 mg	Tab
644	Lithium 300 mg	Tab
645	Lithium 450 mg	Tab
646	Loperamide 2 mg	Tab
647	Loratadine 10 mg	Tab
648	Lorazepam 1 mg	Tab
649	Lorazepam 2 mg	Tab
650	L-ornithine L aspartate 5gm, 10 ml Inj	Amp
651	L-ornithine L-aspartate 150 mg +Pancreatin 100 mg equivalent to Hepamerz	Tab
652	Losartan 25 mg	Tab
653	Losartan 25 mg + Amlodipine 2.5 mg	Tab
654	Losartan 25+ Hydrochlorthiazide 12.5 mg	Tab
655	Losartan 50 mg	Tab
656	Losartan 50 mg + Amlodipine 5 mg	Tab
657	Losartan 50 mg + S-Amlodipine 2.5 mg	Tab
658	Losartan 50+ Hydrochlorthiazide 12.5 mg	Tab
659	Losartan 75 mg	Tab
660	Luliconazole 1 % 15 gm Oint	Phile
661	Magaldrate 400 mg + Simethicone 20mg/5ml, 180 ml Susp eq. to stagel	Bott
662	Magnesium Sulphate 1gm, 2 ml Inj	Amp
663	Mannitol 20% 100 ml Inj	Phile
664	Mebendazole 100mg	Tab
665	Mebendazole 100mg/5ml 30 ml Susp	Bott
666	Mebeverine 135 mg	Tab
667	Mebeverine 200 mg SR	Tab
668	Medroxyprogesterone 10 mg	Tab
669	Medroxyprogesterone acetate 150mg, 1ml Inj	Amp
670	Mefenamic acid 100mg/5ml, 60 ml Symp	Bott

671	Mefenamic Acid 250 mg	Tab
672	Mefenamic Acid 500 mg	Tab
673	Mefipristone 200 mg	Tab
674	Menadione(vitamin K) 10 mg, 1 ml Inj	Amp
675	Mephentermine 300mg, 10ml Inj	Phile
676	Meropenem 1 gm Inj	Phile
677	Meropenem 125 mg Inj	Phile
678	Meropenem 250 mg Inj	Phile
679	Meropenem 500 mg Inj	Phile
680	Mesalamine 1.2 gm XR	Tab
681	Mesalamine 400 mg	Tab
682	Metformin 1000 mg + Glimepiride 1 mg	Tab
683	Metformin 1000 mg + Glimepiride 2 mg	Tab
684	Metformin 1000 mg + Linagliptin 2.5 mg	Tab
685	Metformin 1000 mg + Sitagliptin 100 mg	Tab
686	Metformin 1000 mg + Sitagliptin 50 mg	Tab
687	Metformin 1 gm	Tab
688	Metformin 1gm SR	Tab
689	Metformin 500 mg	Tab
690	Metformin 500 mg + Glimepiride 1 mg	Tab
691	Metformin 500 mg + Glimepiride 2 mg	Tab
692	Metformin 500 mg + Linagliptin 2.5 mg	Tab
693	Metformin 500 mg + Sitagliptin 50 mg	Tab
694	Metformin 500 mg SR	Tab
695	Metformin 850 mg	Tab
696	Metformin 850 mg + Linagliptin 2.5 mg	Tab
697	Metformin 850 mg + Sitagliptin 50 mg	Tab
698	Metformin 850 mg SR	Tab
699	Methotrexate 10 mg	Tab
700	Methotrexate 2.5 mg	Tab
701	Methotrexate 5 mg	Tab
702	Methotrexate 50 mg Inj	Phile

703	Methotrexate 7.5 mg	Tab
704	Methyl Prednisolone 16 mg	Tab
705	Methyl Prednisolone 4 mg	Tab
706	Methyl Prednisolone 8 mg	Tab
707	Methylcobalamine 1500 mcg	Tab
708	Methyldopa 250 mg	Tab
709	Methyldopa 500 mg	Tab
710	Methylergometrine 0.2 mg, 1 ml Inj	Amp
711	Methylprednisolone 1 gm Inj	Vial
712	Methylprednisolone 125 mg Inj	Vial
713	Methylprednisolone 40mg, 1ml Inj (suspension form)	Vial
714	Methylprednisolone 500 mg Inj	Vial
715	Methylprednisolone 80 mg, 2ml Inj (suspension form)	Vial
716	Metoclopramide 10 mg	Tab
717	Metoclopramide 10mg 2ml Inj	Amp
718	Metoclopramide 5 mg/5 mL, 30 mL Syp	Bott
719	Metolazone 2.5 mg	Tab
720	Metolazone 5 mg	Tab
721	Metoprolol 100 mg XL	Tab
722	Metoprolol 12.5 mg XL	Tab
723	Metoprolol 25 mg XL	Tab
724	Metoprolol 50 mg XL	Tab
725	Metoprolol 5mg, 5 ml Inj	Amp
726	Metronidazole 1% w/w 20 gm Gel	Phile
727	Metronidazole 100 mg + Diloxanide Furoate 125mg/5mL 60 ml Susp	Bott
728	Metronidazole 100 mg/5 mL 60 ml Susp	Bott
729	Metronidazole 200 mg	Tab
730	Metronidazole 200mg/5ml 60 ml Susp	Bott
731	Metronidazole 400 mg	Tab

732	Metronidazole 400 mg + Diloxanide Furoate 500mg	Tab
733	Metronidazole Infusion 500 mg, 100 ml Inj	Phile
734	Miconazole Cream 15 gm	Phile
735	Midazolam 5mg, 5 mL Inj	Phile
736	Minoxidil 2% Solution	Phile
737	Minoxidil 5% 60 ml Solution	Phile
738	Mirtazapine 15 mg	Tab
739	Mirtazapine 30 mg	Tab
740	Mirtazapine 7.5 mg	Tab
741	Misoprostol 100 mcg	Tab
742	Misoprostol 200 mcg	Tab
743	Misoprostol 50 mcg	Tab
744	Mometasone 50 mcg Nasal spray	Phile
745	Mometasone Furoate 0.1% w/w 15gm Oint	Phile
746	Montelukast 10 mg	Tab
747	Montelukast 4 mg	Tab
748	Morphine Sulphate 10 mg Inj	Phile
749	Moxifloxacin 0.5% 10 ml Eye drops	Phile
750	Moxifloxacin 400 mg	Tab
751	Moxifloxacin 400 mg, 100 ml Inj	Phile
752	Multielectrolyte 500 ml Inj equivalent to Physiomax	Phile
753	Multiple Electrolyte solution 500 ml (biodegradable bag)	Phile
754	Mupirocin 2 % w/w + Beclomethasone 0.05 % w/v 5gm Oint	Phile
755	Mupirocin Ointment 10 gm	Phile
756	Mupirocin Ointment 5 gm	Phile
757	Mycophenolate Mofetil 500 mg	Tab
758	N-Acetylcysteine 200 mg/mL, 10 mL	Phile
759	N-Acetylcystine 600 mg	Tab

760	Naloxone 0.4mg/ml 1ml Inj	Amp
761	Naltrexone 50 mg	Tab
762	Naproxen 250 mg	Tab
763	Naproxen 500 mg	Tab
764	Naproxen 750 mg SR	Tab
765	Nebivolol 2.5 mg	Tab
766	Nebivolol 5 mg	Tab
767	Neomycin sulphate 3400 IU+Polymyxin B sulfate 5000 IU+Bacteriacin zinc 400 IU, 5 gm Oint	Phile
768	Neostigmine 2.5 mg + Glycopyrrolate 0.5 mg Inj	Phile
769	Neostigmine 2.5 mg, 5 ml Inj	Phile
770	Nifedipine 10 mg	Tab
771	Nifedipine 20 mg SR	Tab
772	Nifedipine 5 mg	Tab
773	Nitrofurantoin 100 mg	Tab
774	Nitrofurantoin 50 mg	Tab
775	Nitroglycerin 0.2 % 25 gm Oint	Phile
776	Nitroglycerin 2.6 mg	Tab
777	Nitroglycerine 30 mg SR	Tab
778	Noradrenaline 2 mg, 2ml Inj	Amp
779	Norethisterone 5 mg	Tab
780	Norfloxacin 400 mg	Tab
781	Nystatin 100000 IU/ml 30 ml Susp	Bott
782	Octreotide 100mcg, 1ml Inj	Amp
783	Octreotide 50mcg, 1ml Inj	Amp
784	Ofloxacin 0.3%, 5 ml Eyedrop	Phile
785	Ofloxacin 100 mg DT	Tab
786	Ofloxacin 200 mg	Tab
787	Ofloxacin 400 mg	Tab
788	Ofloxacin 50 mg/5ml 30 ml Susp	Bott
789	Ofloxacin 50 mg/5ml 60 ml Susp	Bott
790	Olanzapine 10 mg	Tab

791	Olanzapine 15 mg	Tab
792	Olanzapine 2.5 mg	Tab
793	Olanzapine 20 mg	Tab
794	Olanzapine 5 mg	Tab
795	Olanzapine 7.5 mg	Tab
796	Olapatadine 0.1% Eye drop 5 ml	Phile
797	Olmesartan 10 mg	Tab
798	Olmesartan 20 mg	Tab
799	Olmesartan 40 mg	Tab
800	Omeprazole 20 mg	Cap
801	Omeprazole 40 mg Inj	Vial
802	Ondansetron 2mg/5 mL, 30 mL Symp	Bott
803	Ondansetron 2mg/ml, 2ml Inj	Amp
804	Ondansetron 4 mg	Tab
805	Ondansetron 4 mg MDT	Tab
806	Oral rehydration salt	Sachet
807	Ornidazole 500 mg	Tab
808	Ornidazole 500mg/100 ml Inj	Phile
809	Oxcarbazepine 150 mg	Tab
810	Oxcarbazepine 300 mg	Tab
811	Oxcarbamazepine 450 mg	Tab
812	Oxcarbazepine 600 mg	Tab
813	Oxybutynin 2.5 mg	Tab
814	Oxybutynin 5 mg	Tab
815	Oxymetazoline 0.01 % 10 ml Nasal drop	Phile
816	Oxymetazoline 0.025 % (Pediatric) 10 ml Nasal drop	Phile
817	Oxymetazoline 0.05 % (Adult) 10 ml Nasal drop	Phile
818	Oxymetazoline 0.05 % Nasal Spray	Phile
819	Oxytocin 5 IU, 1 mL Inj	Amp
820	Pantoprazole 20 mg	Tab
821	Pantoprazole 40 mg	Tab



822	Pantoprazole 40 mg +Domperidone 30 mg	Tab
823	Pantoprazole 40 mg Inj	Vial
824	Paracetamol 125 mg + Phenylephrine 5 mg + Chlorpheniramine 1 mg/5 ml 100 ml Syrup	Bott
825	Paracetamol 125 mg + Phenylephrine 2.5 mg + Chlorpheniramine 1 mg/ml 15 ml syrup	Bott
826	Paracetamol 125 mg Suppository	Pcs
827	Paracetamol 125 mg/5 ml 30 ml Syrup eq. to niko	Bott
828	Paracetamol 125 mg/5 ml 60 ml Syrup eq.to niko	Bott
829	Paracetamol 150 mg/ml 15 ml Drop eq. to Niko	Bott
830	Paracetamol 1gm 100 ml Infusion	Bott
831	Paracetamol 1gm 100 ml Infusion	Pouch
832	Paracetamol 250 mg Suppository	Pcs
833	Paracetamol 250 mg/ml 15 ml Drop eq to Niko ds	Bott
834	Paracetamol 325 mg + Ibuprofen 400 mg	Tab
835	Paracetamol 325 mg +Tramadol 37.5 mg	Tab
836	Paracetamol 500 mg	Tab
837	Paracetamol 500 mg + Chlorpheniramine Maleate 4 mg + Phenylephrine 10 mg equivalent to sinex	Tab
838	Paracetamol 500 mg + Chlorzoxazone 250 mg	Tab
839	Paracetamol 500 mg + Chlorzoxazone 500 mg	Tab
840	Paracetamol 500 mg inj 50 ml	Bott
841	Paracetamol 500 mg Suppository	Pcs
842	Paracetamol 500mg + Codeine 10 mg	Tab
843	Paroxetine 10 mg	Tab
844	Paroxetine 12.5 mg SR	Tab
845	Paroxetine 20 mg	Tab
846	Paroxetine 25 mg SR	Tab
847	Pentoxifylline 400 mg	Tab
848	Permethrin 5% w/w 60 ml Lotion	Phile
849	Permethrine 1 % Soap, $\geq$ 75gm	Phile

850	Pethidine 50mg,1 ml Inj	Amp
851	Petrolleum Jelly equivalent to Vaseline 25 gm	Phile
852	Pheniramine 25 mg	Tab
853	Pheniramine 45.5 mg, 2ml Inj	Amp
854	Phenobarbitone 200mg Inj	Amp
855	Phenobarbitone 30 mg	Tab
856	Phenobarbitone 60 mg	Tab
857	Phenoxy Methyl Penicillin 250 mg	Tab
858	Phenylephrine 0.12% + Nephazoline 0.05 % + Sodium CMC 0.5% + Menthol 0.005% 10 ml Eye drops	Phile
859	Phenytoin 100mg, 2ml Inj	Amp
860	Phenytoin 300 mg	Tab
861	Phenytoin 50 mg	Tab/ Cap
862	Phenytoin 100 mg	Tab/ Cap
863	Pioglitazone 15 mg	Tab
864	Pioglitazone 30 mg	Tab
865	Piperacillin + Tazobactam 2.25 gm Inj	Vial
866	Piperacillin + Tazobactam 4.5 gm Inj	Vial
867	Piperacillin+Tazobactam 1.125gm Inj	Vial
868	Piroxicam 20 mg	Tab
869	Plastic Inhalation Device equivalent to Rotahaler	Phile
870	Pneumococcal Vaccine 0.5 ml eq. to prevenar	Phile
871	Podophylline solution	Phile
872	Polyethylene glycol with electrolytes Powder equivalent to Peglec	Bott
873	Polygeline 17.5 gm, 500 ml with electrolyes Inj	Bott
874	Polymyxin B 500000 Unit inj	Vial
875	Polyvinyl alcohol 1.4% + Povidone 0.6 %, 10 ml Eye drop	Phile

876	Potassium Chloride 1.5gm/15ml, 200 ml Solution eq.to Potklor	Bott
877	Potassium chloride 150 mg/mL in 10 ml Inj	Amp
878	Potassium Permanganate 30 gm Powder	Phile
879	Povidone iodine 1 % 100 ml Gargle	Bott
880	Povidone iodine 10 %, 100 ml Solution	Phile
881	Povidone iodine 10 %, 15 g Oint	Phile
882	Povidone iodine 5 % 50 ml solution	Phile
883	Povidone Iodine 5% w/w 15 gm Oint	Phile
884	Povidone iodine gargle 1% 100 ml Gargle	Phile
885	Povidone Iodine vaginal Pessaries	Tab
886	Pralidoxime 500 mg Inj	Amp
887	Prazosin 2.5 mg XL	Tab
888	Prazosin 5 mg XL	Tab
889	Prednisolone 10 mg	Tab
890	Prednisolone 2.5 mg	Tab
891	Prednisolone 20 mg	Tab
892	Prednisolone 40 mg	Tab
893	Prednisolone 5 mg	Tab
894	Pregabalin 150 mg	Cap
895	Pregabalin 25 mg	Cap
896	Pregabalin 50 mg	Cap
897	Pregabalin 75 mg	Cap
898	Pregabalin 75 mg + Methylcobalamin 1500 mg	Tab
899	Probenecid 500 mg	Tab
900	Probiotics equivalent to Enterogermina 2 Million/5 ml 100 ml Solution	Bott
901	Prochlorperazine 12.5 mg, 1ml Inj	Amp
902	Prochlorperazine 5 mg	Tab
903	Progesterone 100 mg	Tab
904	Progesterone 200 mg	Tab
905	Promethazine 25 mg	Tab

906	Promethazine 5mg/5ml, 60ml Syrup	Bott
907	Promethazine HCL 25 mg/ml, 2ml Inj	Amp
908	Propofol 1%, 20 ml Inj (Lct-Mct chain)	Vial
909	Propranolol 10 mg	Tab
910	Propranolol 20 mg	Tab
911	Propranolol 40 mg	Tab
912	Pyridoxine 10 mg	Tab
913	Pyridoxine 100 mg	Tab
914	Quetiapine 25 mg	Tab
915	Quetiapine 100 mg	Tab
916	Quetiapine 200 mg	Tab
917	Quetiapine 300 mg	Tab
918	Quetiapine 400 mg	Tab
919	Quetiapine 50 mg	Tab
920	Rabeprazole 20 mg	Tab
921	Rabeprazole 20 mg Inj	Vial
922	Ramipril 1.25 mg	Tab
923	Ramipril 10 mg	Tab
924	Ramipril 10 mg + Hydrochlorothiazide 12.5 mg	Tab
925	Ramipril 2.5 mg	Tab
926	Ramipril 2.5 mg +Hydrochlorothiazide 12.5 mg	Tab
927	Ramipril 5 mg	Tab
928	Ramipril 5 mg + Hydrochlorothiazide 12.5 mg	Tab
929	Ranitidine 150 mg	Tab
930	Ranitidine 50 mg, 2ml Inj	Amp
931	Ranitidine syrup for Paediatric Use	Bottle
932	Repaglinide 1 mg	Tab
933	Repaglinide 2 mg	Tab
934	Ringer Lactate 1000ml plastic euro head	Phile
935	Ringer Lactate 1000ml plastic nipple head	Phile
936	Ringer Lactate 500 ml glass bottle	Phile
937	Ringer Lactate 500ml nipple head plastic bottle	Bott

938	Ringer Lactate 500ml plastic euro head	Bott
939	Risperidone 1 mg	Tab
940	Risperidone 2 mg	Tab
941	Risperidone 3 mg	Tab
942	Risperidone 4 mg	Tab
943	Rivastigmine 1.5 mg	Tab
944	Rizatriptan 10 mg	Tab
945	Rocuronium 10mg/mL 5 ml Inj	Phile
946	Roflumilast 500 mcg	Tab
947	Rosuvastatin 10 mg	Tab
948	Rosuvastatin 5 mg	Tab
949	Rosvastatin 20 mg	Tab
950	Roxithromycin 150 mg	Tab
951	Salbutamol 2 mg/5 mL, 100 mL Syrup equivalent to Beta-2	Bott
952	Salbutamol 2.5 mg/2.5 ml respulse	Phile
953	Salbutamol 2mg + Bromhexine 4mg/5ml, 100ml Syrup equivalent to Beta-2	Bott
954	Salbutamol 5 mg/2.5 ml respulse	Phile
955	Salbutamol 5mg/ml, 15 ml Resp. Solution	Phile
956	Salbutamol Sulphate 100mcg/puff, 200 MDI	Phile
957	Salbutamol Sulphate 200mcg, 30 Rotacap	Phile
958	Salicylic Acid 10% w/w 25 gm Oint	Phile
959	Salicylic Acid 20% 25 gm Oint	Phile
960	Salicylic Acid 40 % 25 gm Oint	Phile
961	Salmeterol 25 mcg+ Fluticasone 250 mcg MDI	Phile
962	Salmeterol 50 mcg + Fluticasone 250 mcg Rotacap	Phile
963	S-Amlodipine 2.5 mg	Tab
964	S-Amlodipine 5 mg	Tab
965	Secnidazole 1 gm	Tab
966	Serratiopeptidase 10 mg	Tab
967	Serratiopeptidase 5 mg	Tab

968	Sertaconazole 2% 15 gm Oint	Phile
969	Sertraline 100 mg	Tab
970	Sertraline 25 mg	Tab
971	Sertraline 50 mg	Tab
972	Sildenafil 25 mg	Tab
973	Sildenafil 50 mg	Tab
974	Silodosin 4 mg	Tab
975	Silodosin 8 mg	Tab
976	Silver sulfadiazine 1% 25 gm Oint	Phile
977	Silver sulfadiazine 1%, 200 g Oint	Phile
978	Silymarin 140 mg	Tab
979	Silymarin 70 mg	Tab
980	Simethicone 40 mg + Dicyclomine 10 mg, 10 ml Drop eq.to Meftal spas	Bott
981	Simethicone 40 mg + Dicyclomine 10 mg/5ml, 30 ml Susp eq.to Meftal spas	Bott
982	Simethicone 40 mg + Dicyclomine 10 mg/5ml, 60 ml Susp eq.to Meftal spas	Bott
983	Sitagliptin 100 mg	Tab
984	Sitagliptin 25 mg	Tab
985	Sitagliptin 50 mg	Tab
986	Skin Protective Lotion equivalent to Ray shield (40 SPF)	Phile
987	Skin Protective Lotion equivalent to Ray shield (50 SPF)	Phile
988	Sodium bicarbonate 300 mg	Tab
989	Sodium bicarbonate 34 mg/ml 10 ml Eardrop	Phile
990	Sodium Bicarbonate 7.5%, 10 mL Inj	Phile
991	Sodium Chloride 0.45% + Dextrose 5% 500 ml Inj	Phile
992	Sodium chloride 0.65 % 10 ml Nasal Drop	Phile
993	Sodium Chloride 0.9% + Dextrose 5% 1000 ml Euro head Inj	Phile

994	Sodium Chloride 0.9% + Dextrose 5% 1000 ml Nipple head Inj	Phile
995	Sodium Chloride 0.9% + Dextrose 5% 500 ml Euro head Inj	Phile
996	Sodium Chloride 0.9% + Dextrose 5% 500 ml Glass bottle Inj	Phile
997	Sodium Chloride 0.9% + Dextrose 5% 500 ml Nipple head plastic bottle Inj	Phile
998	Sodium chloride 0.9% 100 ml Inj	Phile
999	Sodium chloride 0.9% 1000 ml Euro head Inj	Phile
1000	Sodium chloride 0.9% 1000 ml Plastic nipple head Inj	Phile
1001	Sodium chloride 0.9% 3000 ml Inj	Phile
1002	Sodium chloride 0.9% 500 ml glass bottle Inj	Phile
1003	Sodium chloride 0.9% 500 ml Plastic nipple head Inj	Phile
1004	Sodium chloride 15% + Glycerin 15% 30 ml Enema	Bott
1005	Sodium chloride solution 5% Eye drop 10 ml	Phile
1006	Sodium Valporate 1000 mg	Tab
1007	Sodium Valporate 200 mg	Tab
1008	Sodium Valporate 300 mg	Tab
1009	Sodium Valporate 500 mg	Tab
1010	Sodium Valproate 200mg/5ml 100 ml Symp	Bott
1011	Sodium Valproate 500 mg ,5 ml Inj	Phile
1012	Sodium Bicarbonate 10 %, 25 ml Inj	Phile
1013	Spirolactone 100 mg	Tab
1014	Spirolactone 12.5 mg	Tab
1015	Spirolactone 25 mg	Tab
1016	Spirolactone 50 mg	Tab
1017	Spirolactone 50 mg + Furosemide 20 mg	Tab
1018	Sterile Water for Injection 5 mL Inj	Amp
1019	Sterile Water for Injection 500 ml Inj	Bott

1020	Streptococcus Faecalis 30 million+Clostridium Butyricum 2 million+Bacillus Mesentericus 1 million+Lactobacillus Sporogenes 50 millions 30ml Suspension equivalent to bifilac	Bott
1021	Streptokinase 1.5 M IU Inj	Amp
1022	Succinylcholine 500mg, 10ml Inj	Amp
1023	Sucralfate 1g/10 ml, 200ml Susp	Bott
1024	Sulfamethoxazole 200 mg + Trimethoprim 40 mg/5mL 50 ml Susp	Bott
1025	Sulfasalazine 1 gm	Tab
1026	Sulfasalazine 500 mg	Tab
1027	Sumatriptan 25 mg	Tab
1028	Sumatriptan 50 mg	Tab
1029	Tacrolimus 0.03 %, 10 gm Oint	Phile
1030	Tacrolimus 0.1% 10 gm Oint	Phile
1031	Tamsulosin 0.4 mg	Tab
1032	Teicoplanin 200 mg Inj	Vial
1033	Teicoplanin 400 mg Inj	Vial
1034	Telmisartan 20 mg	Tab
1035	Telmisartan 40 mg	Tab
1036	Telmisartan 40 mg + Amlodipine 5 mg	Tab
1037	Telmisartan 40 mg + Hydrochlorothiazide 12.5 mg	Tab
1038	Telmisartan 80 mg	Tab
1039	Telmisartan 80 mg + Hydrochlorothiazide 12.5 mg	Tab
1040	Teneligliptin 20 mg	Tab
1041	Terbinafine 250 mg	Tab
1042	Terbinafine HCL 1%, 10 gm Oint	Phile
1043	Terbutaline 1.5 mg + Bromhexine 4mg/5ml, 60 ml Sruyp equivalent to Brica-BM	Bott
1044	Terbutaline 2.5 mg + Bromhexine 8mg/5ml, 100 ml Syrup equivalent to Brica-BM	Bott
1045	Terlipressin 1mg/10 ml injection	Phile
1046	Tetanus Toxoid Vaccine 0.5 ml Inj	Amp



1047	Thiamine 100 mg	Tab
1048	Thiamine 75 mg	Tab
1049	Thiamine Hydrochloride 200mg/2ml Injection	Amp
1050	Thiocolchicoside 4 mg	Tab
1051	Thiocolchicoside 8 mg	Tab
1052	Thyroxine Sodium 12.5 mcg	Tab
1053	Thyroxine Sodium 100 mcg	Tab
1054	Thyroxine Sodium 25 mcg	Tab
1055	Thyroxine Sodium 50 mcg	Tab
1056	Thyroxine Sodium 75 mcg	Tab
1057	Timolol 0.25 % 5 ml Eye drop	Phile
1058	Timolol 0.5 % 5 ml Eyedrop	Phile
1059	Tinidazole 1 gm	Tab
1060	Tinidazole 500 mg	Tab
1061	Tiotropium 18 mcg + Formoterol 12 mcg Rotacap	Phile
1062	Tiotropium 18 mcg/puff MDI	Phile
1063	Tiotropium 18mcg Rotacap	Phile
1064	Tizanidine 2 mg	Tab
1065	Tizanidine 4 mg	Tab
1066	Tobramycin 0.3 w/v 5 ml Eye drop	Phile
1067	Tobramycin 20 mg Inj	Phile
1068	Tobramycin 60 mg Inj	Phile
1069	Tobramycin 80 mg Inj	Phile
1070	Topiramate 100 mg	Tab
1071	Topiramate 25 mg	Tab
1072	Topiramate 50 mg	Tab
1073	Torseamide 10 mg	Tab
1074	Torseamide 100 mg	Tab
1075	Torseamide 20mg	Tab
1076	Torseamide 20mg, 2ml Inj	Amp
1077	Torseamide 40	Tab

1078	Total Parenteral nutrition equivalent to Oliclinomel N4 -1000, 1000 ML	Phile
1079	Tramadol 100 mg	Tab
1080	Tramadol 50 mg	Tab
1081	Tramadol 50mg, 1 ml Inj	Amp
1082	Tranexamic acid 500 mg	Tab
1083	Tranexamic Acid 500 mg Inj	Amp
1084	Tretinoin 0.025 % w/w 20 gm Gel	Phile
1085	Tretinoin 0.05% w/v 20 gm Gel	Phile
1086	Triamcinolone oral gel 5 gm	Phile
1087	Trifluoperazine 5 mg + Trihexyphenidyl 2 mg	Tab
1088	Trihexyphenidyl 2mg	Tab
1089	Trimethoprim 160 mg + Sulphamethoxazole 800 mg	Tab
1090	Trimethoprim 20 mg + Sulphamethoxazole 100 mg	Tab
1091	Trimethoprim 80mg+Sulphamethoxazole 400 mg	Tab
1092	Trypsin+Chymotrypsin 100000 IU	Tab
1093	Trypsin+Chymotrypsin 200000 IU	Tab
1094	Ursodeoxycholic Acid 150 mg	Tab
1095	Ursodeoxycholic Acid 300 mg	Tab
1096	Vaginal wash Solution equivalent to V-Wash 100 ml	Phile
1097	Valethamate 8mg , 1ml Inj	Phile
1098	Vancomycin 500 mg Inj	Vial
1099	Vecuronium 4 mg Inj	Phile
1100	Vecuronium Bromide 10 mg Inj	Vial
1101	Venlafaxine 37.5 mg	Tab
1102	Venlafaxine 75 mg	Tab
1103	Verapamil 120 mg ER	Tab
1104	Verapamil 40 mg	Tab
1105	Verapamil 60 mg	Tab
1106	Vitamin B Complex with Zinc equivalent to SBZ	Cap
1107	Vitamin B-complex + Zinc 100ml Syrup	Bott
1108	Vitamin B-complex equivalent to Fortiplex-M	Cap

1109	Vitamin B-complex inj 2 ml equivalent to polybion	Amp
1110	Vitamin C 500 mg	Tab
1111	Vitamin D Drop (400mg/ml)	Bott
1112	Vitamin D Drop (800mg/ml)	Bott
1113	Vitamin E 200 mg	Cap
1114	Vitamin E 400 mg	Cap
1115	Vitamin E 600 mg	Cap
1116	Voglibose 0.2 mg	Tab
1117	Voglibose 0.3 mg	Tab
1118	Voriconazole 200 mg	Tab
1119	Warfarin 1 mg	Tab
1120	Warfarin 2 mg	Tab
1121	Warfarin 3 mg	Tab
1122	Warfarin 5 mg	Tab
1123	Xylometazoline 0.05 % 10 ml Nasal drop	Phile
1124	Xylometazoline 0.1 % 10 ml Nasal drop	Phile
1125	Zinc oxide 25% 30 gm Oint	Phile
1126	Zinc Sulphate 10 mg	Tab
1127	Zinc Sulphate 20 mg	Tab
1128	Zolpidem 10 mg	Tab
1129	Zolpidem 5 mg	Tab

## **Annex-2: List of Surgical Items Available in Hospital Pharmacy**

<b>S.N</b>	<b>Name of Products</b>	<b>Unit</b>
1	Abdominal Belt L	Pcs
2	Abdominal Belt M	Pcs
3	Abdominal Belt XL	Pcs
4	Abdominal Belt XXL	Pcs
5	Abdominal drain kit 20	Pcs
6	Abdominal drain kit 22	Pcs
7	Abdominal drain kit 24	Pcs
8	Abdominal drain kit 26	Pcs
9	Abdominal drain kit 28	Pcs
10	Absorbable Gelatin Spongue equivalent to Ab gel	Pcs
11	Absorbable Hemostate 2*3 equivalent to Surgicel	Pcs
12	Absorbable Hemostate 4*8 equivalent to Surgicel	Pcs
13	Adhesive Elastic Bandage	Pcs
14	Adult Diaper	Pcs
15	Ankle binder with socks L	Pcs
16	Ankle binder with socks M	Pcs
17	Ankle binder with socks S	Pcs
18	Ankle binder with socks XL	Pcs
19	Arm sling pouch L	Pcs
20	Arm sling pouch M	Pcs
21	Arm sling pouch S	Pcs
22	Arm sling pouch XL	Pcs
23	Arm sling pouch XXL	Pcs

24	Arthroscopy Drape	Pcs
25	Axillary Crutches L	Pcs
26	Axillary Crutches M	Pcs
27	Axillary Crutches S	Pcs
28	Bipolar Tip Cautery Wire	Pcs
29	Catgut (Chromic) 1 RB	Pcs
30	Catgut (Chromic) 1-0 RB	Pcs
31	Catgut (Chromic) 2 RB	Pcs
32	Catgut (Chromic) 2-0 RB	Pcs
33	Catgut (Chromic) 3-0 CB	Pcs
34	Catgut (Chromic) 3-0 RB	Pcs
35	Cautery Wire	Pcs
36	Central Venous Catheter Kit (CVP 7 FR) Double Lumen	Pcs
37	Central Venous Catheter Kit (CVP 7 FR) Triple Lumen	Pcs
38	Clavical brace M	Pcs
39	Clavical brace L	Pcs
40	Closed wound suction set 10	Pcs
41	Closed wound suction set 12	Pcs
42	Closed wound suction set 14	Pcs
43	Closed wound suction set 16	Pcs
44	Closed wound suction set 20	Pcs
45	Coated Polyglactin 1 CB Port (equivalent to Vicryl)	Pcs
46	Coated Polyglactin 1 RB (equivalent to Vicryl)	Pcs
47	Coated Polyglactin 1-0 CB (equivalent to Vicryl)	Pcs
48	Coated Polyglactin 1-0 RB (equivalent to Vicryl)	Pcs

49	Coated Polyglactin 2-0 CB (equivalent to Vicryl)	Pcs
50	Coated Polyglactin 2-0 RB (equivalent to Vicryl)	Pcs
51	Coated Polyglactin 3-0 RB (equivalent to Vicryl)	Pcs
52	Coated Polyglactin 4-0 RB (equivalent to Vicryl)	Pcs
53	Coated Polyglactin suture without needle 1-0 (equivalent to Vicryl)	Pcs
54	Cotton 100 gm	Pcs
55	Cotton 25 gm	Pcs
56	Cotton 50 gm	Pcs
57	Crepe Bandage 4"	Plastic Container
58	Crepe Bandage 6"	Plastic Container
59	Digital Thermometer	Pcs
60	Disposable cap female	Pcs
61	Disposable cap male	Pcs
62	Disposable mask triple ply	Pcs
63	Dressing Bandage 10 cm	Pcs
64	Dressing Bandage 5 cm	Pcs
65	ECG lead	Pcs
66	Elastic wrist splint L	Pcs
67	Elastic wrist splint M	Pcs
68	Elastic wrist splint S	Pcs
69	Endo Bronchial Suction Catheter 10	Pcs
70	Endo Bronchial Suction Catheter 12	Pcs
71	Endo Bronchial Suction Catheter 14	Pcs
72	Endo Bronchial Suction Catheter 16	Pcs

73	Endo Bronchial Suction Catheter 18	Pcs
74	Endo Bronchial Suction Catheter 6	Pcs
75	Endo Bronchial Suction Catheter 8	Pcs
76	Endotracheal tube cuffed 4.5	Pcs
77	Endotracheal tube cuffed 4/uncuffed 4	Pcs
78	Endotracheal tube cuffed 5	Pcs
79	Endotracheal tube cuffed 5.5	Pcs
80	Endotracheal tube cuffed 6	Pcs
81	Endotracheal tube cuffed 6.5	Pcs
82	Endotracheal tube cuffed 7	Pcs
83	Endotracheal tube cuffed 7.5	Pcs
84	Endotracheal tube cuffed 8	Pcs
85	Endotracheal tube uncuffed 3	Pcs
86	Endotracheal tube uncuffed 3.5	Pcs
87	Epidural Anesthesia Kit 16 G	Pcs
88	Epidural Anesthesia Kit 18 G	Pcs
89	External Catheter (Condom Catheter) L	Pcs
90	External Catheter (Condom Catheter) M	Pcs
91	External Catheter (Condom Catheter) XL	Pcs
92	External nasal splint	Pcs
93	External Nasal Splint	Pcs
94	Feeding Bottle	Pcs
95	Feeding Nipple	Pcs
96	Fiber glass cast (Cast Padding) 5"	Pcs
97	Fibrillar absorbable hemostate 2*4 (Surgicel)	Pcs
98	Finger cot Splint L	Pcs
99	Finger cot Splint M	Pcs

100	Finger cot Splint S	Pcs
101	Finger extension splint L	Pcs
102	Finger extension splint M	Pcs
103	Free needle 18 G	Pcs
104	Glucose Strip/Single piece	Pcs
105	Guide wire J type	Pcs
106	Guide wire plain type	Pcs
107	Hard cervical collar L	Pcs
108	Hard cervical collar M	Pcs
109	Hard cervical collar S	Pcs
110	Heat and Moisture Exchanger/Bacterial Air Filter	Pcs
111	Hernia Kit	Pcs
112	High concentration oxygen mask Adult	Pcs
113	High concentration oxygen mask Child	Pcs
114	Hot Water bag	Pcs
115	Infant Feeding Tube 10	Pcs
116	Infant Feeding Tube 5	Pcs
117	Infant Feeding Tube 6	Pcs
118	Infant Feeding Tube 7	Pcs
119	Infant Feeding Tube 8	Pcs
120	Insulin Syringe	Pcs
121	Intercostal drainage catheter 24	Pcs
122	Intercostal drainage catheter 26	Pcs
123	Intercostal drainage catheter 28	Pcs
124	Intravenous set-Adult	Pcs
125	Irrigation set for TUR	Pcs
126	Irrigator Syringe 60 ml	Pcs



127	IV Cannula 16 Single Safety	Pcs
128	IV Cannula 18 Single Safety	Pcs
129	IV Cannula 20 Single Safety	Pcs
130	IV Cannula 22 Single Safety	Pcs
131	IV Cannula 24 Single Safety	Pcs
132	IV Cannula 26 Single Safety	Pcs
133	IV Cannula Fixator	Pcs
134	Jet type Nebulizer Chamber Adult (equivalent to Aeroneb)	Pcs
135	Jet type Nebulizer Chamber Paediatric (equivalent to Aeroneb)	Pcs
136	Knee cap L	Pcs
137	Knee cap M	Pcs
138	Knee cap XL	Pcs
139	Lancet	Pcs
140	Latex Examination gloves	Pcs
141	Lega clip small type	Pcs
142	LMA (Laryngeal mask airway) 1	Pcs
143	LMA (Laryngeal mask airway) 2	Pcs
144	LMA (Laryngeal mask airway) 2.5	Pcs
145	LMA (Laryngeal mask airway) 3	Pcs
146	LMA (Laryngeal mask airway) 3.5	Pcs
147	LMA (Laryngeal mask airway) 4	Pcs
148	LMA (Laryngeal mask airway) 5	Pcs
149	Long knee brace L	Pcs
150	Long knee brace M	Pcs
151	LS belt L	Pcs
152	LS belt M	Pcs

153	LS belt S	Pcs
154	LS belt XL	Pcs
155	LS belt XXL	Pcs
156	Maternity Pad(1*10)	Pcs
157	Mixture of beeswax and Vaseline (Bonewax) 12 stick set	Pcs
158	Mixture of beeswax and Vaseline (Bonewax) 24 bar set	Pcs
159	Nasal Pack with thread/without thread	Pcs
160	Nasogastric Tube 10	Pcs
161	Nasogastric Tube 12	Pcs
162	Nasogastric Tube 14	Pcs
163	Nasogastric Tube 16	Pcs
164	Nasogastric Tube 18	Pcs
165	Oropharyngeal Airway 1	Pcs
166	Oropharyngeal Airway 2	Pcs
167	Oropharyngeal Airway 3	Pcs
168	Oropharyngeal Airway 4	Pcs
169	Paediatric Infusion set	Pcs
170	Paper Tape 1”	Pcs
171	Paper Tape 2”	Pcs
172	Petrolatum Gauze equivalent to Vaseline Guaze	Pcs
173	Pigtail Nephrostomy tube FR 10	Pcs
174	Pigtail Nephrostomy tube FR 12	Pcs
175	Pigtail Nephrostomy tube FR 16	Pcs
176	Plaster of Paris 4 “	Pcs
177	Plaster of Paris 6 “	Pcs
178	Polyamide (Nylon 6 and 6.6) 2-0 CB equivalent to Ethilon	Pcs

179	Polypropylene 1 CB(equivalent to Prolene)	Pcs
180	Polypropylene 1-0 CB(equivalent to Prolene)	Pcs
181	Polypropylene 2-0 RB(equivalent to Prolene)	Pcs
182	Polypropylene 3-0 CB(equivalent to Prolene)	Pcs
183	Polypropylene 3-0 RB(equivalent to Prolene)	Pcs
184	Polypropylene 4-0 CB	Pcs
185	Polypropylene 5-0 CB	Pcs
186	Polypropylene 2-0 CB (equivalent to Prolene)	Pcs
187	Polypropylene Mesh 8*15 (equivalent to Prolene Mesh)	Pcs
188	Polypropylene Mesh 15*15 (equivalent to Prolene Mesh)	Pcs
189	Pregnancy test kit (HCG kit)	Pcs
190	Pressure extension Line 150 cm (equivalent to vein-o-line)	Pcs
191	Pressure monitoring line (equivalent to PMO line)	Pcs
192	RAE (Ring-Adair-Elwyn) Tube Nasal 5	Pcs
193	RAE (Ring-Adair-Elwyn) Tube Nasal 5.5	Pcs
194	RAE (Ring-Adair-Elwyn) Tube Nasal 6	Pcs
195	RAE (Ring-Adair-Elwyn) Tube Nasal 6.5	Pcs
196	RAE (Ring-Adair-Elwyn) Tube Oral 4	Pcs
197	RAE (Ring-Adair-Elwyn) Tube Oral 4.5	Pcs
198	RAE (Ring-Adair-Elwyn) Tube Oral 5	Pcs
199	RAE (Ring-Adair-Elwyn) Tube Oral 5.5	Pcs
200	RAE (Ring-Adair-Elwyn) Tube Oral 6	Pcs
201	RAE (Ring-Adair-Elwyn) Tube Oral 6.5	Pcs
202	RAE (Ring-Adair-Elwyn) Tube Oral 7	Pcs
203	RAE (Ring-Adair-Elwyn) Tube Oral 7.5	Pcs
204	Respiratory Exerciser equivalent to Respirometer	Pcs

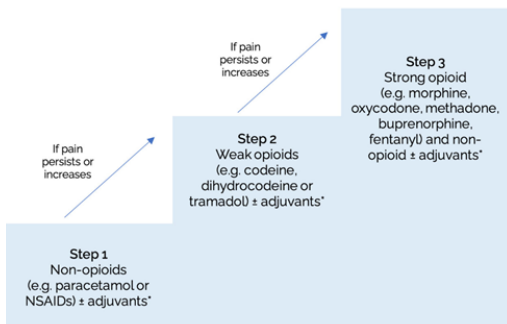
205	Roller bandage 4"	Pcs
206	Roller Bandage 6"	Pcs
207	Sanitary Pad long( 1*7)	Pcs
208	Scalp Vein Set (equivalent to Butterfly cannula)	Pcs
209	Short knee brace	Pcs
210	Silk (Braided) 1 CB	Pcs
211	Silk (Braided) 1-0 CB (equivalent to Mersilk)	Pcs
212	Silk (Braided) 2-0 CB(equivalent to Mersilk)	Pcs
213	Silk suture without needle 3-0	Pcs
214	Skin Stapler	Pcs
215	Skin traction set	Pcs
216	Soft cervical collar L	Pcs
217	Soft cervical collar M	Pcs
218	Soft cervical collar S	Pcs
219	Solution Topocryl (N- butyl -2-cyanoacrylate ) 0.25 ml	Pcs
220	Spacer for Inhalation	Pcs
221	Spacer with mask for inhalation	Pcs
222	Spinal needle 22 G	Pcs
223	Spinal needle 25 G	Pcs
224	Spinal needle 26 G	Pcs
225	Sterile Gloves equivalent to Ortho Gloves 7	Pair
226	Sterile Gloves equivalent to Ortho Gloves 7.5	Pair
227	Sterile Gloves equivalent to Ortho Gloves 8	Pair
228	Sterile Surgical Gloves 6 equivalent to Surgicare	Pair
229	Sterile Surgical Gloves 6.5 equivalent to Surgicare	Pair
230	Sterile Surgical Gloves 7 equivalent to Surgicare	Pair

231	Sterile Surgical Gloves 7.5 equivalent to Surgicare	Pair
232	Surgical Gown	Pcs
233	Supra pubic ballon Catheter (Supra Catheter) 16	Pcs
234	Supra pubic ballon Catheter (Supra Catheter) 18	Pcs
235	Surgical Blade 10	Pcs
236	Surgical Blade 11	Pcs
237	Surgical Blade 15	Pcs
238	Surgical Blade 20	Pcs
239	Surgical Blade 22	Pcs
240	Syringe 1 ml	Pcs
241	Syringe 10 ml	Pcs
242	Syringe 20 ml	Pcs
243	Syringe 3 ml	Pcs
244	Syringe 5 ml	Pcs
245	Syringe 50 ml	Pcs
246	Tayler brace L	Pcs
247	Tayler brace M	Pcs
248	Tayler brace XL	Pcs
249	Tennis Elbow L	Pcs
250	Tennis Elbow M	Pcs
251	Tennis Elbow XL	Pcs
252	Three way stopcock (3 way cannula)	Pcs
253	Thumb spica splint L	Pcs
254	Thumb spica splint M	Pcs
255	Thumb spica splint S	Pcs
256	Tissue Paper	Pcs
257	Tracheostomy Tube Cuffed 6	Pcs
258	Tracheostomy Tube Cuffed 6.5	Pcs
259	Tracheostomy Tube Cuffed 7	Pcs
260	Tracheostomy Tube Cuffed 7.5	Pcs

261	Tracheostomy Tube Cuffed 8	Pcs
262	T-Tube 12	Pcs
263	T-Tube 14	Pcs
264	T-Tube 16	Pcs
265	TUR (Trans Urethral Resection) Set	Pcs
266	Under water seal drainage bag	Pcs
267	Urethral Catheter (Dj Stent) one end open	Pcs
268	Urethral Catheter (Dj Stent) two end open	Pcs
269	Urine collection bag Adult	Pcs
270	Urine collection bag Paediatric	Pcs
271	Urocatheter (Folyes) 10 G 2 Way	Pcs
272	Urocatheter (Folyes) 12 G 2 Way	Pcs
273	Urocatheter (Folyes) 14 G 2 Way	Pcs
274	Urocatheter (Folyes) 16 G 2 Way	Pcs
275	Urocatheter (Folyes) 18 G 2 Way	Pcs
276	Urocatheter (Folyes) 18 G 3 Way	Pcs
277	Urocatheter (Folyes) 20 G 2 Way	Pcs
278	Urocatheter (Folyes) 20 G 3 Way	Pcs
279	Urocatheter (Folyes) 22 G 3 Way	Pcs
280	Urocatheter (Folyes) 24 G 3 Way	Pcs
281	Urocatheter (Folyes) 8 G 2 Way	Pcs
282	Ventilation tube for ear Adult	Pcs
283	Ventilation tube for ear Paediatric	Pcs
284	Ventilator Circuit	Pcs
285	Yankaur suction set equivalent to vaccu suck	Pcs
286	Zigzag Cotton 100 gm	Pcs
287	Zigzag Cotton 50 gm	Pcs

## Annex-3: Pictorial Diagram of Commonly Used Guidelines

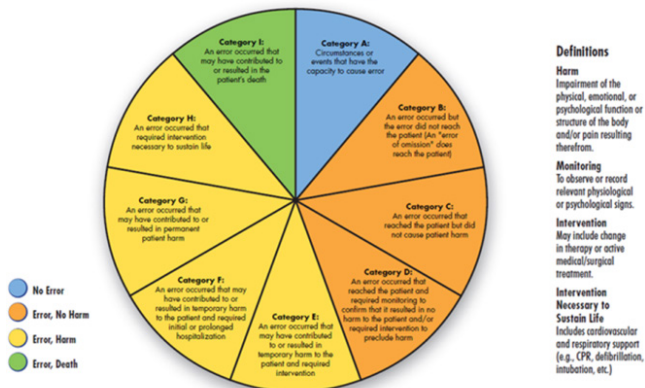
### WHO Analgesic Ladder



\*Adjuvants can be used along any step of the ladder, these may include antidepressants, anticonvulsants, corticosteroids, and anxiolytics

GEEKY MEDICS

### NCC MERP Index for Categorizing Medication Errors



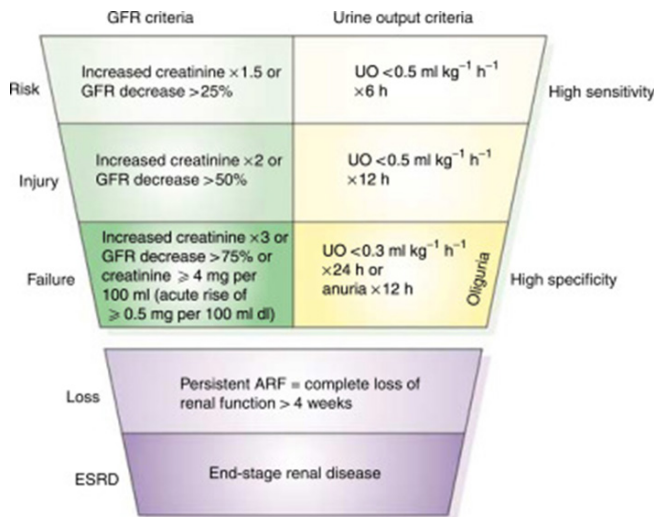


Fig.: RIFLE classification

Parameter	Assign 1 point	Assign 2 points	Assign 3 points
Ascitis	Absent	Slight	Moderate
Bilirubin (mg/dL)	$< 2$	2-3	$>3$
Albumin (g/dL)	$>3.5$	2.8-3.5	$<2.8$
Prothrombin time (second over control) or INR	$<4$	4-6	$>6$
Encephalopathy	None	Grade 1-2 (Mild to moderate)	Grade 3-4 (Severe)

Fig.: Child Pugh Score



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