

BHARATPUR

HOSPITAL FORMULARY 2082

5th EDITION



Government of Nepal

BHARATPUR HOSPITAL

Drugs & Therapeutics Committee (DTC)

It is our collective privilege to present the **5th Edition of the Bharatpur Hospital Formulary**. As healthcare continues to evolve, Bharatpur Hospital remains resolute in its commitment to the **Hospital Pharmacy Directive-2072**, ensuring that our clinical practices are guided by evidence-based medicine, transparency, and safety.

This edition represents a significant milestone in our journey toward pharmaceutical excellence. Building upon the foundation of previous versions, the 5th Edition has been meticulously updated by a collaborative team of pharmacists, physicians, and nurses to serve as the definitive guide for rational drug use within our institution.

What's New in This Edition?

To better align with national health priorities and improve patient outcomes, we have introduced several critical updates:

- **National List of Essential Medicines:** Integration of the latest national standards to ensure the availability of priority medications.
- **Comprehensive List of Free Drugs:** A clear directory of medicines provided at no cost to patients, supporting the government's commitment to accessible healthcare.
- **ART Drug Listing:** A dedicated section for Antiretroviral Therapy (ART) drugs to support HIV/AIDS treatment programs.
- **Expanded Clinical Data:** Continued inclusion of the WHO AwaRe classification for antibiotics, pregnancy safety categories, and specialized nursing considerations to promote the highest standards of patient-centered care.

This formulary is a testament to the synergy between the **Hospital Development Committee**, the **Hospital Administration**, and the **Drug and Therapeutics Committee (DTC)**. We extend our sincere gratitude to the **Pharmacy Department** and the entire **Editorial Team** for their exhaustive efforts in reviewing treatment protocols and dosing recommendations.

We also recognize the vital role of the Health Insurance Scheme of Nepal, the Social Security Fund (SSF), and the Drug Bulletin of Nepal (DBON) in shaping the contents of this compendium.

**Drugs & Therapeutics Committee
Bharatpur Hospital**

The government of Nepal and Bharatpur Hospital are committed to ensure basic and specialized health services to the people. Addressing Hospital Pharmacy Directive-2072, it is our pleasure to present the 5th 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

I felt honored to roll out the newest edition (5th) of Hospital Formulary of Bharatpur Hospital. It is the result of perseverance, collective expertise, dedication and unwavering commitment. I extend my sincere appreciation to the editorial team, department of pharmacy for this excellent, comprehensive formulary which also gives quick view, reference for clinical use of drugs and surgical items. It has included the critical update of National list of essential medicine, Comprehensive list of free drugs, ART drug listing and expanded critical datas.



As a chairman of Drug and Therapeutic Committee, I pay gratitude to the chairman of Bharatpur Hospital Development Committee, Medical Superintendent, members of Drugs and Therapeutic committee and all hospital staffs who helped directly or indirectly. I look forward to continuing the updated and edited version in coming years.

Dr. Ramesh Bhandari
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How to use this Compendium?

The drug classified in the formulary is by taking the reference from Nepalese National Formulary 3rd 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	Inclusion on NLEM
Amlodipine 2.5 mg Tab	HI	C	R. T	ED
Amlodipine 5 mg Tab	HI	C	R. T	ED
Amlodipine 10 mg Tab	HI	C	R.T	NA

1st Column: Generic Name, Strength and Dosage form of Medicines.

2nd Column: Availability of Drug on Insurance Scheme, NA indicates Not available.

3rd Column: Pregnancy Category.

4th Column: Storage condition of the drug.

5th Column: Drugs Listed on NLEM .

In case of antibiotics, the **6th column** indicates the WHO AWaRe classification of antibiotics.

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 on Pharmaceutical Dosage form.

S N	Dosage Form	Information
A.	Solid Dosage Forms	
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 the tongue and not allow it to take food until completely absorbed.
4	Pessary Tablet (pess)	For vaginal use only, store in a cool place.
5	Suppository (Supp)	For rectal use only, store in a cool place.

6	Enteric coated Tablet	They are designed to dissolve in the 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 reduces 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 periods. Do not crush or chew before administering.
9	Delayed release Tablet	They are designed to protect from low stomach pH or stomach irritation by drug. Once it reaches the desired pH site, it works like an immediate tab by releasing drugs. Do not crush or chew before administering.
10	Powder Oral (pow)	They are designed to dissolve in liquid before administering.
11	Rotacap (R/C)	Capsules contain powder for inhalation by use of rotahaler or revolizer.
B	Semisolid Dosage	
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 the eye.
3	Cream (Cr)	For external use, stored in cool places, 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.
C	Liquid Dosage	
1	Solution (Sol)	A homogenous liquid mixture designated to use externally.
2	Gargle (Garg)	For use externally; do not swallow in large quantities. If appropriate dilute
3	Mouth Wash (MW)	Same as Gargle.
4	Mouth Paint (MP)	Not to be swallowed in large quantities. 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 do 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 prolonged and excessive use.
14	Nasal Spray (N/S)	Do not use it if the seal is broken or missing. Keep out the 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 sources. Do not exceed the prescribed dose.
16	Respiratory Solution (R/Sol)	For inhalation purpose only.
17	Parenteral Injection (Inj)	Sterile preparation for parenteral use only.

Abbreviations:

S.N.	Abbreviations	Meaning
1	BD	Twice a day
2	E/D	Ear Drop, Eye Drop
3	Gtt	(guttae) Drop

4	HS	At bedtime
5	ID	Intradermal
6	IM	Intramuscular
7	INF	Infusion
8	IV	Intravenous
9	MDI	Metered dose inhaler
10	OD	Once a day
11	PV	Per vagina
12	PR	Per rectum
13	PRN or P.R.N	(pro re nata) As needed
14	QID	Four times a day
15	RC	Rotacap
16	Rx	Prescription
17	Soln	Solution
18	SOS	(Si Opus Sit) if needed
19	Supp	Suppository
20	Susp	Suspension
21	Syp	Syrup
22	Tbsp	Table spoon
23	TDS	Three time a day
24	Top	Topical
25	Tsp	Teaspoon
26	W/O	Without
27	W/F	With food
28	Sc	subcutaneous
29	IM	Intramuscular

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

1.1. Antacids

Antacids are chemical buffers that neutralize stomach acid, increasing gastric pH for relief from ulcer dyspepsia and non-erosive GER.

1. Aluminum Hydroxide and Magnesium Hydroxide

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

Caution: Renal impairment.

Precaution: Avoid taking other medicines within 2 hours before or after you take aluminum hydroxide, magnesium hydroxide, and simethicone. Prolonged use may lead to constipation (Aluminium) or diarrhea (Magnesium).

Preparation Available:

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

2. Sodium Bicarbonate

Indication: Relief of discomfort in mild urinary-tract infections; alkalinization of urine: metabolic acidosis.

Side-effects: Eructation, alkalosis on prolonged use.

Precautions: Use cautiously in Cardiac disease; patients on sodium-restricted diet; elderly; Pregnancy.

Preparation Available:

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

1. Atropine

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

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

Caution: patients with glaucoma, cardiac conditions, prostatic hypertrophy, elderly and children.

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

Preparation Available:

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

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

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 20mg Tab	NA	B	RT	NA
Dicyclomine 10 mg/5 ml, 30 ml Syrup	HI	B	RT	NA
Dicyclomine 10 mg simethicone 40 mg / 5ml , 30ml Syrup	HI	B	RT	NA

4. Mebeverine

Indication: Irritable bowel syndrome, adjunct in gastrointestinal disorder characterized by smooth muscle spasm.

Adverse effects: Rash, urticaria, angioedema.

Caution: 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	NA
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Mebeverine 200 mg SR tab	NA	NA	RT	NA
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Drotaverine

Indication: Smooth muscle spasm.

Adverse effects: Nausea, vomiting, vertigo, transitory decrease in blood pressure.

Preparation Available:

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

5. 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	D	CT	NA
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1.3 Ulcer-healing drugs

1. Ranitidine

Indication: Benign duodenal ulcer, gastric ulcer, reflux esophagitis and Zollinger-Ellison syndrome.

Adverse effects: Headache, dizziness, myalgia, nausea, skin rash and diarrhea or constipation.

Caution: 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 esophagitis, 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	ED
Ranitidine 50 mg/2 ml Inj	HI	B	RT	NA
Ranitidine 75mg/5ml,	NA	B	RT	NA

1. Esomeprazole

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

Adverse effects: Nausea, vomiting, diarrhea, abdominal colic, skin rash, headache and dizziness.

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

Gastro-esophageal 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 esophagitis, 20 mg daily for up to 4 weeks, then in adult over 18 years 20 mg daily when required. Not recommended for children.

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

Preparation Available:

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

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 esophagitis, 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 esophagitis refractory to other treatment, may be continued at 20 mg daily.

Preparation Available:

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

3. Pantoprazole

Indication: See under Esomeprazole.

Adverse effects: 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 esophagitis, 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	NA
Pantoprazole 40 mg tab	HI	B	RT	NA
Pantoprazole 40 mg Inj	HI	B	RT	NA

Combination Available:

Pantoprazole 40mg + Domperidone 30mg pellets	HI	NA	RT	NA
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4. Rabeprazole

Indication: See under Esomeprazole.

Adverse effects: 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-esophageal 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 for children.

Preparation Available:

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

5. Ilaprazole

Indication: Similar to PPI.

Adverse effects and cautions: See omeprazole.

Preparation Available:

Ilaprazole 10 mg tab	NA	B	RT	NA
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Lansoprazole

Indication: Similar to PPI.

ADR and cautions: See under omeprazole.

Preparation Available:

Lansoprazole 30mg Tab	HI	B	RT	NA
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6. Sucralfate

It is a complex of aluminum 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: Constipation, diarrhoea, dry mouth, nausea, dizziness.

Caution: 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	NA
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1.4 Antiemetics

1. Domperidone

It blocks the dopamine (D2) receptors in the CTZ.

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

Adverse effects: Gynecomastia, galactorrhea, 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	ED
Domperidone 10 mg MDT	NA	C	RT	NA
Domperidone 5mg/5ml, 30 ml susp.	HI	C	RT	ED

2. Metoclopramide

It blocks dopamine receptors in CTZ.

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

Adverse effect: 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	ED
Metoclopramide 5 mg/5 ml, 30 ml syp	NA	B	RT	NA
Metoclopramide 10 mg/ml, 2 ml Inj	HI	B	RT	NA

3. Ondansetron

It is a 5-HT₃ 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: Headache, flushing, transient visual disturbances, arrhythmias, hypotension.

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

4. Prochlorperazine

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

Indication: Nausea, vomiting, vertigo, labyrinthine disorders.

Adverse effect: Dry mouth, drowsiness, extrapyramidal symptoms.

Caution: 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	ED
Prochlorperazine 12.5 mg/ml, 1ml Inj	HI	C	RT	ED

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: Drowsiness, dryness of mouth, blurring of vision, confusion, fatigue.

Caution: Safe use of promethazine during pregnancy (Except during labor) 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	ED
Promethazine 25 mg/ml 2 ml Inj	HI	C	RT	ED
Promethazine 5 mg/5 ml, 60 ml Susp	HI	C	RT	ED

6. Granisetron

It acts by blocking the specific 5HT₃ receptor in GT tract and CNS.

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

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

Preparation Available:

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

6. 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	NA
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1.5 Antidiarrhoeal drugs

1. Loperamide

It is an antiperistalsis antidiarrheal agent.

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

Adverse effects: Abdominal pain, distension or discomfort, constipation, dry mouth, nausea and vomiting.

Caution: 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	NA
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2. Oral Rehydration Salts (ORS)

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

Adverse effects: Vomiting (too rapid administration), hypernatremia and hyperkalemia (overdose in renal impairment or administration of too concentrated solution). The boiled and cool water must be used to prepare the ORS solution.

Caution: 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	ED
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3. Zinc

Indication: Adjunct to ORS in acute diarrhea.

Adverse effect: Abdominal pain, dyspepsia, nausea, vomiting, diarrhoea, headache, gastritis.

Caution: Acute renal failure (zinc may accumulate).

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	ED
Zinc Sulfate 20 mg Tab	HI	NA	RT	ED

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 tumors of the pancreas and GI tract, diarrhoea induced by chemotherapy, diarrhoea associated with HIV infection and diabetes; sulfonylurea overdose to control hypoglycemia.

Adverse effects: Gallbladder problem (like decreased gallbladder contractility and gallstones), dysglycemia, hypothyroidism, bradycardia.

Caution: Hepatic and renal impairment (may necessitate dosing adjustments).

Preparation Available:

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

1.6 Cathartic drugs

Cathartics, laxative and purgative are terms describing drugs that promote defecation. A balanced diet including adequate fluid intake and fiber 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: Abdominal cramp, colitis, nausea, vomiting and local irritation with rectal use.

Caution: 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	B	RT	ED
Bisacodyl 10 mg Supp	HI	B	RT	NA

Ispaghula husk

It is a bulk-forming cathartic.

Indication: Constipation.

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

Dose: 0.5 to 2 gm

Preparation Available:

Ispaghula husk	NA	A	RT	ED
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2. Lactulose

It is osmotic cathartic.

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

Adverse effects: Nausea, vomiting, gaseous distention.

Caution: Diabetic patients (the lactulose solution may contain free lactose and galactose).

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	ED
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3. 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: 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	NA
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4. Sodium Picosulphate

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

Indication: Constipation.

Adverse Effect: Abdominal cramp, nausea, vomiting, dizziness and excessive use can cause diarrhoea, hypokalemia.

5. Glycerin and allied preparation

Osmotic cathartic draws fluid into the colon and stimulates evacuation.

Indication: Constipation.

Adverse effects: Rectal irritation, burning sensation, cramping pain.

Preparation Available:

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

1. Sulfasalazine

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

Adverse effects: Blood disorder, cough, dizziness, fever, insomnia, megaloblastic anemia, proteinuria stomatitis, taste disturbances, tinnitus.

Caution: Acute porphyrias, history of allergy, history of asthma, maintain adequate fluid intake, risk of hematological toxicity, risk of hepatotoxicity, risk of renal toxicity. Theoretical risk of neonatal hemolysis in the third trimester, adequate folate supplements should be given to the mother.

Preparation Available:

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

2. Mesalazine

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

Adverse effects: Dizziness, oligospermia.

Preparation Available:

Mesalazine 400 mg tab	HI	B	RT	NA
Mesalazine 1200 mg tab	HI	B	RT	NA

1.8. Drugs affecting biliary composition and flow

1. Ursodeoxycholic acid / Ursodiol

Indication: Dissolution of gallstones, primary biliary cirrhosis.

Adverse effects: Nausea, vomiting, diarrhoea, gallstone calcification, pruritus.

Caution: Avoid 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	NA
Ursodeoxycholic acid 150 mg Tab	HI	B	RT	NA

1.9. Drugs for Rectal and anal disorders

1. Lignocaine

Indication: Hemorrhoids (piles) and anal fissure.

Adverse effects: 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	ED
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2. Nitroglycerine

Indication: Chronic anal fissure.

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

Preparation Available:

Nitroglycerine 0.2 % Oint	HI	C	RT	NA
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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: Throbbing headache, dizziness, flushing, tachycardia, syncope and cardiovascular collapse.

Caution: Patients with postural hypotension; hypovolemia; Glaucoma.

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	NA
Glyceryl Trinitrate 0.5 mg Sub. Lingual Tab	NA	C	RT	ED

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	HI	C	RT	ED
Isosorbide dinitrate 10 mg Tab	HI	C	RT	ED
Isosorbide dinitrate 20 mg Tab	NA	C	RT	NA

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	HI	C	RT	NA
Isosorbide mononitrate 10 mg Tab	HI	C	RT	NA
Isosorbide mononitrate 20 mg Tab	HI	C	RT	NA
Isosorbide mononitrate 30 mg XL Tab	HI	C	RT	NA

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: Bradycardia, heart block, tiredness, fatigue, bronchospasm.

Caution: 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	HI	C	RT	NA
Propranolol 20 mg Tab	HI	C	RT	NA
Propranolol 40 mg Tab	HI	C	RT	NA

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, supraventricular 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	HI	D	RT	NA
Atenolol 50 mg tab	HI	D	RT	NA

3. Bisoprolol

It is a cardio selective beta-blocker.

Indication: Hypertension, angina, adjunct in heart failure.

Adverse effects: Cramp, depression, muscle weakness.

Caution: 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 de-compensated heart failure requiring intravenous inotropes.

Preparation Available:

Bisoprolol 2.5 mg Tab	HI	C	RT	NA
Bisoprolol 5 mg Tab	HI	C	RT	ED
Bisoprolol 10 mg Tab	HI	C	RT	NA

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: Postural hypotension, headache, dizziness, bradycardia and impotence.

Caution: Avoid in 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	HI	C	RT	NA
Carvedilol 6.25 mg Tab	HI	C	RT	NA
Carvedilol 12.5 mg Tab	HI	C	RT	NA

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 IV 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 IV 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	HI	C	RT	NA
Metoprolol 25 mg XL Tab	HI	C	RT	NA
Metoprolol 50 mg XL Tab	HI	C	RT	NA
Metoprolol 100mg XL Tab	HI	C	RT	NA
Metoprolol 1 mg/ml 5 ml Inj	HI	C	CRT	NA

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: Flushing, headache, ankle edema, abdominal pain, palpitation, hypotension, impotence and gynecomastia.

Caution: 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	ED
Amlodipine 5 mg Tab	HI	NA	RT	ED
Amlodipine 10 mg Tab	HI	NA	RT	NA

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	NA
S Amlodipine 5 mg Tab	HI	C	RT	NA

3. Verapamil

Verapamil reduces afterload and myocardial contractility.

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

Adverse effects: Constipation, nausea, abdominal discomfort, headache, dizziness, gingival hyperplasia, bradycardia and heart block.

Caution: 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	NA
Verapamil 60 mg Tab	NA	C	RT	NA
Verapamil 120 mg Tab	HI	C	RT	NA

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: Bradycardia, dizziness, gastro-intestinal disturbances, hypotension, malaise.

Caution: Cardiac conduction disorders, heart failure, liver and renal impairment.

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

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 pnyphalaxis, hiccups in palliative care.

Adverse effects: Dizziness, giddiness, flushing, lightheadedness, peripheral oedema and palpitation.

Caution: Patients with congestive heart failure or aortic stenosis, especially in those receiving concomitant beta-blocking agents, 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	NA
Nifedipine 10 mg Tab	HI	C	RT	NA
Nifedipine 20 mg SR Tab	HI	C	RT	ED

6. Nimodipine

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

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

Adverse effects: Hypotension, flushing, headache, sweating and feeling of warmth, gastro-intestinal disorders.

Caution: 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^+ 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: Nausea, cutaneous vasodilation with flushing, dizziness, headache, increase heart rate, rectal bleeding.

Caution: 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-ischemic agent which, in addition to providing symptom relief and functional improvement in patients with angina pectoris, has a cytoprotective action during ischemia. 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 e.g. Quinidine, Lidocaine, flecainide etc.

1. Disopyramide

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

Adverse effects: Hypotension, AV block, dry mouth, blurred vision.

Caution: 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 IV 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:

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

Adverse effects: 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 IV infusion, 0.5-10 micrograms/minute.

Preparation Available:

Isoproterenol 1 mg Inj	HI	C	CRT	NA
Isoprenaline 2mg Inj	HI	C	CRT	NA

2. Esmolol

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

Adverse effects: 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	NA
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Class III

It substantially prolongs cardiac action potential.

1. Amiodarone:

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

Adverse effects: Bradycardia, phototoxicity, raised serum transaminases, bradycardia and pulmonary toxicity.

Caution: Liver function test and thyroid function tests before treatment and then every 6 months. Serum potassium measurement and chest X-ray 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 IV infusion over at least 3 minutes 300 mg.

Preparation Available:

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

Class IV

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

1. Adenosine:

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

Adverse effects and cautions: Chest pain, transient facial flush, bronchospasm, nausea and severe bradycardia.

Caution: 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 IV 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	NA
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2.6 Antihypertensive Drugs Antiadrenergic

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: Depression, oedema.

Caution: Patient taking calcium-channel blocker or cardiac glycosides or using inhaled anesthetics

Contraindication: Acute or decompensated heart failure requiring intravenous inotropes.

Dose: Hypertension 5 mg daily.

Preparation Available:

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

4. Labetalol

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

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

Adverse effects: Dizziness, lightheadedness, nausea, tingling sensation of scalp, fatigue.

Caution: 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	NA
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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: Persistent dry cough, headache, loss of taste, diarrhoea, hypotension (usually with initial dose), skin rash and angioedema of the extremities, myocardial infarction, angina, impotence.

Caution: Impaired liver function.

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	NA
Enalapril 5 mg Tab	HI	C	RT	ED
Enalapril 10 mg Tab	HI	C	RT	ED

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	NA	D	RT	NA
Ramipril 2.5 mg Tab	HI	D	RT	ED
Ramipril 5 mg Tab	HI	D	RT	ED
Ramipril 10 mg Tab	NA	D	RT	NA

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

Caution: 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	ED
Losartan 50 mg Tab	HI	C	RT	ED
Losartan 75 mg Tab	HI	C	RT	NA

2. Telmisartan

Indication: See under losartan.

Adverse effects: Back pain, chest pain, arthralgia, eczema, GI-disturbances.

Caution: 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	NA
Telmisartan 40 mg Tab	HI	C	RT	NA
Telmisartan 80 mg Tab	HI	C	RT	NA

3. Olmesartan

Indication: Hypertension.

Adverse effects: Chest pain, arthritis, fatigue, GI disturbances, hematuria.

Caution: 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	NA	C	RT	NA
Olmesartan 20 mg Tab	HI	C	RT	NA
Olmesartan 40 mg Tab	HI	C	RT	NA

4. Irbesartan

Indication: Hypertension, Hypertension in patient receiving hemodialysis, renal diseases in hypertensive type 2 diabetes mellitus.

Adverse effects: Fatigue, musculoskeletal pain, nausea, vomiting; don't use in pregnant risk of congenital malformation.

Caution: Renal artery stenosis; avoid in bilateral renal artery stenosis Dose: Hypertension 150 mg daily initially and can be increased up to 300 mg daily.

Preparation Available:

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

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: Hypokalemia, hyponatremia, tinnitus, reversible or permanent hearing impairment or reversible deafness hyperuricemia and gout.

Caution: Patients with hepatic cirrhosis.

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 IM injection or slow IV 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	ED
Furosemide 40 mg Tab	HI	C	RT	ED
Furosemide 10 mg/ml, 2 ml Inj	HI	C	RT	ED

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

3. Hydrochlorothiazide

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

Indication: Hypertension, oedema.

Adverse effects: Hypokalemia, hyperuricemia, skin rash, thrombocytopenia, hyperglycemia, postural hypotension, impotence.

Cautions: Patients with severe renal disease because the drugs decrease glomerular filtration rate (GFR) and may precipitate azotemia.

Contraindication: 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	NA
Hydrochlorothiazide 25 mg Tab	HI	B	RT	ED
Hydrochlorothiazide 50 mg Tab	HI	B	RT	ED

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: Skin rash, hypokalemia, anorexia, diarrhoea, orthostatic hypotension.

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 PO_4 reabsorption.

Indication: Hypertension, Oedema.

Adverse effects: Chest pain, depression, dizziness, drowsiness.

Caution: 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	NA
Metolazone 5 mg Tab	HI	B	RT	NA

Potassium Sparing Diuretics

1. Amiloride

It inhibits Na/K-ATpase, decreases Ca, Mg and Hydrogen excretion.

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

Adverse effects: Hyperkalemia, hyponatremia, postural hypotension, diarrhoea, loss of appetite, dizziness.

Caution: 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: Hyperkalemia, loss of appetite, nausea, vomiting, gynecomastia, menstrual irregularities, impotence.

Caution: Renal or Hepatic Impairment.

Contraindication: Hyponatremia, hyperkalemia, 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	NA
Spironolactone 25 mg Tab	HI	C	RT	ED
Spironolactone 50 mg Tab	NA	C	RT	NA
Spironolactone 100 mg Tab	HI	C	RT	NA

Eplerenone

It is a selective aldosterone receptor antagonist.

Indication: Adjunct in chronic mild heart failure.

Adverse effects: Azotemia, constipation diarrhoea, dizziness, hyperkalemia, hypotension.

Caution: For elderly.

Contraindication: Hyperkalemia.

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: Acidosis, thirst, urinary retention, chills, fever, angina-like chest pain.

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

Preparation Available:

Mannitol 20 % 100 ml Inj	HI	C	RT	ED
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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	NA	RT	NA
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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	NA	RT	NA
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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	NA
Telmisartan 80 mg + Hydrochlorothiazide 12.5 mg Tab	HI	NA	RT	NA

2.10 Centrally acting antihypertensive

1. Methyldopa

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

Indication: Hypertension in pregnancy.

Adverse effects: Edema, vomiting, dry mouth, sedation, dizziness, sexual dysfunction, and lupus erythematosus like syndrome.

Caution: 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	ED
Methyldopa 500 mg Tab	HI	B	RT	NA

2. Clonidine

Central sympatholytic via stimulation of central alpha-2 receptors.

Indication: Hypertension, prevention of recurrent migraine.

Adverse effects: Constipation, depression, dizziness, drowsiness, dry mouth, headache, postural hypotension.

Caution: 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	NA
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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	NA	RT	NA
Amlodipine 5 mg + Atenolol 50 mg Tab	HI	NA	RT	NA

2. Amlodipine and Losartan

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

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

3. Telmisartan and Amlodipine

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

Telmisartan 40 mg + Amlodipine 5 mg Tab	HI	NA	RT	NA
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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	NA	RT	NA
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Ramipril and Hydrochlorothiazide

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

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

5. Atenolol and Hydrochlorothiazide

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

Preparation Available:

Atenolol 50 mg + Hydrochlorothiazide 12.5 mg Tab	NA	C	RT	NA
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6. 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	NA
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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: Arrhythmias, diarrhoea, dizziness, loss of appetite, nausea, vomiting and yellow vision.

Caution: Patients with hypothyroidism, acute myocardial infarction (risk of arrhythmia); hypercalcemia, hypomagnesaemia and Hypokalemia (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 digitalization, 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 IV 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	ED
Digoxin 0.25 mg Tab	HI	C	RT	ED
Digoxin 0.25 mg/ml, 2 ml Inj	HI	C	RT	ED

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: 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	NA
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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: Ectopic beats, tachycardia, anginal pain, palpitation, dyspnea, 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.

Caution: 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 fetus. 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 IV infusion, 2-5 micrograms/kg/minute initially.

Preparation Available:

Dopamine 200 mg/5 ml Inj	HI	C	RT	NA
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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: Tachycardia, increase in systolic blood pressure, phlebitis.

Caution: 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	NA
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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 hemorrhagic disease of newborn.

Adverse effects: Hypersensitivity characterized by flushing of the face, bronchospasm, dyspnea, hypotension.

Caution: Injection should be given very slowly because of risk of vascular collapse.

Preparation Available:

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

Heparin is an anticoagulant drug which acts by catalyzing 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: Haemorrhage, thrombocytopenia, hypersensitivity reaction.

Caution: Osteoporosis (after prolonged use); low body-weight (increased risk of bleeding).

Contraindication: Presence of active bleeding from any site, hemophilia, purpura and thrombocytopenia.
Dose: Prophylaxis of deep-vein thrombosis and pulmonary embolism, by subcutaneous injection, 5000 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 IV injection, loading dose of 5 000 units (75 units/kg) followed by continuous infusion of 18 units/kg/hour or by SC 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	NA
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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 Sc 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. Orthopedic 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	NA
Enoxaparin 60 mg Inj	HI	B	RT	ED

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: Haemorrhage, nausea, vomiting and abdominal cramps.

Caution: 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	ED
Warfarin 2 mg Tab	HI	X	RT	ED
Warfarin 3 mg Tab	HI	X	RT	NA
Warfarin 5 mg Tab	HI	X	RT	ED

Antiplatelet drugs

1. Aspirin

It inhibits synthesis of prostaglandin by cyclooxygenase; inhibits platelet aggregation.

Indication: Prophylaxis of cerebrovascular disease or myocardial infarction.

Adverse effects: 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, hemophilic 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	ED
Aspirin 150 mg Tab	HI	NA	RT	ED

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: Diarrhoea, dyspepsia, abdominal pain, bleeding disorders (including gastro- intestinal and intracranial).

Caution: 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	ED
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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: 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: Nausea, vomiting, bleeding, hypotension.

Contraindication: 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 IV 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	HI	C	RT	NA
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2. Tenecteplase

Indication: Acute myocardial infarction.

Adverse effects: 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: Anemia, bleeding, purpura, fever, nausea.

Contraindication: Active bleeding, bacterial endocarditis.

Antifibrinolytic drugs

1. Etamsylate

Indication: Blood loss in menorrhagia.

Adverse effects: Headache, rashes, nausea, vomiting.

Caution: Exclude structural or histological causes of menorrhagia or fibroids causing distortion of the uterine cavity before initiating treatment.

Contraindication: Acute Porphyria.

Dose: 500 mg 4 times daily during menstruation.

Preparation Available:

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

Indication: Menorrhagia, epistaxis, thrombolytic overdose.

Adverse effects: Nausea, vomiting, diarrhoea, disturbances in color vision.

Caution: 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 up to 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	ED
Tranexamic acid 500 mg Inj	HI	B	RT	ED

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: 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	NA
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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: Headache, chest pain, arthralgia, anorexia, epistaxis, hyperglycemia, pharyngolaryngeal pain.

Caution: 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.

Contraindicated: Active liver disease.

Dose: Primary hyperlipidemia and combined hyperlipidemia, 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 hypercholesterolemia, 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 10 mg Tab	HI	NA	RT	ED
Atorvastatin 20 mg Tab	HI	NA	RT	ED
Atorvastatin 40 mg Tab	HI	NA	RT	NA

2. Simvastatin

Indication: See under atorvastatin.

Adverse effects: See under atorvastatin, and also dizziness, jaundice, pancreatitis.

Caution: 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: Myalgia, arthralgia, proteinuria, hematuria.

Caution: 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	NA
Rosuvastatin 10 mg Tab	HI	X	RT	NA
Rosuvastatin 20 mg Tab	HI	X	RT	NA

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 hypertriglyceridemia patients.

Indication: Severe hypertriglyceridemia.

Adverse effects: Gastro-intestinal disturbances, rash, urticaria, fatigue, headache, impotence.

Caution: 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).

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	ED
Fenofibrate 200 mg Tab	HI	C	RT	NA

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 hypercholesterolemia.

Adverse effect: Fatigue, headache, myalgia, GI disturbances.

Caution: Patient with mild hepatic impairment or severe renal impairment.

Dose: 10 mg daily for hypercholesterolemia.

Preparation Available:

Ezetimibe 10 mg Tab	NA	C	RT	NA
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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	NA	C	RT	NA
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Chapter-3: Drugs Acting on the Respiratory System

3.1. Drugs for Airway Disease and Obstruction

Methylxanthines

They increase tissue concentration of cAMP by inhibiting the phosphodiesterase enzyme, leading to effects like bronchial smooth muscle relaxation, pulmonary vasodilation, and central nervous system stimulation.

1. Aminophylline

Indication: Acute severe asthma, reversible airway obstruction.

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

Caution: Rapid injection may result in sudden death from dysrhythmias. Take cautiously in hypertension, hyperthyroidism, epilepsy, and peptic ulcer—risk of hypokalemia.

Preparation Available:

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

Indication: See under aminophylline.

Adverse effects: Arrhythmias, diarrhoea, gastric irritation, headache, convulsion, CNS stimulation; caution in cardiac arrhythmias or cardiac disease, elderly, hypertension, hyperthyroidism, seizure.

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

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 Muscle cramps, dizziness, headache, tremor and palpitation.

Caution: 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 mcg/kg 4 times daily; 2-6

years:1-2 mg 3-4 times daily; 6-12 years:2 mg.

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

Prophylaxis in exercise induced bronchospasm, 200 mcg (2 puffs); Child 100 mcg (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 nebulized 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 syrup	HI	C	RT	ED
Salbutamol 5 mg/ 2.5ml repulse	HI	C	RT	NA
Salbutamol 2.5 mg/ 2.5ml repulse	NA	C	RT	NA
Salbutamol 2 mg/+Bromhexine 4mg/5ml, 100 ml equivalent to Beta-2	HI	C	RT	NA
Salbutamol 100 mcg/puff, 200 MDI	HI	C	RT	ED
Salbutamol 5 mg/ml, 15 ml R/Sol	HI	C	RT	NA
Salbutamol 200 mcg R/C	HI	C	RT	NA

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: See under salbutamol. It can produce paradoxical bronchospasm.

Caution: 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 mcg/kg 3 times daily.

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

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

Preparation Available:

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

4. Formoterol

Long action beta-2 agonist.

Indication: Reversible airway obstruction, nocturnal asthma, prophylaxis of exercise induced bronchospasm.

Adverse effects: Nausea, Pruritus, taste disturbances

Caution: 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 nebulized 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: 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), and cataracts (inhaled drug).

Caution: In active or quiescent tuberculosis and autoimmune hepatitis.

Dose: By inhalation of nebulized 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	HI	NA	RT	NA
Budesonide 200 mcg MDI	HI	NA	RT	NA
Budesonide 100 mcg R/C,30 Rotacap	HI	NA	RT	NA
Budesonide 200 mcg R/C, 30 Rotacap	HI	NA	RT	NA
Budesonide 400 mcg R/C,30 Rotacap	HI	NA	RT	NA

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

3. Fluticasone

Indication: Prophylaxis of asthma.

Adverse effects: Arthralgia, dyspepsia, nasopharyngitis, headache, bronchitis, sinusitis.

Cautions: Not indicated for use as rescue therapy for acute bronchospasm.

Preparation Available:

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

3.4 Antimuscarinic Drugs

1. Ipratropium

Indication: Reversible airway obstruction, bronchospasm, asthma.

Adverse effects: Dry mouth, headache, constipation, tachycardia.

Caution: 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	NA
Ipratropium 400 mcg R/C	HI	B	RT	NA

2. Tiotropium

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

Indication: Treatment of COPD, asthma.

Adverse effects: Epistaxis, oropharyngeal candidiasis, taste disturbances.

Caution: 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	NA
Tiotropium 18 mcg/puff MDI	NA	C	RT	NA

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

2. Salmeterol and Fluticasone

Indication, Adverse effects and cautions: See under Salmeterol and Fluticasone

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

3. Levosalbutamol and Beclomethasone

Indication, Adverse effects and cautions: See under Levosalbutamol and Beclomethasone

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

3.5 Antitussives (Cough suppressants)

1. Codeine

Indication: Nonproductive cough, acute diarrhoea, mild to moderate pain.

Adverse effects: Nausea, constipation, respiratory depression in sensitive patients or in large doses.

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 apnea.

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

Indication: Dry cough.

Adverse effects: 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: Nausea, vomiting, headache.

Preparation Available:

Levodropropazine 30mg/5ml, 100 ml Syrup	HI	D	RT	NA
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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: 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: Skin rashes, occasional gastrointestinal irritation.

Caution: History of peptic ulceration.

Contraindication: Acute peptic ulceration, first trimester of pregnancy.

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: 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 the amount of respiratory tract fluid and irritates gastric mucosa.

Indication: Cough due to minor throat and bronchial irritation.

Adverse effects: 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 exceeding 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	NA	B	RT	NA
Montelukast 10 mg Tab	HI	B	RT	NA

Chapter 4: Drugs Acting on Central Nervous System

Analgesics

4.1 Opioids 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.

1. Codeine

See under antitussives.

2. 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: Respiratory depression, postural hypotension, nausea, vomiting, constipation

Caution: Asthma, hypotension, moderate to severe renal impairment, decreased respiratory reserve.

Dose: Acute pain, by Sc or IM 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 IV injection $\frac{1}{4}$ - $\frac{1}{2}$ corresponding IM dose. Myocardial infarction, by slow IV 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	NA
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3. Naltrexone

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

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

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

Cautions: 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, with 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; in child not recommended.

Preparation Available:

Naltrexone 50 mg Tab	HI	C	RT	NA
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4. Pentazocine

It is analgesic and has both agonist and antagonistic

effects. Following IV 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 the workload on the heart.

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

Contraindication: See under morphine.

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

5. 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 IM injection. Analgesia may be maintained for 2-4 hours following subcutaneous or IM 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 Sc or IM injection, 25-100 mg, repeated after 4 hours; Child by IM injection, 0.5-2 mg/kg. By slow IV injection 25-50 mg repeated after 4 hours. Obstetric analgesia, by Sc or IM 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	ED
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6. 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: 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 IM or IV injection (over 2-3 minutes) or by IV infusion, 50-100 mg every 4-6 hours.

Preparation Available:

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

7. Butorphanol

Indication: Preoperative and pre anesthesia, labor pain.

Adverse effects: Sedation, dizziness, nasal congestion, nausea or vomiting, anxiety.

Contraindication: Opioid dependence, respiratory depression, respiratory failure.

Dose: 1–2 mg every 3–4 hours as needed; Give IV slowly over at least 2 minutes; Maximum usually not more than 4–8 mg/day, depending on clinical situation.

Preparation Available:

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

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

Adverse effects: Abdominal pain, asthenia, anorexia, anxiety, appetite change, application site reaction, diarrhoea, dyspepsia, dyspnea, rhinitis, stomatitis, tremor.

Caution: Monitor respiratory depression especially during initiation or following a dose increase.

Contraindication: Cerebral tumor, impaired consciousness.

Preparation Available:

Fentanyl 50 mcg/ml 2 ml Inj	HI	C	RT	ED
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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: 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 IV 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	ED
Paracetamol 1 gm/100 ml Inj	HI	B	RT	NA
Paracetamol 150 mg/ml, 2 ml Inj	HI	B	RT	ED
Paracetamol 125 mg Supp	HI	B	RT	ED
Paracetamol 250 mg Supp	NA	B	RT	ED
Paracetamol 500 mg Supp	NA	B	RT	NA
Paracetamol 150 mg/ml 15 ml, Drop	HI	B	RT	NA
Paracetamol 125 mg/5 ml, 30ml, 60 ml Symp	HI	B	RT	ED
Paracetamol 250 mg/5ml Symp	HI	B	RT	NA

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	NA
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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	NA
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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	C	RT	NA
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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	C	RT	NA
Paracetamol 500 mg + Chlorzoxazone 500 mg Tab	HI	C	RT	NA

5. Paracetamol and Ibuprofen

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

Paracetamol 325 mg + Ibuprofen 400 mg Tab	HI	C	RT	NA
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Paracetamol 125 mg + Ibuprofen 100 mg/5 ml 60 ml Symp	HI	C	RT	NA
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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	B	RT	NA
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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	B	RT	NA
Paracetamol 125 mg + Phenylephrine 2.5 mg + chlorpheniramine 1mg/ml, 15 ml syp	HI	B	RT	NA

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: Gastrointestinal disturbances, dizziness, drowsiness, blurred vision, leukopenia and aplastic anemia, mild transient generalized erythematous rash.

Caution: 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	NA	D	RT	ED
Carbamazepine 200 mg Tab	HI	D	RT	ED
Carbamazepine 300 mg Tab	NA	D	RT	NA
Carbamazepine 400 mg Tab	HI	D	RT	ED
Carbamazepine 400 mg CR	HI	D	RT	NA

2. 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: Apnea and hypotension (rapid parenteral administration), thrombophlebitis, sedation, drowsiness, ataxia, headache, muscle weakness.

Caution: 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 apnea and hypotension are reduced if injections are administered slowly.

Dose: By IV 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 IV 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	NA
Diazepam 5 mg Tab	HI	D	RT	NA
Diazepam 10 mg Tab	HI	D	RT	NA
Diazepam 5 mg/ml 2 ml Inj	HI	D	RT	ED

3. 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 hospitalized 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	NA
Clobazam 10 mg Tab	HI	C	RT	NA

4. Clonazepam

It is a benzodiazepine.

Indication: All types of epilepsy, status epilepticus.

Adverse effects: Dizziness, drowsiness, muscle hypotonia, restlessness, salivary or bronchial hypertension in infants and small children, sexual dysfunction, dependence and withdrawal.

Caution: 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	NA
Clonazepam 0.5 mg Tab	HI	D	RT	NA

5. 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 generalization.

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

Caution: 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	NA
Gabapentin 300 mg Tab	HI	C	RT	NA

6. Lamotrigine

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

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

Adverse effects Dizziness, ataxia, blurred or double vision, nausea, vomiting, rash, Stevens- Johnson syndrome.

Caution: Myoclonic seizures may be exacerbated by lamotrigine and it can cause serious rashes especially in Children; dose recommendations should be adhered to closely; cautiously 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.

7. Oxcarbazepine

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

Indication: Monotherapy or adjunct therapy for partial seizures.

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

Caution: 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	NA
Oxcarbazepine 300 mg Tab	HI	C	RT	NA
Oxcarbazepine 450 mg Tab	HI	C	RT	NA
Oxcarbazepine 600 mg Tab	NA	C	RT	NA

8. Phenobarbitone (Phenobarbital)

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

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

Caution: 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 IV 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	ED
Phenobarbital 60 mg Tab	HI	D	RT	ED
Phenobarbital 200 mg/ml, 1 ml Inj	NA	D	RT	ED

9. Phenytoin

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

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

Adverse effects: 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	ED
Phenytoin 100 mg Tab	HI	D	RT	ED
Phenytoin 300 mg Tab	HI	D	RT	NA
Phenytoin 50 mg/ml, 2 ml Inj	HI	D	RT	NA

10. 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: Nausea and gastric irritation, weight gain, increased appetite, thrombocytopenia, transient hair loss, oedema, drug induced hepatitis, sedation and drowsiness; Avoid abrupt withdrawal.

Caution: 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	ED (if ER)
Sodium Valproate 300 mg Tab	HI	D	CT	NA
Sodium Valproate 500 mg Tab	HI	D	CT	ED (if ER)
Sodium Valproate + Valproic acid equivalent to Valproic acid 200 mg CR Tab	HI	D	CT	NA
Sodium Valproate + Valproic acid equivalent to valproic acid 300 mg CR Tab	HI	D	CT	NA
Sodium Valproate + Valproic acid equivalent to 500 mg CR Tab	HI	D	CT	NA
Sodium Valproate 200 mg/5ml 100 ml Symp	HI	D	CT	ED
Sodium Valproate 100 mg/ml, 5 ml, Inj	HI	D	RT	NA

11. Levetiracetam

Not a 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 generalization, adjunctive treatment of focal seizures, myoclonic and tonic-clonic seizure.

Adverse effects: Abdominal pain, aggression, anorexia, anxiety, ataxia, cough, convulsion, dizziness, diarrhoea.

Caution: Monitor the behavior of patients because of probability of psychiatric reaction.

Preparation Available:

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

12. 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: Nausea, vomiting, asthenia, headache, and somnolence.

Caution: Children, child bearing women, hepatic disorder.

Preparation Available:

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

13. 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: Appetite changes, blurred vision, confusion, constipation, diplopia, disturbances in muscle control and movement.

Caution: Severe congestive heart failure.

Preparation Available:

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

14. Topiramate

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

Indication: Tonic-clonic seizure, migraine prophylaxis.

Adverse effects: Abdominal pain, aggression, agitation, alopecia, appetite changes, arthralgia, cognitive impairment.

Caution: Avoid in acute porphyrias risk of metabolic acidosis, risk of nephrolithiasis.

Preparation Available:

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

4.4 Antiparkinsonism Drugs

1. Amantadine

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

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

Adverse effects: 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.

Cautions: 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 making levodopa available for transport to the brain.

Indication: Parkinsonism (but not drug induced).

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

Caution: 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	NA	C	RT	NA
Levodopa 100 mg + Carbidopa 25 mg Tab	HI	C	RT	NA
Levodopa 200 mg + Carbidopa 50 mg Tab	HI	C	RT	NA

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: Dry mouth, constipation, dizziness, blurred vision, gastro- intestinal disturbances and less commonly tachycardia.

Caution: Patients with conditions in which anticholinergic effects are undesirable.

Dose: 1 mg daily gradually increased; usual maintenance dose 5-15 mg daily in 3-4 divided doses, Child not recommended.

Preparation Available:

Trihexyphenidyl 2 mg Tab	HI	C	RT	ED
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4. Citicoline

Citicoline (CDP-choline) enhances neuronal membrane repair by increasing phosphatidylcholine synthesis and boosting neurotransmitters such as acetylcholine and dopamine.

Indication: Ischemic stroke, traumatic brain injury, cognitive impairment, and post-stroke recovery.

Adverse effect: Uncommon but may include headache, insomnia, agitation, nausea, or blood-pressure fluctuations.

Caution: Epilepsy, severe hypertonia, pregnancy, breastfeeding, and in patients taking levodopa due to increased risk of dyskinesia.

Contraindicated: hypersensitivity and generally avoided in intracranial hemorrhage.

Dose: The usual dose is 500–2000 mg daily orally in divided doses, or 500–1000 mg IM/IV once or twice daily.

Citicoline 500 mg Tab	NA	NA	RT	NA
Citicoline 500 mg/2 ml Inj	NA	NA	RT	NA

4.5 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	NA
Alprazolam 0.5 mg Tab	HI	D	RT	NA

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	ED
Chlordiazepoxide 25 mg Tab	NA	C	RT	ED

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	ED
Lorazepam 2 mg Tab	HI	D	RT	ED

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: Nausea, vomiting, headache, dizziness, diarrhoea, ataxia, memory disturbances, changes in libido.

Caution: 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	NA	C	RT	NA
Zolpidem 10 mg Tab	HI	C	RT	NA

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: Acute dystonic reactions, increase prolactin (gynecomastia), hypothermia, obstructive jaundice.

Caution: 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 behavior, 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	NA
Chlorpromazine 50 mg Tab	HI	C	RT	ED
Chlorpromazine 100 mg Tab	HI	C	RT	ED
Chlorpromazine 100 mg Inj	HI	C	RT	NA

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: Akathisia, dystonia, depression, weight loss; cautions with hypocalcemia, arteriosclerosis, hypokalemia (does not cause jaundice).

Caution: Strong EPS tendency.

Dose: By mouth, schizophrenia and other psychosis, mania, short term adjunctive management of psychomotor agitation, excitement and violent or dangerously impulsive behavior, 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	NA
Haloperidol 1.5 mg Tab	HI	C	RT	NA
Haloperidol 5 mg Tab	HI	C	RT	ED
Haloperidol 5 mg/ml, 1 ml Inj	HI	C	RT	ED

4. Trifluoperazine

It antagonizes 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: 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	NA
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Haloperidol and Benzhexol

Indication, Adverse effects and cautions: See under Haloperidol and trihexyphenidyl/Benzhexol.

Haloperidol 1.5 mg + Benzhexol 2 mg Tab	HI	C	RT	NA
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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 on prolactin release.

1. Risperidone

Risperidone is a dopamine D₂, 5-HT_{2A}, alpha₁-adrenoceptor, and histamine-1 receptor antagonist.

Indication: acute and chronic psychosis, mania.

Adverse effects: Weight gain, hyperprolactinemia (galactorrhea, menstrual disturbances, gynecomastia), priapism, cerebrovascular accident, tachycardia, neutropenia, thrombocytopenia.

Caution: 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	ED
Risperidone 2 mg Tab	HI	C	RT	ED
Risperidone 3 mg Tab	HI	C	RT	NA
Risperidone 4 mg Tab	HI	C	RT	ED

2. Quetiapine

Quetiapine is a dopamine D₁, dopamine D₂, 5-HT₂, alpha1-adrenoceptor, and histamine-1 receptor antagonist.

Indication: Schizophrenia, treatment and prevention of mania and depression in bipolar disorder.

Adverse effects: Asthenia, dyspnea, tachycardia, agitation, dry mouth, weight gain.

Caution: Cerebrovascular disease, elderly.

Preparation Available:

Quetiapine 25 mg Tab	HI	C	RT	NA
Quetiapine 50 mg Tab	HI	C	RT	NA
Quetiapine 100 mg Tab	HI	C	RT	NA
Quetiapine 200 mg Tab	NA	C	RT	NA
Quetiapine 300 mg Tab	NA	C	RT	NA
Quetiapine 400 mg Tab	NA	C	RT	NA

3. Aripiprazole

Aripiprazole is a dopamine D₂ partial agonist with weak 5-HT_{1a} partial agonism and 5-HT_{2A} receptor antagonism.

Indication: Maintenance in schizophrenia, prevention and treatment of mania.

Adverse effects: Anxiety, hypersalivation, malaise.

Caution: 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	NA
Aripiprazole 10 mg Tab	HI	NA	RT	NA
Aripiprazole 20 mg Tab	HI	NA	RT	NA

4. Amisulpride

Amisulpride is a selective dopamine receptor antagonist with high affinity for mesolimbic D₂ and D₃ receptors.

Indication: Acute psychotic episode in schizophrenia.

Adverse effects: 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	NA
Amisulpride 100 mg Tab	HI	NA	RT	NA
Amisulpride 200 mg Tab	HI	NA	RT	NA
Amisulpride 400 mg Tab	NA	NA	RT	NA

5. Olanzapine

Olanzapine is a dopamine D₁, D₂, D₄, 5-HT₂, histamine₁ and muscarinic-receptor antagonist.

Indication: Schizophrenia, combination therapy for mania, preventing recurrence in bipolar disorder.

Adverse effects: Arthralgia, hypercholesterolemia, increased appetite, malaise, oedema.

Caution: 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	ED
Olanzapine 5 mg Tab	HI	C	RT	ED
Olanzapine 7.5 mg Tab	HI	C	RT	NA
Olanzapine 10 mg Tab	HI	C	RT	ED
Olanzapine 15 mg Tab	NA	C	RT	NA
Olanzapine 20 mg Tab	NA	C	RT	NA

4.8. Antidepressants

Tricyclic and related drugs

1. Amitriptyline

Indication: Depressive illness, nocturnal enuresis.

Adverse effects: Sedation, dry mouth, blurred vision, constipation, postural hypotension, tachycardia.

Caution: 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	ED
Amitriptyline 25 mg Tab	HI	C	RT	ED
Amitriptyline 75 mg Tab	HI	C	RT	ED

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	HI	C	RT	NA
Clomipramine 25 mg Tab	HI	C	RT	NA
Clomipramine 50 mg Tab	HI	C	RT	NA

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	NA
Imipramine 50 mg Tab	HI	D	RT	NA
Imipramine 75 mg Tab	HI	D	RT	NA

4. Mirtazapine

It is different from other TCAs. It is a presynaptic α_2 -antagonist. It increases central noradrenergic and serotonergic neurotransmission.

Indication: Major depression.

Adverse effects: Sedation, increased appetite and weight gain, oedema, postural hypotension, convulsions, tremor, abnormal dreams, rash, reversible agranulocytosis, severe hyponatremia.

Caution: 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	NA	C	RT	NA
Mirtazapine 7.5 mg Tab	HI	C	RT	NA
Mirtazapine 15 mg Tab	HI	C	RT	NA
Mirtazapine 30 mg Tab	HI	C	RT	NA

5. Dosulepin or Dothiepin

Indication: Depression Illness.

Adverse effects: Dysarthria, extrapyramidal symptoms, tremor.

Caution: 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	HI	C	RT	NA
Dosulepin 75 mg Tab	HI	C	RT	NA

4.9. Selective Serotonin Reuptake Inhibitors (SSRIs)

1. Fluoxetine

Indication: Major depression, bulimia nervosa.

Adverse effects: Gastro-intestinal disturbances,

anorexia with weight loss, postural hypotension, taste disturbances, sexual dysfunction, ataxia, urinary retention and frequency.

Caution: 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	NA
Fluoxetine 20 mg Tab	HI	C	RT	ED

2. Escitalopram

Indication: Depressive illness, generalised anxiety disorder, panic disorder.

Adverse effects: 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	NA
Escitalopram 10 mg Tab	HI	C	RT	NA
Escitalopram 20 mg Tab	HI	C	RT	NA

3. Fluvoxamine

Indication: Depressive illness, obsessive-compulsive disorder.

Adverse effects: 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	NA
Fluvoxamine 100 mg Tab	NA	C	RT	NA

4. Paroxetine

Indication: Major depressive disorder, generalised anxiety disorder, obsessive-compulsive disorder, panic disorder, social phobia, generalised anxiety disorder, post-traumatic stress disorder.

Adverse effects: Asthenia (unusual tiredness or weakness), extrapyramidal reactions, withdrawal features, constipation, diarrhoea, drowsiness, dryness of mouth, palpitation, myalgia, sexual dysfunction, weight loss or gain.

Caution: 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	NA	D	RT	NA
Paroxetine 12.5 mg SR Tab	NA	D	RT	NA
Paroxetine 20 mg Tab	NA	D	RT	NA
Paroxetine 40 mg Tab	NA	D	RT	NA
Paroxetine 10 mg SR Tab	NA	D	RT	NA
Paroxetine 20 mg SR Tab	NA	D	RT	NA

5. Sertraline

Indication: major depressive disorder, panic disorder, obsessive-compulsive disorder, post-traumatic stress disorder in adults.

Adverse effects: Sexual dysfunction (decreased sexual desire or ability, delayed ejaculation is most common), anorexia, breast tenderness or enlargement, extra-pyramidal effects, palpitation, skin rash, drowsiness, dryness of mouth, weight loss, headache.

Caution: 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	NA
Sertraline 50 mg Tab	HI	C	RT	NA
Sertraline 100 mg Tab	HI	C	RT	NA

4.10 Serotonin and Noradrenaline Reuptake inhibitors (SNRIs).

1. Duloxetine

Indication: Depressive disorder, anxiety disorder, diabetic neuropathy.

Adverse effects: Abdominal pain, abnormal dreams, anorexia, dizziness, dry mouth.

Caution: Bleeding disorders, cardiac disease, elderly, history of mania, history of seizures, hypertension.

Preparation Available:

Duloxetine 20 mg Tab	HI	C	RT	NA
Duloxetine 30 mg Tab	HI	C	RT	NA
Duloxetine 40 mg Tab	NA	C	RT	NA

2. Venlafaxine

Indication: See under duloxetine.

Adverse effects and cautions: See under duloxetine.

Preparation Available:

Venlafaxine 37.5 mg Tab	NA	C	RT	NA
Venlafaxine 75 mg Tab	NA	C	RT	NA

4.11 Antimigraine Drugs

1. Sumatriptan

Selective 5-HT_{1B} and 5-HT_{1D} receptor agonist in cranial arteries; vasoconstriction and anti-inflammatory effects.

Indication: Treatment of acute migraine attacks, cluster headache.

Adverse effects: Chest pain, and tightness (coronary vasoconstriction), drowsiness, hypotension, bradycardia or tachycardia, nausea, vomiting, dizziness.

Caution: 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	NA
Sumatriptan 50 mg Tab	HI	C	RT	NA

2. Rizatriptan

Selective 5-HT₁ receptor agonist in cranial arteries; vasoconstriction and anti-inflammatory effects.

Indication: Acute migraine.

Adverse effects: Decreased alertness, diarrhoea, drowsiness, dry mouth, dyspnea, headache.

Caution: Coronary artery disease, elderly.

Contraindication: Coronary vasospasm, ischemic heart disease, peripheral vascular disease, previous cerebrovascular accident, myocardial infarction or transient ischemic attack.

Preparation Available:

Rizatriptan 10 mg Tab	NA	C	RT	NA
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4.12 Nicotine Dependence

1. Bupropion or Amfebutamone

Indication: Adjunct to smoking cessation in combination with motivational support.

Adverse effects: Insomnia, dry mouth, gastro-intestinal disturbances, tremor, headache, dizziness, depression, rash, pruritus, sweating.

Caution: Hepatic or renal impairment, elderly.

Contraindication: History of seizures, eating disorders, CNS tumor, 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: **Abnormal** dreams, aggression, agitation, anorexia, diarrhoea.

Caution: 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	NA
Donepezil 10 mg Tab	HI	C	RT	NA

Chapter-5: Drugs used in Musculoskeletal and Joint Diseases

5.1 Non-Steroidal anti-inflammatory drugs (NSAIDs)

1. Paracetamol

See under CNS preparation non-opioid analgesics.

2. Diclofenac

Indication: Rheumatic disease, osteoarthritis, acute gout, migraine, post-operative pain.

Adverse effects: Gastro-intestinal distress, occasionally gastrointestinal bleeding and gastric ulceration, hepatic damage, interstitial fibrosis associated with NSAIDs can lead to renal failure, hearing disturbances.

Cautions: The drug should be used with caution in breast-feeding, renal or cardiac or hepatic impairment. While using topical preparations, avoid contact with eyes, mucous membrane, and broken skin.

Contraindication: Active GI bleeding, pregnancy, cerebrovascular disease, renal or hepatic impairment.

Dose:

Adult: 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 pain: 75 mg once daily (twice daily in severe cases) for a maximum of 2 days.

Ureteric colic: Oral 75 mg then a further 75 mg after 30 minutes if necessary.

Preparation Available:

Diclofenac 50 mg Tab	HI	C	RT	ED
Diclofenac 75 mg SR Tab	NA	C	RT	NA
Diclofenac 100 mg SR Tab	HI	C	RT	ED
Diclofenac 25 mg/ml, 3 ml Inj	HI	C	RT	NA
Diclofenac 75 mg/ml, 1 ml Inj	HI	C	RT	ED
Diclofenac Cream 1%, 30 gm Oint	HI	C	RT	NA

3. Ibuprofen

Indication: Rheumatic disease, Musculo-skeletal disorders, post-operative pain, dysmenorrhea, dental pain.

Adverse effects: Gastrointestinal irritation, bleeding, rash, pruritus, tinnitus, dizziness, headache, fluid retention, vertigo.

Cautions: Allergic disorders, cardiac impairment, coagulation defects, cerebrovascular disease.

Contraindication: 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, dysmenorrhea, Musculo-skeletal disorders, closure of ductus arteriosus.

Adverse effects: Abdominal pain, diarrhoea, gastrointestinal haemorrhage, severe headache, dizziness, confusion, depression, psychosis, thrombocytopenia, aplastic anemia, hypertension and hyperkalemia.

Cautions: The drug should be used with caution in breast-feeding, epilepsy and Parkinsonism; Child not recommended.

Contraindication: Pregnancy, active GI bleeding, active GI ulceration.

Dose: Rheumatic disease, 50-200 mg daily in divided doses, with food; Child not recommended. Acute gout, 150-200 mg daily in divided doses.

Dysmenorrhea - up to 75 mg daily.

Preparation Available:

Indomethacin 25 mg Cap	HI	C	RT	NA
Indomethacin 50 mg Cap	HI	C	RT	NA
Indomethacin 75 mg Cap	HI	C	RT	NA

5. Mefenamic Acid

Indication: Osteoarthritis, rheumatoid arthritis, pain during dysmenorrhea, post-operative pain.

Adverse effects: Diarrhoea, rashes, thrombocytopenia, glucose intolerance, hemolytic anemia and drowsiness.

Cautions: Acute porphyrias, allergic disorder, cardiac impairment, dehydration (risk of renal 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	NA	C	RT	NA
Mefenamic acid 250 mg Tab	HI	C	RT	NA
Mefenamic acid 500 mg Tab	HI	C	RT	NA

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 1-2 divided doses; Child (over 5 years) juvenile arthritis, 10 mg/kg daily in 2 divided doses.

Acute musculoskeletal disorders and dysmenorrhea: 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	NA
Naproxen 500 mg Tab	HI	C	RT	NA
Naproxen 750 mg SR Tab	HI	C	RT	NA

7. Piroxicam

Indication: Rheumatoid arthritis, osteoarthritis, ankylosing spondylitis.

Adverse effects: Nausea, diarrhoea, indigestion, upper respiratory infection, with topical use -photosensitivity.

Cautions: Use with caution in allergic disorders, cardiac impairment, coagulation defects. For topical

preparations, apply with gentle massage only and avoid contact with eyes, broken skin and mucous membranes.

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	NA	C	RT	NA
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8. Aceclofenac

Its actions and adverse effects are similar to naproxen.

Indication: Rheumatoid arthritis, osteoarthritis and ankylosing spondylitis, analgesic.

Adverse effects: Allergic disorders, exacerbation of symptoms of asthma, hearing disturbances, colitis.

Cautions: Allergic disorders, avoided in acute porphyrias, cardiac impairment, Crohn's disease, renal impairment.

Dose: 100 mg twice daily; Child not recommended.

Preparation Available:

Aceclofenac 100 mg Tab	HI	NA	RT	NA
Aceclofenac 200 mg SR Tab	NA	NA	RT	NA

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: Short term management of moderate to severe acute post-operative pain.

Adverse effects: Headache, hypersensitivity, agranulocytosis, angioedema, aplastic anemia, vision disorders.

Cautions: May mask symptoms of infection, allergic disorders, cardiac impairment, concomitant use of ocular corticosteroids.

Contraindications: Active or history of GI bleeding, GI ulceration, complete or partial syndrome of nasal polyps, coagulation disorders.

Dose: 10 mg three to four times daily, not exceeding 40 mg per day.

Preparation Available:

Ketorolac 10 mg Tab	HI	C	RT	NA
Ketorolac 30 mg/ml 1 ml Inj	HI	C	RT	NA
Ketorolac 2%, 15 gm Oint	NA	C	RT	NA

Etoricoxib

Indication: Pain and inflammation in osteoarthritis, rheumatoid arthritis, ankylosing spondylitis.

Adverse effects: Stevens-Johnson syndrome, palpitations, headache, dermatitis. Upper GI ulceration.

Cautions: Allergic disorders, cardiac impairment, coagulation defects, elderly (systemic use).

Contraindications: GI bleeding, inflammatory bowel disease, ischemic heart disease.

Dose: Arthritis; 60 mg once daily, increased if necessary to 90 mg once daily. Acute gout; 120 mg once daily (maximum 8 days).

Preparation Available:

Etoricoxib 60 mg Tab	NA	NA	RT	NA
Etoricoxib 90 mg Tab	HI	NA	RT	NA
Etoricoxib 120 mg Tab	NA	NA	RT	NA

5.2 Drugs for Gout treatment

1. Allopurinol

Indication: Prophylaxis of gout, prophylaxis of hyperuricemia associated with cancer chemotherapy.

Adverse effects: Nausea, vomiting, diarrhoea, maculopapular skin rash, rarely exfoliate dermatitis, arthralgia and aplastic anemia.

Cautions: Use with caution in pregnancy, breast-feeding, hepatic and renal impairment. Liberal fluid intake is advocated during treatment. Initiation or up-titration of treatment may precipitate an acute attack of gout.

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 only if benefit outweighs risk.

Preparation Available:

Allopurinol 100 mg Tab	HI	NA	RT	ED
Allopurinol 300 mg Tab	HI	NA	RT	ED

2. Colchicine

Indication: Acute gout, during initiation of allopurinol therapy.

Adverse effects: Diarrhoea, nausea, vomiting, abdominal pain, rarely gastro-intestinal.

haemorrhage, rashes, renal and hepatic damage. Chronic therapy causes agranulocytosis.

Cautions: Safe use in pregnancy has not been established. The drug should be used with caution in breast-feeding, cardiac or hepatic or renal impairment, and elderly.

Contraindications: Blood disorders, previous failed response.

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	ED
Colchicine 15 mg Tab	NA	C	RT	NA

3. Febuxostat

Xanthine oxidase inhibitors.

Indication: Chronic hyperuricemia in gout.

Adverse effects: Abnormal liver function test, GI disturbances, headache, oedema, rash.

Cautions: Use with caution in congestive heart failure, ischemic heart disease, thyroid disorders, transplant recipients. Administer prophylactic NSAID (not aspirin or salicylates) or colchicine for at least 6 months after starting febuxostat to avoid precipitating an acute attack.

Contraindications: Not a treatment for acute gout but continue if attack develops when already receiving febuxostat, and treat attack separately.

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	NA
Febuxostat 80 mg Tab	HI	C	RT	NA

5.3 Drugs for Rheumatoid Arthritis

1. Glucosamine

Intermediate in glycosaminoglycan synthesis; sulphate form absorbed better than other. It is a natural substance found in mucopolysaccharides, mucoproteins, and chitin.

Indication: Symptomatic relief of mild to moderate osteoarthritis of knee.

Adverse effects: Abdominal pain, constipation, diarrhoea, drowsiness, dyspepsia.

Cautions: Use with caution in asthma, impaired glucose tolerance, predisposition to cardiovascular disease.

Dose: 1500 mg once daily.

Preparation Available:

Glucosamine 500 mg Tab	HI	NA	RT	NA
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2. Hydroxychloroquine

Indication: Active rheumatoid arthritis, systemic and discoid lupus erythematosus, dermatological conditions caused or aggravated by sunlight.

Adverse effects and cautions: GI disturbances, headache, pruritus, rashes, skin reaction, discoloration of skin, hair and nails, ototoxicity.

Cautions: Acute porphyrias, elderly, diabetes (may lower blood glucose), G6PD deficiency, may aggravate myasthenia gravis, neurological disorders.

Contraindications: Hypersensitivity to 4-aminoquinoline derivatives, retinal or visual field changes 4-aminoquinoline compounds, long term therapy in children.

Dose: 200 to 400 mg daily.

Preparation Available

Hydroxychloroquine 200 mg Tab	HI	C	RT	ED
Hydroxychloroquine 400 mg Tab	NA	C	RT	NA

Important safety information: Increased risk of cardiovascular events when used with macrolide antibiotics.

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, musculoskeletal predominant SLE.

Adverse effects: Myelosuppression, mucositis, loss of appetite, intestinal ulceration and bleeding, diarrhoea, impotence, loss of libido. On long term use pneumonitis, pulmonary fibrosis and hepatic cirrhosis.

Cautions: 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, immunodeficiency syndromes.

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	ED
Methotrexate 5 mg Tab	HI	X	RT	ED
Methotrexate 7.5 mg Tab	HI	X	RT	NA
Methotrexate 10 mg Tab	HI	X	RT	ED
Methotrexate 50 mg Inj	HI	X	RT	NA

4. Leflunomide

Indication: Active rheumatoid arthritis, active psoriatic arthritis.

Adverse effects: Abdominal pain, alopecia, nausea, vomiting, anorexia, asthenia, diarrhoea, dizziness, dry skin, and headache.

Cautions: Use with caution in anemia, 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	NA	X	RT	NA
Leflunomide 20 mg Tab	NA	X	RT	NA

5.4 Muscle Relaxants

1. Chlorzoxazone

It blocks intraneuronal conduction in spinal cord and subcortical brain areas by depressing polysynaptic reflexes.

Indication: Musculoskeletal pain.

Adverse effects: Lightheadedness, dizziness, drowsiness, excitement, somnolence, malaise.

Cautions: Cautions needed for patients with a history of allergic reactions, liver disease, pregnancy, and breastfeeding.

2. Baclofen

It inhibits synaptic transmission through spinal reflex arcs, via hyperpolarization of primary afferent fiber terminals.

Indication: Pain of muscle spasm in palliative care, hiccup due to gastric distension, severe spasticity. **Adverse effects:** Agitation, anxiety, ataxia, cardiovascular depression, confusion, dry mouth.

Cautions: 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	NA
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2. 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: Dizziness, drowsiness, dry mouth, fatigue, GI disturbances, hypotension, nausea.

Cautions: Elderly.

Contraindications: Hypersensitivity, pregnancy, breastfeeding.

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 adjusted 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	NA
Tizanidine 4 mg Tab	HI	C	RT	NA

Miscellaneous Preparation:

Diacerein 50 mg Tab	HI	B	RT	NA
Serratiopeptidase 5 mg Tab	HI	NA	RT	NA
Serratiopeptidase 10 mg Tab	HI	NA	RT	NA

Combination Product

1. Paracetamol and Chlorzoxazone

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

Preparations available:

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

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: Headache, but incidence of sedation and antimuscarinic effects are low.

Cautions: 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	NA
Cetirizine 10 mg Tab	HI	NA	RT	NA

2. Levocetirizine

It is a levo-rotatory isomer of cetirizine.

Indication: See under cetirizine.

Adverse effects and cautions: See under cetirizine.

Contraindications: Avoid in acute porphyrias.

Dose: Adult and Child over 6 years, 5 mg daily.

Preparation Available:

Levocetirizine 0.5 mg/ml, 30ml syrup	HI	B	RT	NA
Levocetirizine 5 mg Tab	HI	B	RT	ED

3. Chlorpheniramine/Chlorphenamine

Indication: Symptomatic relief of allergy such as urticaria, hay fever, insect stings and pruritus of allergic origin. Relief of itch associated with chickenpox.

Adverse effects: Headache, anticholinergic effects such as dry mouth, blurred vision and urinary retention. Some patients, especially children may experience paradoxical excitement characterized by restlessness, insomnia, tremors and even seizures.

Cautions: 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.

Important safety information: Children under 6 years should not be given over the counter cough and cold medicines containing chlorpheniramine.

3. 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 Syp	HI	C	RT	ED
Fexofenadine 120 mg Tab	HI	C	RT	NA
Fexofenadine 180 mg Tab	HI	C	RT	NA

4. Cyproheptadine

It has antihistamine and anti-serotonergic properties.

Indication: Hay fever, urticaria, pruritus.

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 Syp	HI	B	RT	NA
Cyproheptadine 2 mg/5 ml 200 ml syp	HI	B	RT	NA

5. Loratadine

Indication: See under cetirizine.

Adverse effects and cautions: See under cetirizine.

Contraindications: Avoid in acute porphyria, epilepsy

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	NA
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6. Promethazine

See under antiemetic drugs.

7. Cinnarizine

Indication: Relief of symptoms of vestibular disorders such as vertigo, tinnitus, nausea and vomiting in meniere's disease; motion sickness.

Adverse effects: Drowsiness, GI disturbance, dry mouth;

Cautions: Use with caution in epilepsy, glaucoma (in children), prostatic hypertrophy (in adults).

Contraindications: Avoid in acute porphyrias.

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	NA
Cinnarizine 75 mg Tab	HI	C	RT	NA

8. Ebastine:

Indication: See under Cetirizine.

Adverse effects: See under Cetirizine.

Dosage schedule: Oral, adult: 10-20 mg once daily.

Preparation available:

Ebastine 10 mg Tab	HI	NA	RT	NA
Ebastine 20 mg Tab	HI	NA	RT	NA

9. Flunarizine:

Indication: Migraine prophylaxis, vertigo, antihistamine property.

Adverse effects: Drowsiness, sedation, constipation, dry mouth, weight gain, extrapyramidal effects.

Contraindications: Known hypersensitivity, patients with a history of depressive illness, with pre-existing symptoms of Parkinson disease or other extrapyramidal disorders.

Preparation available:

Flunarizine 5 mg Tab	HI	NA	RT	NA
Flunarizine 10 mg Tab	HI	NA	RT	NA

10. 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	ED
Pheniramine 22.75 mg/ml 2 ml Inj	HI	C	RT	ED

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: Tachycardia, tremor, hypertension, sweating, vomiting, headache.

Cautions: The drug should be used with caution in hypertension, arrhythmias, diabetes mellitus, heart disease, second stage of labor, 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	ED
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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: Gastro-intestinal discomfort, headache.

Caution: The drug should not be used during the first trimester of pregnancy.

Dose: The usual dose for adults and children aged 2 years 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 400 mg/10 ml, 10 ml Susp	HI	NA	RT	ED	NA
Albendazole 400 mg Tab	HI	NA	RT	ED	NA

2. Diethylcarbamazine

Indication: Filariasis, tropical pulmonary eosinophilia.

Adverse effects Anorexia, nausea, headache, vomiting, skin rashes, itching, painful and tender glands, joint pain, swelling of face (especially eyes).

Caution: Low doses should be used for initial therapy, especially in onchocerciasis and Loa infection to minimize 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	ED	NA
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3. Ivermectin

Indication: Lymphatic filariasis.

Adverse effects: Itching, headache, tachycardia, diarrhoea, dizziness, hypotension.

Dose: 200 micrograms/kg as a single dose once a year with albendazole.

Preparation Available:

Ivermectin 6 mg Tab	HI	C	RT	NA	NA
Ivermectin 12 mg Tab		C	RT	NA	NA

4. Mebendazole

Indication: Ascaris, hookworm, pinworm, whipworm infection.

Adverse effects: 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.

Contraindications: 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, Roundworm and hookworm, 100 mg twice daily for 3 days.

Preparation Available:

Mebendazole 100 mg/5 ml 30 ml Symp	HI	C	RT	NA	NA
Mebendazole 100 mg Tab	HI	C	RT	ED	NA

5. Niclosamide

Indication: Tapeworm infection.

Adverse effects: 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	ED
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6. Praziquantel

Indication: Taeniasis (*T. solium*, *T. saginata*), hymenolepiasis (*H. nana*), diphyllobothriasis (*D. latum*) and cysticercosis.

Adverse effects and cautions: Nausea, abdominal discomfort, headache, dizziness, drowsiness and rarely urticaria and rectal bleeding.

Cautions: 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	ED
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7.2. Antiamoebic and Anti giardial 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: 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.

Cautions: 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	ED	Access
Metronidazole 400 mg Tab	HI	B	RT	ED	Access
Metronidazole 200 mg/5 ml, 60ml Syp	HI	B	RT	ED	Access
Metronidazole 100 mg/5 ml, 60 ml Syp	HI	B	RT	ED	Access
Metronidazole 500 mg/100 ml Inj	HI	B	RT	ED	Access

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	ED	Access
Tinidazole 1 gm Tab	HI	C	RT	NA	Access

3. Diloxanide Furoate

Indication: asymptomatic cyst passers and extra intestinal amoebiasis (together with tissue amoebicidal). 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 st Trimester used with caution in 2 nd & 3 rd Trimester	RT	NA	Access
Ornidazole 500 mg/100 ml Inj	HI		RT	NA	Access

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	NA	NA
Metronidazole 400 mg + Diloxanide 500 mg Tab	HI		RT	NA	NA

7.3. 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	ED	NA
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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: Diarrhoea, headache, nausea, rash.

Contraindications: The drug should be avoided in pregnancy and breastfeeding.

Cautions: 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	NA	NA
Fluconazole 150 mg Tab	HI	D	RT	NA	NA
Fluconazole 200 mg Tab	NA	D	RT	ED	NA

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: Abdominal pain, diarrhoea, headache, dizziness, rash, Stevens-Johnson syndrome, menstrual disorder, hypokalemia.

Caution: Breast-feeding, and renal impairment.

Dose: 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	ED	NA
Itraconazole 10mg/ml oral liquid	NA	C	RT	NA	NA

4. Griseofulvin

Indication: Dermatophyte infections, Tinea capitis.

Adverse effects Nausea, vomiting, headache, heartburn, photosensitivity and skin rashes.

Cautions: 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	NA
Griseofulvin 500 mg Tab	HI	X	RT	NA

5. Terbinafine

Indication: Dermatophyte infections, Tinea pedis, Tinea corporis, cutaneous candidiasis.

Adverse effects Abdominal discomfort, anorexia, arthralgia, diarrhoea, dyspepsia cautions: 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	NA
Terbinafine HCl 1%, 10 gm oint	NA	B	RT	NA

6. Voriconazole

Indication: Invasive aspergillosis, serious infections caused by *Scedosporium* spp. *Fusarium* spp., or invasive fluconazole-resistant *Candida* spp. (including *C. krusei*).

Adverse effects Abdominal pain, acute renal failure, agitation, alopecia, anemia, anxiety, asthenia, blood disorders, headache, dizziness.

Cautions: History of QT interval prolongation, risk of pancreatitis, symptomatic arrhythmias.

Dose: By mouth, 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.
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, 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	NA
Voriconazole 200 mg Inj	NA	D	RT	NA

7.4. Antimalarial Drugs

1. Chloroquine

Indication: Chemoprophylaxis and treatment of malaria, rheumatoid arthritis, lupus erythematosus.

Adverse effects: Epigastric discomfort, anorexia, nausea, vomiting, pruritus and headache.

Cautions: Long term daily treatment may cause reversible visual disturbance.

Dose: Malaria prophylaxis, 300 mg base once weekly starting one week before entering the susceptible 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 the first 2 days, then 5 mg base/kg for the third day.

Preparation Available:

Chloroquine 150 mg Tab	HI	C	RT	ED	NA
Chloroquine 250mg Tab	HI	C	RT	NA	NA
Chloroquine 500 mg Tab	NA	C	RT	NA	NA
40mg/ml in 5ml ampule	NA	C	RT	ED	NA
50mg/5ml oral liquid	NA	C	RT	ED	NA

7.5 Antibacterials

Beta lactam and related medicines

Penicillin:

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 PPIs as triple or quadruple therapy.

Adverse effects 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 IV 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:

Powder for injection 250mg,500mg, 1gm in vial.	NA	B	RT	ED	Access
Powder for oral liquid 125 mg/5 ml,	HI	B	RT	ED	Access
Amoxicillin 125 mg DT	HI	B	RT	ED	Access
Amoxicillin 250 mg DT	HI	B	RT	ED	Access
Amoxicillin 500 mg Tab	HI	B	RT	ED	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 leukemia, cytomegalovirus (increased risk of erythematous rashes), There is evidence of partial cross-reactivity between penicillin and cephalosporins.

Dose: By IM or IV 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	NA	Access
Ampicillin 500 mg Inj	NA	B	RT	ED	Access
Ampicillin 1 gm Inj	NA	B	RT	NA	Access

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 IM injection, 250 mg every 4-6 hours, doubled in severe infection; by slow IV injection or IV 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 Capsule	NA	B	RT	NA	NA
Cloxacillin 250 mg Capsule	HI	B	RT	ED	NA
Cloxacillin 500 mg Capsule	HI	B	RT	ED	NA
Cloxacillin 500 mg Inj	HI	B	RT	ED	NA
Cloxacillin 125 mg/5ml 100 ml Symp	HI	B	RT	ED	NA

4. Flucloxacillin

Acid-stable penicillinase resistant penicillin.

Indication: Infections due to beta-lactamase producing staphylococci including otitis externa; adjunct in pneumonia, impetigo, osteomyelitis, staphylococcal endocarditis, surgical prophylaxis.

Adverse effects 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 IM 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	NA	Access
Flucloxacillin 500 mg Tab	HI	B	RT	NA	Access
Flucloxacillin 500 mg Inj	HI	B	RT	NA	Access
Flucloxacillin 125 mg/5 ml 100 ml D.Symp	HI	B	RT	NA	Access

5. Phenoxyethylpenicillin/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	ED	Access
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6. Benzylpenicillin/ Penicillin G

Indication: Endocarditis, pneumonia, otitis media, meningococcal meningitis and streptococcal infections.

Adverse effects: Hypersensitivity, acute anaphylactic reactions, angioedema.

Less common hypersensitivity includes serum sickness, eosinophilia, neutropenia and diarrhoea.

Dose: By IM or by slow IV 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	NA	Access
Benzylpenicillin 1 M IU Inj	HI	B	RT	NA	Access
Powder for injection 300000 IU in vial	HI	B	RT	ED	Access

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 IM 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: Rash, hemolytic anemia, injection site pain.

Dose: IV 3-4 g/dose in 4 to 6 hours; IM 2-3 g/dose in 6 to 12 hours.

Combination Products:

Ampicillin 100 mg + Cloxacillin 50mg/ml, 10 ml Drop	NA	B	RT	NA	NA
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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 IM injection or IV injection or infusion 0.5-1g every 6-12 hours.

Preparation Available:

Cefazolin 500 mg Inj	HI	B	RT	NA	Access
Cefazolin 1 gm Inj	HI	B	RT	ED	Access

2. Cephalexin/Cefalexin

Indication: Susceptible infections due to sensitive gram –ve and gram +ve bacteria, anaerobes.

Adverse effects: Abdominal pain, agitation, anemia, angioedema.

Cautions: Adjust dose in severe renal insufficiency; prolonged 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 hours, 250 mg every 8 hours.

Prophylaxis of recurrent urinary-tract infection, Adult 125 mg at night.

Preparation Available:

Cephalexin 125 mg/5 ml, 250mg/5ml D.Syp	HI	B	RT	ED	Access
Cephalexin 250 mg capsule	NA	B	RT	ED	Access
Cephalexin 500 mg capsule	NA	B	RT	NA	Access

3. Cefadroxil

Indication: Susceptible infections due to sensitive gram -ve and gram +ve bacteria, soft-tissue infection.

Adverse effects: Nausea, vomiting, rash, urticaria.

Caution: Renal impairment.

Dose: 0.5-1g 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	NA	Access
Cefadroxil 500 mg Tab	HI	B	RT	NA	Access
Cefadroxil 125 mg/5 ml 30 ml D	HI	B	RT	NA	Access
Cefadroxil 250 mg/5 ml 30 ml D.Syp	NA	B	RT	NA	Access

Second Generation

1. Cefuroxime

It is administered both orally and IM or IV.

Indication: Infection due to gram +ve and -ve bacteria, active against HInfluenza, N. gonorrhoeae, E. coli, klebsiella spp, Streptococcus pneumonia, pyrogens.

Adverse effects and cautions: Nausea, vomiting, diarrhoea, eosinophilia; use with caution in patients 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 IM or IV 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 IV injection at induction; may be supplemented with 750 mg IM or IV 8, 16 and 24 hours later for high-risk procedures.

Preparation Available:

Cefuroxime 250 mg Tab	HI	B	RT	NA	Watch
Cefuroxime 500 mg Tab	HI	B	RT	NA	Watch
Cefuroxime 125 mg/5 ml 30 ml Susp	NA	B	RT	NA	Watch
Cefuroxime 750 mg Inj	NA	B	RT	NA	Watch
Cefuroxime 1.5 gm Inj	NA	B	RT	NA	Watch

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 penicillin (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	NA	Watch
Cefaclor 50 mg/ml 10 ml D.	NA	B	RT	NA	Watch
Cefaclor 25 mg/ml D.	NA	B	RT	NA	Watch

Third Generation

1. Cefpodoxime

Indication: Susceptible organism bacteroides fragilis, clostridium perfringens, E. coli, HInfluenza, 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	NA	Watch
Cefpodoxime 200 mg Tab	HI	B	RT	NA	Watch
Cefpodoxime 50 mg/5ml 60 ml D.Syp	HI	B	RT	NA	Watch
Cefpodoxime 100 mg/5ml 30 ml D.Syp	NA	B	RT	NA	Watch

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	NA	Watch
Cefixime 100 mg/5 ml 60 ml D.Syp	NA	B	RT	ED	Watch
Cefixime 100 mg Tab	HI	B	RT	NA	Watch
Cefixime 200 mg & 400 mg Tab	HI	B	RT	ED	Watch

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	NA	Watch
Cefotaxime 250 mg, 500 mg, & 1gm Inj	HI	B	RT	ED	Watch

4. Ceftazidime

Indication: See under cefotaxime, differs from other third generations 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 anesthesia repeated if necessary when catheter removed.

Preparation Available:

Ceftazidime 500 mg Inj	NA	B	RT	NA	Watch
Ceftazidime 1 gm Inj	HI	B	RT	NA	Watch

5. Ceftriaxone

Longer duration of action.

Indication: See under cefotaxime.

Adverse effects and cautions: See under cefotaxime.

Dose: By deep IM injection, or by IV injection over 2-4 minutes, or by IV infusion, 1g daily as a single dose; 2-4 g daily as a single dose in severe infection; IM doses over 1g divided between more than one site.

Uncomplicated gonorrhoea, by deep IM injection, 250 mg as a single dose.

Surgical prophylaxis, by deep IM injection or by IV injection over 2-4 minutes, 1 g as a single dose at induction; colorectal surgery, by deep IM injection over 2-4 minutes or by IV infusion, 2g at induction, IM doses over 1 g divided between more than one site.

Endocarditis (in combination with other antibacterials), by IV infusion, 2-4 g daily.

Preparation Available:

Ceftriaxone 125 mg Inj	NA	B	RT	NA	Watch
Ceftriaxone 250 mg Inj	HI	B	RT	ED	Watch
Ceftriaxone 500 mg Inj	HI	B	RT	NA	Watch
Ceftriaxone 1 gm Inj	HI	B	RT	ED	Watch

6. Cefoperazone

Indication: Treatment of pelvic infections, urinary-tract infections, bone and joint infections, differs from other third generations having stronger activity on pseudomonas.

Adverse effects and cautions: See under cefotaxime.

Dose: By IM or IV injection, 1-2 g (base) every 12 hours.

Preparation Available:

Cefoperazone 1 gm Inj	NA	B	RT	NA	Watch
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7. Cefditoren

Indication: HInfluenzae, 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	NA	Watch
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Fourth Generation

1. Cefepime

Indication: Greater coverage against gram +ve and –ve organism, Bacteroids spp, Enterobacter spp, E. coli, HInfluenzae, Klebsiella spp, proteus mirabilis, pseudomonas spp, S. aureus, S. pyogenes.

Adverse effects Positive combs test without hemolysis, rashes, diarrhoea, hypophosphatemia, elevated alanine aminotransferase.

Dose: By IV injection, 2 g every 12 hours.

Preparation Available:

Cefepime 250 mg Inj	NA	B	FT	NA	Watch
Cefepime 500 mg Inj	NA	B	FT	NA	Watch
Cefepime 1 gm Inj	NA	B	FT	NA	Watch

Carbapenem

1. Imipenem

Indication: Aerobic and anaerobic Gram-positive and Gram-negative infections; surgical prophylaxis, hospital- acquired septicemia, polymicrobial infections including septicemias, complicated UTI; not active against methicillin-resistant staphylococcus aureus and enterococcus faecium.

Adverse effects: 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 IM injection, mild to moderate infections, 500-750 mg every 12 hours. By IV 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 IV 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	NA	Watch
Meropenem 250 mg Inj	NA	B	RT	NA	Watch
Meropenem 500 mg Inj	HI	B	RT	ED	Watch
Meropenem 1 gm Inj	HI	B	RT	ED	Watch

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	NA	Reserves
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Beta lactamase inhibitors

1. Clavulanic acid

Semisynthetic acid isolated from streptomyces 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	NA	Access
Amoxicillin 500 mg + Clavulanic acid 125 mg Tab	HI	B	RT	ED	Access
Amoxicillin 875 mg + Clavulanic acid 125 mg Tab	NA	B	RT	ED	Access
Amoxicillin 200 mg + Clavulanic acid 28.5 mg/5 ml 30 ml D.Syp	HI	B	RT	NA	Access
Amoxicillin 1 gm + Clavulanic acid 0.2 gm Inj	HI	B	RT	ED	Access
Amoxicillin 200 mg + Clavulanic acid 28.5 mg/5 ml 60 ml Susp	HI	B	RT	NA	Access
Amoxicillin 125 mg + Clavulanic acid 31.25 mg/5 ml 30 ml D.Syp	NA	B	RT	NA	Access

Amoxicillin 400 mg + Clavulanic acid 57 mg/5 ml 30 ml D.Syp	NA	B	RT	NA	Access
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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	NA	Watch
Piperacillin 2 gm + Tazobactam 0.25 gm Inj	HI	NA	RT	ED	Watch
Piperacillin 4 gm + Tazobactam 0.5 gm Inj	HI	NA	RT	ED	Watch

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 HInfluenzae and Strep. Pneumoniae, acute otitis media in children and acute maxillary sinusitis in adults due to HInfluenzae and Strep. Pneumonia, Pneumocystis carinii pneumonia.

Adverse effects: Nausea, vomiting, rashes, drug fever, erythema multiforme of Stevens-Johnson type, leucopenia, granulocytopenia, glossitis, stomatitis, megaloblastic anemia and crystalluria.

Cautions: Treatment should be immediately stopped if a rash or other manifestation of hypersensitivity occurs. and the drug should be used with caution in nursing mothers.

Contraindications: should not be used during pregnancy, 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	ED	Access
Sulfamethoxazole 400 mg + Trimethoprim 80 mg Tab	HI	D	RT	ED	Access
Sulfamethoxazole 100 mg + Trimethoprim 20 mg Tab	HI	D	RT	ED	Access
Sulfamethoxazole 800 mg + Trimethoprim 160 mg Tab	HI	D	RT	ED	Access

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: Nausea, vomiting, pancreatitis, tachycardia, hypotension, tinnitus, sweating;

Cautions: Patients with epilepsy or history of epilepsy, hepatic or renal impairment, breast- feeding.

Dose: By mouth, RTIs, 250-500 mg twice daily; UTIs, 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 IV infusion (over 30-60 minutes) 200-400 mg twice daily. UTIs 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 IV infusion 8-16 mg/kg daily in 2 divided doses.

Preparation Available:

Ciprofloxacin 250 mg Tab	HI	C	RT	ED	Watch
Ciprofloxacin 500 mg Tab	HI	C	RT	ED	Watch
Ciprofloxacin 200 mg/100 ml Inj	HI	C	RT	NA	Watch

2. Norfloxacin

Indication: Uncomplicated UTIs, prophylaxis in recurrent UTIs, chronic prostatitis.

Adverse effects and cautions: See under ciprofloxacin.

Dose: UTI, 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	NA	Watch
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3. Ofloxacin

Indication: Uncomplicated UTI, acute or chronic prostatitis, infective chronic airway disease and gonorrhoea.

Adverse effects and cautions: See under ciprofloxacin.

Dose: By mouth, UTI, 200-400 mg daily preferably in the morning, increased, if necessary, in upper urinary-tract infections to 400 mg twice daily LRTIs, 400 mg daily preferably in the morning, increased if necessary to 400 mg twice daily.

By IV infusion (over at least 30 minutes for each 200 mg), complicated urinary-tract infection, 200 mg daily. LRTIs 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	NA	Watch
Ofloxacin 50 mg/5 ml, 60ml Susp	NA	C	RT	NA	Watch
Ofloxacin 100 mg DT	HI	C	RT	NA	Watch
Ofloxacin 200 mg Tab	HI	C	RT	NA	Watch
Ofloxacin 400 mg Tab	HI	C	RT	NA	Watch
Ofloxacin 200 mg/100 ml Inj	HI	C	RT	NA	Watch
Ofloxacin solution eye drop 0.3%	HI	C	RT	ED	Watch

Second Generation

1. Levofloxacin

Indication: Chronic prostatitis, UTIs, exacerbation of chronic bronchitis, CAP, skin and soft tissue infections.

Adverse effects and cautions: See under ciprofloxacin. It also causes tachycardia, hypotension, hypoglycemia, and pneumonitis.

Dose: UTIs 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.

CAP: 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 IV infusion (over at least 60 minutes for 500 mg), the CAP, 500 mg once or twice daily.

Complicated urinary-tract infections, 250 mg daily, increased in severe infections.

Preparation Available:

Levofloxacin 100 mg DT	NA	C	RT	ED	Watch
Levofloxacin 250 mg Tab	NA	C	RT	ED	Watch
Levofloxacin 500 mg Tab	HI	C	RT	ED	Watch
Levofloxacin 750 mg Tab	HI	C	RT	ED	Watch
Levofloxacin 500 mg/100 ml Inj	HI	C	RT	NA	Watch

2. Moxifloxacin

Indication: Sinusitis, CAP, exacerbation of chronic bronchitis, complicated skin and soft-tissue infections.

Adverse effects: Angina, arrhythmias, constipation,

flatulence, gastritis, sweating, palpitation.

Cautions: Significant bradycardia or acute myocardial ischemia, photosensitivity reaction may occur, avoid excessive sunlight; superinfection on prolong use.

Dose: Sinusitis 400 mg once daily, CAP 400 mg daily for 7 to 14 days.

Preparation Available:

Moxifloxacin 400 mg Tab	HI	C	RT	ED	Watch
Moxifloxacin 400 mg, 100ml Inj	HI	C	RT	NA	Watch

7.8 Tetracyclines

1. Doxycycline

Indication: Susceptible infections (e.g. 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	ED	Access
Doxycycline 100 mg Inj	HI	D	RT	NA	Access

7.9 Aminoglycoside

1. Gentamicin

Indication: UTI due to Pseudomonas, meningitis and other CNS infections, septicemias 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 IV injection over at least 3 minutes or by iv infusion, 3-5 mg/kg daily (in divided doses every 8 hours).

Preparation Available:

Gentamicin 20mg/ml 2 ml Inj	NA	D	RT	NA	Access
Gentamicin 40 mg/ml 2 ml Inj	HI	D	RT	ED	Access

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 IM or slow IV 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	NA	Access
Amikacin 250 mg Inj	HI	D	RT	ED	Access
Amikacin 500 mg Inj	HI	D	RT	NA	Access

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	NA	Watch
Tobramycin 60 mg Inj	NA	C	CRT	NA	Watch
Tobramycin 80 mg Inj	NA	C	CRT	NA	Watch

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: RTIs, otitis media, skin and soft tissue infections, non-gonococcal urethritis, multidrug resistant typhoid; greater action on gram negative organism than erythromycin.

Adverse effects: Abdominal discomfort, diarrhoea, nausea, vomiting, pancreatitis, constipation, headache, drowsiness.

Cautions: 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	NA	Watch
Azithromycin 200 mg/5 ml, 15 ml Susp	HI	B	RT	ED	Watch
Azithromycin 500 mg Inj	HI	B	RT	NA	Watch
Azithromycin 250 mg Tab	HI	B	RT	ED	Watch
Azithromycin 500 mg Tab	HI	B	RT	ED	Watch

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 ethyl succinate; 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 250 mg/5 ml, 60 ml Susp	HI	B	RT	ED	Watch
Erythromycin 250 mg Tab	HI	B	RT	ED	Watch
Erythromycin 500 mg tab	HI	B	RT	NA	Watch

3. Clarithromycin

It is an erythromycin derivative with slightly greater activity than the parent compound.

Indication: RTIs, 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 discoloration, 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).

Preparation Available:

Clarithromycin 250 mg Tab	HI	C	RT	NA	Watch
Clarithromycin 500 mg Tab	HI	C	RT	ED	Watch

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	NA	Watch
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7.11 Lacosamide:

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; **Contraindications:** 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 IV infusion only, single doses by IV infusion not to exceed 1.2 g.

Preparation Available:

Clindamycin 150 mg Tab	HI	B	RT	ED	Access
Clindamycin 300 mg Tab	HI	B	RT	NA	Access
Clindamycin 600 mg Tab	NA	B	RT	NA	Access
Clindamycin 150 mg/ml, 4 ml Inj	HI	B	RT	ED	Access
Clindamycin 75 mg/5 ml oral liquid	NA	B	RT	ED	Access

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 IV 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 250mg Inj	HI	C	RT	ED	Watch
Vancomycin 500 mg Inj	HI	C	RT	NA	Watch

2. Teicoplanin

Indications: See under vancomycin.

Adverse effects: Rash, bronchospasm, anaphylaxis, headache, rigours.

Cautions: Renal or liver impairment.

Dose: By IM or IV injection or infusion, initially 400 mg (for severe infections initially 400 mg every 12 hours for 3 days) then 200 mg daily. Children over 2 months by IV 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	NA	Watch
Teicoplanin 400 mg Inj	NA	B	RT	NA	Watch

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*, *HInfluenza*;

effective against *N. Gonorrhoeae* but not against concurrent chlamydial infection.

Adverse effects: Rash, bronchospasm, asthenia, neutropenia.

Cautions: Dose reduction required in renal impairment; prolonged use results in superinfection as colitis.

Dose: Adult: 1 g every 8 hours, alternatively 2 g every 12 hours, single doses over 1 g IV route only.

Preparation Available:

Aztreonam 500 mg Inj	NA	B	CRT	NA	Reserves
Aztreonam 1 gm Inj	NA	B	CRT	NA	Reserves

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; prolonged use results in superinfection as 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 IV 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 IV injection; maximum 6 million units per day.

Preparation Available:

Colistimethate 1 M IU Inj	HI	C	RT	NA	Reserve
Colistimethate 2 M IU Inj	HI	C	RT	NA	Reserve

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	ED	Reserve
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Miscellaneous

1. Chloramphenicol

Indications: Life threatening infections particularly those caused by HInfluenzae.

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 septicemias 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: Diarrhoea, eosinophilia, headache, nausea, taste disturbances, vomiting;

Cautions: Acute confusional states, bipolar depression, carcinoid tumor, 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	ED	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: Nausea, vomiting, diarrhoea, hemolytic anemia in individuals with G-6 PD deficiency, allergic manifestations such as chills, fever, leucopenia, cholestatic jaundice and peripheral neuropathy.

Contraindications: The drug should not be used in acute pyelonephritis, infants less than 3 months old and

known hypersensitive to nitrofurantoin.

Cautions: 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	NA	Access
Nitrofurantoin 100 mg Tab	HI	B	RT	ED	Access

7.15 Antiviral

1. Acyclovir / Acyclovir:

Indication: Herpes infections.

Adverse effects: Gastrointestinal disturbances, rashes, increase in blood urea and creatinine, headache and fatigue.

Cautions: 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	ED	NA
Acyclovir 400 mg Tab	HI	B	RT	ED	NA
Acyclovir 800 mg Tab	HI	B	RT	ED	NA
Acyclovir 200 mg/5 ml Susp	NA	B	RT	NA	NA
Acyclovir 250 mg/10 ml Inj	HI	B	RT	ED	NA

Abacavir

It inhibits HIV-1 reverse transcriptase by competing with dGTP as substrate, inhibiting replication.

Indication: HIV infection in combination with other antiretroviral drugs.

Adverse effects: Nausea, vomiting, fatigue, diarrhoea.

Cautions: 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.

Caution: Patients with asthma, heart failure, pregnancy and renal disease.

Contraindication: In vascular disease (especially disease of coronary arteries).

Dose: By SC or IM injection, diabetes insipidus, 5-20 units every four hours. By IV 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: Hypertension, sodium retention, potassium loss, muscle weakness, diabetes, osteoporosis, dyspepsia, increased susceptibility to and severity of infection.

Cautions: 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 IM injection or slow IV injection or infusion initially 0.5-24 mg; Child 0.2-0.4 mg/kg daily Cerebral oedema by IV injection, 10 mg initially, then 4 mg by IM 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	NA
Dexamethasone 4 mg Tab	HI	C	RT	ED
Dexamethasone 4 mg/ml 2 ml Inj	HI	C	RT	ED

2. Betamethasone

Indication: suppression of inflammatory and allergic disorder, congenital adrenal hyperplasia.

Adverse effects and cautions: Indigestion, increased 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	NA
Deflazacort 30 mg Tab	NA	NA	RT	NA
Deflazacort 6 mg/5ml, 30 ml Susp	NA	NA	RT	NA

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 IM injection or slow IV injection or infusion, 100 to 500 mg, 3-4 times in 24 hours or as required; child by slow IV 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	ED
Hydrocortisone 200 mg Inj	NA	C	RT	ED
Hydrocortisone ointment/cream 1%	NA	C	RT	ED

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	NA
Prednisolone 5 mg Tab	HI	C	RT	ED
Prednisolone 10 mg Tab	HI	C	RT	ED
Prednisolone 20 mg Tab	HI	C	RT	ED
Prednisolone 40 mg Tab	HI	C	RT	NA
Prednisolone solution eye drop 0.5%	NA	C	RT	ED

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 IV injection or slow IV injection or infusion, initially 100-500 mg.

Preparation Available:

Methylprednisolone 1 gm Inj	HI	C	CRT	NA
Methylprednisolone 500 mg Inj	HI	C	CRT	NA
Methylprednisolone 125 mg Inj	HI	C	CRT	NA

Methylprednisolone 80 mg/ ml Inj Sup.	HI	C	CRT	ED
Methylprednisolone 40 mg/ml Inj Sup	HI	C	CRT	ED
Methylprednisolone 4 mg Tab	HI	C	RT	NA
Methylprednisolone 8 mg Tab	HI	C	RT	NA
Methylprednisolone 16 mg Tab	HI	C	RT	NA

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: Abdominal pain, flatulence, diarrhoea, jaundice.

Caution: caution with insulin and sulfonylureas (enhanced hypoglycemia).

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	NA
Acarbose 25 mg Tab	HI	B	RT	NA

2. Voglibose

Indication, Adverse effects and cautions: Similar to acarbose.

Preparation Available:

Voglibose 0.2 mg Tab	HI	B	RT	NA
Voglibose 0.3 mg Tab	HI	B	RT	NA

Biguanides

1. Metformin

Metformin decreases gluconeogenesis and increases peripheral utilization 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: 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	B	RT	ED
Metformin 1 gm SR Tab	NA	B	RT	NA
Metformin 850 mg Tab	HI	B	RT	ED
Metformin 850 mg SR Tab	NA	B	RT	NA
Metformin 500 mg Tab	HI	B	RT	ED
Metformin 500 mg SR Tab	NA	B	RT	NA

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: GI disturbances, nasopharyngitis, pain, peripheral oedema, upper respiratory infection.

Caution: 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	NA
Sitagliptin 50 mg Tab	HI	B	RT	NA
Sitagliptin 100 mg Tab	HI	B	RT	NA

2. Teneligliptin

Indication, Adverse effects and cautions: See under sitagliptin.

Preparation Available:

Teneligliptin 20 mg Tab	NA	B	RT	NA
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3. Linagliptin

Indication, Adverse effects and caution: See Under Sitagliptin.

Preparation Available:

Linagliptin 5mg Tab	HI	B	RT	NA
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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 effects: Urinary Tract Infection, Genital Infection, Increased Urination, Diabetic ketoacidosis.

Caution: 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	NA
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Empagliflozin 25 mg	HI	D	RT	NA
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2. Dapagliflozin

Indication, Adverse effects and caution: See Under Empagliflozin.

Preparation Available:

Dapagliflozin 5mg Tab	NA	C	RT	NA
Dapagliflozin 10mg Tab	NA	C	RT	NA

Meglitinides

1. Repaglinide

It stimulates insulin release.

Indication: Type 2 diabetes mellitus.

Adverse effects: Diarrhoea, constipation, abdominal pain, nausea, vomiting.

Caution: 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	NA
Repaglinide 2 mg Tab	HI	NA	RT	NA

Sulfonylureas

It increases insulin release, decreases hepatic glucose production and increases insulin receptor sensitivity.

1. Glibenclamide

Indication: Type 2 diabetes mellitus.

Adverse effects: 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	NA
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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	ED
Gliclazide 80 mg Tab	HI	NA	RT	ED

3. Glimepiride

Indication: Type 2 diabetes mellitus.

Adverse effects and cautions: See under glibenclamide.

Dose: Initially 1mg daily, adjusted according to response, then increased in steps of 1mg every 1–2 weeks, increased to 4mg daily, dose to be taken shortly before or with first main meal, the daily dose may be increased further, in exceptional circumstances; maximum 6 mg per day.

Preparation Available:

Glimepiride 1 mg Tab	HI	C	RT	NA
Glimepiride 2 mg Tab	HI	C	RT	NA
Glimepiride 3 mg Tab	HI	C	RT	NA
Glimepiride 4 mg Tab	HI	C	RT	NA

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	ED
Glipizide 2.5 mg tab	-	C	RT	ED

Thiazolidinediones

1. Pioglitazone

It improves target cell response to insulin; decreases hepatic gluconeogenesis.

Indications: Type 2 diabetes mellitus.

Adverse effects: Peripheral oedema, headache, anemia, weight gain, dizziness, impotence.

Caution: 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	NA
Pioglitazone 30 mg Tab	HI	NA	RT	NA

Insulin

Properties of Insulin Preparations

Types Short	Added Protein	Species Source	Onset of action (Hr)	Peak (Hr)	Duration of Action (Hr)
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.

While insulin does not have a specific pregnancy category, it is widely regarded as safe for use during pregnancy when prescribed and monitored healthcare professionals.

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 SC in combination with an intermediate- or long-acting preparation.

Indication: Diabetic ketoacidosis, diabetes mellitus.

Adverse effects and cautions: Hypoglycaemia

localized allergic reactions, fat hypertrophy at injection sites.

Dose: By SC, IM or IV injection, according to the patient's requirements.

Preparation Available:

HumanRegularInsulin40IU/ml10mlInj	NA	NA	FT	NA
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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 SC injection, immediately before meals or when necessary, shortly after meals, according to requirements. By IV 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 pediatric 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 SC 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 SC 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 SC 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 another insulin. Separate syringes must be used to minimize 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 SC injections, Adult and Child over 6 years, according to requirements.

Preparation Available:

Glargine 100 IU/ml 10ml Inj	HI	NA	FT	NA
Glargine 100 IU/ml 3 ml Cartridge	HI	NA	FT	NA

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 ratio (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	NA	FT	NA
Regular/Isophane mixture 30/70 Cartridge	HI	NA	FT	NA
Regular/NPH mixture 50/50 Cartridge	HI	NA	FT	NA
Insulin protamine/insulin aspart protamine mixture 30/70 vial	HI	NA	FT	NA
Insulin protamine/insulin aspart protamine mixture 30/70 Cartridge	HI	NA	FT	NA
Insulin protamine/insulin aspart protamine mixture 50/50 vial	HI	NA	FT	NA

Insulin protamine/insulin aspart protamine mixture 50/50 Cartridge	HI	NA	FT	NA
Insulin lispro /Insulin NPL (Neutral Protamine lispro) mixture 25/75	NA	NA	FT	NA
Insulin NPL/Insulin mixture 50/50 Cartridge	HI	NA	FT	NA
Insulin Lispro/ insulin lispro protamine 50:50 equivalent to humalog mix cartridge with pen Inj	HI	NA	FT	NA

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	NA
Metformin 1000 mg + Glimepiride 1 mg Tab	HI	NA	RT	NA
Metformin 500 mg + Glimepiride 2 mg Tab	HI	NA	RT	NA
Metformin 1000 mg + Glimepiride 2 mg Tab	HI	NA	RT	NA

2. Metformin and Sitagliptin

Indication, Adverse effects and cautions: See under Metformin and Sitagliptin.

Metformin 500 mg + Sitagliptin 50 mg Tab	HI	C	RT	NA
Metformin 1000 mg + Sitagliptin 50 mg Tab	HI	C	RT	NA

Metformin 1000 mg + Sitagliptin 100 mg Tab	HI	C	RT	NA
Metformin 850 mg + Sitagliptin 50 mg Tab	HI	C	RT	NA

3. Metformin and Linagliptin

Indication, Adverse effects and cautions: See under Metformin and linagliptin.

Metformin 1000 mg + Linagliptin 2.5 mg Tab	HI	B	RT	NA
Metformin 500 mg + Linagliptin 2.5 mg Tab	HI	B	RT	NA
Metformin 850 mg + Linagliptin 2.5 mg Tab	HI	B	RT	NA

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: Mild hirsutism, decreased breast size, acne, weight gain, oedema, cholestatic jaundice, dizziness, headache, fatigue and tremor.

Cautions: 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 up to 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. Gynecomastia, 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	NA
Danazol 100 mg Tab	HI	X	RT	NA
Danazol 200 mg Tab	NA	X	RT	NA

3. Oestrogens

Ethinylestradiol / Ethinylestradiol.

It acts similar to oestradiol, development and maintenance of the female reproductive system.

Indication: Short-term treatment of symptoms of oestrogen, osteoporosis prophylaxis, menstrual disorder, palliative treatment of prostate cancer.

Adverse effects: Nausea and vomiting; weight gain, jaundice, rashes, depression, headache, breast enlargement and tenderness, withdrawal bleeding; Impotence and gynaecomastia in men.

Cautions: 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	NA
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4. 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	NA
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Progestogens

1. Progesterone

Indication: Infertility due to luteal phase, premenstrual syndrome, dysfunctional uterine bleeding

Adverse effects: Acne, alopecia, bloating, breast tenderness, change in libido, depression, dizziness, drowsiness.

Cautions: 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	NA
Progesterone 200 mg Cap	HI	B	RT	NA

2. Norethisterone

It inhibits secretion of gonadotropins from the pituitary gland, prevents follicular maturation and ovulation.

Indication: Contraceptive, endometriosis, premenstrual syndrome, postponement of menstruation.

Adverse effects: More virilising effects and the greater possibility of liver disturbances and jaundice, urticaria, gastrointestinal disturbances, oedema, weight gain, breast discomfort and irregular menstrual cycles.

Caution: 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	ED
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3. Dydrogesterone:

It is an analogue of the naturally occurring progesterone and does not cause virilization.

Indication: Endometriosis, dysfunctional uterine bleeding, dysmenorrhea, amenorrhea.

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 Dysmenorrhea, 10 mg twice daily from 5 to 25 days of cycle.

Amenorrhea, 10 mg twice daily from 11th to 25th day of cycle with oestrogen therapy from 1st 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	NA
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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: Amenorrhea, dysfunctional uterine bleeding, induction of menses, prevention of preterm labor.

Adverse effects and cautions: See under norethisterone.

Dose: Amenorrhea 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	NA
Hydroxyprogesterone 500 mg Inj	NA	NA	RT	NA

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).

Levonorgestrel 750 mcg capsule	NA	NA	RT	ED
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Levonorgestrel 1.5 mg tablet	NA	NA	RT	ED
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6. Medroxyprogesterone

This is a derivative of progesterone and has less androgenic activity.

Indication: Contraceptive (long acting), secondary amenorrhea, dysfunctional uterine bleeding, mild to moderate endometriosis.

Adverse effects: See under norethisterone; menstrual irregularities are common, and infertility may persist for many months after cessation of treatment.

Dose: For Contraception, by deep IM 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 amenorrhea, by mouth, 2.510 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 amenorrhea. Mild to moderate endometriosis, 10 mg 3 times daily for 90 consecutive days, beginning on day 1 of cycle.

Preparation Available:

Medroxyprogesterone 5 mg Tab	HI	NA	RT	ED
Medroxyprogesterone 150 mg/ml, 1ml Inj	HI	NA	RT	ED

7. Desogestrel

It is a third generation of progesterone and a derivative of norgestrel.

Indication: Contraception.

Adverse effects: Breast discomfort, changes in libido, depression, disturbance of appetite, dizziness, headache, menstrual irregularities, nausea, vomiting.

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-oestrogen

1. Clomiphene / Clomifene

It is a nonsteroidal compound with osteogenic and anti-osteogenic properties. Mechanism in stimulating ovulation is unknown but is believed to be related to its anti-osteogenic 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: 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.

Caution: 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	ED
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Antiprogestins

1. Mifepristone

Indication: Medical termination of intrauterine pregnancy of up to 63 days' gestation, labor induction in fetal death in utero where prostaglandin or oxytocin inappropriate.

Adverse effects: Uterine Contractions, vaginal bleeding (sometimes severe), nausea, vomiting, rash, dizziness, headache.

Caution: 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	NA
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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.

Progestogen inhibits secretion of LH and thus prevents ovulation; it also makes the cervical mucus less suitable for the passage of sperm.

Oestrogen and progestogen 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 (≥ 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>Leukorrhea</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 >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	NA
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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	NA	X	RT	NA
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3. Ethinylestradiol and Levonorgestrel

Ethinylestradiol 0.03 mg + Levonorgestrel 0.15 mg Tab	NA	NA	RT	ED
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4. Ethinylestradiol and Levonorgestrel

Ethinyl Estradiol 0.02 mg + Levonorgestrel 0.1 mg Tab	NA	NA	RT	ED
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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: Headache, tiredness, mood changes, multiple pregnancy.

Cautions: Cardiac or renal impairment, epilepsy, asthma, migraine.

Dose: By SC or IM injection, according to the patient's response.

Preparation Available:

Human chorionic Gonadotropin 10000 IU Inj	NA	X	FT	NA
Human Chorionic Gonadotropin 5000 IU Inj	NA	NA	FT	NA

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: 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	NA
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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: Palpitation, tachycardia, diarrhoea, cardiac arrhythmias, tremor, weight loss, sweating, insomnia, angina pain and increased appetite.

Caution: 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	NA
Levothyroxine 25 mcg Tab	HI	A	RT	ED
Levothyroxine 50 mcg Tab	HI	A	RT	ED
Levothyroxine 75 mcg Tab	HI	A	RT	ED
Levothyroxine 100 mcg Tab	HI	A	RT	ED

Antithyroid Drugs

1. Carbimazole

It inhibits the formation of thyroid hormones by interfering with incorporation of oxidized iodine into tyrosine residues of thyroglobulin and coupling of iodothyronine residues to form iodothyronines.

Indication: Hyperthyroidism.

Adverse effects: 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.

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	ED
Carbimazole 10 mg Tab	NA	D	RT	NA

2. Propylthiouracil

Indication: See under carbimazole.

Adverse effects and cautions: See under carbimazole. The drug may cause thrombocytopenia, aplastic anemia, hypoprote thrombinemia 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 Anesthesia

General anesthetics

9.1 Inhalational Anesthetics

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 vaporizer, 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 anemia, neurological toxic effects; Hepatotoxicity is smaller than halothane.

Dose: Using a special calibrated vaporizer, 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	ED
Isoflurane 250 ml sol	NA	NA	CT	ED

3. 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 Anesthetics

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 pediatric anesthesia. 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 anesthesia for minor surgical or diagnostic procedures; Diagnostic maneuvers 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 center. 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 anesthesia).

Diagnostic maneuvers 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 anesthesia).

Preparation Available:

Ketamine 50 mg/ml, 2 ml Inj	HI	NA	RT	ED
Ketamine 500 mg/ 10 ml Inj	HI	NA	RT	ED

3. Propofol

Indication: Induction and maintenance of anesthesia, sedation for surgical and diagnostic procedures.

Adverse effects and cautions: Bradycardia, hypotension, apnea, 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 anesthesia, 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 anesthesia, 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	ED
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4. Thiopental /Thiopentone sodium

Indication: Induction of general anesthesia, anesthesia of short duration in minor surgical procedures.

Adverse effects and cautions: Arrhythmias, cough, laryngeal spasm, myocardial depression, rash. The number 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 Anesthetics

1. Bupivacaine

It has a slow onset and long duration of action. It is suitable for epidural analgesia in labor 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); labor, lumbar, 0.25-0.5% (maximum 12 ml of either).

Preparation Available:

Bupivacaine 0.5 % Inj	NA	C	RT	ED
Bupivacaine 0.5 % + Dextrose 80 mg Inj	HI	C	RT	ED

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 anesthesia, usual strength 4% for mouth, throat and upper gastrointestinal tract maximum 200 mg. Surface anesthesia of urethra, 4% solution, maximum 400 mg.

Preparation Available:

Lignocaine 2 % , 30 ml Inj	HI	B	RT	ED
Lignocaine 2 %, 30 gm Gel	HI	B	RT	ED
Lignocaine 2 % with Adrenaline Inj	HI	NA	RT	ED
Lignocaine 15 % Spray	HI	B	RT	NA
Lidocaine 5% + Dextrose 2ml Inj	NA	B	RT	ED

9.4 Anesthesia 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	ED
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2. Atracurium

It is a non-depolarizing muscle relaxant. It is metabolized 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	NA	C	FT	NA	NA
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3. Neostigmine

It reverses the effects of the non-depolarizing 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 methyl sulphate 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	NA	C	RT	NA	NA
Neostigmine 2.5 mg/ml 5 ml Inj	HI	C	RT	NA	NA

4. Vecuronium

It is a non-depolarizing 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	NA
Vecuronium 10 mg Inj	HI	C	RT	NA

5. Rocuronium

It is a non-depolarizing 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	NA
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6. 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 pseudo-cholinesterase 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	NA
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7. 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	ED
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8. Dexmedetomidine

It causes activation of central alpha₂ adrenergic receptors that has been used for sedating critically ill/ventilated patients in intensive care units and peri-operative procedures of non-intubated patients. It is also being used as an adjunct to anesthesia.

Indication: Provide sedation without causing respiratory depression; blunts many of the cardiovascular reflexes.

Adverse effects and cautions: hypotension, bradycardia and dry mouth.

Contraindication: No absolute contraindications however, it should be cautiously used in patients with bradycardia and hypotension.

Dose: It is administered by iv infusion.

For ICU sedation, 0.2 to 0.7 mcg/kg per hour. The dose can be increased to 1.5 mcg/kg per hour.

For anesthesia, loading dose of 0.5 to 1.0 mcg/kg over 10 minutes followed by a continuous infusion of 0.2 to 0.7 mcg/kg per hour titrated to desired sedation goals.

For adjunctive peripheral nerve block, 1.0 mcg/kg to achieve the desired prolongation.

For the treatment of mild and severe agitation, 120 mcg and 180 mcg administered sublingually or buccally respectively.

Preparation Available:

Dexmedetomidine 100 mcg/ml, 1 ml Inj	NA	C	RT	NA
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9. Opioids

Fentanyl: It is a potent opioid analgesic generally given at the beginning of painful surgical procedures. It is frequently used to supplement anesthetics in balanced anesthesia which permits the use of lower anesthetic concentrations with better hemodynamic stability.

Indication: Preoperative anesthesia, anesthetic adjunct, general anesthesia, postoperative pain control, regional anesthesia.

Adverse effects and cautions: confusion, respiratory depression, drowsiness, nausea, visual disturbances, dyskinesia, hallucinations, delirium (narcotic delirium), constipation, narcotic ileus, muscle rigidity, hypotension, coma and even death.

Contraindications: Patients with obstructive airway diseases (asthma, COPD, obstructive sleep apnea), liver failure and known intolerance to fentanyl. Fentanyl should not be used concomitantly with medications such as CYP3A4 inhibitors like macrolides, azole-antifungal agents and protease inhibitors that may lead to opioid induced respiratory depression (OIRD). If the patients have used a monoxides inhibitor in the previous 14 days, fentanyl is contraindicated.

Dose: For preoperative analgesia, 50-100 mcg IV/IM for single dose 30 to 60 min before surgery. For anesthetic adjunct, 0.5-2 mcg/kg/dose IV for a single dose. For post operative pain control, 50-100 mcg IV/IM every 1 to 2 hours as needed; alternately 0.5-1.5 mcg/kg/hour iv as needed.

Preparation Available:

Fentanyl 50 mcg/ml, 2ml Inj	HI	C	RT	ED
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8. Diazepam

See under antiepileptic.

9. Atropine

See under antispasmodic.

Chapter-10: Drugs Affecting Nutrition and Blood

10.1 Antianemics

1. Iron

2. Ferrous Salt

Indication: Iron deficiency anemia.

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 anemia.

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	NA	C	RT	ED
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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 anemia.

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	B	RT	NA
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10.2 Vitamins

1. Vitamin B12

Indication: Pernicious anemia and other macrocytic anemia.

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 anemia and other macrocytic anemias 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 anemia, 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 anemia 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	ED
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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 cholinesterase. 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 anemia, cardiac failure.

Preparation Available:

Human albumin 20 % 100 ml Inj	HI	C	FT*	ED
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2. Polygeline

It is a gelatin (hydrolyzed 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⁺, K⁺, Ca²⁺ and Cl⁻ 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	ED
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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	ED
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2. Cholecalciferol (Vitamin D3)

Vitamin D₃, through its active metabolite, 1,25(OH)₂D₃, also plays an important role in maintaining calcium homeostasis by enhancing intestinal calcium absorption, PTH-induced mobilization 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	HI	A	RT	NA
Cholecalciferol 400 IU/ml Drop	NA	A	RT	ED
Cholecalciferol 60 k IU Cap	HI	A	RT	ED

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 hypercalcemia; 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: Nausea.

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	NA
Calcitriol 60k INJ	NA	C	CRT	NA
Calcitriol 0.03% w/w 15 gm Oint	NA	C	CRT	NA

5. 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.

6. Pyridoxine (Vitamin B6)

Indication: Deficiency states causing peripheral neuritis, patients on antituberculosis therapy with

isoniazid, premenstrual syndrome, idiopathic sideroblastic anemia.

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	NA
Pyridoxine 100 mg Tab	HI	A	RT	NA

7. 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 discoloration of urine.

Dose: Treatment, Adult and Child up to 30 mg daily in divided doses. Prophylaxis, Adult and Child, 1-2 mg daily.

8. 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	NA
Thiamine 100 mg Tab	HI	A	RT	ED

9. 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	NA	A	RT	NA
Vitamin E 400 mg Cap	HI	A	RT	NA
Vitamin E 600 mg Cap	NA	A	RT	NA

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: Anemia, arthralgia, dryness of eye, dryness of lips, dryness of nasal mucosa, epidermal fragility, hematuria, headache, myalgia, raised blood glucose concentration.

Contraindication: Hyperlipidemia, 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	X	RT	NA
Isotretinoin 20 mg Tab	HI	X	RT	NA

11. Cyanocobalamin (Vitamin B12)

Indication: Pernicious anemia, nutritional supplementation.

Adverse effects and cautions: Headache, nasopharyngitis, arthralgia, dizziness.

12. 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	C	RT	NA
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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	NA
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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	NA
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5. Calcium Gluconate

Indication: Hypocalcaemia.

Preparation Available:

Calcium Gluconate 10 % w/v, 10 ml Inj	HI	C	RT	ED
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6. 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 deficiency, severe diarrhoea, liver cirrhosis, immune deficiency, hair loss.

Adverse effects and cautions: Dyspepsia, abdominal pain, headache, nausea, vomiting, gastritis; use with caution in acute renal failure.

Preparation Available:

Zinc Sulphate 20 mg TAB	HI	C	RT	ED
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10.6 Amino Acids and derivatives

1. Levocarnitine / Carnitine

Indication: Primary carnitine deficiency due to inborn errors of metabolism, secondary carnitine deficiency in hemodialysis patients.

Adverse effects and cautions: Abdominal pain, body odor, diarrhoea, nausea, vomiting.

Preparation Available:

Levocarnitine 500 mg Tab	NA	B	RT	NA
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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	HI	NA	RT	NA
L ornithine L aspartate 5 gm, 10 ml Inj	HI	NA	RT	NA

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, toxemia of pregnancy.

Preparation Available:

Ringer lactate 500 ml nipple head	HI	C	RT	ED
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2. Dextrose

Indication: To restore glucose concentration in hypoglycemia.

Adverse effects and cautions: Hyperosmolarity, infection at the site of injection; use with caution in patients 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	NA
Dextrose 10 % 500 ml Plastic bottle Inj	HI	C	RT	NA
Dextrose 25 % 25 ml Inj	HI	C	RT	NA
Dextrose 50 % 25 ml Inj	HI	C	RT	NA

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, toxemia of pregnancy.

Preparation Available:

Sodium Chloride 0.9 % 100 ml Inj	HI	C	RT	ED
Sodium Chloride 0.9 % 1000 ml Plastic head Inj	HI	C	RT	ED
Sodium Chloride 0.9 % 1000 ml Euro head Inj	HI	C	RT	ED
Sodium Chloride 0.9 % 500 ml glass bottle Inj	HI	C	RT	ED

Sodium Chloride 0.9 % 500 ml Plastic Bottle Inj	HI	C	RT	ED
Sodium Chloride 1000 ml Inj	HI	C	RT	ED
Sodium Chloride 0.9 % 3 Ltr Inj	HI	C	RT	ED
Sodium Chloride 0.9 % 500 ml Inj Eurohead	HI	C	RT	ED

4. 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	ED
Sodium Chloride 0.9 % + Dextrose 5 % 1000 Euro head ml Inj	HI	C	RT	ED
Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Nipple head Inj	HI	C	RT	ED
Sodium Chloride 0.9 % + Dextrose 5 % 1000 ml Nipple head Inj	HI	C	RT	ED
Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Glass Bottle Inj	HI	C	RT	ED
Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Glass Bottle Inj	HI	C	RT	ED

5. 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	NA	RT	NA
Potassium Chloride 150 mg/ml 10 ml Inj	HI	C	RT	ED

6. 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, toxemia of pregnancy.

Periodic laboratory determinations of the patient's acid-base status are recommended to minimize the risk of overdose.

Contraindication: Metabolic or respiratory alkalosis, Hypocalcaemia.

Preparation Available:

Sodium Bicarbonate 75 mg/ml 10 ml Inj	HI	C	RT	ED
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7. 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	NA	NA	RT	NA
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8. 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 Sulphate 50 mg/ml Inj, 2 ml Inj	HI	D	RT	ED
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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	ED
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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 + Docusate sodium	NA	NA	RT	NA
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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	NA
Vitamin B-complex + zinc Cap	HI	A	RT	NA
Vitamin B-complex Inj, 2 ml	HI	A	RT	NA

4. Iron and Folic acid

Indication, Adverse effects and cautions: See under Iron and Folic acid

Iron Polymaltose 100m g + folic acid 1mg	NA	A	RT	NA
Iron + folic acid 15 ml Haematinics Drop	NA	A	RT	NA

5. Hematinic and vitamin C

Hematinic refers to medicine that increases hemoglobin 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	NA	A	RT
Multivitamin 15 ml Drop	NA	A	RT
Multivitamin 200 ml Syrup	NA	A	RT
Multivitamin + Zinc 200 ml Syrup	HI	A	RT
Multivitamin Inj	NA	A	RT

7. Miscellaneous Preparations

Collagen Pow	NA	B	RT	NA
B-Protein 200 gm Pow	NA	B	RT	NA
Pregnancy Protein Pow	NA	B	RT	NA
Lactobacillus 50 M spores Cap	NA	B	RT	NA
Lactobacillus Probiotic Pow	NA	B	RT	NA
Lactobacillus probiotic syp 5 gm/50 ml	NA	B	RT	NA
Silymarin 70 mg Tab	NA	B	RT	NA
Silymarin 140 mg Tab	NA	B	RT	NA
Trypsin + chymotrypsin 100000 IU Tab	HI	B	RT	NA
Trypsin + chymotrypsin 200000 IU Tab	HI	B	RT	NA

Chapter-11: Drugs acting on Genito-urinary System

Obstetrics

11.1 Labor induction

1. Misoprostol

It is a prostaglandin which is used as a low-dose vaginal tablet.

Indication: Induction of labor, medical termination of pregnancy of up to 63 days gestation.

Adverse effects and cautions: Uterine hyperstimulation, uterine rupture, fetal 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 previa, major cephalopelvic disproportion, fetal malpresentation, fetal distress, history of caesarean section, multiple pregnancy.

Dose: Induction of labor, 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	NA
Misoprostol 100 mcg Tab	NA	X	RT	NA
Misoprostol 200 mcg Tab	HI	X	RT	ED

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	NA	FT	NA
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4. Oxytocin

Indication: Induction of labor, 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, fetal distress, asphyxia and death, arrhythmias, rashes, water intoxication and anaphylactoid reactions; use with caution in hypertension, abnormal presentation, previous caesarean section, caudal block anesthesia.

Contraindication: Mechanical obstruction to delivery, severe pre-eclamptic toxemia, fetal distress, hypertonic uterine contraction and placenta previa.

Dose: By slow intravenous infusion, induction of labor and augmentation of labor in hypotonic uterine inertia, a solution containing 1 unit per liter, 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	ED
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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 1 ½ 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	NA
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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 labor, first and second stage of labor, 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	ED
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11.3 Uterine Relaxants (Tocolytics)

1. Isoxsuprine

Indication: To inhibit premature labor.

Adverse effects and cautions: Transient flushing, hypotension, tachycardia, rashes and gastrointestinal disturbances. Maternal pulmonary oedema and fetal tachycardia have been reported following intravenous administration in premature labor.

It should not be administered parenterally to patients with heart disease or severe anemia.

It should not be given where there is premature detachment of the placenta or immediately postpartum, nor should be used for premature labor if there is infection.

Contraindication: Isoxsuprine is contraindicated following recent arterial haemorrhage.

Dose: To arrest premature labor, by intravenous infusion, 200-300 micrograms per minute, adjust according to the patient's response, until control is achieved. Prophylaxis, by mouth, 40-80 mg daily.

Preparation Available:

Isoxsuprine 10 mg Tab	NA	C	RT	NA
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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	NA
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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	NA
Oxybutynin 5 mg Tab	HI	B	RT	NA

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	NA
Prazosin 5 mg XL Tab	HI	C	RT	ED

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	NA
Tamsulosin 0.4 mg Tab	HI	NA	RT	NA

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	NA
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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	NA
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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	C	RT	NA
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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	ED
Clotrimazole 100 gm D.Pow	NA	B	RT	NA
Clotrimazole 1% w/v 15 gm Oint	HI	B	RT	NA
Clotrimazole lotion, 15 ml	HI	B	RT	NA
Clotrimazole 1% w/v Soap	NA	B	RT	NA

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	NA
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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	NA
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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	NA
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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	NA
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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	NA
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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: Sensitization (cross sensitivity with other aminoglycosides may occur).

2. Metronidazole and allied combinations

Indication: Acute inflammatory exacerbation of rosacea, malodorous fungating tumors.

Adverse effects and cautions: Sensitization (cross sensitivity with other aminoglycosides may occur).

Dose: Apply twice daily for 8 weeks.

Preparation Available:

Metronidazole 1 % Gel, 20 gm Gel	NA	A	RT	NA
Metronidazole 1 % + Chlorhexidine 1 % + Lignocaine 2 %, 10 gm Oint	HI	C	RT	NA

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 colonization 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	ED
Mupirocin 2 % w/w, 10 gm Oint	HI	NA	RT	ED

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	NA
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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	NA
Silver Sulfadiazine 1 % 200 gm Oint	NA	C	RT	NA

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	NA
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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	NA
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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/Acyclovir

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 / Beclomethasone

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	ED
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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	C	RT	NA
Clobetasol 0.05 % 30 gm Oint	HI	C	RT	NA

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	NA	RT	NA
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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	NA
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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	NA	C	RT	NA
Hydrocortisone 1%, 10 gm Oint	HI	C	RT	ED

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	C	RT
Calamine 8%, 300 ml Lo	HI	C	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	NA
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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	NA
Tacrolimus 0.1 % 10 gm Oint	NA	C	RT	NA

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	NA
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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	NA
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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	C	RT	NA
Benzoyl Peroxide 5%, 20 gm Gel	HI	C	RT	NA

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	NA
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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	NA
Salicylic acid 20 % 15 gm Oint	HI	C	RT	NA
Salicylic acid 40 % 15 gm Oint	HI	C	RT	NA

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	NA
Tretinoin 0.05 % w/v 20 gm Gel	HI	D	RT	NA

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	C	RT	NA
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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 intravaginal; 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	C	RT	NA
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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	ED
Permethrin 1 % Soap	NA	B	RT	NA

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	NA
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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	C	RT	NA
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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	C	RT	NA
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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	NA
Diclofenac 15 % + Linseed oil 3 % + Menthol 5 % + Methyl Salicylate 10 % 30 gm Gel	HI		RT	NA

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, sensitization 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	NA
Povidone Iodine 5 % 50 ml gm Sol	HI	B	RT	ED
Povidone Iodine 5 % w/w 15 gm oint	HI	B	RT	NA
Povidone Iodine 1 % 100 ml Garg	HI	D	RT	NA
Povidone Iodine vaginal Pess	HI	D	CRT	NA

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	NA
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3. Potassium Permanganate

Indication: Cleansing and deodorizing suppurating eczematous reactions and wounds.

Adverse effects and cautions: Skin irritation.

Preparation Available:

Potassium Permanganate Powder, 30 gm	HI	C	CT	NA
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13.12 Miscellaneous Preparations

Coconut Oil 100 ml Oil	NA	B	CT	NA
Sunscreen 40 SPF Cream	NA	B	CT	NA
Sunscreen 50 SPF Cream	NA	B	CT	NA

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	B	CT	NA
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3. Allantoin, Hydrocortisone, Lignocaine and zinc oxide **Indication:** Hemorrhoids

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	NA
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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	C	CT	NA
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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	NA
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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	C	CT	NA
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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	NA
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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	C	CT	NA
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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	C	CT	NA
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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	C	CT	NA
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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	B	CT	NA
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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	B	CT	NA
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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	B	CT	NA
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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	B	CT	NA
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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 an undiagnosed 'red eye'.

Preparation Available:

Chloramphenicol 0.5 % w/v E/D	HI	NA	CT	ED
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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	ED
Ciprofloxacin 0.3 % w/v E/O	HI	NA	RT	ED

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	ED
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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	NA
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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	NA
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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	NA
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7. Moxifloxacin

Indication: Bacterial Conjunctivitis.

Adverse Drug Reaction: Dry Eye.

Preparation Available:

Moxifloxacin 0.5 % Eye Drop	HI	NA	RT	NA
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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	NA
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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	NA
Fluorometholone 0.1% + Neomycin 0.35% 5ml eye drop	HI	NA	RT	NA

4. Flurbiprofen

Indication: Ocular inflammation.

Adverse Drug Reaction: Ocular Hyperaemia.

Preparation Available:

Flurbiprofen 0.03% 5ml Eye Drop	HI	NA	RT	NA
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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 synechiae.

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	ED
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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	NA
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14.1.4 Antiglaucoma

1. Acetazolamide

It inhibits carbonic anhydrase, hence reducing the formation of hydrogen and bicarbonate in aqueous humor 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 anemia, thrombocytopenia or leucopenia, electrolyte 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	ED
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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	NA
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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	NA
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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	NA
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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	NA
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5. Olopatadine

Indication: Allergic Conjunctivitis.

Adverse effects and cautions: Swelling of eye lid.

Preparation Available:

Olopatadine 0.1% Eye Drop 5ml	NA	NA	RT	NA
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6. 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	NA
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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	NA
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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	NA
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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	NA
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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 is obtained.

Preparation Available:

Prednisolone 1 % 5 ml Er/D	NA	C	RT	NA
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14.2.4 Removal of Earwax (Cerumenolytics)

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	NA	C	RT	NA
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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	NA
Betahistine 16 mg Tab	HI	C	RT	NA

Combination Products

1. Chloramphenicol and Benzocaine

Indication, Adverse effects and cautions; See under Chloramphenicol and Benzocaine.

Chloramphenicol 5 % + Benzocaine 1 % Er/D	NA	C	RT	NA
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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	NA
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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	NA
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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	NA
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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	ED
Oxymetazoline 0.05 % w/v N/D	NA	C	RT	ED
Oxymetazoline 0.01 % w/v N/S	NA	C	RT	NA

2 Xylometazoline Indication: nasal congestion

Adverse effects: See oxymetazoline.

Preparation Available

Xylometazoline 0.01 % w/v N/S	NA	C	RT	NA
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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	B	RT	NA
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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 sprays in each nostril once daily.

Preparation Available:

Fluticasone 50 mcg N/S	NA	C	RT	NA
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2. Beclomethasone

Indication: Allergic rhinitis, nasal polyps.

Adverse effects and cautions: Nasal pharyngeal irritation, headache, nausea, light headedness

Preparation Available:

Beclomethasone 50 mcg N/S	NA	C	RT	NA
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3. Mometasone

Indication: Corticosteroid used to treat and prevent symptoms of allergic rhinitis and nasal polyps.

Adverse effects and cautions: Nasal ulceration, nasal septal perforation, impaired wound healing.

Dose: Two sprays in each nostril once daily.

Preparation Available:

Mometasone 50 mcg N/S	HI	C	RT	NA
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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	NA	C	RT	NA
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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	HI	C	RT	NA
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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	NA	NA	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	NA	C	RT	NA
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5. Bromhexine, Phenylephrine and Chlorpheniramine

Indication, Adverse effects and cautions: See under Bromhexine, Phenylephrine and Chlorpheniramine.

Bromhexine + Phenylephrine + Chlorpheniramine Symp	NA	C	RT	NA
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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	ED
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2. Lignocaine / Lidocaine

Indication: For dentistry and otorhinolaryngology.

Adverse effects and cautions: Burning, erythema .

Preparation Available:

Lignocaine 10 % Garg	NA	C	NA	RT	NA
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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	C	CT	NA
Choline Salicylate 9% + Benzalkonium chloride 0.02% lignocaine HCL 2% Oint	NA	C	CT	NA
Choline Salicylate 8.7 % + Tannic acid 10 % + Benzalkonium 0.01 % Oint	NA	C	CT	NA

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	NA	B	RT	NA
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5. Betadine Gargle:

Indication: Infection Control: Treatment of acute mucosal infections of the mouth and pharynx (e.g., gingivitis, stomatitis, aphthous ulcers)., Pharyngitis/Tonsillitis: Relief of sore throat symptoms, Prophylaxis: Pre-, intra-, and post-operative oral antisepsis for dental or oropharyngeal surgery.

Adverse effects and Cautions: Local Irritation, Transient stinging, burning, or mucosal irritation, Sensitivity: Rare allergic reactions (pruritus, rash, or angioedema). Systemic Effects: Potential for iodine-induced thyroid dysfunction with prolonged use (due to systemic absorption). Temporary Staining of the teeth.

Preparation Available:

Iodine 1%w/v (Garg/ Mouth Wash)	HI	B	RT	NA
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6. Chlorhexidine:

Indication: Gingivitis & Periodontitis, Post-Oral Surgery, Aphthous Ulcers, Oral Candidiasis.

Adverse effects and Cautions: Extrinsic Staining: Brown staining of teeth, tongue, and silicate/composite

restorations (usually reversible by professional cleaning). Taste Disturbance: Transient alteration of taste (dysgeusia) or a bitter aftertaste immediately after use. Oral Mucosa Desquamation: Occasional peeling of the lining of the mouth or soreness. Calculus Formation.

Preparation Available:

Chlorhexidine 0.2%w/v (Garg/ Mouth Wash)	HI	B	RT	NA
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7. Diclofeance (Oral Rinse/ gargle):

Indication: Inflammatory Conditions: Symptomatic relief of pain and inflammation of the mouth and throat (e.g., pharyngitis, tonsillitis, gingivitis, stomatitis). Post-Traumatic/Post-Surgical: Management of pain following dental procedures, extractions, or minor oral surgery. Radiation Mucositis.

Adverse Effects and Cautions:

Local Irritation: Transient burning, stinging, or tingling sensation in the mouth (common).

Gastrointestinal: Though systemic absorption is low, sensitive patients may experience mild nausea or dyspepsia if small amounts are inadvertently swallowed.

Hypersensitivity: Rare cases of contact dermatitis, skin rash, or angioedema. Cough

Preparation Available: Available in typically 0.074% as oral rinse/ gargle.

8. Triamcinolone Acetonide:

Indication: Mucoadhesive paste: Recurrent Aphthous Stomatitis: Treatment of painful “canker sores.” Ulcerative Lesions: Temporary relief of symptoms from

traumatic oral ulcers (e.g., from braces or dentures).
 Erosive Lichen Planus: Management of chronic inflammatory oral conditions. Adjunctive Therapy: Reducing pain and inflammation in non-infectious mucosal lesions.

Adverse effects and Cautions: Local Reactions: Transient burning, itching, or stinging at the application site. Secondary Infection: Risk of developing oral candidiasis (thrush) with prolonged use. Mucosal Changes: Thinning of the oral lining (atrophy) or “maceration” (softening of the tissue) if overused. Systemic Steroid Effects. Non-Healing Lesions: If a lesion does not show significant repair within **7 days**, treatment should be stopped and the etiology re-evaluated (to rule out malignancy).

Contraindications: Untreated Infections: Contraindicated in the presence of fungal (candidiasis), viral (herpes simplex/cold sores), or bacterial infections. Steroids can mask and worsen these infections. Pregnancy Category ‘C’

Preparation Available: Available in 0.1% paste.

14.6 Miscellaneous Preparation:

Potassium nitrate 5 % + Sodium monofluorophosphate 0.7 % 100 gm Gel	NA	C	CT	NA
Hiora 150 ml MW	NA	C	CT	NA
Hiora K 150 ml MW	NA	C	CT	NA

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	NA
Iohexol 300 mg, 100 ml Inj	HI	NA	RT	NA
Iohexol 350 mg, 50 ml Inj	HI	NA	RT	NA
Iohexol 350 mg, 100 ml Inj	HI	NA	RT	NA

2. Polyethylene glycol and electrolyte

Indication: PEG and Electrolyte solution cleanse the colon before certain medical test e.g. colonoscopy, barium enema X-ray exam or colon surgery.

Preparation Available:

PEG and Electrolyte Pow	HI	C	RT	NA
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15.2 Sera and Immunoglobulin

1. Anti-D Immunoglobulin

Indication: To rhesus-negative women for prevention of Rh₀(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 fetal red cells, extra 100-125 units per ml fetal red cells.

Following any potentially sensitizing 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	NA
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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	NA
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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. Immunization 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: Immunization 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	B	FT	NA
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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	A	FT	ED
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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 immunization against tetanus.

Dose: Primary immunization, 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.

Unimmunized 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	ED
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4. Influenza vaccine

This is an inactivated quadrivalent 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:

Influneza vaccine 0.5 ml,Inj	HI	C	FT	NA
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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 ≥ 65 years.

Preparation available:

Pneumococcal Vaccine 0.5 ml, Inj	HI	C	FT	ED
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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">• May be seen in opioid, mushroom, organophosphorus insecticide or other cholinergic poisoning.• May be a sign of pontine hemorrhage.
Fixed dilated pupils	<ul style="list-style-type: none">• May be seen in atropine, tricyclic antidepressants, antihistamines poisoning.
Hypotension	<ul style="list-style-type: none">• Severe poisoning with CNS depressants.
Hypertension	<ul style="list-style-type: none">• Sympathomimetic or CNS stimulating agents poisoning.
Irregular heart beat	<ul style="list-style-type: none">• Acute poisonings (tricyclic antidepressants, antipsychotics, antihistaminic).
Hypothermia	<ul style="list-style-type: none">• Especially seen in overdose of barbiturates or phenothiazines.
Hyperthermia	<ul style="list-style-type: none">• Especially seen in overdose of CNS stimulants

Drunk look of patient	<ul style="list-style-type: none"> • It may be a sign of a hypoglycemic state. • Consider all hypnotics, sedatives and antipsychotics.
Metabolic acidosis	<ul style="list-style-type: none"> • Especially in salicylate poisoning.

Prevention of absorption and active elimination of drugs

- i. **Skin decontamination**
- ii. **Eye decontamination**
- iii. **Gastric lavage**

Activated charcoal: - Activated charcoal can bind many poisons in the gastro-intestinal system thereby reducing 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. Multidose activated charcoal (MDAC) is used to 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, heavy metals, hydrocarbons, lithium, potassium and lead are not bound by activated charcoal.

- The drug should be used with caution in drowsy or comatose 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 & Hemodynamics	Detect and correct	Emergency antidote administration
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Detect and correct:

Detection	Correction
Hypoglycemia	<ul style="list-style-type: none"> • Check for blood glucose level in patients with altered mental status • Treat if level decreases from 4.0 mmol/L: 50 ml 50% dextrose IV.

Seizures	<ul style="list-style-type: none"> • Usually generalized. • IV benzodiazepines are first-line. • Barbiturates are second-line therapy. • Pyridoxine in case of seizures secondary to isoniazid.
Hyper/hypothermia	<ul style="list-style-type: none"> • By covering patient with blanket (hypothermia) • By maintaining the temperature of the room with A.C or Cooler (hyperthermia).

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 by 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 is usually not useful.
- Antidote.

Pralidoxime (2-PAM)

Indication: In all patients with evidence of organophosphate poisoning or nerve agent, anticholinesterase overdosage (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 injection	HI	C	R.T	ED
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Atropine:

Indication: Organophosphate 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 the same procedure as mentioned above.

Preparation Available:

Atropine sulphate 0.6mg/ml 1ml	HI	C	R.T	ED
Atropine sulphate 0.6mg/ml 10ml	HI	C	R.T	NA

2. Paracetamol poisoning

Toxic dose:

- A 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 the victim presents within the first hour 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	ED
Acetylcysteine 200mg/ml 10ml injection	HI	B	R.T	ED

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 in 24 hours.
- 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 alkalinization 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 be used in non-opioid-dependent patients.
- Followed by 100 mcg IV every 30-60 secs until spontaneous respiration is re-established
- Followed by 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	ED
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Chapter-16: Drug Interactions.

Drug	Effects
Drug interaction of Anticholinergic drugs	
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).
Drug interaction of skeletal muscle relaxants	
Non-depolarizing blockers (d-tubocuraine, pancuronium)+antibiotics (aminoglycosides)	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 the 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.
Drug interaction of adrenaline	
Adrenaline +beta blockers	Hypertensive crisis and cerebral haemorrhage.
Drug interaction of Beta blockers	
Beta blockers(propranolol)+ Verapamil	Additive cardiac depressant or even cardiac arrest.

beta blockers + insulin/ sulphonyl urea	Delay recovery from Hypoglycaemia.
Cholestyramine & colestipol + Beta blockers	Interface 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).
ACE inhibitors	
ACE inhibitors + Potassium sparing diuretics	Can cause dangerous hyperkalemia.
ACE inhibitor +Heparin	Additive effect.
ACE inhibitors + Trimethoprim	Serious hyperkalemia.
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.
Drug interaction of ARB blockers	
ARB blockers + Potassium sparing diuretics	Can cause dangerous hyperkaliemia.
Drug interaction of Nitrates	
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.
Drug interaction of Digoxin	
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.
Drug interaction of Quinidine	
Quinidine +beta blockers/verapamil// potassium salt	Cardiac arrest.
Drug interaction of amiodarone	
Amiodarone+ Beta blockers/verapamil	Additive depressant 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.
Drug interaction of Adenosine	
Adenosine+ Methylxanthines	Methylxanthines antagonize the effect of adenosine (antagonistic effect).

Adenosine+ Dipyridamole	Potentiates the action of adenosine (synergistic effect).
Drug interaction of Hypolipidemic drugs	
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).
Drug interaction of frusemide	
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.
Drug interaction of barbiturates	
Barbiturates+ Oral contraceptives+ Oral anticoagulants/oral hypoglycemics	Decreases effectiveness of co-administered drugs (pharmacokinetic effect).
Drug interaction of Procainamide	
Procaine +Sulphonamides	Reduces the effect of sulphonamides (antagonistic effect).
Drug interaction of Anti-epileptics drugs	
Carbamazepine+ Oral contraceptic pills	Reduces the effect of both drugs (pharmacokinetic effect).
Phenytoin + OC pills/ steroids/vitamin D/ Theophylline	Reduces the effectiveness of co-administered drugs (pharmacokinetic effect).
Phenytoin + Carbamazepine	Reduce the plasma concentration of both drugs (pharmacokinetic effect).

Chloramphenicol/ warfarin+ Phenytoin	Phenytoin toxicity (pharmacokinetic effect).
Carbamazepine+ Phenytoin/ Phenobarbitone/Sodium valproate /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 valproate+ Phenytoin	Phenytoin toxicity.
Sodium valproate + Phenobarbitone	Increases plasma concentration of phenobarbitone (pharmacokinetic effect).
Sodium valproate + Carbamazepine	Increases incidence of teratogenicity.
Drug interaction of L-dopa	

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).
Drug interaction of Lithium carbonates	
Lithium + Thiazide/ frusemide	Lithium toxicity.
Lithium+ Haloperidol	Lithium and Haloperidol both increase QTc interval.
Drug interaction of Triptans	
Triptan +Ergot preparation	Should not be co-administered.
Drug interaction of NSAIDS	

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).
Drug interaction of Probenecid	
Probenecid Beta lactam antibiotics	Increased plasma concentration of beta lactam antibiotics (pharmacokinetic effect).
Drug interaction of Allopurinol	
Allopurinol+ 6-mercaptopurine	Increases the effect of 6- mercaptopurine (pharmacokinetic effect).

Allopurinol+ Theophylline	Increase the effect of theophylline (synergistic effect).
Drug interaction of Methylxanthines	
Sympathomimetics Methylxanthines	Potentiates the effect of sympathomimetics (synergistic effect).
	Bronchodilation (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).
Drug interaction of Metoclopramide	
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).
Drug interaction of PPIs	
Omeprazole+ Phenytoin/ Warfarin/Diazepam	Inhibit the metabolism of co-administered drugs (pharmacokinetic effect).
PPIs+ Itraconazole/iron salts	Decrease the bioavailability of administered drugs (pharmacokinetic effect).
Cimetidine+ Phenytoin/ Digoxin/ Theophylline/ Warfarin/Propranolol	Increase plasma concentration of co-administered drugs (pharmacokinetic effect).
Sucralfate+ Digoxin/ Tetracyclines/ Ketoconazole/ Fluoroquinolone	Reduce the absorption of co-administered drugs (pharmacokinetic effect).
Antacid+ Iron / Tetracycline/ Fluroquinolone/ Ketoconazole	Reduce the absorption of co-administered drugs (pharmacokinetic effect).
Drug interaction of Warfarin	
Warfarin+ Cholestyramine	Reduce bioavailability of warfarin (pharmacokinetic effect).

Oral anticoagulants + Barbiturates/ carbamazepine/ rifampicin	Decreases anticoagulants effect (pharmacokinetic effect).
Warfarin+ Phenytoin/ Sulphonamides	Enhance anticoagulant effect (pharmacokinetic effect).
Warfarin+ Erythromycin/ Metronidazole	Increase anti-coagulant effect (pharmacokinetic effect).
Warfarin + Tetracyclines	Potentiate warfarin effect.
Warfarin+ Cefoperazone/ Ceftriaxone	Sever bleeding can occur.
Warfarin+ Aspirin /other NSAIDs	Potentiate warfarin effect (pharmacokinetic effect).
Drug interaction of OC pills	
Rifampin/Phenytoin/ Carbamazepine +OC pill	Contraceptive failure.
Oral contraceptives+ Albendazole	Potentiate teratogenicity.
Oral contraceptives+ Tetracyclines/Ampicillin	Contraceptive failure.
Drug interaction of Antibiotics.	
Salicylates+ Insulin	Potentiate insulin secretion (synergistic effect).

Sulphonylurea + Salicylates/ Sulphonamides	Severe hypoglycemia (pharmacokinetic effect).
Rifampicin/ Phenobarbitone+ Sulphonylurea	Potentiate the effect of sulphonyl urea (pharmacokinetic effect).
Warfarin/ Sulphonamide+ sulphonylurea	Severe hypoglycemia (pharmacokinetic effect).
Sulphonamide+ phenytoin/methotrexate/ oral anticoagulant/ oral hypoglycemic 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 lactam (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 drugs (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 (NNRTIs)	Reduce plasma level of co-administered drugs (pharmacokinetic effect).
Drug interaction of Antifungal drugs	
Ketoconazole+ Sulphonylurea	Hypoglycaemia.
Ketoconazole + Phenytoin	Phenytoin toxicity.

Ketoconazole+ Cyclosporine	Potentiates nephrotoxicity.
Ketoconazole+ Warfarin	Increase risk of bleeding.
Ketoconazole+ Terfenadine	Fetal ventricular arrhythmias.
Drug interaction of Anti-viral drugs	
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.
Drug interaction of Anti-malarial drugs	
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">• Assess pain and/or fever before and after administration to evaluate effectiveness.• Administer IV over 15 minutes as prescribed; avoid rapid infusion.• Monitor liver function tests (LFTs), especially in patients with liver disease or high-dose use.• Check for hypersensitivity to paracetamol or excipients and discontinue if any reaction occurs.• Ensure total daily dose does not exceed 4 grams, including other paracetamol-containing medications.• Review all medications (including OTC and combination cold/flu products) to prevent overdose.

2.	Ketorolac	NSAIDs	<ul style="list-style-type: none"> • Assess pain prior to and after administration • Therapy should always be given initially by the IM or IV route; then use the oral route as a continuation of parenteral therapy • Stay well-hydrated to prevent renal failure • Assess for signs of GI bleeding • Assess for skin rash • Monitor BUN, serum creatinine, CBC, and liver function tests • Do not administer before any major surgery • Do not administer to clients who are allergic to aspirin or other NSAIDs
3.	Morphine	Opioid Analgesics	<ul style="list-style-type: none"> • Monitor blood pressure prior to administration. Hold if systolic BP < 100 mm Hg or 30 mm Hg below baseline. • Monitor patient's respiratory rate prior to administration. • Reassess pain after administration of morphine. • Monitor for respiratory depression and hypotension frequently up to 24 hours after administration of morphine. • Place a call light signal close to the patient. Accompany patients if need to get out of bed to minimize risk of falls.

4.	Lidocaine/ lignocaine	Anesthetics	<ul style="list-style-type: none"> • Check BP and cardiac monitor prior to administration of lidocaine. • For stable patients, doses should be given slow IV push at 25 mg/minute. • Monitor blood pressure and cardiac monitor during therapy with lidocaine. • Assess neurological and respiratory status frequently for signs of toxicity. • 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. • Therapeutic serum level is 1.5 – 5 mcg/ml. • If a patient appears upset or agitated, consider lidocaine toxicity. If toxicity is evident, simply discontinue IV infusion—serum levels drop in 10-20 minutes.
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5.	Insulin	Rapid-Acting Insulin Insulin lispro (Humalog) insulin aspart (Novolog) inhaled insulin (Afreeza)	<ul style="list-style-type: none"> Administer within 15 minutes before a meal or immediately after a meal
		Short-Acting Insulin regular insulin (Humulin R) regular insulin (Novolin R)	<ul style="list-style-type: none"> Administer 30 minutes before a meal
		Intermediate-Acting Insulin NPH or insulin Isophane (Humulin N) NPH or insulin Isophane (Novolin N)	<ul style="list-style-type: none"> Administer once or twice daily Only administer subcutaneously Gently roll or invert vial/pen several times to resuspend the insulin before administration
		Combination: Intermediate-Acting/Rapid-Acting <ul style="list-style-type: none"> Humalog Mix 50/50 Humalog Mix 75/25 Novolog Mix 70/30 <p>*First number is % of intermediate-acting insulin; second number is % of rapid-acting insulin</p>	<ul style="list-style-type: none"> Administer twice daily, 15 minutes before a meal or immediately after a meal Only administer subcutaneously Gently roll or invert vial/pen several times to resuspend the insulin before administration

		Combination: Intermediate-Acting/Short-Acting <ul style="list-style-type: none"> • Humulin Mix 70/30 • Novolin Mix 70/30 	<ul style="list-style-type: none"> • Administer twice daily, 30-45 minutes before a meal • Only administer subcutaneously • Gently roll or invert vial/pen several times to resuspend the insulin before administration • Do not mix with another insulin
		Long-Acting Insulin <ul style="list-style-type: none"> • insulin glargine (Lantus) • insulin detemir (Levemir) 	<ul style="list-style-type: none"> • Administer once daily (sometimes dose is split and administered twice daily) • Only administer subcutaneously • Do not mix with other insulin
6.	Diazepam	Benzodiazepines	<ul style="list-style-type: none"> • Boxed Warning: Concomitant use of benzodiazepines and opioids may result in profound sedation, respiratory depression, coma, and death • May cause paradoxical effect in children
7.	Lithium	Antimanic	<ul style="list-style-type: none"> • Monitor for signs of lithium toxicity • Monitor serum lithium and sodium levels • Contraindicated in renal and cardiovascular disease and in dehydration

8.	Phenytoin	Anticonvulsant	<ul style="list-style-type: none"> • Careful cardiac monitoring is needed during and after administering intravenous phenytoin • 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 • Monitor serum drug levels • Contraindicated for clients with heart block • Use cautiously in clients with hepatic or renal impairment • Taper dose; do not stop abruptly
9.	Levetiracetam	Anticonvulsant	<ul style="list-style-type: none"> • Taper dose; do not stop abruptly or seizures may occur • Monitor plasma levels for pregnant women • Use cautiously if renal impairment
10.	Amantadine	Anti-Parkinson Agent, Antiviral	<ul style="list-style-type: none"> • Monitor renal function • Monitor mental state • Assess blood pressure

11.	Amiodarone	Antiarrhythmic Class 3	<ul style="list-style-type: none"> ● Monitor blood pressure and apical pulse prior to administration. ● Cardiac monitor should be used on patients receiving Amiodarone therapy. ● Baseline chest x-ray and pulmonary function test is recommended before beginning PO therapy. ● Baseline assessments should be checked of liver function and thyroid function. ● Initial therapy should be implemented under hospital precautions with access to advanced life support. ● Monitor serum level frequently. ● Encourage patients to wear sunglasses for photosensitivity. ● Encourage patients to wear protective clothing and sunscreen when outdoors. ● Caution patient/family about using OTC herbal products (e.g., St. John's wart, Echinacea). ● Patients should obtain an ophthalmic exam regularly.
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12.	Diltiazem	Antiarrhythmic Class 4	<ul style="list-style-type: none"> ● Check blood pressure, heart rate, and cardiac monitor prior to administering Diltiazem. ● Assess baseline renal (BUN, Cr) and liver function (AST, ALT) lab tests. ● Monitor for signs of heart failure (e.g., pulmonary edema, weakness, and dyspnea). ● Provide analgesic for headache. ● Use caution during position changes to prevent orthostatic hypotension.
13.	Adenosine	Antiarrhythmic	<ul style="list-style-type: none"> ● Monitor blood pressure and apical pulse prior to administration. ● Cardiac monitors should be used on patients receiving adenosine IV boluses. ● Flush IV port with flush solution (e.g., normal saline) immediately after IV bolus. ● Use only clear solutions; discard unused medication. ● Warn patient of possibility of transient warmth and flushing of skin immediately following injection. ● Warn other staff that ECG may show transient episodes of asystole. ● Assess for bronchospasms following administration of medication.

14.	Digoxin	Cardiac Glycoside	<ul style="list-style-type: none"> ● Monitor blood pressure and apical pulse prior to administration. ● Cardiac monitor should be used on patients receiving digoxin, especially loading doses. ● Monitor serum digoxin levels closely, especially if receiving antibiotic therapy. ● Monitor serum electrolytes, especially potassium. ● Check for toxicity if visual or GI disturbances occur. ● If DIGOXIN TOXICITY occurs with DYSRHYTHMIAS, 1) Discontinue any digitalis medications and any potassium depleting diuretics. 2) Check serum potassium level. 3) Phenytoin or lidocaine can be used as antidysrhythmic medications [Do Not Use Quinidine or Amiodarone.]. 4) Atropine can be used for bradycardias or AV blocks. 5) Fab antibody agents (Digibind®) can be administered carefully intravenously. ● Avoid electrical cardioversion if the patient is receiving digoxin unless the condition is life-threatening. Then use lower doses (10-20 joules). ● Emphasize to the patient the importance of taking digoxin as prescribed at regular intervals and not missing doses. ● Do not breast feed while taking digoxin.
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15.	Nitroglycerin	Anti-angina nitrates	<ul style="list-style-type: none"> ● Check blood pressure and pulse before each administration of NTG—blood pressure can drop precipitously after a single dose. Hold dose if systolic BP < 90 mm Hg or more than 30 mm Hg below baseline. ● NTG is highly unstable and should be stored in light resistant container in cool environment (not the refrigerator). ● If SL tablets are not bitter, they have probably lost their potency. ● 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. ● Acute chest pain is treated with either SL tablets or spray or with IV infusion of NTG. ● Maintenance therapy to prevent angina is managed with topical applications or sustain-released oral medication. ● Intravenous infusion of NTG requires special glass bottles and IV tubing (regular plastic tubing will absorb 40-80% of NTG). ● Do not discontinue NTG intravenous infusion abruptly—it may result in precipitous rebound hypertension, angina, or coronary artery vasospasms. ● Acetaminophen is generally given PO for relief of headache secondary to NTG therapy.
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16.	Furosemide	Loop Diuretic	<ul style="list-style-type: none"> ● Assess blood pressure ● Monitor electrolytes (potassium) ● Promote potassium-rich diet ● Assess renal function ● Assess for dehydration and intake and output ● Monitor daily weight
17.	Esmolol		<ul style="list-style-type: none"> ● Monitor blood pressure and apical pulse prior to administration. ● Cardiac monitors should be used on patients receiving esmolol therapy. ● Monitor IV injection site closely for signs of inflammation.

18.	Heparin	Anticoagulant	<ul style="list-style-type: none"> ● Do not mix IV lines with any other medications. There is a long list of incompatibilities. ● Protamine sulfate is the antidote for an overly anticoagulated dose of heparin. (1 gm protamine inactivates 100 units of heparin). ● 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. ● Only routes of administration are IV or SQ (does not absorb PO; <i>IM causes hematoma</i>) ● The risk of bleeding increases. Screen patients for contraindications. ● To reduce risk of hemorrhage, dosage must be monitored closely and adjusted according to aPTT levels. ● Monitor with activated partial thromboplastin time (aPTT) which normally is around 40 seconds. ● Therapeutic goal for aPTT is 1.5 – 2 (normal level = 60 – 80 seconds). ● Draw blood for aPTT 30 minutes before SQ or intermittent doses of heparin. ● Does not cross the placental barrier during pregnancy or pass into breast milk during lactation. ● Monitor injection sites for signs of hematoma. ● Apply direct pressure to venipuncture sites for longer durations (e.g., 3 minutes). ● Low molecular weight heparin (e.g., enoxaparin) is preferred for unstable angina and NSTEMI over unfractionated heparin.
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19.	Enoxaparin	Anticoagulant	<ul style="list-style-type: none"> ● Monitor CBC periodically for blood counts. ● Assess urine and stool for signs of blood. ● Monitor injection sites for signs of hematoma. ● Apply direct pressure to venipuncture sites for longer durations (e.g., 3 minutes). ● Low molecular weight heparin (e.g., enoxaparin) is preferred for unstable angina and NSTEMI over unfractionated heparin. ● Do not administer Clopidogrel to ACS patients if CABG is planned within 5 – 7 days. [Controversial evidence about this warning!] ● Platelet function and bleeding time return to baseline in 7 – 10 days. ● Monitor patients for signs of thrombotic thrombocytopenic purpura (low platelet count, neuro symptoms, renal dysfunction, and fever). ● Monitor for signs and symptoms of bleeding (urine, stool, hematoma, epistaxis, petechiae). ● May cause elevation of serum liver enzymes—establish baseline enzymes and bilirubin levels. ● Avoid caffeine ● Requires evaluation of therapeutic blood level to prevent toxicity ● Administer this medication in the morning, if possible, due to potential CNS stimulation
20.	Acetylsalicylic acid (aspirin)	Antiplatelet	
	Clopidogrel		
21.	Theophylline	Xanthine	

22.	Atropine	Muscarinic Antagonist	<ul style="list-style-type: none"> ● Monitor apical pulse prior to administration. ● Cardiac monitors should be used on patients receiving atropine IV boluses. ● Doses of 0.5 mg or less may result in paradoxical slowing of heart rate. ● Eye preparations are 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. ● Atropine can be administered via endotracheal tube in a dose of 2-3 mg diluted in 10 ml H₂O, but intraosseous route is preferred over endotracheal tube if IV access cannot be achieved. ● Older adults and debilitated patients may be more vulnerable to CNS disturbances from atropine. ● Monitor temperature in infants and children for “atropine fever”. ● 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. ● Avoid driving or operating heavy machinery while under the influence of atropine. ● Reduce lighting to decrease photophobia. ● Monitor GI motility (BMs and flatus) and urine output while the patient is receiving atropine. ● Atropine is a common pre-operative agent, and can be given IM, SC, PO, or IV.
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23.	Tamsulosin	Alpha-1 Antagonist	<ul style="list-style-type: none"> • Avoid using with other alpha-blockers • Assess and monitor orthostatic blood pressure, especially after first dose
24.	Dobutamine	Beta-1 Agonist	<ul style="list-style-type: none"> • Monitor blood pressure and cardiac rhythm continuously during therapy. • Hemodynamic monitoring of all parameters is recommended during Dobutamine therapy. • Correct hypovolemia with fluid resuscitation prior to Dobutamine therapy. • Tolerance has been noted during continuous or prolonged infusions. • Check IV drug calculations carefully. Double-check calculations with another nurse or pharmacist. • Weigh patients daily in order to maintain accurate dose calculations.
25.	Metoprolol	Beta-1 Antagonist	<ul style="list-style-type: none"> • Monitor blood pressure and apical pulse prior to administration. • Cardiac monitors should be used on patients receiving Metoprolol IV boluses.

26.	Magnesium sulphate	Electrolyte	<ul style="list-style-type: none"> ● Check serum magnesium level prior to administration. ● Cardiac monitor should be used on patients receiving $MgSO_4$ intravenously. ● Have an injectable form of calcium gluconate available to reverse paralyzing effects of magnesium sulfate. ● Blood pressure may drop if $MgSO_4$ is administered too rapidly. ● Check blood pressure and pulse every 10-15 minutes during therapy. ● Normal serum plasma level of $MgSO_4$ is 1.8 – 3.0 mEq/L. Respiratory paralysis occurs at 12-15 mEq/L. Cardiac arrest occurs at 25 mEq/L. ● Assess patellar reflexes hourly to monitor for evidence of toxicity. ● Monitor hourly urine output. ● Do not breast feed while receiving $MgSO_4$.
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27.	Epinephrine	Catecholamine	<ul style="list-style-type: none"> ● 1:10,000 equals 1 mg/10 ml (for IV pushes or neonatal umbilicus line) ● 1:1,000 equals 1 mg/1 ml (for SC or IM injections) ● Epinephrine may exacerbate chest pain, hypertension, and Tachydysrhythmias. ● Contact lenses should be removed prior to instilling eye drops. ● Patients should be monitored for heart rate, cardiac rhythm, and blood pressure frequently if an IV drip is to be infused. ● Never interrupt an intravenous infusion of medication to administer an IVPB or other medication. ● Extravasation of epinephrine may cause tissue necrosis to skin. Therefore, monitor IV sites every hour. Have phentolamine close to the bedside of the patient. ● B-adrenergic blocking agents will block the actions of epinephrine on the heart.
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28.	Norepinephrine	Catecholamine	<ul style="list-style-type: none"> ● Monitor blood pressure and apical pulse continuously during norepinephrine therapy. ● Cardiac monitors should be used on patients receiving norepinephrine IV infusions. ● The defibrillator and resuscitation cart should be close by during infusion. ● Titrate infusion rate to maintain systolic BP at 80 – 100 mg Hg. ● Assess patients frequently for headache, chest pain, or other signs of toxicity. ● Do not mix other medications in IV line with norepinephrine drip. ● Extravasation of norepinephrine may cause tissue necrosis to skin. Therefore, monitor IV sites every hour. Have phentolamine close to the bedside of the patient.
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29.	Dopamine	Catecholamine	<ul style="list-style-type: none"> ● Pre-Administration: Correct hypovolemia with fluid resuscitation before starting dopamine infusion. ● Monitoring: <ul style="list-style-type: none"> ● Check blood pressure, pulse, and peripheral pulses every 15 minutes. ● Monitor hourly urine output. ● Use a cardiac monitor during infusion. ● Notify Physician: If any of the following occur: <ul style="list-style-type: none"> ● Oliguria ● Tachydysrhythmias ● Diastolic pressure rises, reducing pulse pressure ● Hypotension persists at max dose (20 mcg/kg/min) ● Signs of peripheral ischemia (purple or cold extremities, diminished pulses) ● Patient Weight: Weigh daily to adjust infusion dose accurately. ● Infusion Calculation: Double-check drip rates and doses with another nurse or pharmacist. ● IV Site: Do not use the same IV site for other infusions. ● Extravasation Risk: Monitor IV site every hour for signs of infiltration; have phentolamine on hand for potential tissue necrosis.
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30.	Quinidine	Anti-arrhythmic	<ul style="list-style-type: none"> ● Pre-Administration: Check apical pulse, BP, and cardiac monitor before giving quinidine. ● Monitoring: Regularly check blood pressure, QRS duration, and QT interval. Notify the physician if QRS widens >50%. ● Serum Levels: Maintain quinidine levels between 2–5 mcg/ml. ● Administration: Take oral quinidine with a full glass of water on an empty stomach; take with food if GI symptoms occur. ● Baseline Tests: Obtain baseline cardiac rhythm strip, CBC, liver/renal function tests, and BP. ● Thromboembolism Risk: Watch for symptoms of thromboembolism (sudden chest pain, dyspnea, CVA) during atrial fibrillation conversion.
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31.	Vasopressin	ADH	<ul style="list-style-type: none"> ● Vital Signs: Monitor blood pressure hourly during IV infusion. ● Urine Output: Check urine output and specific gravity. ● Signs of Chest Discomfort/ TIA: Assess for angina or TIA, watch for life-threatening conditions. ● Anginal Episodes: Administer nitroglycerin if angina or ischemia occurs during IV infusion. ● Fluid Balance: Monitor for dehydration or overhydrating, especially in children and the elderly. ● IV Infusion: Prefer central venous line for IV infusion. ● Peripheral IV Sites: Monitor for infiltration; extravasation may cause tissue necrosis. Have phentolamine nearby. ● Alternative Treatment: Use desmopressin (DDAVP) for diabetes insipidus, given nasally with less vasopressor effect.
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32.	<p>1st-generation: cephalexin cefazolin</p> <p>2nd-generation: cefprozil</p> <p>3rd-generation: ceftriaxone</p> <p>4th-generation: cefepime</p> <p>5th-generation: ceftolozane</p>	Cephalosporin		<ul style="list-style-type: none"> • Check for allergies, including if allergic to penicillin • Dosage adjustment if renal impairment • Use with caution with seizure disorder • 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 • Drug interaction: Anticoagulants
	Ampicillin			<ul style="list-style-type: none"> • Culture infected area before treatment; reculture area if response is not as expected. • Check IV site carefully for signs of thrombosis or drug reaction. • Do not give IM injections in the same site; atrophy can occur. Monitor injection sites.

33.	Meropenem	Carbapenems	<ul style="list-style-type: none"> ● Route: IV ● Check for allergies, including penicillin and cephalosporin ● Dosage adjustment if renal impairment ● Use with caution with seizure disorder or renal dysfunction
34.	Levofloxacin	Fluoroquinolones	<ul style="list-style-type: none"> ● Check for allergies ● Infuse 500 mg or less over 60 minutes and doses of 750 mg over 90 minutes ● Dosage adjustment if renal or hepatic impairment ● Use cautiously if history of seizures ● Boxed Warning: Fluoroquinolones have been associated with disabling and potentially irreversible serious adverse reactions, including the following: <ul style="list-style-type: none"> ● Tendinitis and tendon rupture ● Peripheral neuropathy ● Central nervous system effects ● Exacerbation of muscle weakness in clients with myasthenia gravis

35.	Amikacin/ Gentamicin	Aminoglycosides	<ul style="list-style-type: none"> • C&S, renal function, and vestibule cochlear nerve function before therapy. • Monitor peak and trough levels. • Through levels before the next dose, peak 1 hour after IM or after IV infusion. • Periodic serum creatinine, BUN, and complete urinalysis. • Daily renal function tests for treatment >10 days, weekly audiograms, and vestibular tests. • Monitor serum creatinine or creatinine clearance frequently in renal impairment, neonates, or older adults. • High trough (>8 mg/mL) or peak (>30–35 mg/mL) levels may indicate toxicity. • Watch for tinnitus, hearing loss, dizziness, vertigo, nystagmus, or ataxia. • Report auditory symptoms or vestibular disturbances promptly.
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36.	Tetracycline	Tetracycline	<ul style="list-style-type: none"> ● Assess patients for signs of infection and monitor for efficacy of treatment. ● Monitor liver and renal function tests regularly. ● Obtain cultures prior to starting therapy and monitor for signs of pseudomembranous colitis, diarrhea, nausea, vomiting, and rash.
37.	Acyclovir	Antivirals: Antiherpes	<ul style="list-style-type: none"> ● Reconstitute and dilute as per guidelines. ● Administer over ≥ 1 hour to prevent nephrotoxicity. ● Ensure adequate fluid intake to minimize renal damage. ● Check for phlebitis or infiltration. ● Regularly assess BUN and creatinine. ● Monitor for confusion, tremors, or seizures.
38.	Amphotericin B	Antifungals	<ul style="list-style-type: none"> ● Check for allergies ● Route: IV ● Reconstitute and dilute as directed on packaging ● Administer slowly over several hours initially and monitor VS every 30 minutes; may require premedication ● Therapy may require several months ● Alert: Different amphotericin B preparations aren't interchangeable ● Caution if renal impairment ● Boxed Warning: Don't use to treat noninvasive forms of fungal disease in clients with normal neutrophil counts

39.	Metronidazole	Antiprotozoal- Antibacterial	<ul style="list-style-type: none"> • Check for allergies • Don't give by IV push infuse over 30 to 60 minutes • Use cautiously with hepatic impairment, blood dyscrasias, or CNS diseases
40.	Vancomycin	Miscellaneous Antibacterial: Glycopeptides	<ul style="list-style-type: none"> • Check for allergies • Route: IV but for C-diff may be administered PO or rectally as an instilled enema • Obtain culture prior to administering first dose • Dosage adjustment is required for renal impairment • Monitor trough levels • IV should be administered in a diluted solution over a period of 60 minutes or more to avoid rapid-infusion-related reactions
41.	Ondansetron	5-HT ₃ receptor antagonist	<ul style="list-style-type: none"> • Administer Ondansetron 30 minutes before chemotherapy or radiation therapy for optimal effectiveness. • For IV administration, inject slowly over 2-5 minutes or dilute in a compatible IV solution. • Monitor for QT prolongation signs and symptoms, especially in high-risk patients. • Assess for signs of serotonin syndrome when combined with other serotonergic medications. • Monitor for and document the effectiveness of antiemetic therapy.

Chapter-18: Important Information from Drug Bulletin of Nepal (DBON) Vol. 36 No.2

Drugs	Comments
Amphotericin B (lipid formulations)	Risk of hyperkalemia.
Azithromycin	Rare risk of cardiovascular death.
Chlorhexidine (cutaneous use)	Risk of persistent corneal injury and significant visual impairment.
Fezolinetant	Risk of liver injury
Ivacaftor, lumacaftor, tezacaftor, elexacaftor	Risk of depression.
Finasteride	Risk of mood alterations.
Pseudoephedrine	Risk of posterior reversible encephalopathy syndrom (PRES) and reversible cerebral vasoconstriction syndrom (RCVS).
Promethazine HCl injection	Risk of severe chemical irritation and damage to tissues from IV administration.
Valporate	Potential increased risk of neuro developmental disorders in children born after paternal exposure.

Fluoroquinolone (Ciprofloxacin, levofloxacin, moxifloxacin, ofloxacin and delafloxacin)	Further restrictions for use due to risk of disabling and potentially long lasting or irreversible side effects, affecting multiple body systems and senses.
Acetazolamide	Risk of choroidal effusion and choroidal detachment (decrease in vision and pain in eye due to fluid accumulation in vascular layer behind retina).
Pembrolirumab and Atezolizumab	Potential risk of aplastic anaemia.
Ritonavir/ Nirmatrelvir	Risk of serious and fatal adverse reactions
Vitamin B12	Risk of cobalt sensitivity reaction.
Omega 3 acid ethyl esters	Risk of atrial fibrillation usually with a dose of 4gm/day.
Paracetamol	Risk of hepatotoxicity.
Azacitidine	Risk of cutaneous vasculitis.
Pegfilgratim, Filgrastine, Lenograstin	Potential risk of myelodysplastic syndrome and acute myeloid leukemia.
Chimeric Antigen Receptor(CAR) T-cell Immunotherapies	Risk of T- cell malignancy.

Chapter-19: Anti-Microbial Stewardship.

Antimicrobial resistance occurs when microorganisms no longer respond to antimicrobial resistance. As a result of drug resistance, antibiotics 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 importance as a way 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:

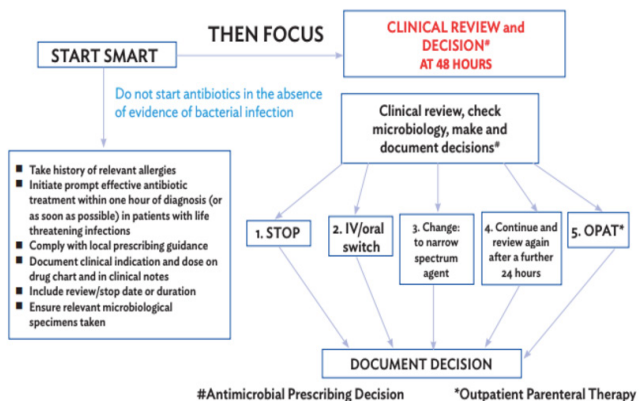
1. Right drug
2. Right dose
3. De-escalation to pathogen directed therapy
4. Right duration of therapy

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.

List of Not Recommended Antibiotics.
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

1	Acyclovir 200 mg / 400 mg / 800 mg	Tab
2	Albendazole 400 mg	Tab
3	Amoxicillin 250 mg DT	Tab
4	Amoxicillin 250mg+Clavulanic Acid 125 mg	Tab
5	Amoxicillin 500mg	Cap
6	Amoxicillin 500mg+Clavulanic Acid 125mg	Tab
7	Amoxicillin 875 mg+Clavulanic acid 125 mg	Tab
8	Azithromycin 250mg / 500 mg	Tab
9	Cefadroxil 250mg / 500 mg	Tab
10	Cefditoren 400 mg	Tab
11	Cefixime 100 mg / 200 mg / 400 mg	Tab
12	Cefpodoxime 100mg / 200 mg	Tab
13	Cefuroxime 250 mg / 500 mg	Tab
14	Cephalexin 500 mg	Tab
15	Chloroquine 500 mg	Tab
16	Ciprofloxacin 500 mg	Tab
17	Clarithromycin 250mg / 500 mg	Tab
18	Clindamycin 150 mg / 300 mg	Tab
19	Clotrimazole 100 mg pessary	Tab
20	Clotrimazole 100 mg + Metronidazole 500 mg + Lactic acid bacillus 150 million Tab(8 tab/pkt)	Strip
21	Cloxacillin 250mg / 500 mg	Tab/Cap
22	Codeine 15 mg	Tab
23	Doxycycline 100mg	Cap
24	Erythromycin 500 mg	Tab
25	Flucloxacillin 250mg / 500 mg	Cap
26	Fluconazole 150mg / 200 mg	Tab/Cap
27	Griseofulvin 250 mg / 500 mg	Tab
28	Hydroxychloroquine 200 mg / 400 mg	Tab
29	Itraconazole 100 mg	Cap
30	Ivermectin 6 mg / 12 mg	Tab
31	Levofloxacin 250 mg / 500 mg / 750 mg	Tab
32	Linezolid 600 mg	Tab

33	Mebendazole 100mg	Tab
34	Metronidazole 200 mg / 400 mg	Tab
35	Metronidazole 400 mg + Diloxanide Furoate 500mg	Tab
36	Moxifloxacin 400 mg	Tab
37	Nitrofurantoin 50 mg / 100 mg	Tab
38	Norfloxacin 400 mg	Tab
39	Ofloxacin 100 mg DT / 200 mg / 400 mg	Tab
40	Ornidazole 500 mg	Tab
41	Phenoxy Methyl Penicillin 250 mg	Tab
42	Roxithromycin 150 mg	Tab
43	Secnidazole 1 gm	Tab
44	Terbinafine 250 mg	Tab
45	Tinidazole 500 mg / 1 gm	Tab
46	Trimethoprim 160 mg + Sulphamethoxazole 800 mg	Tab
47	Trimethoprim 20 mg + Sulphamethoxazole 100 mg	Tab
48	Trimethoprim 80mg+Sulphamethoxazole 400 mg	Tab
49	Voriconazole 200 mg	Tab
50	Aluminum Hydroxide 300 mg +Magnesium Aluminum Silicate 50mg+Magnesium Hydroxide 25mg+Simethicone 25mg	Tab
51	Bisacodyl 10 mg	Tab
52	Bisacodyl 10 mg Suppository	Pcs
53	Calcitriol 0.25 mcg	Sachet
54	Calcium acetate 667 mg	Tab
55	Calcium Carbonate 500 mg + Vitamin D3 250 mg	Tab
56	Calcium Dobesilate 500 mg	Tab
57	Cholecalciferol 60000 IU	Cap/Tab
58	Cholecalciferol 60000 IU	Sachet
59	Dicyclomine 20 mg	Tab
60	Domperidone 10 mg / MDT 10 mg	Tab
61	Esomeprazole 20 mg / 40 mg	Tab
62	Esomeprazole 40 mg (with sodium bicarbonate as buffer)	Tab
63	Evening Primrose oil 1000 mg softgel capsule	Cap
64	Famotidine 40 mg	Tab

65	Ferrous Fumarate + Folic acid (100 mg+1.5 mg) eq. to Orofer XT	Cap
66	Ferrous sulphate 60mg elemental iron	Tab
67	Folic acid 5 mg	Tab
68	Granisetron 1 mg	Tab
69	Herbal product equivalent to Cystone	Bottle
70	Hyoscine Butyl bromide 10 mg / 20 mg	Tab
71	Iron polymaltose 100 mg + Folic acid 1 mg	Tab
72	Isabgol husk Powder	Phile
73	Itopride 50 mg	Tab
74	Lansoprazole 30 mg	Tab
75	Levocarnitine 500 mg	Tab
76	Loperamide 2 mg	Tab
77	L-ornithine L-aspartate 150 mg +Pancreatin 100 mg equivalent to Hepamerz	Tab
78	Mesalamine 400 mg / 1.2 gm XR	Tab
79	Methylcobalamine 1500 mcg	Tab
80	Metoclopramide 10 mg	Tab
81	Omeprazole 20 mg	Cap
82	Ondansetron 4 mg / 4 mg MDT	Tab
83	Pantoprazole 20 mg / 40 mg	Tab
84	Pantoprazole 40 mg +Domperidone 30 mg	Tab
85	Prochlorperazine 5 mg	Tab
86	Promethazine 25 mg	Tab
87	Pyridoxine 10 mg / 100 mg	Tab
88	Rabeprazole 20 mg	Tab
89	Ranitidine 150 mg	Tab
90	Ranitidine syrup for Paediatric Use	Bottle
91	Silymarin 70 mg / 140 mg	Tab
92	Sodium bicarbonate 300 mg	Tab
93	Thiamine 100 mg	Tab
94	Trypsin+ Chymotrypsin 100000 IU / 200000 IU	Tab
95	Vitamin B Complex with Zinc equivalent to SBZ	Cap
96	Vitamin B-complex equivalent to Fortiplex-M	Cap
97	Vitamin C 500 mg	Tab

98	Vitamin E 200 mg / 400 mg / 600 mg	Cap
99	Acyclovir BP 5% w/w 5 gm Oint	Tube
100	Adapalene 0.1% + Clindamycin 1% 10 gm Gel	Tube
101	Adapalene 0.1% w/w 15 gm Gel	Tube
102	Amorolfine cream 0.25%w/w 30 gm cream	Tube
103	Apremilast 10 mg / 30 mg	Tab
104	Bacitracin 250IU + Neomycin 3.5 mg + Polymyxin B 5000IU 10 gm Powder	Phile
105	Benzocaine 20 % 15 gm Gel	Tube
106	Benzoyl peroxide 2.5 % / 5 % 20 gm Gel	Tube
107	Butenafine Hydrochloride 1% 15 gm Oint	Tube
108	Calamine Lotion 100 ml Lotion	Phile
109	Calcitriol 0.3%w/w 15 gm Oint	Tube
110	Chlorhexidine + Lignocaine + Metronidazole + Menthol Ointment 10 gm eq. to delta gel	Tube
111	Chlorhexidine 4% 15 gm Oint	Tube
112	Choline Salicylate + Benzalkonium chloride 10 ml gel eq. to zytee gel	Tube
113	Clarithromycin 1 % 15 gm Oint	Tube
114	Clindamycin phosphate 1%, 15 gm Cream	Tube
115	Clobetasol 0.05% + Gentamicin 0.1 % 20 gm Cream	Tube
116	Clobetasol 0.05% + Salicylic acid 3 % 15 gm Cream	Tube
117	Clobetasol Propionate 10 gm Cream eq. to Cloderm	Tube
118	Clobetasol Propionate 30 gm Cream	Tube
119	Clotrimazole + Beclomethasone dipropionate 10 gm Cream	Tube
120	Clotrimazole 1 % + Selenium 2.5 % 100 ml Shampoo	Phile
121	Clotrimazole 1 % w/v Soap	Phile
122	Clotrimazole 1% w/w 15 gm Cream	Tube
123	Clotrimazole 1% w/w 30 gm Cream eq. to Candid	Tube
124	Clotrimazole 100 gm Dusting Powder	Phile
125	Clotrimazole Lotion (Topical)15 ml	Phile
126	Extra Vergin Coconut oil 200 ml	Pcs

127	Clobetasol propionate 0.05%w/w+ salicylic acid 3%w/w, 30 gm Oint	Tube
128	Conjugated estrogen vaginal Ointment 14 gm equivalent to Premarin	Tube
129	Diclofenac Cream 30 gm	Tube
130	Dinoprostone 0.5 mg Gel	Tube
131	Fluconazole 50mg/5ml 35ml Suspension	Phile
132	Fluocinolone 0.1 mg/ml 30 ml Lotion	Phile
133	Fluocinolone Acetonide 0.025% w/w 20 gm Oint	Tube
134	Fluticasone propionate 10gm Oint	Tube
135	Framycetin sulfate 1 % 30 gm Oint	Tube
136	Fresh human placenta extract 0.25% 20 gm Gel	Tube
137	Fusidic acid 2% w/w 10 gm Oint	Tube
138	Fusidic acid 20 mg + Betamethasone 1.2 mg, 10 gm Oint	Tube
139	Fusidic acid 20 mg + Hydrocortisone 10 mg, 10 gm Oint	Tube
140	Gamma benzene hexachloride 1% + Cetrimide 0.1 %, 100 ml Lotion	Phile
141	Gamma benzene hexachloride 1% w/w, 100 ml Lotion	Phile
142	Halobetasol 0.05% w/w + Fusidic acid 2% w/w 30g Oint	Tube
143	Halobetasol 0.05% w/w + Gentamicin 0.1% 30 g Oint	Tube
144	Halobetasol 0.05% w/w + Salicylic acid 3% 30g Oint	Tube
145	Heparin Ointment equivalent to Thrombophob 20 gm	Tube
146	Hydrocortisone 0.5 % w/w 10 gm Cream	Tube
147	Hydrocortisone 1 % w/w 10 gm Cream eq. to lycor	Tube
148	Hydrogen peroxide 20 % Solution 100 ml	Phile
149	Hydroquinone 2.0% w/w +Tretinoin + 0.025% w/w, Mometasone Furoate + 0.1% w/w 15 gm Oint	Phile
150	Collagen Gel	Phile
151	Isotretinoin 10 mg / 20 mg	Cap
152	Ketoconazole 2% + Zinc Pyrithione 1 % 100 ml Solution	Phile

153	Ketoconazole 2% w/w 15g Oint	Tube
154	Ketorolac 2 % 15 gm Oint	Tube
155	Lignocaine 15 % Spray Topical	Phile
156	Lignocaine 2% 30 gm Gel	Tube
157	Luliconazole 1 % 30 gm Oint eq. to Lulican	Tube
158	Metronidazole 1% w/w 20 gm Gel	Tube
159	Miconazole Cream 15 gm	Tube
160	Minoxidil 2% Solution	Tube
161	Minoxidil 5% 60 ml Solution	Tube
162	Mometasone Furoate 0.1% w/w 15gm Oint eq to Melacare	Tube
163	Mupirocin 2 % w/w + Beclomethasone 0.05 % w/v 5gm Oint	Tube
164	Mupirocin Ointment 5 gm / 10 gm	Tube
165	Luliconazole 1 % 10 gm Oint	Tube
166	Luliconazole 1 % 30 gm Oint eq. to Lulican	Tube
167	Nitroglycerin 0.2 % 25 gm Oint	Tube
168	Permethrin 5% w/w 60 ml Lotion	Phile
169	Permethrin 1 % Soap	Phile
170	Podophylline solution	Phile
171	Potassium Permanganate 30 gm Powder	Phile
172	Povidone iodine 10 %, 100 ml Solution eq. to Betadine	bottle
173	Povidone iodine 10 %, 15 g Oint	tube
174	Povidone iodine 5 % 50 ml solution	bottle
175	Povidone Iodine 5% w/w 15 gm Oint	Tube
176	Povidone Iodine vaginal Pessaries	Strip
177	Salicylic Acid 10% / 20 % / 40 % w/w 25 gm Oint eq. to Salsa	Tube
178	Sertaconazole 2% 15 gm Oint	Tube
179	Silver sulfadiazine 1% 25 gm / 200 gm Oint	Tube
180	Skin Protective Lotion equivalent to Ray shield (40 / 50 SPF)	Phile
181	Tacrolimus 0.03 % / 0.1 10 gm Oint	Tube
182	Terbinafine HCL 1%, 10 gm Oint	Tube
183	Tretinoin 0.025 % / 0.05 % w/w 20 gm Gel	Tube
184	Triamcinolone oral gel 5 gm	Tube

185	Vaginal wash Solution equivalent to V-Wash 100 ml	Phile
186	Baby Moisturizing Lotion 200 ml Eq. to Atogla	Phile
187	Diaper Rash cream 75 gm eq. to B4 Nappi	Phile
188	Zinc oxide 25% 30 gm Oint	Phile
189	Aceclofenac 100 mg / 200 mg SR	Tab
190	Acetazolamide 250 mg	Tab
191	Alendronate Sodium 70 mg	Tab
192	Alfuzosin 10 mg	Tab
193	Allopurinol 100 mg / 300 mg	Tab
194	Azathioprine 50 mg	Tab
195	Baclofen 10 mg	Tab
196	Betahistine 8 mg / 16 mg	Tab
197	Caffeine 25 mg + Paracetamol 500mg	Tab
198	Cetirizine 10 mg	Tab
199	Charcoal activated 250mg	Cap
200	Charcoal activated powder 10gm/sachet	Sachet
201	Cinnarizine 25 mg	Tab
202	Colchicine 0.5 mg	Tab
203	Diacerein 50 mg	Tab
204	Diclofenac 50 mg / 75 mg SR / 100 mg SR	Tab
205	Drotaverine 40 mg / 80 mg	Tab
206	Drotaverine Syrup	Phile
207	Ebastine 10 mg / 20 mg	Tab
208	Entecavir 0.5 mg	Tab
209	Etoricoxib 60 mg / 90 mg / 120 mg	Tab
210	Febuxostat 40 mg / 80 mg	Tab
211	Fexofenadine 120 mg / 180 mg	Tab
212	Finasteride 5 mg	Tab
213	Flavoxate 200 mg	Tab
214	Flunarizine 5 mg / 10 mg	Tab
215	Glucosamine 500 mg	Tab
216	Ibuprofen 400 mg	Tab
217	Indomethacin 25mg / 50 mg / 75 mg	Tab
218	Ketorolac 10 mg	Tab

219	Lactic acid bacillus 50 million+ Bacillus Mesentericus 1 million + Clostridium Butyricum 2 million +Clostridium Butyricum 2 million equivalent to Bifilac	Tab
220	Leflunomide 10 mg / 20 mg	Tab
221	Levocetirizine 5 mg	Tab
222	Loratadine 10 mg	Tab
223	Mefenamic Acid 250 mg / 500 mg	Tab
224	Methotrexate 2.5 mg / 5 mg / 7.5 mg / 10 mg	Tab
225	Montelukast 4 mg / 10 mg	Tab
226	Mycophenolate Mofetil 500 mg	Tab
227	N-Acetylcysteine 600 mg	Tab
228	Naproxen 250 mg / 500 mg / 750 mg SR	Tab
229	Oxybutynin 2.5 mg / 5 mg	Tab
230	Paracetamol 125 mg / 250 mg / 500 mg Suppository	Pcs
231	Paracetamol 325 mg + Ibuprofen 400 mg	Tab
232	Paracetamol 500 mg + Chlorpheniramine Maleate 4 mg + Phenylephrine 10 mg equivalent to sinex	Tab
233	Paracetamol 500 mg + Chlorzoxazone 250 / 500 mg	Tab
234	Paracetamol 500mg + Codeine 10 mg	Tab
235	Pentoxifylline 400 mg	Tab
236	Pheniramine 25 mg	Tab
237	Piroxicam 20 mg	Tab
238	Probenecid 500 mg	Tab
239	Serratiopeptidase 5 mg / 10 mg	Tab
240	Silodosin 4 mg / 8 mg	Tab
241	Sulfasalazine 500 mg / 1 gm	Tab
242	Tamsulosin 0.4 mg	Tab
243	Thiocolchicoside 4 mg / 8 mg	Tab
244	Tizanidine 2 mg / 4 mg	Tab
245	Tramadol 50 mg / 100 mg	Tab
246	Ursodeoxycholic Acid 150 mg / 300 mg	Tab
247	Zinc Sulphate 10 mg / 20 mg	Tab
248	Solifenacin 5 mg	tab

249	Tofacitinib 5mg	Tab
250	Tacrolimus 0.25 mg / 0.5 mg / 1 mg / 2 mg	Tab
251	Milk formula no. 1 eq to Lactogen 1 powder	Pkt
252	Pain relief oil 100 ml eq. to ortho oil	bottle
253	Carica Papaya 1150 mg	Tab
254	Cranberry 400 mg	Tab
255	Pyridoxine 20 Mg / 40 mg	Tab
256	Amiodarone 100 mg / 200 mg	Tab
257	Amlodipine 2.5 mg/ 5 mg / 10 mg	Tab
258	Aspirin 75 mg / 150 mg	Tab
259	Atenolol 25 mg / 50 mg	Tab
260	Atenolol 25mg + Amlodipine 2.5 mg	Tab
261	Atenolol 50 mg + Amlodipine 5 mg	Tab
262	Atenolol 50 mg + Hydrochlorothiazide 12.5 mg	Tab
263	Atenolol 50mg + Chlorthalidone 12.5 mg	Tab
264	Atorvastatin 5 mg / 10 mg / 20 mg / 40 mg	Tab
265	Bisoproprolol 2.5 mg / 5 mg / 10 mg	Tab
266	Carvedilol 12.5 mg	Tab
267	Carvedilol 3.125 mg	Tab
268	Carvedilol 6.25 mg	Tab
269	Clonidine 100 mcg	Tab
270	Clopidogrel 75 mg	Tab
271	Digoxin 0.125 mg / 0.25 mg	Tab
272	Diltiazem 30 mg / 90 mg XR / 120 mg XR	Tab
273	Enalapril 2.5 mg / 5 mg / 10 mg	Tab
274	Etamsylate 500 mg	Tab
275	Ezetimibe 10 mg	Tab
276	Fenofibrate 160 mg / 200 mg	Tab
277	Furosemide 20 mg / 40 mg	Tab
278	Furosemide 40 mg + Amiloride 5 mg	Tab
279	Glyceryl Trinitrate 0.5 mg Sublingual Tablet	Tab
280	Glyceryl Trinitrate 400 mcg Meter Dose Spray	Phile
281	Hydrochlorothiazide 12.5 mg / 25 mg	Tab
282	Hydrochlorothiazide 12.5 mg + Ramipril 5 mg	Tab
283	Irbesartan 150 mg / 300 mg	Tab

284	Isoproterenol 10 mg	Tab
285	Isosorbide Dinitrate 5 mg / 10 mg	Tab
286	Isosorbide mononitrate 10 mg / 20 mg	Tab
287	Isoxsuprine Hydrochloride 10 mg	Tab
288	Losartan 25 mg / 50 mg / 75 mg	Tab
289	Losartan 25 mg + Amlodipine 2.5 mg	Tab
290	Losartan 25+ Hydrochlorothiazide 12.5 mg	Tab
291	Losartan 50 mg + Amlodipine 5 mg	Tab
292	Losartan 50 mg + S-Amlodipine 2.5 mg	Tab
293	Losartan 50+ Hydrochlorothiazide 12.5 mg	Tab
294	Methyldopa 250 mg / 500 mg	Tab
295	Metolazone 2.5 mg / 5 mg	Tab
296	Metoprolol 12.5 / 25 / 50 / 100 mg XL	Tab
297	Nebivolol 2.5 mg / 5 mg	Tab
298	Nifedipine 5 mg / 10 mg / 20 mg SR	Tab
299	Nitroglycerine 2.6 mg	Phile
300	Olmесartan 10 mg / 20 mg / 40 mg	Tab
301	Prazosin 2.5 mg XL / 5 mg XL	Tab
302	Propranolol 10 mg / 20 mg / 40 mg	Tab
303	Ramipril 1.25 mg	Tab
304	Ramipril 10 mg	Tab
305	Ramipril 10 mg + Hydrochlorothiazide 12.5 mg	Tab
306	Ramipril 2.5 mg / 5 mg	Tab
307	Ramipril 2.5 mg + Hydrochlorothiazide 12.5 mg	Tab
308	Ramipril 5 mg + Hydrochlorothiazide 12.5 mg	Tab
309	Rosuvastatin 5 mg / 10 mg / 20 mg	Tab
310	S-Amlodipine 2.5 mg / 5 mg	Tab
311	Sildenafil 25 mg / 50 mg	Tab
312	Spiroноlactone 25 mg / 50 mg / 100 mg	Tab
313	Spiroноlactone 50 mg + Furosemide 20 mg	Tab
314	Telmisartan 20 mg / 40 mg / 80 mg	Tab
315	Telmisartan 40 mg + Amlodipine 5 mg	Tab
316	Telmisartan 40 mg + Hydrochlorothiazide 12.5 mg	Tab

317	Telmisartan 80 mg + Hydrochlorothiazide 12.5 mg	Tab
318	Torsemide 10 mg / 20 mg / 40 mg / 100 mg	Tab
319	Tranexamic acid 500 mg	Tab
320	Verapamil 40 mg / 60 mg / 120 mg ER	Tab
321	Warfarin 1 mg / 2 mg / 3 mg / 5 mg	Tab
322	Acarbose 25 mg / 50 mg	Tab
323	Carbimazole 5 mg / 10 mg	Tab
324	Clomiphene Citrate 50 mg	Tab
325	Combi Pack of Mifepristone + Misoprostol (200 mcg+200 mcg)	Strip
326	Conjugated estrogen 0.625 mg	Tab
327	Danazol 50 mg / 100mg / 200 mg	Cap
328	Deflazacort 6 mg / 30 mg	Tab
329	Dexamethasone 0.5 mg / 4 mg	Tab
330	Dydrogesterone 10 mg eq. to duphaston	Tab
331	Fludrocortisone 100 mcg	Tab
332	Empagliflozin 10 mg / 25 mg	Tab
333	Ethinylestradiol + Levonorgestrel (0.03 mg+0.15mg) equivalent to ovari-L	strip
334	Ethinylestradiol + Norgestrel (0.05mg + 0.5 mg) equivalent to ovari-G	strip
335	Glibenclamide 5 mg	Tab
336	Gliclazide 40 mg / 60 mg / 80 mg	Tab
337	Glimepiride 1 mg / 2 mg / 3 mg / 4 mg	Tab
338	Glipizide 5 mg	Tab
339	Levothyroxine 12.5 / 25 / 37.5 / 50 / 75 / 100 mcg	Tab
340	Linagliptin 5 mg	Tab
341	Medroxyprogesterone 10 mg	Tab
342	Mifepristone 200 mg	Tab
343	Metformin 1000 mg + Glimepiride 1 mg	Tab
344	Metformin 1000 mg + Glimepiride 2 mg	Tab
345	Metformin 1000 mg + Linagliptin 2.5 mg	Tab
346	Metformin 1000 mg + Sitagliptin 100 mg	Tab
347	Metformin 1000 mg + Sitagliptin 50 mg	Tab
348	Metformin 500 mg / 850 mg / 1gm	Tab
349	Metformin 500 mg + Glimepiride 1 mg	Tab

350	Metformin 500 mg + Glimepiride 2 mg	Tab
351	Metformin 500 mg + Linagliptin 2.5 mg	Tab
352	Metformin 500 mg + Sitagliptin 50 mg	Tab
353	Metformin 500 mg SR / 850 mg SR	Tab
354	Metformin 850 mg + Linagliptin 2.5 mg	Tab
355	Metformin 850 mg + Sitagliptin 50 mg	Tab
356	Methyl Prednisolone 4 mg / 8 mg / 16 mg	Tab
357	Misoprostol 200 mcg	Tab
358	Norethisterone 5 mg	Tab
359	Pioglitazone 15 mg / 30 mg	Tab
360	Prednisolone 2.5 mg / 5 mg / 10 mg / 20 mg / 40 mg	Tab
361	Progesterone 100 mg / 200 mg	Tab
362	Repaglinide 1 mg / 2 mg	Tab
363	Sitagliptin 25 mg / 50 mg / 100 mg	Tab
364	Teneligliptin 20 mg	Tab
365	Thyroxine Sodium 12.5 / 25 / 50 / 75 / 100 mcg	Tab
366	Voglibose 0.2 mg / 0.3 gm	Tab
367	Dapagliflozin 5 mg / 10 mg	Tab
368	Rivaroxaban 10 mg / 15 mg / 20 mg	tab
369	Alprazolam 0.25 mg / 0.5 mg	Tab
370	Amisulpride 50 mg / 100 mg / 200 mg / 400 mg	Tab
371	Amitriptyline 10 mg / 25 mg / 75 mg	Tab
372	Aripiprazole 10 mg / 20 mg	Tab
373	Aripiprazole 5 mg	Tab
374	Atomoxetine 10 mg / 25 mg / 40 mg	Tab
375	Carbamazepine 100 mg / 200 mg / 300 mg / 400 mg	Tab
376	Carbamazepine 200 mg CR / 300 mg CR / 400mg CR	Tab
377	Chlordiazepoxide 10 mg / 25 mg	Tab
378	Chlorpromazine 25 mg	Tab
379	Citicoline 500 mg	Tab
380	Clobazam 5 mg / 10 mg	Tab
381	Clomipramine 10 mg / 25 mg / 50 mg	Tab
382	Clonazepam 0.25 mg / 0.5 mg	Tab

383	Clozapine 25 mg / 50 mg / 100 mg / 200 mg	Tab
384	Controlled Release Tablets of Sodium Valproate +Valproic acid 200 / 300 / 500 mg	Tab
385	Desvenlafaxine 50 mg	Tab
386	Diazepam 2 mg / 5 mg	Tab
387	Divalproex sodium 250 mg ER / 500 mg ER	Tab
388	Donepezil 5 mg / 10 mg	Tab
389	Dosulepin 25 mg / 75 mg	Tab
390	Duloxetine 20 mg / 30 mg / 40 mg	Tab
391	Escitalopram 5 mg / 10 mg / 20 mg	Tab
392	Fluoxetine 10 mg / 20 mg	Tab
393	Fluvoxamine 50 mg / 100 mg	Tab
394	Gabapentin 100 mg / 300 mg	Tab/ Cap
395	Haloperidol 0.25 mg / 1.5 mg / 5 mg	Tab
396	Haloperidol 1.5 mg + Benzhexol 2 mg	Tab
397	Haloperidol 5 mg + Trihexyphenidyl 2 mg	Tab
398	Imipramine 25 mg / 50 mg / 75 mg	Tab
399	Levetiracetam 250 mg / 500 mg / 1000 mg	Tab
400	Levodopa 100 mg + Carbidopa 10 mg	Tab
401	Levodopa 100 mg + Carbidopa 25 mg	Tab
402	Lithium 300 mg / 400 mg SR	Tab
403	Lithium 400 mg Sustain Release	Tab
404	Lorazepam 1 mg / 2 mg	Tab
405	Mebeverine 135 mg / 200 mg SR	Tab
406	Mirtazapine 7.5 mg / 15 mg / 30 mg	Tab
407	Naltrexone 50 mg	Tab
408	Olanzapine 2.5 mg / 5 mg / 7.5 mg / 10 mg / 20 mg	Tab
409	Oxcarbamazepine 150 mg / 300 mg / 450 mg / 600 mg	Tab
410	Paracetamol 325 mg +Tramadol 37.5 mg	Tab
411	Paroxetine 10 mg / 20 mg	Tab
412	Paroxetine 12.5 mg SR / 25 mg SR	Tab
413	Phenobarbitone 30 mg / 60 mg	Tab
414	Phenytoin 50 mg / 100 mg / 300 mg	Tab
415	Pregabalin 25 mg / 50 mg / 75 mg / 150 mg	Cap

416	Pregabalin 75 mg + Methylcobalamin 1500 mcg	Tab
417	Pregabalin 50 mg + Methylcobalamin 1500 mcg	Tab
418	Quetiapine 25 mg / 50 mg / 100 mg / 200 mg / 300 mg / 400 mg	Tab
419	Risperidone 1 mg / 2 mg / 3 mg / 4 mg	Tab
420	Rivastigmine 1.5 mg	Tab
421	Rizatriptan 10 mg	Tab
422	Sertraline 25 mg / 50 mg / 100 mg	Tab
423	Sodium Valproate 200 mg / 300 mg / 500 mg / 1000 mg	Tab
424	Sumatriptan 25 mg / 50 mg	Tab
425	Topiramate 25 mg / 50 mg	Tab
426	Trifluoperazine 5 mg + Trihexyphenidyl 2 mg	Tab
427	Trihexyphenidyl 2mg	Tab
428	Venlafaxine 37.5 mg / 75 mg	Tab
429	Zolpidem 5 mg / 10 mg	Tab
430	Acyclovir 200mg/5ml 100 ml Susp	Bott
431	Albendazole 200 mg/5mL, 10 mL Susp	Bott
432	Aluminum hydroxide 500mg + Magnesium hydroxide(500mg + 500mg)/10 ml, 170 ml Susp eq. to Normogel	Bott
433	Alpha Amylase + Papain 15 ml Drop equivalent to Neopeptine	Bott
434	Aluminum hydroxide 300 mg+ Magnesium 150 mg + Simethicone 125 mg+ Oxetacaine 10 mg, 200 ml Susp equivalent to Tricaine MPS	Bott
435	Amoxicillin 125 mg/5 mL 90 ml Dry syrup	Bott
436	Amoxicillin 200 mg + Clavulanic acid 28.5mg/5ml in 30 ml with distilled water D/Syp	Bott
437	Amoxicillin 400 mg + Clavulanic acid 57 mg/5ml in 30 ml with distilled water D/Syp	Bott
438	Azithromycin 100 mg / 5 mL 15 ml Susp	Bott
439	Azithromycin 200 mg/5mL 15 ml Susp	Bott
440	Benzydamine 0.15%w/v 100 ml Mouth Wash	Bott

441	Caffeine citrate oral solution 20mg/ml ,1.5 ml eq. to Apnicaf	Phile
442	Calcium Phosphate 400 + vit D3 200 IU/10 ml 170 ml Susp	Bott
443	Cefaclor 125mg/5ml, 30 ml D/Syp	Bott
444	Cefadroxil 250mg/5ml, 30ml D/Syp	Bott
445	Cefixime 100 mg/5 mL 60 ml D/Syp	Bott
446	Cefixime 50 mg/5 mL, 60ml D/Syp	Bott
447	Cefpodoxime 50 mg/5 mL, 60ml D/Syp	Bott
448	Cefpodoxime 100 mg/5 ml, 30ml D/Syp	Bott
449	Cetirizine 5 mg/5ml 30 ml Syp	Bott
450	Cetirizine 5 mg/5ml 60 ml Syp	Bott
451	Chlorhexidine 0.2% 100 ml Mouth Wash	Bott
452	Chlorpheniramine 2mg/5ml + Phenylephrine 5mg/5ml, 15 ml paediatric drop eq.to Solvincold af	Bott
453	Chlorpheniramine 2mg/ml +Phenylephrine 2.5mg/ml, 15 ml paediatric drop eq.to Alex drop	Bott
454	Chlorpheniramine 4mg+ Ammonium chloride 135 mg+ Menthol 1 mg+ Sod citrate 55 mg 100 ml Syp equivalent to Vasodryl	Bott
455	Cholecalciferol 400 IU/ml 30 ml Syrup equivalent to DV 400	Bott
456	Cloxacillin 125 mg/5 ml 100 ml Syp	Bott
457	Cyproheptadine 2mg/5ml 100ml Syp	Bott
458	Cyproheptadine 2mg/5ml 200ml Syp	Bott
459	Deflazacort 6 mg/5ml, 30 ml Syp	Bott
460	Dextromethorphan 10 mg + Phenylephrine 5 mg + Triprolidine 1.25 mg/5ml 100 ml Syp	Bott
461	Dextromethorphan 15mg+Chlorpheniramine 1mg + Phenylephrine 5mg/5ml 100 ml Syp equivalent to Pulmarin	Bott
462	Dextromethorphan 7.5mg+Chlorpheniramine 1 mg /5ml ,50 ml syrup equivalent to Vasodryl paediatric	Bott
463	Disodium Hydrogen Citrate 100ml Syp	Bott
464	Domperidone 5mg/5ml, 30ml Susp	Bott

465	Ferric ammonium citrate 220 mg + Folic acid 0.5 mg + Pyridoxine 1.5 mg + Cyanocobalamin 4.5 mcg ,200 ml syrup, equivalent to Ferro folic	Bott
466	Fexofenadine 30 mg/5mL, 60mL Susp	Bott
467	Flucloxacillin 125mg/5ml,100ml D/Syp	Bott
468	Fungal diastase 50 mg + Pepsin 10 mg 100ml Syp	Bott
469	Fungal diastase 50 mg + Pepsin 10 mg 200ml Syp	Bott
470	Granisetron 1mg/ml, 10ml Syp	Bott
471	Hand sanitizer with Nozzle Spray 100 ml Solution	Bott
472	Ibuprofen 100 mg + Paracetamol 162.5 mg/5ml 60 ml Syp eq.to Flexon	Bott
473	Iron + Folic acid 15 ml Hematinic Drop eq. to Fero folic	Bott
474	Lactulose 3.35 gm/5ml 100ml Susp	Bott
475	Lactulose 3.35 gm/5ml 200ml Susp	Bott
476	Levocetirizine 2.5 mg/5ml 30 ml Syp	Bott
477	Levodropropazine 30 mg/5 ml 100ml Syp	Bott
478	Liquid paraffin 3.75 ml + Milk of magnesia 11.25 ml 200ml Syp	Bott
479	Magaldrate 400 mg + Simethicone 20mg/5ml, 180 ml Susp eq. to stagel	Bott
480	Mebendazole 100mg/5ml 30 ml Susp	Bott
481	Mefenamic acid 100mg/5ml, 60 ml Syp	Bott
482	Metoclopramide 5 mg/5 mL, 30 mL Syp	Bott
483	Metronidazole 100 mg + Diloxanide Furoate 125mg/5mL 60 ml Susp	Bott
484	Nystatin 100000 IU/ml 30 ml Susp	Bott
485	Metronidazole 100 mg/5 mL 60 ml Susp	Bott
486	Metronidazole 200mg/5ml 60 ml Susp	Bott
487	Ofloxacin 50 mg/5ml 30 ml Susp	Bott
488	Ondansetron 2mg/5 mL, 30 mL Syp	Bott
489	Paracetamol 125 mg + Phenylephrine 5 mg + Chlorpheniramine 1 mg/5 ml 100 ml Syp	Bott
490	Paracetamol 125 mg + Phenylephrine 2.5 mg + Chlorpheniramine 1 mg/ml 15 ml syrup	Bott

491	Paracetamol 125 mg/5 ml 60 ml Syrup eq.to niko	Bott
492	Paracetamol 150 mg/ml 15 ml Drop eq. to Niko	Bott
493	Paracetamol 250 mg/5ml 60 ml Syrup eq. to Niko ds	Bott
494	Polyethylene glycol with electrolytes Powder equivalent to Peglec	Bott
495	Potassium Chloride 1.5gm/15ml, 200 ml Solution eq.to Potklor	Bott
496	Povidone iodine 1 % 100 ml Gargle	Bott
497	Promethazine 5mg/5ml, 60ml Syrup	Bott
498	Salbutamol 2 mg/5 mL, 100 mL Syrup equivalent to Beta-2	Bott
499	Salbutamol 2mg + Bromhexine 4mg/5ml, 100ml Syrup equivalent to Beta-2	Bott
500	Simethicone 40 mg + Dicyclomine 10 mg, 10 ml Drop eq.to Mefstal spas	Bott
501	Simethicone 40 mg + Dicyclomine 10 mg/5ml, 30 ml Susp eq.to Mefstal spas	Bott
502	Sodium chloride 15% + Glycerin 15% 30 ml Enema	Bott
503	Sodium Valproate 200mg/5ml 100 ml Syrup	Bott
504	Streptococcus Faecalis 30 million + Clostridium Butyricum 2 million+ Baccilus Mesentericus 1 million+Lactobacillus Sporogenes 50 million 30ml Suspension equivalent to bifilac	Bott
505	Sucralfate 1g/10 ml, 200ml Susp	Bott
506	Sulfamethoxazole 200 mg + Trimethoprim 40 mg/5mL 50 ml Susp	Bott
507	Terbutaline 1.5 mg + Bromhexine 4mg/5ml, 60 ml Sruyp equivalent to Brica-BM	Bott
508	Terbutaline 2.5 mg + Bromhexine 8mg/5ml, 100 ml Syrup equivalent to Brica-BM	Bott
509	Vitamin B-complex + Zinc 100ml Syrup	Bott
510	Vitamin D Drop (800mg/ml)	Bott
511	Acyclovir 3% eye Ointment 5 gm	Phile
512	Atropine Sulphate 1% 5 ml Eye drop	Phile
513	Beclomethasone 400 mcg, 30 Rotacap	Phile

514	Beclomethasone dipropionate 50 mcg/dose unit, 200 doses Nasal Spray	Phile
515	Brimonidine 0.2% + Timolol 0.5 % Eye Drop	Phile
516	Budesonide 100 mcg + Formoterol 6 mcg Inhaler	Phile
517	Budesonide 100 mcg MDI	Phile
518	Budesonide 200 mcg + Formoterol 6 mcg MDI	Phile
519	Budesonide 200 mcg + Formoterol 6mcg 30 Rotacap	Phile
520	Budesonide 200 mcg MDI	Phile
521	Budesonide 200 micrograms, 30 Rotacap	Phile
522	Budesonide 400 mcg + Formoterol 6 mcg MDI	Phile
523	Budesonide 400 mcg + Formoterol 6 mcg Rotacap	Phile
524	Budesonide 400 micrograms, 30 Rotacap	Phile
525	Carboxymethylcellulose 0.5 % 10 ml Eyedrop	Phile
526	Chloramphenicol +Polymyxin B + Dexamethasone Eye ointment 5 gm	Phile
527	Chloramphenicol 0.5% + Dexamethasone 0.1 % Eyedrop	Phile
528	Chloramphenicol 0.5% 10 ml Eyedrop	Phile
529	Chloramphenicol 5% + Benzocaine 1 % 5 ml Ear drop	Phile
530	Chloramphenicol 5mg +Polymyxin B 5000 IU + Dexamethasone 1 mg, 5 ml Eye/Ear drop	Phile
531	Ciprofloxacin 0.3 %+ Dexamethasone phosphate 0.1 % 5 ml Eye/Ear drop	Phile
532	Ciprofloxacin 0.3% 5 gm Eye Oint	Phile
533	Ciprofloxacin 0.3% 5 ml Eye drop	Phile
534	Clotrimazole 1% w/v + Lignocaine 2% w/v 10 ml Ear Drop	Phile
535	Dorzolamide 2% 5 ml Eye drops	Phile
536	Doxophyllin 200 mg /400 mg Tab	Tab
537	Dry Powder Inhaler equivalent to Revolizer Machine	Phile

538	Etophylline 115mg + Theophylline 35mg Tab	Tab
539	Fluorometholone 0.1 % + Neomycin 0.35 % 5 ml Eye drops	Phile
540	Fluorometholone 0.1 % 5 ml Eye drops	Phile
541	Flurbiprofen 0.03% 5 ml Eye drop	Phile
542	Fluticasone 50 micrograms/puff MDI	Phile
543	Gatifloxacin 0.3 % 5 ml Eye drop	Phile
544	Gentamicin 0.3%w/w 5ml E/Er. Drop	Phile
545	Homatropine 2% Eye drop 5ml	Phile
546	Hydroxypropyl Methylcellulose 0.3 % 10 ml Eye drop	Phile
547	Ipratropium bromide 400 mcg, 30 Rotacap	Phile
548	Ipratropium bromide 500 mcg, 2ml Respules	Phile
549	Ketorolac 0.04% 5 ml Eye drop	Phile
550	Levocetirizine-5mg+Montelukast Sodium- 10mg	Tab
551	Mometasone 50 mcg Nasal spray	Phile
552	Moxifloxacin 0.5% 10 ml Eye drops	Phile
553	Ofloxacin 0.3%, 5 ml Eyedrop	Phile
554	Olapatadine 0.1% Eye drop 5 ml	Phile
555	Oxymetazoline 0.01 % 10 ml Nasal drop	Phile
556	Oxymetazoline 0.025 % (Pediatric) 10 ml Nasal drop	Phile
557	Oxymetazoline 0.05 % (Adult) 10 ml Nasal drop	Phile
558	Oxymetazoline 0.05 % Nasal Spray	Phile
559	Phenylephrine 0.12% + Naphazoline 0.05 % + Sodium CMC 0.5% + Menthol 0.005% 10 ml Eye drops	Phile
560	Plastic Inhalation Device equivalent to Rotahaler	Phile
561	Polyvinyl alcohol 1.4% + Povidone 0.6 %, 10 ml Eye drop	Phile
562	Roflumilast 500 mcg	Tab
563	Salbutamol 2.5 mg/2.5 ml respulse	Phile
564	Salbutamol 5mg/ml, 15 ml Resp. Solution	Phile

565	Salbutamol Sulphate 100mcg/puff, 200 MDI	Phile
566	Salbutamol Sulphate 200mcg, 30 Rotacap	Phile
567	Salmeterol 25 mcg+ Fluticasone 250 mcg MDI	Phile
568	Salmeterol 50 mcg + Fluticasone 250 mcg Rotacap	Phile
569	Sodium bicarbonate 34 mg/ml 10 ml Eardrop	Phile
570	Sodium chloride 0.65 % 10 ml Nasal Drop	Phile
571	Sodium chloride solution 5% Eye drop 10 ml	Phile
572	Timolol 0.25 % 5 ml Eye drop	Phile
573	Timolol 0.5 % 5 ml Eyedrop	Phile
574	Tiotropium 18 mcg + Formoterol 12 mcg Rotacap	Phile
575	Tiotropium 18 mcg/puff MDI	Phile
576	Tiotropium 18mcg Rotacap	Phile
577	Tobramycin 0.3 w/v 5 ml Eye drop	Phile
578	Xylometazoline 0.05 % 10 ml Nasal drop	Phile
579	Xylometazoline 0.1 % 10 ml Nasal drop	Phile
580	Paradichlorobenzene, benzocaine, chlorbutol & turpentine oil ear drop eq. to Otorex	Phile
581	Salmeterol 25 MCG + Fluticasone 250 MCG Auto Inhaler with Dose Counter eq. to Seroflo Synchronbreathe	Pcs
582	Levosalbutamol Respulse 0.63 mg/2.5 ml	Pcs
583	Formoterol 20 mcg + Budesonide 1 mg/2 ml Repulse	Pcs
584	Probiotics for kids-Bacillus Clausii 2 billion/ 5 ml eq. to Enterogermina	Pcs
585	Fluticasone Propionate 0.5mg/2ml Repulse	Pcs

Annex-2: List of Surgical Items Available in Hospital Pharmacy

1. DRAINAGE & SUCTION ITEMS

Item Name	Sizes	Unit	Uses / Description
Abdominal Drain Kit	20, 22, 24, 26, 28	Pcs	Abdominal fluid drainage post-surgery
Closed Wound Suction Set	10, 12, 14, 16, 20	Pcs	Negative suction for surgical wounds
Endo Bronchial Suction Catheter	6, 8, 10, 12, 14, 16, 18	Pcs	Suctioning airway secretions
Intercostal Drainage Catheter	24, 26, 28	Pcs	Thoracic pleural drainage
Pigtail Nephrostomy Tube	10, 12, 16	Pcs	Kidney drainage
T-Tube	12, 14, 16	Pcs	Bile duct drainage
Underwater Seal Drainage Bag	—	Pcs	Chest drainage bottle

2. SUTURES – ABSORBABLE (Catgut & Vicryl / Polyglactin)

Item Name	Sizes / Types	Unit	Uses
Catgut Chromic	1 RB, 1-0 RB, 2 RB, 2-0 RB, 3-0 CB, 3-0 RB	Pcs	Absorbable soft-tissue suturing
Coated Polyglactin (Vicryl Equivalent)	1 CB, 1 RB, 1-0 CB, 1-0 RB, 2-0 CB, 2-0 RB, 3-0 RB, 4-0 RB	Pcs	Internal absorbable sutures
Polyglactin Suture Without Needle	1-0	Pcs	Ligatures

3. NON-ABSORBABLE SUTURES (Nylon, Prolene, Silk)

Item Name	Sizes	Unit	Uses
Polyamide (Nylon 6/6.6)	2-0 CB	Pcs	Skin closure
Polypropylene (Prolene Equivalent)	1 CB, 1-0 CB, 2-0 RB, 3-0 CB, 3-0 RB, 4-0 CB, 5-0 CB, 2-0 CB	Pcs	Cardiovascular/ general surgery
Polypropylene Mesh	8×15, 15×15	Pcs	Hernia repair mesh
Silk Sutures	1-0 RB, 1 CB, 1-0 CB, 2-0 CB	Pcs	General soft tissue
Silk Suture Without Needle	2, 1-0, 3-0	Pcs	Ligature tying

4. AIRWAY MANAGEMENT (ET Tubes, LMA, RAE, Tracheostomy)

Item Name	Sizes	Unit	Uses
Endotracheal Tube Cuffed	4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8	Pcs	Secured airway
Endotracheal Tube Uncuffed	3, 3.5, 4	Pcs	Paediatric airway
LMA	1, 2, 2.5, 3, 3.5, 4, 5	Pcs	Supraglottic airway
RAE Tube Nasal	5, 5.5, 6, 6.5	Pcs	ENT surgery airway
RAE Tube Oral	4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5	Pcs	Oral surgery airway
Tracheostomy Tube Cuffed	6, 6.5, 7, 7.5, 8	Pcs	Surgical airway
Flexometallic Tube	6.5, 7, 7.5	Pcs	Reinforced ETT
ET Tube with Subglottic Suction	7, 7.5, 8	Pcs	VAP prevention

5. FEEDING / GASTRIC & URINARY

Item Name	Sizes	Unit	Uses
Infant Feeding Tube	5, 6, 7, 8, 10	Pcs	Infant feeding / NG
Nasogastric Tube	10, 12, 14, 16, 18	Pcs	Gastric decompression
External Condom Catheter	M, L, XL	Pcs	Male urinary drainage
Supra Pubic Balloon Catheter	16, 18	Pcs	Suprapubic catheter
Uro catheter Foley 2-Way	8, 10, 12, 14, 16, 18, 20	Pcs	Urinary catheter
Uro catheter Foley 3-Way	18, 20, 22, 24	Pcs	TURP irrigation
DJ Stent	One end open, Two end open	Pcs	Ureteric stenting
Urine Bag	Adult, Paediatric	Pcs	Urine collection

6. ORTHOPEDIC SUPPORTS / BRACES

Item Name	Sizes	Unit	Uses / Description
Abdominal Belt	M–XXL	Pcs	Provides abdominal support post-surgery or after hernia repair.
Ankle Binder	S–XL	Pcs	Gives compression and support for ankle sprains/instability.
Arm Sling Pouch	S–XXL	Pcs	Supports the forearm and shoulder in fractures or injuries.
Clavicle Brace	M, L	Pcs	Used to immobilize clavicle fractures and improve posture.
Elastic Wrist Splint	S–L	Pcs	Stabilizes wrist in sprains, strains, carpal tunnel .
Finger Cot Splint	S–L	Pcs	Protects immobilized finger tips in injuries.
Finger Extension Splint	S–L	Pcs	Maintains finger extension for tendon injuries.

Hard Cervical Collar	S–L	Pcs	Provides rigid neck immobilization after trauma.
Soft Cervical Collar	S–L	Pcs	Provides mild neck support for cervical strain.
Knee Cap	M–XL	Pair	Compression support for knee sprain/arthritis.
Long Knee Brace	M, L	Pcs	Immobilizes knee after ligament or fracture injuries.
LS Belt	S–XXL	Pcs	Supports lumbar spine in back pain or disc issues.
Short Knee Brace	—	Pcs	Stabilizes knee during injury recovery.
Skin Traction Set	—	Pcs	Provides traction in lower limb fractures.
Taylor Brace	M–XL	Pcs	Thoracolumbar support for posture correction/spine injury.
Tennis Elbow Strap	M–XL	Pcs	Reduces strain in lateral epicondylitis .
Thumb Spica Splint	S–L	Pcs	Immobilizes thumb in fractures or ligament injuries .
Axillary Crutches	S–L	Pcs	Assist mobility in non-weight-bearing conditions.

7. GLOVES & DISPOSABLES

Item Name	Sizes	Unit	Uses
Latex Examination Gloves	Free size	Pcs	Routine examination and general clinical use.
Sterile Ortho Gloves	7–8	Pair	Used in orthopedic surgeries requiring thicker gloves.
Sterile Surgical Gloves	6–7.5	Pair	For sterile surgical procedures.

Disposable Caps	Male, Female	Pcs	OT hygiene and hair containment.
Disposable Mask Triple Ply	—	Pcs	Standard barrier protection mask.

8. SYRINGES/IV/NEEDLES

Item Name	Sizes	Unit	Uses / Description
IV Cannula Single Safety	16–26	Pcs	For IV access with safety mechanism.
Syringes	1–50 ml	Pcs	Medication administration, flushing, sampling.
Insulin Syringe	—	Pcs	Accurate dosing of insulin .
IV Set Adult / Paediatric	—	Pcs	For intravenous fluid administration .
Pressure Extension Line	150 cm	Pcs	Extends IV lines under high pressure.
Pressure Monitoring Line	—	Pcs	Connects to arterial/central lines for pressure monitoring.
Spinal Needle	Various	Pcs	Used for lumbar puncture or spinal anesthesia.
Free Needle	18G	Pcs	For drawing medications/venous access.
Scalp Vein Set	—	Pcs	Venous access in infants/elderly with fragile veins.
Three Way Stopcock	—	Pcs	Multiple port fluid control for IV lines.

9. OXYGEN / RESPIRATORY / ANESTHESIA

Item Name	Sizes	Unit	Uses
High Concentration Mask	Adult, Child	Pcs	Delivers high FiO₂ for hypoxemic patients.
Jet Nebulizer Chamber	Adult, Pediatric	Pcs	Delivers aerosol medications .
Respiratory Exerciser	—	Pcs	Improves lung expansion and prevents atelectasis.
HFNC Cannula	Neonate–Adult	Pcs	For high-flow oxygen therapy .
BiPAP Mask	Infant–Adult	Pcs	Used in non-invasive ventilation therapy.
CPAP Circuit with Heated Wire	Child/Infant	Pcs	Provides humidified CPAP support .
Ram Cannula	Child, Adult	Pcs	Delivers low-pressure nasal ventilation .
Yankauer Suction Set	—	Pcs	Rigid suction used for oropharyngeal secretion removal .
Ventilator Circuit	Various	Pcs	Connects patient to ventilator for mechanical ventilation.

10. SURGICAL CONSUMABLES / DRESSING

Item Name	Sizes	Unit	Short Use Description
Cotton	25g, 50g, 100g	Pcs	Used for cleaning, dressing wounds, and general medical purposes.
Zigzag Cotton	50g, 100g	Pcs	Soft absorbent cotton for wound cleaning and patient hygiene.
Gauze	—	Pcs	Sterile/ non-sterile fabric used for wound dressing and absorption.

Petrolatum Gauze	—	Pcs	Non-adherent gauze for burns, grafts, and delicate wounds.
ABS Gelatin Sponge	—	Pcs	Absorbable hemostatic sponge used to control bleeding during surgery.
Surgicel Equivalent	2×3, 4×8	Pcs	Oxidized cellulose used as a hemostatic agent in surgeries.
Bandages	10 cm, 5 cm	Pcs	Used to secure dressings and support injured areas.
Roller Bandage	4", 6"	Pcs	Wraps around limbs to hold dressings or provide light compression.
Crepe Bandage	4", 6" (plastic container)	—	Elastic bandage for sprains, strains, and compression support.
Adhesive Elastic Bandage	—	Pcs	Sticky elastic wrap for support, compression, and immobilization.
Maternity Pad	Pack	Pcs	High-absorbency pad used postpartum for heavy bleeding.
Sanitary Pad	Pack	Pcs	Absorbent pad for menstrual hygiene.
Dressing Bandage	—	Pcs	Used to cover wounds and secure dressings.
Paper Tape	1", 2"	Pcs	Hypoallergenic tape for securing dressings and medical tubing.
Surgical Gown	—	Pcs	Sterile gown worn by surgeons and staff to maintain a sterile field.

11. BLADES / INSTRUMENTAL ITEMS

Item Name	Sizes	Unit	Uses / Description
Surgical Blades	10, 11, 15, 20, 22	Pcs	Used for precise surgical incisions ; each blade size is designed for specific tissue types and procedures (e.g., skin incisions, delicate cuts, deep incisions).

12. KITS & SPECIALTY ITEMS

Item Name	Size	Unit	Uses / Description
Hernia Kit	—	Pcs	Complete set used for open or laparoscopic hernia repair , includes mesh and essential instruments.
TUR Set	—	Pcs	Used for Transurethral Resection (TURP/TURBT) procedures to remove prostate tissue or bladder tumors.
Epidural Kit	16G, 18G	—	Contains epidural needle, catheter & accessories for epidural anesthesia/analgesia in labor, surgery, or pain management.
CVC Kit (Double/ Triple Lumen)	7F	—	Provides central venous access for medications, fluids, vasopressors, TPN, and CVP monitoring.
EVD External Ventricular Drain	—	Pcs	Used to drain CSF and monitor intracranial pressure in hydrocephalus, trauma, or hemorrhage patients.

Arthroscopy Drape	—	Pcs	Sterile drape for arthroscopic joint surgeries , enabling a sterile field with instrument ports.
C-Arm Cover	—	Pcs	Sterile protective cover for C-arm imaging equipment , preventing contamination in the OT.
Camera Cover	—	Pcs	Sterile cover for endoscopic or surgical cameras , ensuring sterility while maintaining visibility.
Bonewax	12-stick, 24-bar	—	Sterile wax used to control bleeding from bone surfaces during orthopedic or neurosurgery procedures.
Surgical Skin Glue (Topocryl)	0.25 ml	—	Fast-acting tissue adhesive for closing small wounds and incisions without sutures; provides waterproof closure.

Annex-3: List of Free Drug Available in Hospital

S.N.	Items name	Unit
1	Tab. Aceclofenac 100mg	Tab
2	Tab. Albendazole 400mg	Tab
3	Tab. Alprazolam 0.25/ 0.5 mg	Tab
5	Tab. Amlodipine 2.5mg/5mg	Tab
6	Tab. Amitriptyline 10mg / 25 mg	Tab
7	Tab. Amlodipine 5mg+Atenolol 50mg	Tab
8	Tab. Amlodipine 5mg + Losartan 50 mg	Tab
9	Tab. Aspirin 75mg	Tab
10	Tab. Atorvastatin 10mg	Tab
11	Tab. Azithromycin 500mg	Tab
12	Tab. Carbamazepine 200mg/300 mg/ 400 mg	Tab
13	Tab. Calcium Carbonate500mg+Vitamin D3 250 iu	Tab
14	Tab. Cefixime 200mg	Tab
15	Tab. Cefadroxil 500mg	Tab
16	Tab. Cefpodoxime proxetil 200mg	Tab
17	Tab. Cefuroxime500mg	Tab
18	Tab. Cetirizine 10mg	Tab
19	Tab. Ciprofloxacin 500mg	Tab
20	Tab. Clarithromycin 500mg	Tab
21	Tab. Clavulanic acid 125mg+ Amoxycillin 500mg	Tab
22	Tab. Clonazepam 0.25mg	Tab
23	Tab. Chlorpromazine 25mg	Tab
24	Tab. Clopidogrel 75mg	Tab
25	Tab. Diazepam 5mg	Tab
26	Tab. Dydrogesterone (10.0 Mg)	Tab
27	Tab. Doxycycline 100mg	Tab
28	Tab. Doxophyllin 400mg	Tab
29	Tab. Domperidone 10mg	Tab
30	Tab. Escitalopram 5mg/ 10 mg	Tab
31	Tab. Etophylline+ Theophylline 150mg	Tab
32	Tab. Ferrous Sulphate+ Folic acid	Tab

33	Tab. Fexofenadine 180 mg	Tab
34	Tab. Furosemide 40mg	Tab
35	Tab. Finasteride 5mg	Tab
36	Tab. Hydralazine 10mg / 25mg	Tab
37	Tab. Hyoscine Butyle Bromide 20mg	Tab
38	Tab. Ibuprofen 400mg	Tab
39	Tab. Ibuprofen 400mg+ Paracetamol 500mg	Tab
40	Tab. Isosorbide Dinitrate 5mg	Tab
41	Tab. Itopride 50mg	Tab
42	Tab. Ketorolac 10mg	Tab
43	Tab. Labetalol 50mg/ 10 mg	Tab
44	Tab. Levocetirizine 5mg	Tab
45	Tab. Levofloxacin 500mg	Tab
46	Tab. Lorazepam 1mg/ 2mg	Tab
47	Tab. Losartan 50mg	Tab
48	Tab. Metformin 850mg/500 mg	Tab
49	Tab. Metformin 500mg + Glimepiride 1mg	Tab
50	Tab. Metformin 500mg + Glimepiride 2mg	Tab
51	Tab. Methyl dopa 250mg/ 500 mg	Tab
52	Tab. Metronidazole 400mg	Tab
53	Tab. Mefenamic Acid 500mg	Tab
54	Tab. Misoprostol 200mcg	Tab
55	Tab. Nifedipine 20mg retard	Tab
56	Tab. Nitrofurantoin 100mg	Tab
57	Tab. Nitroglycerin 2.6mg	Tab
58	Tab. Norethisterone 5mg	Tab
59	Tab. Ofloxacin 200mg	Tab
60	Tab. Ondansetron 4mg	Tab
61	Tab. Pantoprazole 40mg	Tab
62	Tab. Paracetamol 500mg	Tab
63	Tab. Phenobarbitone 30mg	Tab
64	Tab. Phenytoin 50 mg / 100 mg	Tab
65	Tab. Prednisolone 10mg /20 mg/ 40 mg	Tab
66	Tab. Ranitidine 150mg	Tab
67	Tab. Risperidone 1mg/ 2 mg	Tab
68	Tab. Rosuvastatin 10mg	Tab

69	Tab. Salbutamol 4mg	Tab
70	Tab. Sertraline 50mg	Tab
71	Tab. Serratiopeptidase 5mg/ 10 mg	Tab
72	Tab. Sodium Valporate 300mg/ 500 mg	Tab
73	Tab. Thiamine 100mg	Tab
74	Tab. Thyroxine sodium 12.5mcg/ 25/50/100 mcg	Tab
75	Tab. Tizanidine 2mg	Tab
76	Tab. Tranexamic acid 500mg	Tab
77	Tab. Vitamin B Complex	Tab
78	Tab. Methylcobalamin 1500mg	Tab
79	Tab. Naproxen 250mg / 500 mg	Tab
80	Tab. Warfarin 1mg/ 2mg	Tab
81	Tab. Zinc DT 20mg	Tab
82	Cap. Ampicillin + Cloxacillin 500mg	Cap
83	Cap. Amoxicillin 500mg	Cap
84	Cap. Doxycycline 100mg	Cap
85	Cap. Fluconazole 150mg/ 200 mg	Cap
86	Cap. Flucloxacillin 500mg	Cap
87	Cap. Fluoxetine 10mg	Cap
88	Cap. Itraconazole 100mg	Cap
89	Cap. Pregabalin 75mg	Cap
90	Cap. Tamsulosin 0.4mg	Cap
91	Cap. Nifedipine 10mg/ 5 mg	Cap
92	Susp. Amoxicillin 200mg + clavulanic acid 28.5mg/5ml, ≥ 50 ml	Ph
93	Susp. Albendazole 400mg	Ph
94	Susp. Azithromycin 100mg/5ml, 15ml	Ph
95	Susp. Azithromycin 200mg/5ml, 15ml	Ph
96	Cefixime dry syrup 50mg/5ml, 60ml	Ph
97	Cefpodoxime dry syrup 50mg/5ml, 60ml	Ph
98	Syp. Disodium Hydrogen citrate 100ml	Ph
99	Susp. Ibuprofen 100mg + Paracetamol 125mg/5ml, 60ml	Ph
100	Syp Lactulose 200ml	Ph
101	Susp. Paracetamol 125mg/5ml	Ph
102	Drop. Paracetamol 150mg/ml	Ph
103	Susp. Metronidazole 100mg/5ml, ≥ 50 ml	Ph

104	Syp. Sodium valporate 200mg/5ml	Ph
105	Susp.Sucralfate 200 ml	Ph
106	Inj. Adenosine	Vial
107	Inj. Amino acid 20ml	Amp
108	Inj. Atropine 1ml(0.6mg)	Amp
109	Inj. Atropine 10ml(0.6mg/ml)	Vial
110	Inj. Atropine 30ml(0.6mg/ml)	Vial
111	Inj. Adrenalin	Amp
112	Inj. Ampicillin 250mg	Vial
113	Inj. Ampicillin 500mg	Vial
114	Inj. Ampicillin 250mg+Cloxacillin 250mg	Vial
115	Inj. Ampicillin+ Cloxacillin 1gm	Vial
116	Inj. Amiodarone Hcl 50mg/ml	Amp
117	Inj. Amikacin 100mg	Vial
118	Inj. Amikacin 500mg	Vial
119	Inj. Aminophylline	Amp
120	Inj. Anti-D (Immunoglobulin 300mcg)	Vial
121	Inj. Calcium Gluconate	Amp
122	Inj. Carboprost	Amp
123	Inj. Ceftriaxone 1gm/ 500 mg/ 250 mg	Vial
124	Inj. Cefotaxime 500mg/ 250 mg/ 1gm	Vial
125	Inj. Cefuroxime 750mg	Vial
126	Inj. Ciprofloxacin 200mg	ph
127	Inj. Clavulanic acid + Amoxycillin 1.2gm	Vial
128	Inj. Clindamycin 300mg	Vial
129	Inj. Clindamycin 600mg	Vial
130	Inj. Cloxacillin 500mg	Vial
131	Inj. Colistimethate Sodium (1 million IU)/ 2 Million IU	Vial
132	Inj. Dextrose saline (DNS)	Ph
133	Inj. DNS 0.45%,500ml	Ph
134	Inj. Dextrose 5% / 25% / 50% 10%	Ph
135	Inj. Dexamethasone 8mg	Vial
136	Inj. Diazepam	Amp
137	Inj. Diclofenac sodium 75mg	Amp
138	Inj. Digoxin	Amp
139	Inj. Dobutamine	Vial

140	Inj. Dopamine	Amp
141	Inj. Doxycycline 100mg	Vial
142	Inj. Drotaverine Hcl	Amp
143	Inj. Enoxaparin40mg	Syringe
144	Inj. Enoxaparin60mg	Syringe
145	Inj. Erythropoietin 2000iu/ 4000 IU	Syringe
146	Inj. Fentanyl 50mcg	Amp
147	Inj Flucloxacillin 500mg	Vial
148	Inj. Furosemide 20mg	Amp
149	Inj. Gentamycin 20mg/ 80 mg	Vial
150	inj. Glycerin Trinitrate 5mg/ml	Amp
151	Inj. Haemocoel 500ml	Bottle
152	Inj. Hydrocortisone 100mg	Vial
153	Inj. Hydroxy Progesterone 500mg	Amp
154	Inj. Hyoscine Butyl bromide 20mg	Amp
155	Inj. Hydralazine Hcl 20mg	Amp
156	Imipenem & Cilastatin Inj. 500mg/ 1gm	Vial
157	Inj. Isoflurane 250ml	Bottle
158	Inj. Iohexol 300mg/100ml	Vial
159	Inj. Iohexol 300mg/50ml	Vial
160	Inj Ketamine 100mg/ml/10ml	Amp
161	Inj. Ketorolac 30mg	Amp
162	Inj Labetalol Hcl 5mg/ml	Amp
163	Inj. Levetiracetam 500mg	Vial
164	Inj. Levofloxacin 500mg	Ph
165	Inj. Lignocaine 1%	Vial
166	Inj. Lignocaine hydrochloride 2% (Plain)	Vial
167	Inj. Lignocaine 2%+ adrenalin	Vial
168	Inj. Linezolid 2mg/ml,300ml bottle	Ph
169	Inj. Magsulf 50% Mgso4	Amp
170	Inj. Multielectrolyte -p 500ml	Ph
171	Inj. Meropenem 250mg	Vial
172	Inj. Meropenem 500mg/ 1gm	Vial
173	Inj. Methylethergometrine 2mg/ml	Amp
174	Inj. Metoclopramide 10mg	Amp
175	Inj. Metronidazole 500mg /100ml	Ph

176	Inj. Midazolam 5mg	Vial
177	Inj. Mannitol 20% /100ml	Ph
178	Inj. Morphine 10mg	Amp
179	Inj. Naloxone Hydrochloride 0.4mg/ml	Amp
180	Inj. NS 100ml	Ph
181	Inj. NS 500ml 0.9%	Ph
182	Inj. Neonatal Surfactant	Vial
183	Inj. Neostigmine 0.5mg/ml	Amp
184	Inj. Nitroglycerin 25mg/5ml	amp
185	Inj. Noradrenalin 10 mcg/ml	Amp
186	Inj. Ondansetron 4mg	Amp
187	Inj. Oxytocin	Amp
188	Inj. Pantoprazole 40mg	Vial
189	Inj. Paracetamol 300mg/amp	Amp
190	Inj. paracetamol 1gm	Ph
191	Inj. Pentazocine 30mg	Amp
192	Inj. Piperacillin+Tazobactam 4.5gm	Vial
193	Inj. Piperacillin + Tazobactam 1.125mg	Vial
194	Inj. Piperacillin + Tazobactam 2.25mg	Vial
195	Inj. Pethidine 50mg	Amp
196	Inj. Phenytoin 100mg/amp	Amp
197	Inj. Pheneramine Maleate 25mg	Amp
198	Inj. Phenobarbitone 200mg/ml	Amp
199	Inj. Potassium Chloride (KCL)	Amp
200	Inj. Pralidoxime 500mg	Vial
201	Inj. Promethazine Hcl 25mg/ml	Amp
202	Inj. Propofol 10mg/ml, 20ml	Vial
203	Inj. Ranitidine 50mg	Amp
204	Inj. Ringer Lactate 500ml	Ph
205	Inj. Rocuronium Bromide 50mg	Vial
206	Inj. Sodium bicarbonate	Amp
207	Inj. Sodium Valporate 500mg	Vial
208	Inj. Streptokinase 150000iu	Vial
209	Inj. Succinylcholine (Scolin)	Vial
210	Inj. Sensorcaine Heavy (with sterile packing)	Vial
211	Inj. Thiamine 100mg/amp	Amp

212	Inj. Titanus Toxide Vaccine 0.5ml	Amp
213	Inj. Torsemide 20mg	amp
214	Inj. Tramadol 50mg	Amp
215	Inj. Tranexamic acid 500mg	Amp
216	Inj. Vacuronium Bromide 10mg	Vial
217	Inj. Vancomycin 500mg	Vial
218	Inj. Vancomycin 1 gm	Vial
219	Inj. Vitamin K	Amp
220	Inj. Vitamin B-Complex	Amp
221	Water for inj. 10ml, plastic bottle	Amp
222	Water for Inj.500ml	Ph
223	Lignocaine jelly 2%	Tube
224	Chlorhexidine oint 4% ,3gm	Tube
225	Glycerin 15%W/V +Sodium chloride 15%w/v Enema	Bottle
226	Ciprofloxacin 0.3% Eye oint, 5gm	Tube
227	Carboxymethylcellulose 0.5% Eye drop, 5ml	ph
228	Prednisolone 1% Eye drop	ph
229	Flurbiprofen 0.03% Eye drop, 5ml	ph
230	Tobramycin Eye drop 0.3%, 5ml	ph
231	Timolol 0.5% Eye Drop, 5ml	ph
232	Activated Charcoal powder	pkt
233	ORS	Sachet
234	Povidine Iodine 5%, 7.5% 10%, solution,500ml (DDA approved and Betadine or equivalent)	Bottle
235	Chlorhexidine 2% solution,500ml	Bottle
236	R/C Salmeterol 50mcg + Fluticasone Propionate 250mcg,30cap/box	box
237	R/C Tiotropium 18mcg,30cap/box	box
238	Salbutamol Respirator solution 2.5mg/2.5ml	Respule
239	Ipratropium Nebulizer solution BP 500mcg/2ml	Respule
240	Budecort 0.5mg repulse	Respule
241	Oint Mupirocin 5gm	Tube
242	Inj. Normal saline 1000ml	Bottle
243	Inj. Heparin (2500IU 5ml vial)	Vial
244	Inj. Normal saline 1000ml	pouch
245	Part A (Acetatefluid 5L) + Part B (Bicarbonate fluid 847 gm Pkt)	set

Annex-4: List of ARV drugs Available in Hospital

Drug Name
Fixed Dose combination (FDC) Adult
Tenofovir/Lamivudine/Dolutegravir (300 mg/300 mg/50 mg)
Tenofovir/Lamivudine/Efavirenz (300 mg/300 mg/600 mg)
Tenofovir/Lamivudine (300 mg/300 mg)
Zidovudine/Lamivudine (300 mg/150 mg)
Abacavir/Lamivudine (600 mg/300 mg)
Emtricitabine/Tenofovir (200 mg/300 mg)
Lopinavir/Ritonavir (200 mg/50 mg)
Atazanavir/Ritonavir (300 mg/100 mg)
Fixed Dose combination (FDC) Pediatric
Abacavir/Lamivudine (120 mg/60 mg)
Zidovudine/Lamivudine (60 mg/30 mg)
Lopinavir/Ritonavir (100 mg/25 mg)
Lpinavir/Ritonavir Oral Pellets (40mg/10mg)
Single Dose Formulation (SDF)
Abacavir 300 mg
Tenofovir 300 mg
Raltegravir 400 mg
Darunavir 600 mg
Raltegravir 100 mg
Raltegravir 100 mg (sachet)
Dolutegravir 50 mg
Dolutegravir 10 mg
Dolutegravir 5 mg
Ritonavir 100 mg
Lamivudine 150 mg
Fixed Dose combination (FDC) Child
Nevirapine 10 mg/mL oral solution, 100 ml
Zidovudine 50 mg / 5 ml oral solution, 100 ml

References

- Whalen, K. (2018). *Lippincott® illustrated reviews: pharmacology*. Wolters kluwer India Pvt Ltd.
- Papadakis, M. A. (2024). *Current medical diagnosis & treatment 2024*.
- 2021 AWaRe classification
- The 2023 WHO AWaRe classification of antibiotics for evaluation and monitoring of use
- Pregnancy and Lactation Labeling (Drugs) Final Rule | FDA
- DDA: Drug Bulletin of Nepal
- Pharmacists - Medscape
- COK-AD-17-05-GUIDELINE-2018-eng-Antibiotic-Guidelines.pdf
- DDA: Home
- Health Organization. Guide to good storage practices for pharmaceuticals, WHO Technical Report Series, No. 908, 2003, Annex 9.
- Vaccine Storage and Handling | Vaccines & Immunizations | CDC



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