HOSPITAL FORMULARY



Government of Gandaki Province
Ministry of Health

PROVINCE HOSPITAL

Damauli, Tanahun, Nepal

Drugs and Therapeutics Committee (DTC)



I am pleased to acknowledge and appreciate the sincere efforts of the Pharmacy Department of Province Hospital, Damauli in preparing and publishing the third edition of the Hospital Formulary. This formulary is an important tool that will guide healthcare professionals in the safe, effective, and rational use of medicines for the benefit of our patients.

I would like to commend the pharmacy team for their dedication, teamwork, and commitment in updating this formulary according to current standards and clinical needs. I also extend my gratitude to all doctors, nurses, and other healthcare professionals who contributed their valuable suggestions and support during the preparation of this book.

This updated formulary will play a vital role in improving patient care, promoting uniform prescribing practices, and strengthening pharmaceutical services at Province Hospital, Damauli. I am confident that it will serve as a reliable reference for all healthcare providers.

I wish the Pharmacy Department continued success and encourage all staff members to make the best use of this formulary in their daily clinical practice.

Dr. Pariwartan Baral

Medical Superintendent

Province Hospital, Damauli



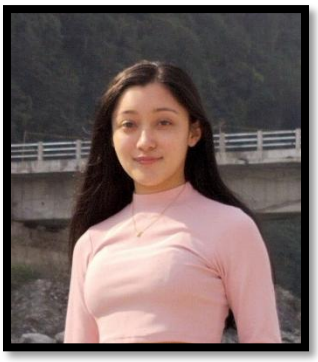
I am pleased to present the 3rd Edition of the hospital formulary of Province Hospital, Damauli. This edition has been prepared to reflect the current clinical practices and to support the rational use of medicines in our hospital.

The formulary is the result of a collaborative effort by doctors, nurses, pharmacists, and other healthcare professionals to represent our continued commitment to providing quality patient care while fulfilling the requirements of the Hospital Pharmacy Directive 2072. The formulary will be reviewed and updated annually.

This edition provides information on medicines and related items available in the hospital pharmacy, serving as a practical reference for prescribers.

I sincerely thank the editorial team, the Drugs and Therapeutics Committee, the Pharmacy Department, and all the contributors for their valuable support.

Surendra Babu Shrestha
Pharmacy In-charge
Province Hospital, Damauli



It is a privilege to present the third edition of our hospital formulary, which reflects our continued commitment to current clinical practice and evidence-based care. This formulary is the result of a collaborative effort among pharmacists, physicians, nurses, and other healthcare professionals who have contributed their expertise and guidance throughout its development.

This edition includes updated information on indications, dosage schedules, contraindications, adverse effects, and drug interactions of medicines available in the hospital pharmacy. In addition, it also incorporates details on drug inclusion under the Government of Nepal health insurance scheme, along with respective pregnancy categories.

I extend my sincere gratitude to all healthcare professionals for their continuous support, cooperation and valuable contributions in the preparations of this formulary. The commitment to patient safety and rational drug use has been instrumental in the completion of this formulary. We welcome ongoing feedback to facilitate future revisions and updates to ensure the formulary remains current and clinically relevant.

Nisha Shrestha

Pharmacy Officer

Province Hospital, Damauli

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Section I

Rational Prescribing

Determining whether a medication is required or not is crucial in a situation where many potent medications can have adverse effects. Prescription medications should only be given when absolutely required, and in every situation, the risks and benefits of giving the medication should be weighed against each other. Rational prescribing is providing the appropriate medication to the appropriate patient for the appropriate indication, at the appropriate time, in the appropriate dosage, for the appropriate length of time, with the appropriate documentation and patient education.

From a medical, socioeconomic, and legal perspective, rational prescribing has become increasingly important. The selection of appropriate medications for a particular indication has become increasingly difficult due to the proliferation of available medicines. Inappropriate prescribing practices result in increased costs, patient distress or injury, an exacerbation or prolonged sickness, and ineffective and potentially hazardous therapy.

WHO guideline to Good Prescribing Steps includes:

- Step 1: Define the patient's Problem.
- Step 2: Specify the therapeutic objectives
- Step 3: Verify the Suitability of P-drugs (Safety, Efficacy, Standard Duration of treatment,

Standard Dosing Schedules)

- Step 4: Write Prescription.
- Step 5: Give information, instruction and Warning
- Step 6: Monitor (and Stop the treatment)

Note: P-drugs or Personal or preferred or priority choice drug of the physician is the medication chosen to prescribe regularly and have grown accustomed to. Prescribers' choice of P-drugs may vary, and decisions should be based on the cost and availability of the medications, various national lists of important drugs and formularies, medical culture, and personal information interpretation.

Prescription Writing:

A prescription is a written instruction from a prescriber to a dispenser. A prescriber can be a doctor or a paramedical worker, such as a health assistant and community health workers (with restrictions). The dispenser is not always a pharmacist, but can be a pharmacy technician, an assistant, or a layperson. Thus, it is essential that the following guidelines, which are not exclusive, for prescription writing be followed:

1. Prescriptions should be written legibly in ink and should be dated. The local language is preferred.

2. The prescriber's name, address, and telephone number so that s/he can be contacted if necessary.

3. The patient's full name, age, sex and address. If required, patient's body weight should also be mentioned. Mentioning age is especially important for children under 12 years of age. Body weight is important when medicine doses are to be adjusted accordingly and body weight is expected to change during therapy.

4. The name, form, strength, frequency of the drugs and duration of the therapy should be clearly stated.

- International Non-proprietary name or generic names should be used unless the prescriber desires a specific brand name formulation for justifiable reasons.
- The strengths of the formulation should be mentioned in standard (International System, SI) units. Whole numbers should be used (500 mg instead of 0.5g, 500micrograms instead of 0.5 mg).
- For oral liquid preparations, especially those for children, the dose should preferably be stated in terms of 5 ml spoonfuls.
- Confusing abbreviations (mcg, U) and unnecessary decimals (1.00) should be avoided. When decimals are unavoidable, a zero should be written in front of the decimal point when there is no other figure e.g., 0.5 ml.
- The route of administration and specific guidelines, such as "whenever pain is severe," or "before," or "after meals," or "not to exceed twelve tablets a day," must be clearly stated.
- Old Latin phrases should be avoided. To lessen the chance of error in giving medicines, it is very important that the frequency and time of giving drugs should be clearly stated in easily understandable terms, which may mean writing these instructions in a language that even the patient can read and understand.

5. Finally, the prescription should be signed by the prescriber, and his/her registration number should be written at the bottom of the prescription.

Adherence to therapy

Adherence or compliance of the patient to the treatment plan is the cornerstone for the success of the treatment. The reason for poor adherence to the therapy may be related to the patient, the disease, the doctor, the prescription, the pharmacist or the health system and can often be avoided. Some of the reasons for non-compliance may be intolerance to the drug, confusion of the patient regarding the dosage regimen, cost of the drug, unavailability of the drug, etc.

Some of the factors influencing adherence are:

Patient factors: Generally, Women are found to have good adherence when compared to men. Older patients, younger patients, and those living alone have poor adherence to the therapy. Illiteracy, cultural and religious beliefs are also reasons for poor patient compliance.

Disease factors: Diseases with worse prognosis or painful conditions have shown better adherence than compared to asymptomatic (sometimes considered benign) conditions.

Doctor-patient interaction: Patient satisfaction during the consultation plays a crucial role in maintaining adherence to the therapy. Dissatisfaction or doubt in the patient leads to poor adherence or sometimes even switching to complementary medicines.

Pharmacist: Pharmacists' professionalism and attitude have a major impact on the adherence of patients to the therapy. Proper drug information and advice can be valuable for reinforcing the therapy.

Health care system: One of the biggest factors influencing patient adherence is the health care system. Long waiting times, uncaring staff, an uncomfortable environment, and unreliable drug supplies are all common problems in many settings and have a major impact on adherence. Some studies have confirmed the obvious, that patients furthest from the clinic are least likely to adhere to treatment in the long term.

Adverse Drug Reaction (ADR)

An adverse effect is "any undesirable or unintended consequences of drug administration". It is a broad term that includes all kinds of noxious effects, serious or fatal. Adverse drug reactions (ADRs) are harmful or seriously unpleasant effects occurring at doses intended for therapeutic (including prophylactic or diagnostic) effect, and which call for a reduction of doses or withdrawal of the drug and/or a forecast of hazard for future administration.

S.N.	Types of ADR	Examples
1.	Type A/ Augmented/ Predictable reactions	Respiratory depression due to opioids, bleeding with warfarin
2.	Type B/Bizarre/ Unpredictable	Anaphylaxis with penicillin, skin rashes with antibiotics
3.	Type C/ Chronic Effects	Osteonecrosis of the jaw by Biphosphonates
4.	Type D/ Delayed effects	Leucopenia, which can occur up to six weeks after a dose of Lomustine
5	Type E/ End of use/ end of treatment effects	Insomnia, anxiety, and perceptual disturbances following the withdrawal of Benzodiazepines
6.	Type F/ Failure of therapy	-
7.	Genetic reactions	-

Side Effect: Side effects are minor reactions occurring at normal therapeutic doses and are predictable and dose related. For example: Atropine used for the preanesthetic medication for its antisecretory action causes dryness of mouth as side effects.

Controlled substances and drug dependence

Drug Standard Rules, 2035, has classified drugs into different groups, among which medicines classified as Group Ka have high abuse potential. Such drugs are only to be dispensed by the registered pharmacist upon the prescription of the registered physician.

Prescriptions containing controlled medicines should be signed and dated by the prescriber, and the prescriber's registration number should be mentioned. Upon dispensing of such drugs, the prescription should be stamped "Prescription filled," and the information of the dispenser, such as name, signature, and quantity dispensed, should be mentioned.

Drug Interaction

When two or more drugs are given together, they may interact with each other, which is generally termed as drug interaction. This interaction may be positive (Synergism) or negative (antagonism). Drug interactions are classified into two broad categories:

Pharmacodynamic interactions occur between drugs that have similar or antagonistic pharmacological effects. They are usually predictable from knowledge of the pharmacology of the interacting drugs, and an interaction occurring with one drug is likely to happen with a related drug.

Pharmacokinetic interactions occur when one drug alters the amount of another drug available to produce its pharmacological action. An interaction occurring with one drug cannot be assumed to occur with a related drug unless their pharmacokinetic properties are similar.

Guidelines for drug use during pregnancy and lactation

Whether a particular drug will harm the developing embryo is dependent on the following factors

- Type of drug
- Dose of drug
- Time of exposure
- Access to embryo

The stage of pregnancy at which exposure occurs must also be taken into account

- First two weeks of conception: Embryo is considered resistant to adverse effects
- Next six weeks or first trimester period: Susceptible to damage
- Second and third trimester: Comparatively safe

Guidelines for safe prescribing

- Use caution while prescribing drugs for women of childbearing age. Ask for history of the last menstrual period
- If possible, all drugs should be avoided specially during the first trimester of pregnancy

- Choose the drug which have been extensively used in pregnancy and appears to be usually safe.
- Prescribe relatively safe drugs for the diseases with prolonged therapy (e.g., epilepsy). Inform the patient about the risks and benefits.
- Advice to avoid even OTC (Over the Counter) drugs.
- Prescribe only if the expected benefit to the mother is thought to be greater than the risk to the child.
- The smallest effective dose for the minimal duration should be used.
- Few drugs have been conclusively shown to be teratogenic in humans, but no drug is safe beyond all doubt in pregnancy.

The FDA created five letter risk categories—A, B, C, D, and X—in 1979 to denote a drug's potential to result in birth abnormalities if taken while pregnant. The classifications were established by evaluating the reliability of documentation as well as the ratio of risk to benefit. These classifications did not account for the potential hazards posed by pharmacological substances or their byproducts in breast milk. This information is placed in the "Use in Specific Populations" section of the medicinal product label.

Category	**Description of risk**
A	**Controlled studies show no risk**. Well-controlled human studies failed to demonstrate risk to fetus
B	**No evidence of risk in humans.** Either animal studies show no fetal risk or animal studies show risk but human studies do not show risk
C	**Risk cannot be ruled out**
D	**Positive human evidence of fetal risk**
X	**Contraindicated in pregnancy**

Lactation

FDA (Food and Drug Administration) ratings of drug safety in lactation

Category	**Description of risk**
A	Compatible with breastfeeding
B	Effect of the drug to nursing mother is unknown, but can be given
C	Significant effect, given in concern
X	Avoided in all nursing mothers

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

1. Drugs Acting on the Respiratory System

1.1 Anticholinergic (antimuscarinic) bronchodilators

1. IPRATROPIUM BROMIDE
Indications: COPD

Contraindications/Precautions: known sensitivity to Atropine, Closed-angle glaucoma, urinary outflow obstruction, enlarged prostate
If there is severe palpitation, the drug has to be changed.
The drug should be used with caution in patients with acute angle-closure glaucoma and prostatic hyperplasia.
Dosage schedule:
• By aerosol inhalation: 20-40 µg, 3-4 times daily; child up to 6 years - 20 µg 3 times daily; 6-12 years - 20-40 µg 3 times daily.
• By inhalation of powder: 40 µg 3-4 times daily; child under 12 years - not recommended
Adverse effects: Dry mouth, urinary retention, buccal ulceration, paralytic ileus, headache, nausea, constipation, paradoxical bronchospasm, hypersensitivity reactions (angioedema, urticaria), acute angle closure glaucoma
Drug and food interactions: Bronchodilator effect is increased when taken with large amounts of tea.

Drug	Under Health Insurance Scheme	Pregnancy Category
Ipratropium bromide nebulized solution	NA	B

Note: NA= Information not available

2. TIOTROPIUM
Long acting antimuscarinic agents inhibit M3-receptors at smooth muscle.
Indication: COPD, asthma.
Dose: R/C;18mcg
Contraindications: Hypersensitivity to atropine and its derivatives (e.g., ipratropium)
Adverse effects and cautions: Upper respiratory tract infections, dry mouth, sinusitis, epistaxis, oropharyngeal candidiasis, taste disturbances
Not for acute use, not a rescue medication; if immediate hypersensitivity reactions (e.g., angioedema, itching, rash) occur, stop treatment immediately.
Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tiotropium 18mcg	Yes	NA

1.2 Adrenergic Drugs
1. SALBUTAMOL
Short-acting selective beta-2 agonist and has minimal action on the heart.
Dosage form and Strength: Aerosol pressurized inhalation: 100 µg per inhalation; Dry powder: 200 µg per dose; Injection: 50 µg and 500 µg/ml; Oral Solution: Each 2 mg/5 ml; Tablets: 2 mg, 4 mg, and 8 mg.
Indications: Bronchial asthma,
Adverse effects and cautions: Muscle cramps, insomnia in children, nausea, dizziness, headache, fever, tremor, and palpitation.
Drugs should be used with caution in hyperthyroidism, hypertension, and diabetes mellitus.
Contraindications/Precautions: Intravenous Salbutamol and occasionally salbutamol tablet is used in the management of premature labour uncomplicated by conditions like pre-eclampsia, placenta previa and post-partum bleeding. However, Salbutamol inhaler

preparations are not suitable for managing premature labour. Salbutamol preparations should not be used for threatened abortion during the first or second trimesters of pregnancy.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Salbutamol 2.5 mg/ 2.5ml repulse	Yes	NA
Salbutamol 2 mg/+Bromhexine 4mg/5ml, 100 ml equivalent to Beta-2	Yes	NA
Salbutamol 100 mcg/puff, 200 MDI	Yes	NA
Salbutamol 200 mcg R/C	Yes	NA

2. SALMETEROL

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.

Contraindications: Hypersensitivity to salmeterol. Monotherapy in asthma

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

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

Patient information: Hold breath for 10 seconds after inhalation, wash the rotahaler only with tap water.

3. FORMOTEROL

Long-acting beta-2 agonist

Dosage form and strength: Aerosol pressurized inhalation: 12 µg per dose; Dry powder inhalation: 12 µg per dose

Indications: Asthma, prophylaxis of exercise-induced bronchospasm, nocturnal asthma, COPD. **Contraindications/Precautions:** Same as salmeterol

Dosage schedule:

Adult: 12 µg twice daily, dose may be increased in more severe airway obstruction; increased to 24 µg twice daily

Adverse effects: Very rare QT-interval prolongation, frequency not known. dizziness, nausea, pruritus, taste disturbances

4. TERBUTALINE

Short-acting selective beta 2-adrenoceptor stimulants

Indication: Acute bronchospasm

Adverse effects and cautions: Tachycardia, nervousness, tremor, palpitations, dizziness, headache, nausea, vomiting, anxiety, lethargy, chest discomfort, muscle cramps, tinnitus, rarely seizures

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

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

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

Precaution: Use with caution in patients with thyrotoxicosis, HTN, DM, Ketoacidosis, CV disorders such as ischaemic heart disease, coronary insufficiency, or associated arrhythmias.
Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Terbutaline 1.5mg + Bromhexine 4mg/5ml, 60 ml	Yes	C
Terbutaline 2.5mg + Bromhexine 8mg/5ml, 100 ml	Yes	C

1.3 Corticosteroids

The mode of action seems to be manifold. They decrease vascular permeability, modulation of cytokine and chemokine production. They do not directly relax airway smooth muscle and thus have little effects on acute bronchoconstriction. Alleviation of symptoms usually occurs 3-7 days after inhalation. Beclomethasone, budesonide and fluticasone are equally effective. Inhaled corticosteroids are recommended for prophylactic treatment of asthma when patients are using a beta-2 agonist more than 3 times a week or if symptoms disturb sleep more than once a week or if the patient has suffered exacerbations in the last 2 years requiring a systemic corticosteroid or a nebulised bronchodilator. An acute attack of asthma should be treated with a short course of an oral corticosteroid starting with a high dose.

1.3.1 Inhaled corticosteroids

1.BUDESONIDE
Indication: Prophylaxis of asthma, Bronchial asthma
Contraindications/Precautions: Avoid in case of hypersensitivity, active PTB, oral thrush, acute bronchospasm, status asthmaticus. An inhaled corticosteroid should be used cautiously in quiescent tuberculosis, osteoporosis, diabetes mellitus. Not to exceed recommended doses because adrenal suppression may occur, maintain good oral hygiene if using a nebulizer or inhaler, and avoid breastfeeding.
Dosage Schedule: By inhalation of nebulised suspension, when starting treatment, during periods of severe asthma and while reducing or discontinuing oral corticosteroid, 1-2 mg twice daily; Child 3 months – 12 years, 0.5-1 mg twice daily. Maintenance is usually half the above doses.
Adverse effects and cautions: Inhaled corticosteroids have considerably fewer systemic effects than oral corticosteroids. Oropharyngeal candidiasis, cough, adrenal suppression (usually with higher doses of inhaled drug and in children), growth retardation (usually with oral drug and in children), glaucoma (prolonged high dose of inhaled drug), cataract (inhaled drug), respiratory infections, rhinitis, otitis media.
Drug and food interactions: Concomitant use of corticosteroids (generally other than topical and inhaled) antagonizes the hypotensive effect of ACE inhibitors, alpha-blockers, angiotensin-II receptor antagonists, and calcium channel blockers.
Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Budesonide 100 mcg MDI	Yes	NA
Budesonide 200 mcg MDI	Yes	NA
Budesonide 100 mcg R/C,30 Rotacap	Yes	NA

Budesonide 200 mcg R/C, 30 Rotacap	Yes	NA
Budesonide 400 mcg R/C,30 Rotacap	Yes	NA

2.BECLOMETHASONE

Dosage form:

Inhalation (aerosol): 50 µg and 250 µg per dose.

Indications: See under budesonide

Contraindications/Precautions: Untreated fungal infection, active or quiescent tuberculosis; systemic therapy may be required during periods of stress or when airway obstruction or mucus prevent drug access to smaller airways; not for relief of acute symptoms; monitor height of children receiving prolonged treatment; if growth is slowed, review therapy.

Dosage schedule:

• Chronic asthma: by aerosol inhalation (standard-dose inhaler): adult: 200 151 Drugs used in Respiratory Disorders µg twice daily or 100 µg 3–4 times daily (in more severe cases, initially 600 800 µg daily); child: 50–100 µg 2–4 times daily or 100–200 µg twice daily.

• Chronic asthma: by aerosol inhalation (high-dose inhaler): adult: 500 µg twice daily or 250 µg 4 times daily; if necessary may be increased to 500 µg 4 times daily; child: not recommended.

Adverse effects: Oropharyngeal candidiasis, cough, and dysphonia, adrenal suppression, growth retardation in children and adolescents, impaired bone metabolism, glaucoma, and cataract.

Patient information: The products are not always interchangeable owing to differences in route of administration and in the amount of active drug released per spray. Use the personal container to avoid the spread the infection and shake the canister well before administering.

Combination Preparation

BUDESONIDE AND FORMOTEROL

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Budesonide 100 mcg + Formoterol 6 mcg Inhaler	Yes	NA
Budesonide 200 mcg + Formoterol 6 mcg/puff MDI	Yes	NA
Budesonide 200 mcg + Formoterol 6 mcg R/C	Yes	NA
Budesonide 400 mcg + Formoterol 6 mcg MDI	Yes	NA
Budesonide 400 mcg + Formoterol 6 mcg R/C	Yes	NA

SALMETEROL AND FLUTICASONE

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

Preparation Available:

Drugs	Under Health Insurance	Pregnancy

	Scheme	Category
Salmeterol 25 mcg + Fluticasone 250 mcg MDI	NA	NA
Salmeterol 50 mcg + Fluticasone 250 mcg R/C	Yes	NA
Salmeterol 50 mcg + Fluticasone 500 mcg R/C	NA	NA

3.HYDROCORTISONE

Dosage form and strength: Injection: 100 mg and 200 mg; Injection: 25mg/5ml; Ointment: 0.1%, 0.5% and 1%

Indications: Inflammatory and allergic disorders, acute adrenocortical insufficiency, inflammatory bowel disease, asthma, immunosuppression, nephritic syndrome, rheumatic disease, hematological disorders (Acquired, autoimmune hemolytic anaemia, idiopathic thrombocytopenic purpura in adults, Erythroblastopenia), neoplastic disease (Leukemias and lymphomas in adults, Acute leukemia in childhood), Drug hypersensitivity reactions

Contraindication/Precautions: Active untreated infectious, except for tuberculous meningitis, lactation, and peptic ulcer, diabetes mellitus, psychiatric disease, undiagnosed fever. Avoid live virus vaccines in those receiving immunosuppressive doses.

Dose depends upon condition being treated and response of patient.

Discontinuation of long-term therapy requires gradual withdrawal by tapering the dose.

Dosage schedule: Adult: slow IV or infusion, 100-500 mg TDS or QID in a day or as required; Child: up to 1 year Slow IV: 25 mg daily; 1-5 year: 50mg daily; 5-12 years: 100 mg daily; locally: 1-2 times daily for mild inflammatory skin disorder such as eczema, nappy rash; 5-50 mg intra-articular depending on joint size.

Adverse effects: Sodium and fluid retention, Potassium and calcium depletion, Muscle wasting, weakness, hyperglycaemia, buffalo hump, moon face, growth retardation in children (prolonged therapy), raised intraocular pressure, psychosis, depression, bruising, hirsutism, acne, flushing,increased susceptibility for infections. Topical use: Dermal atrophy, local irritation, folliculitis

Inhaled: May cause hoarseness, candidiasis of mouth and throat.

Drug and food interactions: Increased hypokalemia and hyperglycaemia when used with furosemide, hydrochlorothiazide, and piperacillin. Increased incidence of peptic ulcer or GI bleeding when used concurrently with NSAIDs.

Patient information: Emergency identification card as a corticosteroid user should be carried. Report immediately in case of abdominal pain, black tarry stools, because GI bleeding/perforation can occur. Not to discontinue abruptly because adrenal crisis can result; drug has to be tapered before stopping.

1.4 Leukotriene receptor antagonists

1.MONTELUKAST

Indications: Chronic asthma in adults and children, seasonal allergic rhinitis, bronchospasm prophylaxis.

Contraindications/Precautions: Hypersensitivity. Pregnancy, breastfeeding, children 15 yr: 10 mg/day in PM; child 6 -14 yrs: 5 mg chew tab/day in PM; child 2 – 5 yrs: 1 packet (4 mg) granules taken in PM

Adverse effects: Dizziness, fatigue, headache, behavior change, hallucinations, agitation, anxiety and rarely Churg-Strauss syndrome (allergic granulomatous angiitis).

Patient information: Avoid hazardous activities; dizziness may occur. Continue the use of inhaled beta agonists if exercise-induced asthma.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Montelukast 10mg Tab.	Yes	NA

1.5 Xanthines

1.AMINOPHYLLINE

Dosage form and strength: Tablet: 100 mg; Injection: 250 mg/10ml

Indications: Bronchial asthma, COPD, Emohysema

Contraindications/Precautions: Hyperthyroidism, uncontrolled arrhythmias, hypersensitivity. Patient of Age> 60 years, patient with liver disease.

Should not be given to the children under one year of age except in apnea of prematurity, the therapeutic dose is near the toxic dose, so give carefully, don't give IM or SC.

Dosage schedule: Adult: 100-300 mg three times a day; Injection: IV dose 6 mg /kg over 20 to 30 minutes as loading dose, then maintenance dose 0.4 to 0.7 mg/kg/hour depending on comorbidities; Child dose, loading dose: IV 5-6mg/kg, maintenance dose: IV 1-2 mg/kg/dose every 8 hours

Adverse effects: Headache, dizziness, seizures, palpitations, anorexia. With intravenous use: Abdominal pain, anxiety, arrythmia, confusion, electrolyte imbalance, gastrointestinal hemorrhage, hypotension, insomnia, skin reactions, visual impairment. With oral use: Arrythmias, CNS stimulation, epigastric comfort.

Drug and food interaction: Additive CVS and CNS side effects can be seen with sympathomimetics, elevated serum levels in patients receiving cimetidine, beta blockers, erythromycin, allopurinol or oral contraceptive pills.

Patient information: Suggest that patients take a lot of water with this medicine. Medicine should be taken on an empty stomach or at least 1 hr before or 2 hr after meals

2.DOXOFYLLINE

Dosage form and strength: Tablet: 200mg,400 mg

Indications: Asthma, COPD

Contraindications/Precautions: Hypersensitivity, acute myocardial infarction, hypotension. Use with caution in patients with hypoxemia, hyperthyroidism, liver disease, renal disease, in those with a history of peptic ulcer and in elderly.

Dosage schedule: Adult: 400 mg once daily or twice daily; Children: 12 mg/ kg/day

Adverse effects: Headache, nausea, vomiting, sleeplessness, dizziness

Drug and food interaction: Should not be administered together with other xanthine derivatives, including beverages and foods containing caffeine.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Doxophylline 400mg	Yes	NA

3.THEOPHYLLINE

Dosage form and strength: Tablet: 100 mg and 200 mg

Indications: COPD, Bronchial asthma, Nocturnal asthma

Contraindications/Precautions: Same as aminophylline. Close monitoring of the patient taking medicine should be done because the effective dose is very close to the toxic dose.

Dosage schedule:

• Adult: 200 mg bid.Dose can be increased after 1 week up to 300 mg bid, Over 70 kg: 200-300 mg twice daily;
• Neonatal apnea: Loading dose: PO 5 mg/kg/dose, maintenance dose: PO 3-6 mg/kg/day in 3-4 divided doses; Child: >1 year
• Bronchospasm: PO 12-14 mg/kg/day in 3-4 divided doses (Max. dose 300 mg/day)
Adverse effects: Nausea, vomiting, GI upset, headache, dizziness, convulsion,
Drug and food interaction: Never combine with ciprofloxacin, corticosteroids, theophylline, erythromycin and cimetidine they may cause increase the level of theophylline in the blood. Never combine with carbamazepine; phenytoin and barbiturates they may cause decrease the level of theophylline in the blood.
Patient information: Same as aminophylline

1.6 Drugs used in cough
1.6.1 Antitussives
1.CODEINE PHOSPHATE
It increases the cough threshold. The addictive liability associated with codeine is low.
Dosage forms and strength: Tablet: 15 mg, 30 mg and 60 mg
Indications: Non-productive cough, acute diarrhoea, mild to moderate pain
Contraindications/Precautions: In asthmatics, patients with decreased respiratory reserve, patients who are allergic to codeine or oxycodone, patients with a history of drug abuse and drug-seeking behavior (due to abuse liability). It should be cautiously used in patients with severe prostatic hypertrophy and hepatic disease; pregnancy, breastfeeding, and COPD.
Dosage Schedule:
• Mild to moderate pain: 30-60 mg every 4 hours when necessary, to a maximum of 240 mg daily; child 1-12 years, 0.5-1 mg/kg/dose every 6 hours (Max. dose 60 mg/kg);
• Dry or painful cough: 15-30 mg 3-4 times daily. Child 5-12 years, 1-1.5 mg/ kg 4 times daily.
Adverse drug reaction: Nausea, constipation, drowsiness, confusion, blurred vision, hypotension, bradycardia, respiratory depression on large doses, physical dependence on prolonged use.
Drug and food interaction: Codeine is used with extreme caution in patient receiving MAO inhibitors, additive CNS depression occurs with alcohol, antidepressants, antihistamines, sedative and hypnotics.
Patient information: Avoid driving or other activities requiring high alertness.

2.DEXTROMETHORPHAN
The antitussive activity of the drug is about equal to that of codeine. It centrally elevates the threshold for coughing. Activity persists for 5-6 hours. The drug produces no analgesia or addiction or CNS depression.
Dosage form and strength: Syrup: 10 mg and 30 mg/5 ml
Indication: Non-productive cough
Contraindications/Precautions: Allergy to Dextromethorphan, patients taking MAO inhibitors or SSRIs, should not be used for chronic productive cough. Pregnancy, lactation, children less than four years of age, patients with a history of drug abuse, and drug-seeking behavior.
Dosage schedule: 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.
Adverse drug effects: Dizziness, sedation, nausea

Drug and Food interactions: Use along with MAO inhibitors may cause serotonin syndrome (nausea, confusion, changes with blood pressure), CNS depression is increased with alcohol, antihistamines, antidepressants, sedatives, hypnotics, opioids, and amiodarone. Quinidine may increase blood levels and precipitate adverse drug reactions.
Preparation Available: See under combination products.

1.7 Mucolytic Agents
1.BROMOHEXINE
A mucolytic drug used to decrease the viscosity of mucus in the airway
Dosage form and strength: Tablets: 5 mg; Syrup: 4 mg/5 ml
Indications: Reduction of sputum viscosity in COPD patients.
Contraindications/Precautions: Contraindicated to patients who are hypersensitive to bromhexine.
Not recommended for infants < 1year, peptic ulcer, severe hepatic /renal impairment. Should be used with caution in pregnant and breastfeeding women. Since mucolytics may disrupt the gastric mucosal barrier, bromhexine should be used with caution in patients with a history of gastric ulceration. Clearance of bromhexine or its metabolites may be reduced in patients with severe hepatic or renal impairment.
Dosage Schedule: Oral: 8 to 16 mg three times daily; child 2-6 years 8 mg 2-3 divided dose daily; 6-12 years: 4-8 mg per dose three times daily.
Adverse effects: Gastrointestinal side effects may occur occasionally with bromhexine and a transient rise in serum aminotransferase values has been reported. Other reported adverse effects include headache, vertigo (dizziness), sweating, and allergic reactions.
Patient information: Should be taken after meal.

2.ACETYL CYSTINE
Dosage form and strength: Tablet: 200mg; Inhalation: 200 mg/ml
Indications: Mainly as a mucolytic and in the management of paracetamol (acetaminophen) overdose.
Contraindications/Precautions: Hypersensitivity
Use with caution in patients with asthma or history of bronchospasm, peptic ulceration, pregnancy and lactation
Dosage schedule: When nebulized into a face mask, mouth piece or tracheostomy, 1 to 10 mL of the 20% solution or 2 to 20 mL of the 10% solution may be given every 2 to 6 hours. Oral, as a mucolytic, adult dose 200mg TID
Adverse effects: Stomatitis, nausea, vomiting, fever, rhinorrhea, drowsiness, clamminess, chest tightness, bronchoconstriction, bronchospasm

3.AMBROXOL
Indication: All forms of tracheobronchitis, emphysema with bronchitis, and chronic inflammatory pulmonary conditions.
Adverse effects and cautions: occasional GI disturbances.
Contraindications: Hypersensitivity
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.

1.8 Expectorants
GUAIFENESIN
Medication used to eliminate phlegm and treat chest congestion.

Indication: Cough due to minor throat and bronchial irritation.
Adverse effects and cautions: Dizziness, drowsiness, stomach pain, nausea, vomiting; notify health-care practitioner if no improvement within 7 days of self-medication.
Dose: Cough, 100 to 400 mg 3 to 4 times a day not exceed 2.4 gm per day
Patient Information: Take with a full glass of water. Absorption is unaffected by food.

1.9 Systemic nasal decongestant

1.PHENYLEPHRINE
Indications: Nasal congestion associated with acute or chronic rhinitis, common cold, and sinusitis.
Contraindications/Precautions: Patients with diabetes, hypertension, ischemic heart disease, hepatic impairment, renal impairment. Stinging may occur: to rinse dropper with hot water to prevent contamination.
Dosage schedule: Oral: 5 mg 3-4 times a day; Child 1-6 years: 1-2 drops 0.01%, 6-12 years: 1-2 drops 0.25 %,> 12 years: 0.25 or 0.5%.
Adverse effects: Increased heart rate, palpitation, tremors, ventricular premature contractions and hypertension.

2.PSEUDOEPHEDRINE
Drug used to treat congestion and runny nose
Indications: Nasal congestion associated with acute or chronic rhinitis, common cold, sinusitis. In patients with otic inflammation or infection, the drug may be useful in opening an obstructed Eustachian tube. The drug may be used as an adjunct to analgesics, antihistamines, antitussives when indicated.
Contraindications/Precautions: Use cautiously in patients with prostatic hypertrophy, ischemic heart disease, glaucoma and diabetes mellitus.
Dosage schedule: 60 mg 3-4 times daily; child 4 mg/kg/day per oral in 3-4 divided doses.
Adverse effects: Nervousness, restlessness, dizziness, insomnia, headache and drowsiness. Larger doses may cause lightheadedness, nausea and /or vomiting.
Drug and food interactions: Do not use with MAOIs or tricyclics; hypertensive crisis may occur.
Patient information: Do not crush, divide, chew or dissolve, avoid taking drug near bed time because stimulation can occur.

Chapter 2. Drugs used in Blood Disorders

2.1 Drugs 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, and X.
Indication: Antagonists to warfarin, prophylaxis against haemorrhagic disease of the newborn.
Adverse effects and cautions: Bronchospasm, dyspnoea, and hypotension, phlebitis at the site of inj. Injection should be given very slowly because of risk of vascular collapse. Increased risk of severe haemolytic anaemia in neonates after large doses.
Contraindication: Hypersensitivity
Preparation Available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Phytonadione 10 mg/ml 1ml Inj	Yes	C

2. HEPARIN

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

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

Adverse effects and cautions: Haemorrhage, heparin-induced thrombocytopenia, hypersensitivity reaction, and osteoporosis (after prolonged use);

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

Dose: Prophylaxis of deep-vein thrombosis and pulmonary embolism, by subcutaneous injection, 5 000 units 2 hours before surgery, then every 8-12 hours for 7 days or until patient is ambulant; Treatment of deep-vein thrombosis and pulmonary embolism, by intravenous injection, loading dose of 5 000 units (75 units/kg) followed by continuous infusion of 18 units/kg/hour or by subcutaneous injection of 15,000 units every 12 hours (laboratory monitoring essential - preferably on a daily basis).

Drug and food interactions: Heparin action increases with concomitant use of oral anticoagulants, salicylates, dextran, NSAIDs, and heparin action decreases with digoxin, tetracycline, and nicotine.

Preparation Available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Heparin 25000 IU/ml, 5 ml Inj	Yes	C

3. ENOXAPARIN

Low molecular weight heparin is preferred over heparin (unfractionated) in the prevention of venous thromboembolism because they are as effective and has 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: Hemorrhage, elevation of serum aminotransferases, fever, rarely atrial fibrillation, heart failure, pulmonary edema, pneumonia

Enoxaparin injection should not be administered by the intramuscular route. Use with caution in cases with an increased risk of bleeding. It is recommended that the platelet count be monitored before the initiation of treatment and regularly thereafter.

Contraindication: Hypersensitivity, clotting disorders like thrombocytopenia, active gastrointestinal ulcer or lesion likely to bleed

Dose: Prophylaxis of deep-vein thrombosis especially in surgical patients, by subcutaneous injection, moderate risk, 20 mg (2000 units) about 2 hours before surgery then 20 mg (2000 units) every 24 hours for 710 days; high risk (e.g. Orthopaedic surgery), 40 mg (4000 units) 12 hours before surgery, then 4000 units every 24 hours for 7-10 days. Prophylaxis of deep-vein thrombosis in medical patients by subcutaneous injection, 4000 units every 24 hours for at least 6 days until the patient is ambulant (maximum 14 days).

4. WARFARIN

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

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

Adverse effects and cautions: Haemorrhage, nausea, vomiting, abdominal cramps, jaundice, hepatic dysfunction, purpura.

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

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

Contraindication: Patient with hemorrhagic tendencies or blood dyscrasia, active ulcerations of the gastrointestinal tract, severe hypertension, bacterial endocarditis, threatened abortion, eclampsia, pre-eclampsia, or malignant HTN.

Preparation Available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Warfarin 1 mg Tab	Yes	X
Warfarin 2 mg Tab	Yes	X
Warfarin 3 mg Tab	Yes	X
Warfarin 5 mg Tab	Yes	X

5. RIVAROXABAN

It is a direct-acting oral anticoagulant.

Dosage form and indication: Tablets: 10 mg, 15 mg and 20 mg; Prophylaxis of venous thromboembolism (orthopaedic surgery), deep vein thrombosis, pulmonary embolism, and nonvalvular atrial fibrillation.

Adverse effects: Abdominal pain, constipation, diarrhea, dizziness, dyspepsia, hemorrhage, headache, hypotension, nausea, pain in extremities, pruritus, rash, renal impairment, vomiting

Contraindication/Precautions: Hypersensitivity, active bleeding, malignant neoplasms, oesophageal varices, recent brain surgery, GI ulcer, vascular aneurysm. Anesthesia with postoperative indwelling epidural catheter (risk of paralysis), bronchiectasis, prosthetic heart valve, risk of bleeding, pulmonary embolism in patients with hemodynamic instability, severe hypertension, vascular retinopathy.

Dosage schedule:

• Prophylaxis of venous thromboembolism (orthopaedic surgery): oral, adult: 10 mg once a day for 12 days,

• Deep vein thrombosis or pulmonary embolism: oral, adult: 15 mg twice a day for 21 days, then 20 mg per oral once a day for 6 months.

Drug and food interactions: Analgesics and anticoagulants (increase risk of haemorrhage), antibacterial, antidepressants, antiepileptics (decrease plasma concentration of rivaroxaban), antifungal and antiviral (increase the plasma concentration of rivaroxaban)

2.2 Antiplatelet drugs

1. ASPIRIN

It inhibits synthesis of prostaglandin by cyclooxygenase; inhibits platelet aggregation

Indication: Prophylaxis of cerebrovascular disease or myocardial infarction.
Adverse effects and cautions: Adverse effects, in most cases, are dose-related and 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: Hypersensitivity, Children under 16 years, breastfeeding mothers, active peptic ulcer, haemophiliac 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:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Aspirin 75 mg Tab	Yes	C (for 1st and 2nd trimester) and D for 3rd trimester
Aspirin 150 mg Tab	Yes	C

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), and Myocardial infarction.
Adverse effects and cautions: Flu-like syndrome, Diarrhoea, dyspepsia, abdominal pain, bleeding disorders (including gastrointestinal and intracranial).
The drug should be used with caution in pregnancy, liver impairment, renal impairment; risk of increased bleeding from trauma, surgery or other pathological conditions.
Contraindication: Active pathological bleeding. Hypersensitivity
Dose: Acute coronary syndrome, initially 300 mg then 75 mg daily (with aspirin).
Preparation Available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Clopidogrel 75 mg Tab	Yes	B

2.3 Hematinics
1. FERROUS FUMARATE
Ferrous fumarate is an iron supplement used to treat and prevent iron deficiency anemia.
Indications: Iron-deficiency anemia
Adverse effects: GI disturbances such as diarrhea, constipation, nausea, epigastric pain, and heartburn. Liquid preparations containing iron salts should be well diluted with water. If possible, swallowed through a drinking straw to prevent discoloration of teeth.
Contraindication/Precautions: Hemochromatosis, hemosiderosis, hemolytic anemia (unless iron deficiency state is also present), any form of anaemia not caused by iron deficiency; patients receiving repeated blood transfusions; parenteral iron therapy.
Dosage schedule:
• Iron deficiency anemia (prophylactic): Oral, > 12 years: 210 mg elemental iron 1–2 times a day.
• Iron deficiency anemia (therapeutic): Oral, 12 years: 210 mg 2–3 times a day

Drug and food interaction: Concurrent administration with antacids and tetracyclines with oral iron preparation will inhibit absorption of tetracyclines and iron. Citric acid and ascorbic acid increase the absorption of iron.

Patient information: Take missed dose as soon as remembered within 12 hr. Do not double the dose. Advise the patient that stool may become dark green or black, and this is harmless.

2. FERROUS FUMARATE with FOLIC ACID

The properties listed below are those particular to the combination only. For the properties of the components, please consider ferrous fumarate, folic acid.

Dosage form and strength: Tablet: Ferrous fumarate: 322 mg and Folic acid 350 mcg; Capsule: Ferrous fumarate 305 mg and Folic acid 350 mcg.

Indications: Iron deficiency anemia

Dosage schedule: Oral, adult: 1 tablet/capsule daily, to be taken before food

3. FOLIC ACID

It is the synthetic vitamin folate, also known as vitamin B9.

Indication: Folate deficiency megaloblastic anemia; prevention of neural tube defects in pregnancy.

Contraindication/Precautions: Should never be given without vitamin B12 in undiagnosed megaloblastic anaemia or other vitamin B12 deficiency.

Dosage schedule:

• Treatment of folate deficiency megaloblastic anemia: Oral, adult: 5 mg daily for 4 months (in pregnancy continued to term); ≤15 mg daily may be necessary in malabsorption states.

• Prevention of neural tube defect: Oral, adult: 4-5 mg daily before conception and continued through the 1st trimester.

Adverse effect: Bronchospasm, erythema, malaise, pruritis, rash, slight flushing

Drug and food interactions: Folic acid may cause a decrease in serum concentrations of other vitamin B complex when given in high continuous doses.

Preparation Available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Folic acid 5mg Tab.	Yes	A

2.4 Antifibrinolytics

1. TRANEXAMIC ACID

It is an antifibrinolytic agent.

Indications: Menorrhagia, epistaxis, thrombolytic overdose, hereditary angioedema, and prophylaxis of hereditary angioedema.

Adverse effects: Headache, Nasal and sinus symptoms, back pain, abdominal pain, musculoskeletal, arthralgia

Contraindication/Precautions: Severe renal impairment, color vision disorders, and thromboembolic disease. Caution in renal impairment and pregnancy. Monitor LFT and eye examination regularly during long-term use.

Dosage schedule:

• Menorrhagia (initiated when menstruation started): oral, adult: 1 g 3 times daily for up to 4 days, maximum 4 g daily.

• Local fibrinolysis: adult, oral: 15-25 mg/kg 2-3 times daily. Epistaxis: oral, adult: 1 g 3 times a day for 7 days.

• Hereditary angioedema: oral, adult: 1–1.5 g 2–3 times a day, for short-term.

Patient information: Drug shouldn't be used in combination with hormonal contraceptives (birth control pills, patches, rings, injections). Do not take for more than 5 days in a row.
Preparation Available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Tranexamic acid 500mg inj.	Yes	B
Tranexamic acid 500mg Tab.	Yes	B

Chapter 3. Drugs acting on the Gastrointestinal System

3.1 Antacids

Antacids are chemical substances that increase the pH of gastric contents, thereby neutralizing stomach acid and providing symptomatic relief in ulcer dyspepsia and non-erosive gastro-oesophageal reflux. Liquid preparations are more effective than solid preparations.

1.ALUMINUM HYDROXIDE AND MAGNESIUM HYDROXIDE

Indication: Ulcer dyspepsia, non-corrosive gastroesophageal reflux.

Adverse Effects and Caution: Chalky taste, constipation, fecal impaction. Avoid taking other medicines within 2 hours before or after taking aluminum hydroxide, magnesium hydroxide, or simethicone

Contraindication: Hypersensitivity to aluminium salts

Preparation Available:

Drug	**Under Health Insurance**	**Pregnancy Category**

	Scheme	
Aluminum Hydroxide 500 mg + Magnesium Hydroxide 500 mg/10 ml 170 ml Susp	Yes	C

2.SODIUM BICARBONATE

Indication: Dyspepsia, relief of discomfort in mild urinary-tract infections; alkalinisation of urine, metabolic acidosis

Adverse effects and Caution: Hypernatremia, hypokalemia, tetany, alkalosis on prolonged use, aggravated CHF. Should be taken at least one hour before food or two hours after food.

Use with caution in cardiac disease patients, patients on a sodium-restricted diet, elderly

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Sodium Bicarbonate 75 mg/ml, 25 ml Inj	Yes	C

3.2 Antispasmodics

1. ATROPINE

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

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

Contraindication: Glaucoma, chronic respiratory disease, thyrotoxicosis, cardiac failure, prostatic hypertrophy

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Atropine 0.6 mg/ml, 1 ml Inj	Yes	C
Atropine 0.6 mg/ml, 10 ml Inj	Yes	C

2.HYOSCINE BUTYL BROMIDE

Indication: abdominal pain, gastrointestinal tract spasm, genitourinary tract spasm

Adverse effects and caution: Flushing, postural hypotension, tachycardia, blurred vision, dryness.

Contraindication: Narrow-angle glaucoma, paralytic ileus, myasthenia gravis

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.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Hyoscine 10 mg tab Tab	Yes	C
Hyoscine 20 mg Tab	Yes	C
Hyoscine 20 mg/ml, 1ml Inj	Yes	

3. DICYCLOMINE

Indication: Gastrointestinal tract spasm, Irritable bowel syndrome, intestinal hypermotility

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:

Drug	Under Health Insurance Scheme	Pregnancy Category
Dicyclomine 10 mg/5 ml, 30 ml Syp	Yes	B
Dicyclomine 10 mg simethicone 40 mg / 5ml , 30ml	Yes	B

4.DROTAVERINE

Indication: Smooth muscle spasm, dysmenorrhea, biliary colics

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

Contraindication: Severe hepatic, renal, or cardiac dysfunction

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Drotavarine 40 mg Tab	Yes	C

Drotavarine 80 mg Tab	Yes	C
Drotaverine 40 mg/2 ml Inj	Yes	C

3.3 Ulcer-healing drugs

1. RANITIDINE

Indication: Benign duodenal ulcer, gastric ulcer, GERD, Zollinger-Ellison syndrome

Adverse effects and cautions: Headache, dizziness, myalgia, nausea, skin rash, and diarrhea or constipation; used with caution in renal impaired patients.

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Ranitidine 150 mg tab	Yes	B
Ranitidine 50 mg/2 ml Inj	Yes	B

2.ESOMEPRAZOLE

Indication: Heartburn, acid-related dyspepsia, peptic ulcer disease, Zollinger-Ellison syndrome, GERD, duodenal and gastric ulcer, Helicobacter pylori infection

Adverse effects and cautions: Nausea, vomiting, diarrhea, abdominal colic, skin rash, Agranulocytosis (rare), headache, and dizziness.

Dose: Duodenal ulcer associated with Helicobacter pylori, 20 mg twice daily. Gastro-oesophageal reflux disease, Age over 12 years, 40 mg once daily for 4 weeks, continued for a further 4 weeks if not fully healed or symptoms persist; maintenance 20 mg daily; Symptomatic treatment in the absence of oesophagitis, 20 mg daily for up to 4 weeks, then in adults over 18 years 20 mg daily when required. Not recommended in children.

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Esomeprazole 40 mg tab	Yes	C
Esomeprazole 40 mg tab (with sodium bicarbonate buffer).	Yes	C
Esomeprazole 40 mg inj	Yes	C

3.OMEPRAZOLE

Indication: See under Esomeprazole

Adverse effects and caution: See under Esomeprazole

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

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

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

Preparation Available:

Drug	**Under Health Insurance Scheme**	**Pregnancy Category**
Omeprazole 20 mg tab	Yes	C

4.PANTOPRAZOLE

Indication: See under Esomeprazole

Adverse effects and caution: Long-term use increases 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 a further 2 weeks if not fully healed. Benign gastric ulcer, 40 mg daily in the morning for 4 weeks, continued for a further 4 weeks if not fully healed. Reflux oesophagitis, 20-40 mg daily in the morning for 4 weeks, continued for a further 4 weeks if not fully healed, maintenance 20mg daily, increased to 40 mg daily if symptoms persist.

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

Preparation Available:

Drug	**Under Health Insurance Scheme**	**Pregnancy Category**
Pantoprazole 20 mg tab	NA	B
Pantoprazole 40 mg tab	Yes	B
Pantoprazole 40 mg Inj	Yes	B

Combination Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Pantoprazole 40mg + Domperidone 30mg pellets	Yes	-

5. RABEPRAZOLE

Indication: See under Esomeprazole

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

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

Duodenal ulcer, 20 mg daily in the morning for 4 weeks, continued for a further 4 weeks if not fully healed. Gastro-oesophageal reflux, 20 mg once daily for 4-8 weeks; maintenance 10-20 mg daily.

Duodenal and benign gastric ulcer associated with Helicobacter pylori, 20 mg twice daily with other drugs.

Not recommended in children.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Rabeprazole 20 mg tab	Yes	B
Rabeprazole 20 mg Inj	Yes	B

6.SUCRALFATE

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

Indication: Peptic ulcer, chronic gastritis.

Adverse effects and caution: Constipation, diarrhea, dry mouth, nausea, dizziness. The safety and efficacy of sucralfate in children have not been established. Sucralfate should be taken at least 2 hours after the administration of other drugs.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Sucralfate 1gm/ml 200 ml Susp	Yes	B

3.4Antiemetics

1. DOMPERIDONE

Dopamine (D2 receptor) antagonist.

Indication: Nausea and vomiting, Gastritis, migraine, non-ulcer dyspepsia

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

Dose: Acute nausea and vomiting 10-20 mg every 6-8 hours, Child: 250-500 micrograms/kg every 6-8 hours. Functional dyspepsia, 10-20 mg 3 times daily before food and 10-20 mg at night; maximum period of treatment 12 weeks; Child: Not recommended.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Domperidone 10 mg tab	Yes	C
Domperidone 5mg/5ml, 30 ml susp.	Yes	C

2.METOCLOPRAMIDE

It blocks dopamine receptors in CTZ.

Indication: Gastro-oesophageal reflux disease, Diabetic gastric stasis, Nausea and vomiting associated with chemotherapy or radiotherapy.

Adverse effects and cautions: Restlessness, drowsiness, fatigue, and extrapyramidal reaction.

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Metoclopramide 10 mg tab	Yes	B
Metoclopramide 10 mg/ml, 2 ml Inj	Yes	B

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, and Nausea and vomiting in pregnancy

Adverse effects and cautions: Headache, flushing, transient visual disturbances, arrhythmias, hypotension. The drug should be used with caution in moderate to severe liver impairment.

Contraindication: Use with apomorphine (profound hypotension)

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:

Drug	Under Health Insurance Scheme	Pregnancy Category
Ondansetron 4 mg tab	Yes	B
Ondansetron 2mg/5ml, 30ml susp	Yes	B
Ondansetron 4 mg/2ml, 2ml Inj	Yes	B

4.PROCHLORPERAZINE

It is a phenothiazine that acts by blocking dopamine receptors in CTZ.

Indication: Nausea, vomiting, vertigo, severe anxiety disorders

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

Contraindication: CNS depression, bone marrow depression

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.

5.PROMETHAZINE

Indication: Nausea, vomiting, motion sickness, urticaria, vertigo.

Adverse effects and caution: Neuroleptic Malignant Syndrome, CV effects (bradycardia, transient HTN), jaundice, extrapyramidal effects

Contraindication: Comatose patients, patients suffering from CNS depression, children below 2 years of age

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Promethazine 25 mg Tab	Yes	C
Promethazine 25 mg/ml 2 ml Inj	Yes	C

6.GRANISETRON

It acts by blocking the specific 5-HT_3 receptor in the GIT and CNS.

Indication: Nausea and vomiting, chemotherapy-induced and post-operative nausea and vomiting

Adverse effects and caution: Headache, diarrhea, asthenia, somnolence, sedation, drowsiness.

7.ITOPRIDE

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

Indications: disorders associated with reduced gastrointestinal motility

Adverse effects and caution: cholinergic effects, GI discomfort, dizziness

Contraindications: Conditions when increased gastrointestinal motility may be harmful (GI hemorrhage, mechanical obstruction, or perforation)

3.5 Antidiarrhoeal drugs

1. LOPERAMIDE

It is an antiperistaltic antidiarrheal agent.

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

Adverse effects and caution: Abdominal pain, distention, and discomfort, paralytic ileus, constipation, dry mouth, drowsiness, dizziness, fatigue

Loperamide should not be used in the treatment of diarrhea resulting from some infections.

Dose: Acute diarrhea, 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 diarrhea in adults initially 4-8 mg daily in divided doses; subsequently adjusted accordance to response and given in 2 divided doses for maintenance.

2. ORAL REHYDRATION SALTS (ORS)

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

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

Antibacterials should not be given in acute diarrhoea except in cholera and shigellosis.

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Oral Rehydration Salt	Yes	A

3.ZINC

Indication: Adjunct to ORS in acute diarrhea.

Adverse effects and caution: Abdominal pain, dyspepsia, nausea, vomiting, diarrhea, headache, gastritis.

Zinc may accumulate in acute renal failure.

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Zinc Sulfate 10 mg Tab	Yes	NA
Zinc Sulfate 20 mg Tab	Yes	NA

1. BISACODYL

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

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

Adverse effects and cautions: Abdominal cramp, colitis, nausea, vomiting and local irritation with rectal use. The excessive use of stimulant laxatives can cause diarrhea 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.

2.LACTULOSE

It is osmotic cathartic.

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

Adverse effects and caution: Nausea, vomiting, gaseous distention. The lactulose solution may contain free lactulose and galactose, so it needs to be used with caution in diabetic patients.

Dose: In case of a solution containing 3.35g/5ml. Constipation, initially 15 ml twice daily, gradually reduced according to the patient's needs, child under 1 year 2.5 ml, 1-5 years 5ml, 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:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Lactulose 3.35gm/ 5ml, 100ml, 200ml, syp	Yes	B

Adverse effects and cautions: Abdominal cramp, nausea, vomiting, dizziness, and excessive use can cause diarrhea, hypokalaemia.

3.GLYCERIN AND ALLIED PREPARATION

Osmotic cathartic draws fluid into the colon and stimulates evacuation.

Indication: Constipation.

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Glycerin 2/4 gm Supp.	Yes	NA

3.8 Drugs affecting biliary composition and flow
1. URSODEOXYCHOLIC ACID / URSODIOL
Indication: Dissolution of gallstones, primary biliary cirrhosis.

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

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Ursodeoxycholic acid 300 mg Tab	Yes	B
Ursodeoxycholic acid 150 mg Tab	Yes	B

3.9 Drugs for Rectal and anal disorders

1.LIGNOCAINE GEL

Indication: Hemorrhoids (piles) and anal fissure.

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Lignocaine 2 % Gel	Yes	B

2.NITROGLYCERINE

Indication: Chronic anal fissure.

Adverse effects and Caution: Headache, dizziness, hypotension, application site reaction like rash, exfoliative dermatitis.

Additive hypotensive effects may occur when co-administered with nitric oxide donors like isosorbide dinitrate and antihypertensive drugs

Chapter 4: Drugs acting on the Cardiovascular System

4.1 Anti-anginal Drugs

Nitrates

1.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, acute myocardial infection, severe hypertension

Adverse effect and cautions: Throbbing headache, hypotension, dizziness, flushing, tachycardia, syncope, cardiovascular collapse, rarely methemoglobinemia.

Gradual withdrawal in patients who have received prolonged high dose infusion. Nitrates-free interval is recommended in patients on continuous treatment with nitrates to reduce risk of tolerance.

Contraindication: Hypersensitivity, severe hypotension, heart failure, marked anemia, raised intracranial pressure

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.

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.

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: Hypotension, tachycardia, flushing, headache, dizziness, palpitation, syncope, dry mouth, fatigue, edema, chest pain

Tolerance may develop after long-term treatment.

Contraindication: Severe hypotension or anemia, hypovolemia, raised intracranial pressure due to head trauma or cerebral hemorrhage.

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.

Patient information: Should be taken on an empty stomach (i.e. at least one hour before food or two hours after food)

4.2 Beta-blockers

1. PROPRANOLOL

It is a non-selective beta-adrenergic blocker.

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

Adverse effects and cautions: Bradycardia, congestive heart failure, heart block, tiredness, fatigue, bronchospasm, hypotension, thrombocytopenic purpura, insomnia, vivid dreams, hallucinations, bronchospasm, epigastric distress, hypersensitivity reactions.

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

Contraindication: Sinus bradycardia, cardiogenic shock, sick sinus syndrome, 2nd and 3rd degree heart block, bronchial asthma, COPD, severe peripheral arterial disease.

Dose: Oral, 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), 1040 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:

Drug	Under Health Insurance scheme	Pregnancy category
Propranolol 10 mg Tab	Yes	C
Propranolol 20 mg Tab	Yes	C

2.ATENOLOL

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

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

Adverse effects and cautions: Tiredness, hypotension, bradycardia, depression, nausea, drowsiness, AV block

Contraindication: Sinus bradycardia, 2nd or 3rd degree AV block, sick sinus syndrome, cardiogenic shock, hypotension, uncontrolled heart failure, peripheral arterial disorders

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:

Drug	Under Health Insurance scheme	Pregnancy category
Atenelol 50 mg tab	Yes	D

Atenelol 25 mg tab	Yes	D

3. METOPROLOL

It is a selective beta-blocker that 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, 100200 mg daily in divided doses.

By intravenous injection, arrhythmias up to 5 mg at rate 1-2 mg/minute, repeated after 5 minutes if necessary, total dose 10-15 mg. In surgery, 2-4 mg by slow intravenous injection at induction or to control arrhythmias developing during anesthesia; 2 mg doses may be repeated to a maximum of l0 mg.

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Metoprolol 12.5 mg XL Tab	Yes	C
Metoprolol 25 mg XL Tab	Yes	C
Metoprolol 50 mg XL Tab	Yes	C

4.3 Calcium channel blockers

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, Raynaud's disease

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

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

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

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Amlodipine 2.5 mg Tab	Yes	NA
Amlodipine 5 mg Tab	Yes	NA
Amlodipine 10 mg Tab	Yes	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.

3.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, supraventricular tachycardia, angina, atrial fibrillation

Adverse effects and cautions: Edema, headache, bradycardia, dizziness, gastro-intestinal disturbances, hypotension, malaise.

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

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

4. NIFEDIPINE

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

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

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

Contraindication: Acute MI, cardiogenic shock, acute unstable angina,

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:

Drug	Under Health Insurance scheme	Pregnancy category
Nifedipine 10 mg Tab	Yes	C

Class III

It substantially prolongs cardiac action potential.

1. AMIODARONE

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

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

Adverse effects and cautions: Bradycardia, phototoxicity, raised serum transaminases, and pulmonary toxicity.
Liver function test and thyroid function tests should be done before treatment and then every 6 months. Serum potassium measurement and chest X-ray should be done before treatment. Safe use of drugs in the second and third trimester of pregnancy or breastfeeding has not been established.
Contraindication: Sinus bradycardia, SA heart block, thyroid dysfunction and iodine sensitivity.
Dose: 200 mg 3 times daily for 1 week reduced to 200 mg twice daily; ventricular fibrillation, by intravenous infusion over at least 3 minutes 300 mg.

Class IV
Calcium Channel blockers (include verapamil, Adenosine, but not the dihydropyridine group)
1. ADENOSINE
It slows conduction through AV nodes and interrupts AV reentry pathways, which restore normal sinus symptoms. It has a very short duration of action.
Indication: Paroxysmal supraventricular tachycardia (including Wolff-Parkinson White syndrome)
Adverse effects and cautions: Chest pain, transient facial flush, bronchospasm, nausea, and severe bradycardia. The drug should be used with caution in patients with atrial fibrillation or flutter and a heart transplant.
Contraindication: Pre-existing second or third degree AV block, asthma, COPD, and sick sinus syndrome.
Dose: Rapid intravenous injection into a 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

4.7 Antihypertensive Drugs
4.7.1Antiadrenergics
1. ATENOLOL
See under antianginal beta-blocker

2. METOPROLOL
See under antianginal beta-blocker
3. NEBIVOLOL
Competitive and selective beta-1 receptor antagonists have little or no effect on beta-2 receptors at doses below 10 mg.
Indication: Hypertension, hypertension with renal impairment, stable mild to moderate heart failure
Adverse effects and cautions: Headache, fatigue, dizziness, increased triglycerides levels and insulin resistance, peripheral edema.
Used with caution in patients taking calcium-channel blockers, cardiac glycosides or using inhaled anaesthetics
Contraindication: Acute or decompensated heart failure requiring intravenous inotropes.

Dose: Hypertension 5 mg daily.

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 and cautions: Dizziness, lightheadedness, nausea, tingling sensation of the scalp, fatigue;

Use with caution in liver disease. Avoid abrupt withdrawal

Contraindication: Asthma, COPD, severe bradycardia, cardiogenic shock, uncompensated heart failure

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

Oral administration immediately after meals.

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Labetalol 5 mg/ml 4 ml Inj	Yes	C

4.7.2 ACE Inhibitors

1. ENALAPRIL

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

Adverse effects and cautions: Persistent dry cough, headache, loss of taste, diarrhea, hypotension (usually with initial dose), skin rash, and angioedema of the extremities, myocardial infarction, angina, impotence.

The drug should be used with caution in patients with impaired liver function.

Contraindication: Hypersensitivity, history of angioedema due to previous treatment with ACE inhibitors

Dose: Hypertension used alone, initially 5 mg daily; if used in addition to a 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.

4.7.3 Angiotensin-II Antagonist

It inhibits vasoconstriction and the aldosterone-secreting effects of angiotensin II. Unlike ACE inhibitors, it does not inhibit the breakdown of bradykinin or other kinins, so it is unlikely to cause a persistent dry cough.

1.LOSARTAN

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

Adverse effects and cautions: Hypotension, dizziness, diarrhea, pruritus, rash, taste disturbance, thrombocytopenia. The drug should be avoided in pregnancy and breast-feeding.
The drug should be used with caution in renal artery stenosis, moderate to severe renal impairment, or liver impairment, aortic or mitral valve stenosis.
Contraindication: Hypersensitive to losartan, severe hepatic impairment
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:

Drug	Under Health Insurance scheme	Pregnancy category
Losartan 25 mg Tab	Yes	D
Losartan 50 mg Tab	Yes	D

2.TELMISARTAN
Indication: See under losartan
Adverse effects and caution: Back pain, chest pain, arthralgia, eczema, GI disturbances; correct any volume or salt depletion before initiating therapy, and observe for signs and symptoms of hypotension
Contraindication: Severe hepatic impairment, biliary obstructive disorders
Dose: Hypertension, 40 mg daily initially and can be titrated to 20-80 mg daily depending on response
Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Telmisartan 20 mg Tab	Yes	D
Telmisartan 40 mg Tab	Yes	D
Telmisartan 80 mg Tab	Yes	D

4.7.4 Diuretics
1.FUROSEMIDE
It decreases reabsorption of sodium and chloride primarily in the ascending loop of Henle and increases the excretion of potassium and ammonia
Indication: Hypertension resistant to thiazides, nephrotic syndrome, oedema, oligourea due to renal failure.
Adverse effects and cautions: Hypokalemia, hyperuricemia, hyponatremia, tinnitus, reversible or permanent hearing impairment, or reversible deafness

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

Contraindication: Renal failure with anuria, hypersensitivity to sulfonamides and furoseide, severe sodium and water depletion

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

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

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Furosemide 20 mg Tab	Yes	C
Furosemide 40 mg Tab	Yes	C
Furosemide 10 mg/ml, 2 ml Inj	Yes	C

2.TORSEMIDE

Loop diuretics have similar properties to furosemide.

Indication: Edema, hypertension.

Adverse effects and cautions: Excessive urination, headache, electrolyte imbalance, dizziness, rhinitis

Used with caution in patients with prostatic hypertrophy, hyperuricemia, patients receiving cardiac glycosides, liver cirrhosis, ascites

Contraindication: Renal failure with anuria, hepatic coma, hypersensitivity to torsemide, sulphonylureas, cardiac arrythmias

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:

Drug	Under Health Insurance scheme	Pregnancy category
Torsemide 10 mg Tab	Yes	B
Torsemide 20 mg Tab	Yes	B
Torsemide 40 mg Tab	Yes	B
Torsemide 100 mg Tab	Yes	B
Torsemide 20 mg inj	Yes	B

3.HYDROCHLOROTHIAZIDE

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

Indication: Hypertension, oedema.

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

Thiazides should be used with cautions in patient with severe renal disease because the drugs decrease glomerular filtration rate (GFR) and may precipitate azotemia.

Contraindication: The routine use of thiazides is contraindicated in pregnant women, severe hepatic impairment, anuria, hypersensitivity to sulfonamide-derived drugs

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:

Drug	Under Health Insurance scheme	Pregnancy category
Hydrochlorothiazide 12.5 mg Tab	Yes	B
Hydrochlorothiazide 25 mg Tab	Yes	B

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

Contraindication: Patients with hyperkalemia, moderate renal impairment and elderly patient **Dose**: Used alone, initially 10 mg daily or 5 mg twice daily, maximum 20 mg daily. With other diuretics, congestive heart failure and hypertension, initially 5-10 mg daily; cirrhosis with ascites, initially 5 mg daily.

2.SPIRONOLACTONE

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

Indication: Oedema, hepatic cirrhosis with ascites and edema, nephrotic syndrome, congestive heart failure, primary hyperaldosteronism.

Adverse effects and cautions: Hyperkalaemia, loss of appetite, nausea, vomiting, gynaecomastia, menstrual irregularities, hirsutism, impotence.

Spironolactone should be used with caution in patients with impaired renal function or hepatic disease.

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

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

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Spironolactone 12.5 mg Tab	Yes	C
Spironolactone 25 mg Tab	Yes	C
Spironolactone 50 mg Tab	Yes	C

4.7.6 Osmotic Diuretics

1.MANNITOL

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

Indication: Cerebral oedema, reduction of intraocular pressure.

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

Mannitol should be used during pregnancy only when clearly needed.

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

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

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Mannitol 20 % 100 ml Inj	Yes	C

4.8 Centrally acting antihypertensive

1. METHYLDOPA

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

Indication: Hypertension in pregnancy.

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

Contraindication: Active liver disease and depression. Concomitant use with MAOIs

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

2. CLONIDINE

Central sympatholytic via stimulation of central alpha-2 receptors

Indication: Hypertension, prevention of recurrent migraine

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

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

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

Combination Products:

Drug	Under Health Insurance scheme	Pregnancy category
Amlodipine 2.5 mg + Losartan 25 mg Tab	Yes	-
Amlodipine 5 mg + Losartan 50 mg Tab	Yes	-
Telmisartan 40 mg+ Amlodipine 5 mg Tab	Yes	-
S-Amlodipine 2.5 mg + Losartan 50 mg Tab	No	-
Atenolol 50 mg + Hydrochlorothiazide 12.5 mg Tab	Yes	-
Losartan 50 mg + Hydrochlorothiazide 12.5 mg Tab	Yes	-
Furosemide 20 mg + Spironolactone 50 mg Tab	Yes	-
Telmisartan 40 mg + Hydrochlorothiazide 12.5 mg Tab	Yes	-

4.9 Cardiac Glycoside

1. DIGOXIN

Positive inotropic drugs

Indication: Heart failure, supraventricular arrhythmias (particularly atrial fibrillation)

Adverse effects and cautions: Arrhythmias, diarrhea, dizziness, loss of appetite, nausea, vomiting, and yellow vision. Should be used with caution in patients with hypothyroidism, acute myocardial infarction (risk of arrhythmia), hypercalcaemia, hypomagnesaemia, and Hypokalaemia (risk of digitalis toxicity)

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

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

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

4.11 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, acute heart failure

Adverse effects and cautions: Ectopic beats, tachycardia, anginal pain, palpitation, dyspnoea, headache, hypertension and peripheral vasoconstriction.
Dopamine is a potent drug and must be diluted before administration to the patient. Fluids to which it can be added are: sodium chloride injection, 5% dextrose injection, sodium chloride and 5% dextrose injection, ringer lactate solution and 1/6 molar sodium lactate solution.
Dopamine should not be added to any alkaline solution as it will be inactivated.
There has been insufficient experience to establish safety and efficacy of dopamine in children Dopamine may cause peripheral ischemia in patients with a history of occlusive vascular disease.
Contraindication: Hypersensitivity to dopamine, pheochromocytoma, ventricular fibrillation, uncorrected tachyarrhythmias
Dose: By intravenous infusion, 2-5 micrograms/kg/ minute initially.

2.DOBUTAMINE
It is a strong beta-1 and weak beta2/alpha effect, resulting in increased cardiac contractility with little effect on rate.
Indication: Inotropic support in infarction, heart failure
Adverse effects and cautions: Tachycardia, hypertension, phlebitis.
Contraindication: Hypersensitivity
Dose: By intravenous infusion, 2.5 – 10 micrograms/ kg/minute, adjusted according to response.

4.12 Lipid-regulating Drugs
1.ATORVASTATIN
It inhibits rate-limiting steps in cholesterol biosynthesis by competitively inhibiting HMG-CoA reductase.
Indication: Primary hypercholesterolemia, mixed hyperlipidemia in patients who have not responded adequately to diet and other appropriate measures.
Adverse effects and cautions: Headache, chest pain, arthralgia, anorexia, epistaxis, hyperglycemia, pharyngolaryngeal pain, rhabdomyolysis with acute renal failure (severe)
The drug should be used with caution in patients with liver disease or with a high alcohol intake. Liver function tests should be carried out before and within 1-3 months of starting treatment and thereafter at intervals of 6 months for 1 year, unless indicated sooner by signs or symptoms suggestive of hepatotoxicity.
Contraindication: The drug is contraindicated in active liver disease.
Dose: Primary hyperlipidaemia and combined hyperlipidaemia, usually 10 mg once daily; if necessary, may be increased at intervals of at least 4 weeks to a maximum 80 mg once daily; child 10-13 years usually 10 mg once daily. Familial hypercholesterolaemia, initially 10 mg daily, increased at intervals of at least 4 weeks to 40 mg once daily; if necessary, further increased to a maximum of 80 mg once daily; for children 10-13 years, up to 20 mg once daily.
Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category

Atorvastatin 10 mg Tab	Yes	X
Atorvastatin 20 mg Tab	Yes	X
Atorvastatin 40 mg Tab	Yes	X

2.ROSUVASTATIN

Indication: See under atorvastatin

Adverse effects and caution: Myalgia, arthralgia, proteinuria, hematuria; use with caution in patients who consume large amounts of alcohol or have a history of liver disease.

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

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Rosuvastatin 5 mg Tab	Yes	X
Rosuvastatin 10 mg Tab	Yes	X
Rosuvastatin 20 mg Tab	Yes	X

3.FENOFIBRATE

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

Indication: severe hypertriglyceridemia.

Adverse effects and cautions: Gastrointestinal disturbances, rash, urticaria, fatigue, headache, impotence.

The drug should be used with caution in renal impairment. Liver function tests are recommended every 3 months for the first year.

Combination of a fibrate with statin increases the risk of muscle effects (especially rhabdomyolysis) and should be used with caution

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

Dose: Initially 200 mg daily in divided doses.

Preparation Available:

Drug	Under Health Insurance scheme	Pregnancy category
Fenofibrate 160 mg Tab	Yes	C
Fenofibrate 200 mg Tab	Yes	C

Chapter 5: Drugs acting on the Central Nervous System

5.1 Antiepileptics

1.CARBAMAZEPINE

Its antiepileptic activity is similar to phenytoin.

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

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

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

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

Dose: Epilepsy, initially 100-200 mg 1-2 times daily increased slowly to usual dose of 0.8-1.2 g daily in divided doses; in some cases, 1.6 g daily may be needed; Child, daily in divided doses, up to 1 year, 100200 mg, 1-5 years 200- 400 mg, 5-10 years 400-600 mg, 10-15 years 0.6-l 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:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Carbamazepine 100mg	Yes	D
Tab Carbamazepine 200mg	Yes	D

2.DIAZEPAM

Indication: Status epilepticus, convulsions due to poisoning, muscle spasm of varied aetiology, tetanus, anxiety, adjuvant in treatment of alcohol withdrawal **Adverse effects and cautions**: Apnoea and hypotension (rapid parenteral administration), thrombophlebitis, sedation, drowsiness, ataxia, headache, muscle weakness.

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

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

Dose: By intravenous injection, 10-20 mg at a rate of 0.5 ml (2.5 mg) per 30 seconds, repeated if necessary after 30-60 minutes; may be followed by intravenous infusion to maximum 3 mg/kg over 24 hours; Child 200-300 micrograms/kg.

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

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Diazepam 5mg	Yes	D
Diazepam 10mg inj	Yes	D

3.CLOBAZAM

Indication: Adjunct in epilepsy, anxiety.

Adverse effects and cautions: See under diazepam.

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Clobazam 5mg	Yes	C
Tab Clobazam 10mg	Yes	C

4.CLONAZEPAM

Indication: all types of epilepsy, status epilepticus.

Adverse effects and cautions: Dizziness, drowsiness, muscle hypotonia, restlessness, salivary or bronchial hypertension in infants and small children, sexual dysfunction, dependence and withdrawal. The drug should be used with caution in pregnancy and breastfeeding 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:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Clonazepam 0.25mg	Yes	D
Tab Clonazepam 0.5mg	Yes	D

5.GABAPENTIN

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

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

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

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

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Gabapentin 100mg	Yes	C
Tab Gabapentin 300mg	Yes	C

6.PHENOBARBITONE (PHENOBARBITAL)

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

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

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

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

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

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Phenobarbitone 30mg	Yes	D

Tab Phenobarbitone 60mg	Yes	D

7.PHENYTOIN

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

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

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

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

Contraindication: Pregnant women

Dose: By mouth, initially 3-4 mg/kg daily or 150300 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.

8.VALPROATE (VALPROIC ACID AND SODIUM VALPROATE)

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

Indication: All types of epilepsy.

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

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

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

Dose: By mouth-initially, 600 mg daily in divided doses, preferably after food, increasing by 200 mg/ day at 3 days' intervals to a maximum of 2.5 g daily in divided doses, usual maintenance 1-2 g daily (2030 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:

Drugs	**Under the Health Insurance Scheme**	**Pregnancy Category**
Tab Valproic acid 300mg CR	Yes	D
Tab Valproic acid 500mg	Yes	D

CR		

9.LEVETIRACETAM

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

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

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

Preparation Available:

Drugs	**Under the Health Insurance Scheme**	**Pregnancy Category**
Tab Levetiracetam 500mg	Yes	C
Tab levetiracetam 1000mg	Yes	C
Tab Levetiracetam 750mg	Yes	C
Levetiracetam 500mg inj	Yes	C

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

Preparation Available:

Drugs	**Under Health Insurance Scheme**	**Pregnancy Category**
Tab Pregabalin 75mg	Yes	C
Tab Pregabalin 50mg	Yes	C

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

Dose: Acute pain, by subcutaneous or intramuscular injection, 10 mg every 4 hours; Child up to 1 month 150 micrograms/kg, 1-12 months 200 micrograms/ kg, 1-5 years 2.5-5 mg, 6-12 years 5-10 mg. By slow intravenous injection ¼-½ corresponding intramuscular dose. Myocardial infarction, by slow intravenous injection (2 mg/minute), 10 mg followed by further 5-10 mg if necessary.

Preparation Available:

Drugs	**Under Health Insurance Scheme**	**Pregnancy Category**
Morphine 15mg/ml,2ml inj	Yes	C
Tab Morphine 10mg	Yes	C

3. PETHIDINE

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

Indication: Moderate to severe pain and obstetric analgesia.

Adverse effects and caution: Respiratory Depression, Seizures, Drowsinessor sedation.

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

Dose: By subcutaneous or intramuscular injection, 25100 mg, repeated after 4 hours; Child by intramuscular injection, 0.5-2 mg/kg. By slow intravenous injection 25-50 mg repeated after 4 hours. Obstetric analgesia, by subcutaneous or intramuscular injection, 50-100 mg, repeated 1-3 hours later if necessary; maximum 400 mg in 24 hours.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Pethidine 50mg/ml 1ml inj	Yes	B

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

Contraindication: See under morphine.

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tramadol 50mg/ml 1ml inj	Yes	C

7.FENTANYL

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

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

Contraindication and cautions: cerebral tumour, impaired consciousness.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Fentanyl 50mcg/ml, 2ml inj	Yes	C

5.3 Non-opioid

1.PARACETAMOL / ACETAMINOPHEN

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

Indication: mild to moderate pain, fever.

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

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

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

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Paracetamol 500mg	Yes	B
Paracetamol 1 gm/100 ml Inj	Yes	B
Paracetamol 150 mg/ml, 2 ml Inj	Yes	B
Paracetamol 125 mg/5 ml,30ml, 60 ml Syp	Yes	B
Paracetamol 250 mg/5ml Syp	Yes	B
Paracetamol 150 mg/ml drops	Yes	B

Combination Product

Paracetamol and Tramadol

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

Drugs	Under Health Insurance	Pregnancy Category

	Scheme	
Paracetamol 325 mg + Tramadol 37.5 mg Tab	Yes	-

Paracetamol and Caffeine

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

Drugs	Under Health Insurance Scheme	Pregnancy Category
Paracetamol 500mg+ Caffeine 25 mg tab	Yes	-

Paracetamol and Codeine

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

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Paracetamol 500mg and Codeine 10mg	Yes	-

Paracetamol and Chlorzoxazone

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

Drugs	Under Health Insurance Scheme	Pregnancy Category
Paracetamol 500 mg + Chlorzoxazone 250 mg Tab	Yes	-
Paracetamol 500 mg + Chlorzoxazone 500 mg Tab	Yes	-

Paracetamol and Ibuprofen

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

Drugs	Under Health Insurance Scheme	Pregnancy Category
Paracetamol 325 mg + Ibuprofen 400 mg Tab	Yes	-
Paracetamol 125 mg + Ibuprofen 100 mg/5 ml 60 ml	Yes	-

Syp		

Paracetamol, Chlorpheniramine and Phenylephrine

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

Drugs	**Under Health Insurance Scheme**	**Pregnancy Category**
Paracetamol 500 mg + Chlorpheniramine 4 mg + Phenylephrine 10 mg Tab	Yes	-

5.4 Anti-Parkinsonism Drugs

5.4.1. LEVODOPA and CARBIDOPA

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

Indication: Parkinsonism (but not drug induced)

Adverse effects and cautions: Anorexia, nausea, postural hypotension, tachycardia, arrhythmias, abnormal involuntary movements, psychiatric effects such as psychosis, depression or hypomania.
The drug should be used with caution in patients with a history of myocardial infarction, history of active peptic ulcer because there is a possibility of upper gastrointestinal haemorrhage.

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

Contraindication: Closed-angle glaucoma.

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

5.4.2. TRIHEXYPHENIDYL / BENZHEXOL

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

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

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

Trihexyphenidyl should be used with caution in patients with conditions in which anticholinergic effects are undesirable.

Dose: 1 mg daily gradually increased; usual maintenance dose 5-15 mg daily in 34 divided doses, Child not recommended.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Trihexyphenidyl 2mg	Yes	C

5.5 Anxiolytics

5.5.1 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:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Alprazolam 0.25mg	Yes	D
Tab Alprazolam 0.5mg	Yes	D

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.

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:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Lorazepam 1mg	Yes	D
Tab Lorazepam 2mg	Yes	D

5.5.2 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.

5.6 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.

5.6.1 Typical Antipsychotics

They are also called first generation potent D2 blocker and have greater extrapyramidal symptoms. It increases prolactin release (dose related)

1.HALOPERIDOL

It has higher action dopamine (D2) receptors than muscarinic, histamine and serotonin.

Indication: Schizophrenia and other psychosis, mania, short term adjunctive management of psychomotor agitation, excitement and violent or dangerously impulsive behavior.

Adverse effects and cautions: Akathisia, dystonia, depression, weight loss; cautions with hypocalcemia, arteriosclerosis, hypokalaemia (does not cause jaundice); strong EPS tendency.

Dose: By mouth, schizophrenia and other psychosis, mania, short term adjunctive management of psychomotor agitation, excitement and violent or dangerously impulsive behaviour, initially 1.5-3 mg, 2-3 times daily or 3- 5 mg, 2-3 times daily in severely affected or resistant patients; in resistant schizophrenia up to 30 mg daily may be needed.

Short-term adjunctive management of severe anxiety, adults 500 micrograms twice daily. Intractable hiccup, 1.5 mg 3 times daily adjusted according to response; Child not recommended.

By intramuscular or intravenous injection, 2-10 mg subsequent doses are given every 4-8 hours according to response to a maximum 18 mg daily; Child not recommended.

Combination Products

Trifluoperazine and Trihexyphenidyl
Indication, Adverse effects and cautions: See under trifluoperazine and trihexyphenidyl

Drugs	Under Health Insurance Scheme	Pregnancy Category
Trifluoperazine 5 mg + Trihexyphenidyl 2 mg Tab	Yes	C

5.6.2 Atypical Antipsychotics

They are also called the second generation. They have greater specificity for the mesolimbic system and have fewer incidences of extrapyramidal side effects. It has no effect in prolactin release.

1.RISPERIDONE

Risperidone is a dopamine D2, 5-HT2A, alpha1adrenoceptor, and histamine-1 receptor antagonist.
Indication: acute and chronic psychosis, mania.

Adverse effects and cautions: Weight gain, hyperprolactinaemia (galactorrhoea, menstrual disturbances, gynaecomastia), priapism, cerebrovascular accident, tachycardia, neutropenia, thrombocytopenia.

The drug should be used with caution in pregnancy, hepatic impairment, and renal impairment.

Contraindication: In breast-feeding.

Dose: Psychosis, 2 mg in 1-2 divided doses on first day then 4 mg in 1-2 divided doses on second day; usual dose ranges 4-6 mg daily; Elderly (or in hepatic or renal impairment) initially 500 micrograms twice daily increased in steps of 500 micrograms twice daily to 1-2 mg twice daily; Child under 15 years not recommended.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Risperidone 1mg	Yes	C
Tab Risperidone 2mg	Yes	C
Tab Risperidone 3mg	Yes	C
Tab Risperidone 4mg	Yes	C

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 and cautions: Asthenia, dyspnoea, tachycardia, agitation, dry mouth, weight gain; caution in cerebrovascular disease, elderly.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Quetiapine 25 mg	Yes	C
Tab Quetiapine 50 mg	Yes	C
Tab Quetiapine 100 mg	Yes	C

3.OLANZAPINE

Olanzapine is a dopamine D1, D2, D4, 5-HT 2, histamine1 and muscarinic-receptor antagonist. **Indication**: schizophrenia, combination therapy for mania, preventing recurrence in bipolar disorder

Adverse effects: arthralgia, hypercholesterolaemia, increased appetite, malaise, oedema; use with caution in bone-marrow depression, diabetes mellitus (risk of exacerbation or ketoacidosis),

Contraindication: Acute myocardial infarction, bradycardia, severe hypotension, unstable angina, **Dose:** 10 mg daily, adjusted according to response, usual dose 5 – 20 mg daily.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Olanzapine 2.5mg	Yes	C
Tab Olanzapine 5mg	Yes	C
Tab Olanzapine 10mg	Yes	C

5.7 Antidepressants

5.7.1 Tricyclic and related drugs

1.AMITRIPTYLINE

Indication: Depressive illness, nocturnal enuresis.

Adverse effects and cautions: Sedation, dry mouth, blurred vision, constipation, postural hypotension, tachycardia; caution in cardiovascular disease, chronic constipation, diabetes, epilepsy; patients for whom excessive anticholinergic activity could be harmful, such as those with benign prostatic hypertrophy or history of urinary retention or angle- closure glaucoma. Safe use of drugs in the third trimester of pregnancy has not been established.

Contraindication: Arrhythmia (particularly heart block), manic phase and severe liver disease. **Dose**: By mouth, depression, initially 75 mg (elderly and adolescents 30-75 mg) daily in divided doses or as a single dose at bed time increased gradually as necessary to maximum 150-200 mg; Child under 16 years not recommended.
Nocturnal enuresis, CHILD 7-10 years 10 -20 mg, 11-16 years 25-50 mg at night; maximum period of treatment (including gradual withdrawal) 3 months.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Amitryptyline 10mg	Yes	C
Tab Amitryptyline 25mg	Yes	C

2.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 2550 mg, over 11 years 50-75 mg at bedtime; maximum period of treatment (including gradually withdrawal) 3 months.

3.MIRTAZAPINE

It is different from other TCAs. It is a presynaptic a2-antagonist. It increases central noradrenergic and serotonergic neurotransmission.

Indication: Major depression.

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

The drug should be used with caution in pregnancy, breast-feeding, hepatic or renal impairment, epilepsy, hypotension, history of urinary retention, diabetes mellitus, angle-closure glaucoma.

Dose: Initially 15 mg daily at bedtime increased within 2-4 weeks according to response; maximum 45 mg daily as a single dose at bedtime or in 2 divided doses; Child and adolescent under 18 years not recommended.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Mirtazapine 5mg	Yes	C
Tab Mirtazapine 7.5mg	Yes	C
Tab Mirtazapine 15mg	Yes	C
Tab Mirtazapine 30mg	Yes	C

5.7.2 Selective Serotonin Reuptake Inhibitors (SSRIs)

1.FLUOXETINE

Indication: Major depression, bulimia nervosa.

Adverse effects and cautions: Gastrointestinal disturbances, anorexia with weight loss, postural hypotension, taste disturbances, sexual dysfunction, ataxia, urinary retention and frequency.

The drug should be used with caution in epilepsy, cardiac disease, diabetes, angle-closure glaucoma, pregnancy, breast-feeding, children and adolescents.

Dose: Major depression, 20 mg once daily, increased after 3 weeks if necessary.

Bulimia nervosa, 60 mg once daily; maximum 80 mg once daily; children and adolescents under 18 years not recommended.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Fluoxetine 10mg	Yes	C
Tab Fluoxetine 20mg	Yes	C

2.ESCITALOPRAM

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

Adverse effects and cautions: See under fluoxetine; also, postural hypotension, taste disturbance, fatigue.

Dose: Depressive illness and generalised anxiety disorder, 10 mg once daily increased if necessary to maximum 20 mg daily; Elderly initially half adult dose, lower maintenance dose may be sufficient; Child and Adolescent under 18 years not recommended.

Panic disorder, initially 5 mg daily increased to 10 mg daily after 27 days, maximum 20 mg daily; Elderly initially half adult dose, lower maintenance dose may be sufficient; Child and Adolescent under 18 years not recommended.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Escitalopram 5 mg	Yes	C
Tab Escitalopram 10mg	Yes	C
Tab Escitalopram 20mg	Yes	C

3.**SERTRALINE**

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

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

The drug should be used with caution in patients with hepatic or renal impairment, seizure disorders, neurological impairment, children and adolescents.

Contraindication: History of mania.

Dose: Major depression initially 50 mg daily, increased if necessary by increments of 50 mg over several weeks to maximum 200 mg daily, usual maintenance dose 50 mg daily, Child and Adolescent under 18 years not recommended.

Post-traumatic stress disorder, initially 25 mg daily, increased after 1 week to 50 mg daily, dose increased in steps of 50 mg over several weeks to maximum 200 mg daily; Child and Adolescent under 18 years not recommended.

Preparation Available:

Drugs	Under Health Insurance scheme	Pregnancy Categeory
Tab Sertraline 25mg	Yes	C

Tab Sertraline 50mg	Yes	C
Tab Sertraline 100mg	Yes	C

5.7.3 Serotonin and Noradrenaline Reuptake inhibitors (SNRIs)

1.DULOXETINE

Indication: Depressive disorder, anxiety disorder, diabetic neuropathy,

Adverse effects and cautions: Abdominal pain, abnormal dreams, anorexia, dizziness, dry mouth; used with caution in bleeding disorders, cardiac disease, elderly, history of mania, history of seizures, hypertension.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Duloxetine 20mg	Yes	C
Tab Duloxetine 30mg	Yes	C

Chapter 6: Drugs Used in Musculoskeletal Disorders

6.1 Non-steroidal anti-inflammatory drugs (NSAIDs)

1. **PARACETAMOL**

See under drugs acting on CNS, non-opioid analgesics

2. **DICLOFENAC**

Indication: Rheumatic disease, osteoarthritis, acute gout, migraine.

Adverse effects and cautions: Gastrointestinal distress, occasionally gastrointestinal bleeding and gastric ulceration, hepatic damage, and interstitial fibrosis associated with NSAIDs can lead to renal failure. The drug should be used with caution in breastfeeding, renal or cardiac, or hepatic impairment.
Contraindication: Active GI bleeding, pregnancy, cerebrovascular disease.

Dose: By mouth, 75-150 mg daily in 2-3 divided doses, preferably after food.

By deep intramuscular injection into the gluteal muscle, acute exacerbations and post-operative, 75 mg once daily (twice daily in severe cases) for a maximum of 2 days.

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

Preparation Available:

Drug	Health insurance	Pregnancy Category
Diclofenac 50 mg Tab	Yes	C
Diclofenac 75 mg/ml, 1 ml Inj	Yes	C
Diclofenac Cream 1%, 30 gm Oint	Yes	C

3. IBUPROFEN

Indication: Rheumatic disease, musculoskeletal disorders, post-operative pain, dysmenorrhoea.

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

Contra-Indication: See under diclofenac.

Dose: Initially 1.2-1.8 g daily in 3-4 divided doses preferably after food, increased if necessary to maximum of 2.4 g daily; maintenance dose of 0.6-1.2 g daily may be adequate, Child, 20-30 mg/kg daily in divided doses (juvenile arthritis, up to 40 mg/kg daily), not recommended for children under 5 kg.

Drug	Under Heath Insurance	Pregnancy Category
Tab Ibuprofen 400 mg	Yes	C

4. INDOMETHACIN

Indication: Acute gouty arthritis, rheumatic disease, dysmenorrhoea, musculoskeletal disorders, closure of the ductus arteriosus.

Adverse effects and cautions: Abdominal pain, diarrhoea, gastrointestinal haemorrhage, severe headache, dizziness, confusion, depression, psychosis, thrombocytopenia, aplastic anaemia, hypertension, and hyperkalaemia; used with caution in breast-feeding, epilepsy, and Parkinsonism; not recommended for children.

Contraindication: Pregnancy.

Dose: Rheumatic disease, 50-200 mg daily in divided doses, with food; Child not recommended. Acute gout, 150-200 mg daily in divided doses. Dysmenorrhoea, up to 75 mg daily.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Cap Indomethacin 25 mg	Yes	C
Cap Indomethacin 50 mg	Yes	C
Cap Indomethacin 75 mg	Yes	C

5.MEFENAMIC ACID

Indication: Osteoarthritis, rheumatoid arthritis, dysmenorrhoea, post-operative pain.

Adverse effects and cautions: Diarrhoea, rashes, thrombocytopenia, haemolytic anaemia, and drowsiness; use with caution in acute porphyrias, allergic disorders, and cardiac impairment.

Dose: 500 mg 3 times daily, preferably after food; Child over 6 months, 25 mg/kg daily in divided doses for not longer than 7 days except in juvenile arthritis.

Preparation Available:

Drug	Under Health insurance	Pregnancy Category
Mefenamic acid 500 mg Tab	Yes	C
Mefenamic acid 100 mg/5 ml, 60 ml Syp	Yes	C

6.NAPROXEN

Indication: See under diclofenac.

Adverse effects and cautions: See under diclofenac, but has better tolerance.

Dose: 0.5-1 g daily in 2 divided doses; CHILD (over 5 years) juvenile arthritis, 10 mg/kg daily in 2 divided doses.

Acute musculoskeletal disorders and dysmenorrhoea, 500 mg initially, then 250 mg every 6-8 hours as required; Child under 16 years not recommended. Acute gout, 750 mg initially, then 250 mg every 8 hours until the attack has passed;

Preparation Available:

Drug	Under Health insurance	Pregnancy Category
Naproxen 250 mg Tab	Yes	C
Naproxen 500 mg Tab	Yes	C

7.ACECLOFENAC

Its actions and adverse effects are similar to naproxen.

Indication: Rheumatoid arthritis, osteoarthritis, and ankylosing spondylitis.

Adverse effects and caution: Allergic disorders, Crohn's disease may exacerbate. See under naproxen.

Dose: 100 mg twice daily; Child not recommended.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Aceclofenac 100 mg Tab	Yes	NA

8.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.

9.KETOROLAC
Indication: Headache, analgesic in moderately severe acute pain

Adverse effects and cautions: GI pain, nausea, dyspepsia, somnolence
Dose: 10 mg three to four times daily, not exceed 40 mg per day.
Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Tab Ketorolac 10 mg	Yes	C
Ketorolac 0.4%, eye drops	Yes	-
Ketorolac 30mg/ml 1ml inj	Yes	C

10.ETORICOXIB
Indication: pain and inflammation in osteoarthritis, rheumatoid arthritis, and ankylosing spondylitis.

Adverse effects and cautions: fatigue, ecchymosis, palpitation, and influenza-like symptoms.

Dose: 60 mg once daily, increased if necessary to 90 mg once daily.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Etoricoxib 60 mg Tab	NA	NA
Etoricoxib 90 mg Tab	Yes	NA

6.2 Drugs for Gout Treatment

1. ALLOPURINOL

It acts by inhibiting synthesis of urates.

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

Adverse effects and cautions: Nausea, vomiting, diarrhoea, maculo-papular skin rash, rarely exfoliate dermatitis, arthralgia and aplastic anaemia; caution in pregnancy, breast-feeding, hepatic and renal impairment.

Contraindication: Not a treatment for acute gout but continues if attack develops when already receiving allopurinol, and treat attack separately.

Dose: Initially 100 mg daily as a single dose after food, gradually increased over 1-3 weeks according to the plasma or urinary uric acid concentration, to about 300 mg daily; Children under 15 years 10-20 mg/kg daily.

2. COLCHICINE

Indication: Acute gout.

Adverse effects and cautions: Diarrhoea, nausea, vomiting, abdominal pain, rarely gastro-intestinal haemorrhage, rashes, renal and hepatic damage. Safe use in pregnancy has not been established. The drug should be used with caution in breast-feeding, cardiac or hepatic or renal impairment.

Dose: 1 mg initially, followed by 500 micrograms every 4 hours until relief of pain is obtained or vomiting or diarrhoea occurs. The course should not be repeated within 3 days.

3.FEBUXOSTAT

Xanthine oxidase inhibitors

Indication: Chronic hyperuricemia

Adverse effects and cautions: Abnormal liver function test, GI disturbances, headache, oedema, rash; use with caution in congestive heart failure, ischaemic heart disease, thyroid disorders, transplant recipients.

Dose: Initially 80 mg once daily, if after 2–4 weeks of initial dose, serum uric acid is greater than 6 mg/100 mL, then increase dose; increase if necessary to 120 mg once daily.

Preparation Available:

Drug	Under Health insurance	Pregnancy Category
Tab Febuxostat 40 mg	Yes	C
Tab Febuxostat 80 mg	Yes	C

6.3 Drugs for Rheumatoid Arthritis

1.GLUCOSAMINE
Intermediate in glycosaminoglycan synthesis; the sulphate form is absorbed better than others.

Indication: Symptomatic relief of mild to moderate osteoarthritis.

Adverse effects and cautions: Abdominal pain, constipation, diarrhoea, drowsiness, dyspepsia; use with caution in asthma, impaired glucose tolerance.

Dose: 1500 mg once daily.

2. HYDROXYCHLOROQUINE
Indication: Active rheumatoid arthritis, systemic and discoid lupus erythematosus

Adverse effects and cautions: GI disturbances, headache, pruritus, rashes, skin reaction; caution in acute porphyrias, elderly, G6PD deficiency, may aggravate myasthenia gravis, and neurological disorders

Dose: 200 to 400 mg daily.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Tab Hydroxychloroquine 200mg	Yes	C

3.METHOTREXATE
It is a disease-modifying anti-rheumatic drug, inhibits the enzyme dihydrofolate reductase, essential for purines and pyrimidines synthesis.

Indication: Moderate to severe rheumatoid arthritis.

Adverse effects and cautions: Myelosuppression, mucositis, loss of appetite, intestinal ulceration and bleeding, diarrhoea, pulmonary oedema, impotence, loss of libido.

The drug should be used with caution in blood disorders (blood count, liver and renal function tests should be performed before starting treatment and repeated weekly), peptic ulceration, and pleural effusion.

Contraindication: Pregnancy, breast-feeding, active infection, renal or hepatic impairment.

Dose: By mouth, 7.5 mg once weekly (as a single dose or divided into 3 doses of 2.5 mg given at intervals of 12 hours), maximum total weekly dose 20 mg.

6.4 Muscle Relaxants

1.CHLORZOXAZONE
It blocks interneuronal conduction in spinal cord and subcortical brain areas by depressing polysynaptic reflexes

Indication: Musculoskeletal pain

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

2.BACLOFEN

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

Indication: Pain of muscle spasm in palliative care, hiccup due to gastric distension, severe spasticity

Adverse effects and cautions: Agitation, anxiety, ataxia, cardiovascular depression, confusion, dry mouth; use with caution in the elderly, epilepsy, diabetes, cardiovascular disease.

Contraindication: Active peptic ulceration.

Dose: 5 -10 mg three times a day.

3.TIZANIDINE

It increases presynaptic inhibition of motor neurons through an alpha-2 adrenergic receptor agonist.

Indication: Spasticity associated with multiple sclerosis or spinal cord injury or disease.

Adverse effects and cautions: Dizziness, drowsiness, dry mouth, fatigue, GI disturbances, hypotension, and nausea.

Dose: Adult: Initially 2 mg daily, then increased in steps of 2 mg daily in divided doses, increased at intervals of at least 3–4 days and adjust according to response; usual dose up to 24 mg daily in 3–4 divided doses; maximum 36 mg per day.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Tab Tizanidine 2 mg	Yes	C
Tab Tizanidine 4 mg	Yes	C

Miscellaneous drugs:

Drug	Under Health Insurance	Pregnancy Category
Tab Diacerin 50 mg	Yes	B
Tab Serratopeptidase 10 mg	Yes	NA

Chapter 7: Drugs used in the disorders of the Endocrine system

7.1 Drugs for corticosteroid-responsive conditions

1.DEXAMETHASONE

Indication: Suppression of inflammatory and allergic disorders, mild to severe croup, and congenital adrenal hyperplasia (under expert supervision).

Adverse effects and cautions: Hypertension, sodium retention, potassium loss, muscle weakness, diabetes, osteoporosis, dyspepsia, increased susceptibility to and severity of infection. Mental disturbance includes euphoria, psychosis, depression, aggravation of epilepsy. Peptic ulceration can lead to haemorrhage or perforation.

Dose: By mouth usual range 0.5-10 mg daily; Child 10-100 micrograms/kg daily.

By intramuscular injection or slow intravenous injection or infusion initially 0.5-24 mg; Child 0.2-0.4 mg/kg daily Cerebral oedema by intravenous injection, 10 mg initially, then 4 mg by intramuscular injection every 6 hours as required for 2-4 days, then gradually reduced and stopped over 5-7 days.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Dexamethasone 4mg/ml 2ml inj	Yes	C
Tab Dexamethasone 0.5mg	Yes	C

2.BETAMETHASONE

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

Adverse effects and cautions: indigestion, increase appetite, nervousness; See under dexamethasone Dose: By mouth, usual range 0.5-5 mg daily.

3.DEFLAZACORT

Indication: Suppression of inflammatory and allergic disorder.

Adverse effects and cautions: cushingoid appearance, weight increased, increased appetite, cough

Dose: By mouth Child 1 month–11 years: 0.25–1.5 mg/kg once daily or on alternate days; increased if necessary up to 2.4 mg/kg daily (max. per dose 120 mg in emergencies); 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 emergencies).

4.HYDROCORTISONE

Indication: Thyrotoxic crisis, adrenocortical insufficiency in Addison's disease, acute hypersensitivity.

Adverse effects and cautions: Phosphate ester associated with pain and paraesthesia, and see under dexamethasone.

Dose: By intramuscular injection or slow intravenous injection or infusion, 100 to 500 mg, 3-4 times in 24 hours or as required; child by slow intravenous injection up to 1 year 25 mg, 1-5 years 50 mg, 6-12 years 100 mg.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Hydrocortisone 100mg inj	Yes	C
Hydrocortisone 200mg inj	Yes	C

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:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Prednisolone 2.5 mg	Yes	C
Tab Prednisolone 5 mg	Yes	C
Tab Prednisolone 10mg	Yes	C
Tab Prednisolone 20mg	Yes	C

6.METHYLPREDNISOLONE

Indication: Suppression of inflammatory and allergic disorders, cerebral oedema associated with malignancy, treatment of graft rejection, and acute exacerbations of multiple sclerosis.

Adverse effects and cautions: See under dexamethasone.
Dose: By mouth, usual range 2-40 mg daily.

By intramuscular injection or slow intravenous injection or infusion, initially 100-500 mg.

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 the patient's response.

Preparations available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Triamcinolone 40 mg inj	Yes	C

7.3 Drugs for Diabetes Mellitus

7.3.1 Alpha Glucosidase inhibitors

1.ACARBOSE

It delays the digestion and absorption of starch and sucrose.

Indication: Diabetes mellitus inadequately controlled by diet or by diet with oral antidiabetic drugs.

Adverse effects and cautions: Abdominal pain, flatulence, diarrhoea, jaundice; use with caution with insulin and sulfonylureas (enhanced hypoglycaemia).

Contraindication: Pregnancy, breastfeeding, 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:

Drug	Under Health Insurance scheme	Pregnancy Category
Tab Acarbose 50mg	Yes	B
Tab Acarbose 25mg	Yes	B

2. VOGLIBOSE

Indication, **Adverse effects and cautions**: Similar to acarbose.
Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Voglibose 0.2 mg	Yes	B
Tab Voglibose 0.3 mg	Yes	B

7.3.2 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 and cautions: Anorexia, nausea, vomiting, diarrhoea, metallic taste, and lactic acidosis (rarely).

Contraindication: Renal impairment, hepatic impairment, recent myocardial infarction, ketoacidosis,

Dose: Age over 10 years, initially 500 mg with breakfast for at least 1 week then 500 mg every 12 hours with or after food for at least 1 week, maximum 2 g daily in divided doses.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Metformin 1 gm	Yes	B
Tab Metformin 850 mg	Yes	B
Tab Metformin 500 mg	Yes	B

7.3.3 Dipeptidyl Peptidase-4 Inhibitors

1.SITAGLIPTIN
It increases insulin secretion and lowers glucagon secretion.

Indication: Type 2 diabetes mellitus as monotherapy or in combination.

Adverse effects and cautions: GI disturbances, nasopharyngitis, pain, peripheral oedema, upper respiratory infection; take with caution in a history of heart failure; dose modification in renal and hepatic impairment.

Dose: 100 mg once daily.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Sitagliptin 25 mg	Yes	B
Tab Sitagliptin 50 mg	Yes	B
Tab Sitagliptin 100 mg	Yes	B

2. **LINAGLIPTIN**

Indication: Type 2 DM

Adverse effects and caution: sore throat, cough. Rarely, pancreatitis, severe joint pain, and serious allergic reactions

Contraindications: Hypersensitivity to the drug

Dose: adult daily dose is 5 mg daily

Preparations available:

Drug	Under Health Insurance	Pregnancy Category
Tab Linagliptin 5 mg	Yes	B

7.3.4 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 and Cautions: Urinary Tract Infection, Genital Infection, Increased Urination, Diabetic ketoacidosis. Used with caution in patients with renal impairment.

Contraindication: Should not be used in patients having an eGFR less than 30ml/min. Type-1 diabetes 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

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Empagliflozin 10 mg	Yes	D
Tab Empagliflozin 25 mg	Yes	D

2.DAPAGLIFLOZIN

Indication: Type 2 DM

Adverse effects and cautions: renal impairment, urinary tract infections, female and male genital mycotic infections

Contraindications: Hypersensitivity, moderate to severe renal impairment, pregnancy and lactation

Dose: Initially 5 mg once daily in AM; may increase to 10 mg OD

Preparations available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Dapagliflozin 5 mg	NA	NA
Tab Dapagliflozin 10 mg	NA	NA

7.3.5 Meglitinides

1. REPAGLINIDE

It stimulates insulin release.

Indication: Type 2 diabetes mellitus.

Adverse effects and cautions: Diarrhoea, constipation, abdominal pain, nausea, vomiting; use with caution in myocardial infarction, infection, coma, during surgery, renal impairment.

Contraindication: Ketoacidosis, pregnancy, breastfeeding, 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.

7.3.6 Sulfonylureas

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

1. **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:

Drug	Under Health insurance Scheme	Pregnancy Category
Tab Gliclazide 40 mg	Yes	C
Tab Gliclazide 80 mg	Yes	C

2. **GLIMEPIRIDE**

Indication: Type 2 diabetes mellitus.

Adverse effects and cautions: Refer to the section on glibenclamide.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Tab Glimepiride 1 mg	Yes	C
Tab Glimepiride 2 mg	Yes	C
Tab Glimepiride 3 mg	Yes	C
Tab Glimepiride 4 mg	Yes	C

7.3.7 Insulin

Short acting

They are administered to mimic the prandial (mealtime) release of insulin, and they are usually not used alone but, rather, along with longer-acting insulin to assure proper glucose control. Insulin lispro is usually administered 15 minutes prior to a meal or immediately following a meal, whereas glulisine can be taken either 15 minutes before a meal or within 20 minutes after starting a meal. Insulin aspart must be administered just prior to the meal. All of the rapid-acting formulations are suitable for intravenous administration, although regular insulin is most commonly used when the intravenous route is needed. Insulin lispro, insulin aspart, and insulin glulisine may also be used in external insulin pumps.

1. HUMAN REGULAR INSULIN

Insulin (regular) is a clear solution prepared from zinc insulin crystals dissolved usually in a buffer at neutral pH. Short-acting insulin (i.e., regular or soluble) usually should be injected 30 to 45 minutes before meals. After intravenous injection, there is a rapid fall in the blood glucose concentration, which usually reaches a nadir in 20 to 30 minutes. The 30- to 60-minute onset of action requires proper timing of premeal regular insulin, which is difficult for most patients. When metabolic conditions are stable, regular insulin is usually given subcutaneously in combination with an intermediate- or long-acting preparation.

Indication: Diabetic ketoacidosis, diabetes mellitus.

Adverse effects and cautions: Hypoglycaemia, localised allergic reactions, lipodystrophy

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Human Regular Insulin 40 IU/ml 10 ml Inj		

Rapid acting

1.INSULIN LISPRO

Insulin lispro is a rapid-acting, recombinant DNA-derived insulin human analog that is structurally identical to human insulin 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, like all rapid-acting insulins, provides patients with greater flexibility in their lifestyle. These insulins lower 2-hour postprandial blood glucose levels and decrease the risk for late postprandial and nocturnal hypoglycemia compared with regular insulin formulations. Because Lispro has a shorter duration of action than regular insulin, hyperglycemia and ketosis may occur more rapidly if insulin delivery is inadvertently interrupted.

Indication: Diabetes mellitus.

Adverse effects and cautions: See under soluble/ regular insulin

Dose: By subcutaneous injection, immediately before meals or when necessary shortly after meals, according to requirements. By intravenous injection or infusion according to requirements

2.INSULIN ASPART

Insulin aspart is a rapid-acting insulin analog that differs from human insulin by substitution of aspartic acid at B28. Insulin aspart is approved for use in paediatric patients, age 6 and older. Insulin aspart controls postprandial glucose excursions similar to insulin lispro. Its absorption and activity profile is similar to insulin lispro and more reproducible than regular insulin.

Indication: diabetes mellitus

Adverse effects and cautions: See under soluble insulin.

Dose: By subcutaneous injections, Adult and Child over 6 years, according to requirements.

Intermediate acting

1. NPH (NEUTRAL PROTAMINE HAGEDORN OR ISOPHANE)

NPH insulin is a suspension of insulin in a complex with zinc and protamine in a phosphate buffer. Intermediate-acting insulins are usually given either once a day before breakfast or twice a day. Its duration of action is less than that of protamine zinc insulin. After subcutaneous injection, proteolytic tissue enzymes degrade the protamine to permit absorption of insulin. It will not control diabetes throughout the 24 hours by itself, but it is of value when combined with soluble insulin. Biphasic insulin preparations (containing soluble insulin and isophane or insulin aspart or insulin lispro) are available and given two to four times daily for insulin replacement in patients with type 1 diabetes.

Indication: diabetes mellitus.

Adverse effects and cautions: See under soluble insulin.

Dose: By subcutaneous injection, according to the patient's requirements.

Long acting

1. INSULIN GLARGINE

Insulin glargine has a slow onset of action (1–1.5 hours) and achieves a maximum effect after 4–5 hours. This maximum activity is maintained for 11–24 hours or longer. Once injected, insulin glargine (which is a clear solution with a pH of 4.0) precipitates at physiological pH, forming a depot that releases insulin slowly over 24 hours. and insulin glargine should not be mixed with other insulins. Separate syringes must be used to minimize the risk of contamination and subsequent loss of efficacy. A 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: Refer to the section on soluble insulin.

Dose: By subcutaneous injections, Adult and Child over 6 years, according to requirements.
Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Glargine 100 IU/ml 3 ml Cartridge	Yes	NA

Combination Insulin

Drug	Under Health Insurance
Regular/Isophane mixture 30/70 Cartridge	Yes
Regular/NPH mixture 50/50 Cartridge	Yes

Combination Products

1. **METFORMIN AND GLIMEPIRIDE**

Indication, **Adverse effects and cautions**: See under Metformin and Glimepiride

Drugs	Under Health Insurance	Pregnancy Category
Metformin 500 mg + Glimepiride 1 mg Tab	Yes	-
Metformin 1000 mg + Glimepiride 1 mg Tab	Yes	-
Metformin 500 mg + Glimepiride 2 mg Tab	Yes	-
Metformin 1000 mg + Glimepiride 2 mg Tab	Yes	-

2. **METFORMIN AND SITAGLIPTIN**

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

Drug	Under Health Insurance	Pregnancy Category
Metformin 500 mg + Sitagliptin 50 mg Tab	Yes	-
Metformin 850 mg + Sitagliptin 50 mg Tab	Yes	-
Metformin 1000 mg + Sitagliptin 50 mg Tab	Yes	-

3. **METFORMIN AND LINAGLIPTIN**

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

Drug	Under health Insurance	Pregnancy Category
Metformin 1000 mg + Linagliptin 2.5 mg Tab	Yes	-
Metformin 850 mg + Linagliptin 2.5 mg Tab	Yes	-
Metformin 500 mg + Linagliptin 2.5 mg Tab	Yes	-

7.4 Sex Hormones

7.4.1 Androgen

1.**OESTROGENS**

ETHINYLESTRADIOL / ETHINYLESTRADIOL

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

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

Adverse effects and cautions: Nausea and vomiting; weight gain, jaundice, rashes, depression, headache, breast enlargement and tenderness, withdrawal bleeding; Impotence and gynaecomastia in men; use with caution in risk factors for venous thromboembolism, arterial disease, history of severe depression.

Contraindication: Pregnancy, history of arterial and venous thrombosis, transient cerebral ischaemic attacks, migraine.

Dose: Menopausal symptoms, 10-50 micrograms daily.

Prostate cancer (palliative) 0.15-1.5 mg daily.

2.**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.

2.Progestogens

1. **PROGESTERONE**

Indication: Infertility due to luteal phase, premenstrual syndrome, dysfunctional uterine bleeding **Adverse effects and cautions**: Acne, alopecia, bloating, breast tenderness, change in libido, depression, dizziness, drowsiness; use with caution in cardiac dysfunction, diabetes (glucose tolerance can decrease), hypertension. **Dose**: Premenstrual syndrome, 200–800 mg daily, doses above 200 mg to be given in 2 divided doses, for premenstrual syndrome start on day 12–14 and continue until onset of menstruation (but not recommended); rectally if barrier methods of Contraception are used, in patients who have recently given birth or in those who suffer from vaginal infection or recurrent cystitis.

2. **NORETHISTERONE**

It inhibits secretion of gonadotropins from pituitary gland, prevents follicular maturation and ovulation. **Indication**: Contraceptive, endometriosis, premenstrual syndrome, postponement of menstruation.

Adverse effects and cautions: More virilising effects and the greater possibility of liver disturbances and jaundice, urticaria, gastrointestinal disturbances, oedema, weight gain, breast discomfort and irregular menstrual cycles; use with caution in patients with conditions

that might be aggravated by fluid retention (cardiac or renal dysfunction, or epilepsy or hypertension), diabetes, impaired liver function. **Contraindication**: Pregnancy and patients with genital or breast cancer.

Dose: Endometriosis, 10-15 mg daily starting 5th day of cycle for 4-6 months (increased if spotting occurs to 20-25 mg daily, reduced once bleeding has stopped). Postponement of menstruation, 5 mg 3 times daily starting 3 days before anticipated onset (menstruation occurs 2- 3 days after stopping).

3.**DYDROGESTERONE**

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

Indication: Endometriosis, dysfunctional uterine bleeding, dysmenorrhoea, amenorrhoea.

Adverse effects and cautions: See under norethisterone. **Dose**: Endometriosis, 10 mg 2-3 times daily from 5th to 25th day of cycle or continuously.

Dysfunctional uterine bleeding, 10 mg twice daily (together with an oestrogen) for 5-7 days to arrest bleeding; 10 mg twice daily (together with day of cycle to prevent bleeding. than oestrogen) from 11th to 25 Dysmenorrhoea, 10 mg twice daily from 5 to 25 days of cycle.

Amenorrhoea, 10 mg twice daily from 11th to 25th day of cycle with oestrogen therapy from 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

4.HYDROXYPROGESTERONE

This is a derivative of progesterone. It is more potent than progesterone and has a longer duration of action (7-14 days).

Indication: Amenorrhoea, dysfunctional uterine bleeding, induction of menses, prevention of preterm labour.

Adverse effects and cautions: See under norethisterone

Dose: Amenorrhoea or dysfunctional uterine bleeding, by intramuscular injection, 375 mg. Induction of menses, intramuscular injection 125-250 mg on day 10 of the menstrual cycle. Hydroxyprogesterone 500 mg Inj

5.LEVONORGESTREL

It is a second-generation progesterone and active isomer of norgestrel and has twice its potency. It inhibits ovulation by a negative feedback mechanism on the 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 the cycle.

Emergency Contraceptive, 1.5 mg as a single dose as soon as possible after sex (preferably within 12 hours but not later than 72 hours).

6.**MEDROXYPROGESTERONE**

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

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

Adverse effects and cautions: See under norethisterone; menstrual irregularities are common, and infertility may persist for many months after cessation of treatment. Dose: For Contraception, by deep intramuscular injection, 150 mg within the first 5 days of cycle or within first 5 days after parturition (delay until 6 weeks after parturition if breastfeeding); for long-term Contraception, repeated every 3 months.

Dysfunctional uterine bleeding and secondary amenorrhoea, by mouth, 2.510 mg daily for 5-10 days beginning on 16-21 days of the cycle, repeated for 2 cycles in dysfunctional uterine bleeding and 3 cycles in secondary amenorrhoea. Mild to moderate endometriosis, 10 mg 3 times daily for 90 consecutive days, beginning on day 1 of the cycle.

3.Antiprogestins

1. MIFEPRISTONE

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

Adverse effects and cautions: Uterine Contractions, vaginal bleeding (sometimes severe), nausea, vomiting, rash, dizziness, headache; use with caution in hepatic or renal impairment, breast-feeding, asthma, mothers aged over 35 years.

Contraindication: Suspected ectopic pregnancy, uncontrolled severe asthma.

2.COMBINATION ORAL CONTRACEPTIVE PILLS (COC)

The mode of action is as follows:

- Oestrogen inhibits the secretion of FSH via negative feedback on the anterior pituitary and thus suppresses the development of the ovarian follicle.
- Progestogen inhibits the 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
Nausea Increased breast size (ductal and fatty tissue) Cyclic weight gain owing to fluid retention Leukorrhea Cervical eversion or ectopy Hypertension Rise in cholesterol concentration in gallbladder bile Growth of leiomyomata Telangiectasia Hepatocellular adenomas or hepatocellular cancer (rare) Cerebrovascular accidents (rare) Thromboembolic complications including pulmonary emboli (rare) Stimulation of breast neoplasia (exceedingly rare) (Most pills with >50 mcg of ethinyl estradiol do not produce troublesome estrogen-mediated side effects or complications.)	Both the estrogenic and the progestational components of oral contraceptives may contribute to the development of the following adverse effects: Breast tenderness Headaches Hypertension Myocardial infarction (rare)	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: Increased appetite and weight gain Depression, fatigue, tiredness Decreased libido and/or enjoyment of intercourse Acne, oily skin Increased breast tenderness or breast size Increased low-density lipoprotein (LDL) cholesterol levels Decreased high-density lipoprotein (HDL) cholesterol levels Decreased carbohydrate tolerance; increased insulin resistance Pruritus

7.5 Thyroid and Antithyroid drugs

7.5.1 Thyroid Hormones

1. LEVOTHYROXINE / THYROXINE

The principal pharmacological effect of exogenous thyroid hormones is to increase the metabolic rate of body tissues.

Indication: Hypothyroidism.

Adverse effects and cautions: Palpitation, tachycardia, diarrhoea, cardiac arrhythmias, tremor, weight loss, sweating, insomnia, angina pain and increased appetite; use with caution and in reduced dosage in patients with angina pectoris or other cardiovascular disease including hypertension, diabetes mellitus, pregnancy and breast- feeding.

Contraindication: Thyrotoxicosis.

Dose: The initial dose should not exceed 50-100 micrograms daily, preferably before morning meal or breakfast, or 25-50 micrograms in elderly patients or those with cardiac disease, increased by 50 micrograms at intervals of at least 3-4 weeks. Neonate up to 1 month a daily dose of 5-10 micrograms/kg; Child over 1 month initially 5 micrograms/kg, adjusted in steps of 25 micrograms every 2-4 weeks until mild toxic symptoms appear then reduce dose slightly. **Preparation Available:**

Drug	Under Health Insurance Scheme	Pregnancy Category
Levothyroxine 12.5 mcg Tab	Yes	A
Levothyroxine 25 mcg Tab	Yes	A
Levothyroxine 50 mcg Tab	Yes	A
Levothyroxine 75 mcg Tab	Yes	A
Levothyroxine 100 mcg Tab	Yes	A

7.5.2 Antithyroid Drugs

1.**CARBIMAZOLE**

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

Indication: Hyperthyroidism.

Adverse effects and cautions: Rashes, nausea, headache, arthralgia, agranulocytosis and pruritus.

The patient should be asked to report sore throat; WBC count should be performed if there is clinical evidence of infection; use with caution in pregnancy, breastfeeding 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.

2.**PROPYLTHIOURACIL**

Indication: See under carbimazole.

Adverse effects and cautions: See under carbimazole. The drug may cause thrombocytopenia, aplastic anaemia, hypoprothrombinemia and bleeding. **Dose:** 200-400 mg daily and maintained on this dose until the patient becomes euthyroid, the dose may then be gradually reduced to maintenance of 50 to 150 mg daily.

Chapter 8: Drugs Used in Infectious Disorders

8.1 Anthelmintics

1.ALBENDAZOLE

Indication: Ascaris, pinworm, hookworm, whipworm, strongyloides infection, hydatid disease

Adverse effects: Gastrointestinal discomfort, headache.

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

Take the medicine with food

Contraindication: Hypersensitivity, Hepatic impairment.

Dose: The usual dose for adults is 400 mg in a single dose.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Albendazole 200 mg/5 ml, 10 ml Susp	Yes	NA
Albendazole 400 mg Tab	Yes	NA

2.IVERMECTIN

Indication: Lymphatic filariasis.

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

Dose: 200 mcg/kg as a single dose once a year, administered with albendazole.

4.MEBENDAZOLE

Indication: Ascaris, hookworm, pinworm, whipworm infection.

Adverse effects: Abdominal pain, diarrhoea and rash.

Precautions: The drug should not be given to pregnant women or to children younger than 2 years of age.

Dose: 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.

8.2 Anti-Amoebic and Anti-Giardial Drugs

1.METRONIDAZOLE

Indication: Giardiasis, acute amoebic dysentery, acute oral infections, surgical prophylaxis, Helicobacter pylori and anaerobic bacterial infections

Adverse effects & cautions: Metallic taste, nausea, headache, furred tongue, dizziness, vertigo, dark brown urine and reversible peripheral neuropathy. Avoid alcohol or preparations containing alcohol during use or for 4-8 hours after use of this product.

Contraindication: Pregnancy (1st trimester), breastfeeding, hypersensitivity.

Drug and food interactions: Avoid use with zalcitabine, norfloxacin, and disulfiram. Disulfiram-like reactions have occurred in patients who have ingested alcohol concurrently with these drugs.

Dose:

Invasive intestinal amoebiasis: 800 mg every 8 hours for 5 days, Child 1-3 years 200 mg every 8 hours

Extra-intestinal amoebiasis: 400-800 mg every 8 hours for 5-10 days
Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Metronidazole 200 mg Tab	Yes	B
Metronidazole 400 mg Tab	Yes	B
Metronidazole 200 mg/5 ml, 60ml Syp	Yes	B
Metronidazole 100 mg/5 ml, 60 ml Syp	Yes	B
Metronidazole 500 mg/100 ml Inj	Yes	B

2.TINIDAZOLE

Indications: Amoebic infections, bacterial vaginosis, acute ulcerative colitis, intestinal amoebiasis

Contraindications: Hypersensitivity, Children, CNS depression, Blood dyscrasias, Alcoholism.

Dose: Anaerobic infections, by mouth, 2 g initially, followed by 1 g daily or 500 mg twice daily, usually for 5-6 days.

Preparation Available:

Drug	Health Insurance Scheme	Pregnancy Category
Tinidazole 500 mg Tab	Yes	C
Tinidazole 1 gm Tab	Yes	C

3.DILOXANIDE FUROATE

Indication: Asymptomatic cyst passers and extraintestinal amoebiasis (together with tissue amoebicide).

Adverse effects: Vomiting, pruritus, flatulence and urticaria. The drug should be avoided in pregnancy and breastfeeding.

Contraindication: Pregnancy, breastfeeding.

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 a longer half-life and fewer side effects compared to metronidazole.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Ornidazole 500 mg Tab	Yes	X- 1st Trimester used with caution in 2nd & 3rd Trimester
Ornidazole 500 mg/100 ml Inj	Yes	NA

5.SECNIDAZOLE

Indications: Trichomoniasis, amoebiasis, giardiasis, invasive (hepatic) amoebiasis

Adverse effects: Vulvovaginal candidiasis, nausea, headache, dysgeusia, diarrhoea, vomiting, abdominal pain, vulvovaginal pruritus

Dose:

Trichomoniasis, amoebiasis, giardiasis: Adult: single dose 2000 gm.

Children: single dose 30 mg/kg.

Combination Products

1. Metronidazole and Diloxanide Furoate
Indication, adverse effects and caution: See under Metronidazole and Diloxanide Furoate
Preparation Available:

Drugs	Health Insurance	Pregnancy Category
Metronidazole 100 mg + Diloxanide Furoate 125 mg/ 5 ml, 60ml Susp	Yes	Not Recommended
Metronidazole 400 mg + Diloxanide 500 mg Tab	Yes	

8.3 **Antifungal Drugs**

1.FLUCONAZOLE

Indication: Mucosal candidiasis (except genital), vaginal candidiasis, tinea infections, and prevention of fungal infections in immunocompromised patients.

Adverse effects & cautions: Diarrhoea, headache, nausea, rash. If used for oral candidiasis, don't rinse mouth for 15-30 mins after use.

The drug should be avoided in pregnancy and breastfeeding. The drug should be used with caution in renal impairment or liver impairment.

Contraindications: Hypersensitivity, pregnancy, and Acute Porphyria.

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.

Preparation Available:

Drug	Health Insurance Scheme	Pregnancy Category
Fluconazole 150 mg Tab	Yes	D
Fluconazole 200 mg Tab	NA	D

3.ITRACONAZOLE
Indication: Vulvovaginal candidiasis, oral or esophageal candidiasis.

Adverse effects & cautions: Abdominal pain, diarrhoea, headache, dizziness, rash, Stevens-Johnson syndrome, menstrual disorder, hypokalaemia. The drug should be used with caution in pregnancy, breast- feeding, and renal impairment.

Contraindication: Hypersensitivity, fungal meningitis, onychomycosis.

Dose: By mouth, oropharyngeal candidiasis, 100 mg daily (200 mg daily in AIDS or neutropenia) for 15 days.

Vulvovaginal candidiasis, 200 mg twice daily for 1 day.

Preparation Available:

Drugs	Health Insurance	Pregnancy Category
Itraconazole 100 mg Tab	Yes	C
Itraconazole 200 mg Tab	NA	C

4.TERBINAFINE

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

Adverse effects: Abdominal discomfort, anorexia, arthralgia, diarrhoea, dyspepsia:

Precautions: Autoimmune disease, psoriasis (risk of exacerbation).

Dose: Dermatophyte infections, 250 mg once daily for 6 weeks to 3 months.

5.KETOCONAZOLE

Indications: Candidiasis, coccidioidomycosis, histoplasmosis, chromoblastomycosis, paracoccidioidomycosis, tinea, seborrheic dermatitis, dandruff, oropharyngeal candidiasis.

Adverse effects: Irritation, stinging, pustules, pruritus.

Contraindication: Hypersensitivity, breastfeeding, fungal meningitis.

Dose: 200-400 mg/day for 1-2 weeks.

Dandruff*:* shampoo wet to dry hair, lather, and massage for 1minute, rinse, and repeat two times per week spaced by 3 days, for up to 8 weeks, then as needed.

Drug	Under Health Insurance	Pregnancy Category
Ketoconazole 15g Cream	Yes	A
Ketoconazole 2% Shampo	Yes	A

8.4 Antimalarial Drugs

1.CHLOROQUINE

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

Adverse effects: Epigastric discomfort, anorexia, nausea, vomiting, pruritus and headache. **Precautions:** Long-term daily treatment may cause reversible visual disturbance. Blood dyscrasia, severe GI disease, neurologic disease, alcoholism, hepatic disease,

Contraindication: G6PD deficiency, psoriasis, eczema, seizures, preexisting auditory damage, torsade de pointes. Pregnancy (C), breastfeeding, and children.

Dose: Malaria prophylaxis, 300 mg base once weekly starting one week before entering the malaria area and continued for 4 weeks after leaving.

Malaria treatment 600 mg base along with 45 mg primaquine

8.5 Antibacterials

8.5.1 Beta-lactam and related medicines

PENICILLINS

1.AMOXICILLIN

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/PPI or in combination with clarithromycin

Adverse effects & cautions: Nausea, vomiting, diarrhoea and rash occur less frequently than with ampicillin. Take medication without regard to meals.

Contraindications: Documented hypersensitivity to penicillins, cephalosporins, and imipenem. Clostridium difficile-associated diarrhoea (CDAD).

Dose: 500 mg every 8 hours, doubled in severe infections. By intravenous injection or infusion, 500 mg every 8 hours increased to 1 g every 6 hours; Child 50-100 mg/ kg daily in divided doses.

Preparation Available:

Drugs	Health Insurance Scheme	Pregnancy Category
Amoxicillin 125 mg/5 ml, 60 ml Syp	Yes	B
Amoxicillin 250 mg DT	Yes	B
Amoxicillin 500 mg Tab	Yes	B

2.AMOXICILLIN & CLAVULANATE

Indications: Lower respiratory tract infection (LRTI), chronic obstructive pulmonary disease, acute bacterial sinusitis, acute mastoiditis, animal and human bite wounds, erysipelas, pyelonephritis, skin abscess, tonsillitis and pharyngitis.

Precautions: Allergy to penicillins, previous history of cholestatic jaundice/hepatic dysfunction associated with amoxicillin/ clavulanate. Use caution in hepatic impairment. Take with meals to avoid GI upset, take suspension at start of meal to enhance absorption.

Dose:

500/125 mg oral q12hr or 250/125 mg oral q8hr for 10 days.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Tab Amoxicillin & Clavulanic Acid 1gm	NA	NA
Amoxicillin & Clavulanic Acid 625 mg Tab	Yes	NA
Amoxicillin & Clavulanic Acid 457 mg, 30ml syrup	NA	NA
Amoxicillin & Clavulanic Acid 228.5 mg, 60ml syrup	Yes	NA
Amoxicillin & Clavulanic Acid 1.2 g Injection	Yes	NA

3.AMPICILLIN

Indication: Susceptible infections (including bronchitis, UTI, otitis media, sinusitis, uncomplicated community acquired pneumonia, salmonellosis), endocarditis, listeria meningitis.

Adverse effects & cautions: Nausea, vomiting, diarrhoea and rash have been reported more frequently; caution in lymphocytic leukaemia, cytomegalovirus (increased risk of erythematous rashes).

Dose: By intramuscular injection or intravenous injection, or infusion, 500 mg every 4-6 hours; higher dose in meningitis. Child under 10 years, any route, half adult dose.

Preparation Available:

Drugs	Health Insurance Scheme	Pregnancy Category
Ampicillin 250 mg Inj	NA	B
Ampicillin 500 mg Inj	NA	B
Ampicillin 1 gm Inj	NA	B

4.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: Abdominal pain, diarrhoea, nausea, anaemia, impaired LFTs, hypersensitivity, nephritis.

Precautions: Hypersensitivity to penicillin, cephalosporins, imipenem. Concomitant live bacterial vaccines during initial treatment of severe infections.

Dose: By mouth, Adult 500 mg 4 times daily, doubled in severe infection; by intramuscular injection, 250 mg every 4-6 hours, doubled in severe infection;

Preparation Available:

Drug	Health Insurance Scheme	Pregnancy Category
Cloxacillin 500 mg Tab	Yes	B
Cloxacillin 500 mg Inj	Yes	B
Cloxacillin 125 mg/5ml 100 ml Syp	Yes	B

5.FLUCLOXACILLIN

Acid-stable penicillinase resistant penicillins

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

Dose: By mouth, 250-500 mg every 6 hours, at least 30 minutes before food.

By intramuscular injection, 250-500 mg every 6 hours.

Preparation Available:

Drug	Health Insurance Scheme	Pregnancy Category
Flucloxacillin 250 mg Tab	NA	B
Flucloxacillin 500 mg Tab	Yes	B
Flucloxacillin 500 mg Inj	Yes	B

6.PIPERACILLIN

Broad spectrum penicillin

Indication: Used mainly in neutropenic/ immunocompromised patients having serious gram – ve infections and burns, pseudomonas infections.

Adverse effects and cautions: Rash, hemolytic anaemia, injection site pain.

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

Piperacillin with Tazobactam

Indications: Severe infections, nosocomial pneumonia, community-acquired pneumonia, diverticulitis/intra-abdominal abscess/peritonitis, complicated intra-abdominal infection, skin and soft tissue infection, malignant otitis externa

Dose:

3.375 g every 6 hr; total of 13.5 g (piperacillin [12 g] per tazobactam [1.5 g]) for 7-10 days; administer over 30 min.

4.5 g intravenous; add aminoglycoside; total of 18 g (piperacillin 16 g + tazobactam 2 g) for 7-14 days; continue aminoglycoside in *P. aeruginosa* patients.

Preparation Available:

Drug	Health Insurance Scheme	Pregnancy Category
Piperacillin & Tazobactam 4.5 inj.	Yes	NA
Piperacillin & Tazobactam 2.25 inj.	Yes	NA

CEPHALOSPORINS

FIRST GENERATION

1.CEPHALEXIN/CEFALEXIN

Indication: Susceptible infections due to sensitive gram –ve and gram-positive bacteria, anaerobes

Adverse effects: Abdominal pain, agitation, anaemia, angioedema; adjust dose in severe renal insufficiency; prolong use is associated with fungal or bacterial superinfection.

Dose: 250 mg every 6 hours or 500 mg every 8-12 hours, increased to 1-1.5g every 6-8 hours for severe infections

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Cephalexin 125 mg/5 ml Syp	Yes	B
Cephalexin 500 mg Tab	NA	B

2.CEFADROXIL

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

Adverse effects & cautions: Nausea, vomiting, rash, urticaria; caution in renal impairment.

Dose: 0.5-lg twice daily for patients over 40 kg; skin, soft tissue and simple UTI 1 g daily.
Second Generation

3.CEFUROXIME

Indication: Infection due to gram-positive and –ve bacteria, active against H. influenza, N. gonorrhoeae, E. coli, Klebsiella spp, Streptococcus pneumonia, pyrogens.

Adverse effects & cautions: Nausea, vomiting, diarrhoea, eosinophilia; use with caution in patient with history of colitis, renal impairment or seizure disorders. If diabetic, use blood glucose test. To complete the course of dose.

Dose: By mouth, 250 mg twice daily in most infections, including mild to moderate RTI. UTI, 125 mg twice daily, doubled in pyelonephritis. Gonorrhoea, 1 g as a single dose.

By intramuscular or intravenous injection or infusion, 750 mg every 6-8 hours, 1.5 g every 6-8 hours in severe conditions.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Cefuroxime 500 mg Tab	Yes	B
Cefuroxime 750 mg Inj	NA	B
Cefuroxime 1.5 gm Inj	NA	B

THIRD GENERATION

1.CEFPODOXIME

Indication: Susceptible organisms Bacteroides fragilis, Clostridium perfringens, E. coli, H. influenza, Klebsiella spps, N. gonorrhoeae, staphylococci, Group A betahemolytic streptococci.

Adverse effects: Rash, dermatitis, nausea, vomiting, diarrhoea, vaginal infection.

Dose: Upper respiratory-tract infections, 100 mg twice daily (200 mg twice daily in sinusitis).

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Cefpodoxime 100 mg Tab	NA	B
Cefpodoxime 200 mg Tab	Yes	B

Cefpodoxime 50 mg/5ml 60 ml D.Syp	Yes	B
Cefpodoxime 100 mg/5ml 30 ml D.Syp	NA	B
Cefpodoxime 25 mg/ml 10 ml D.Syp	NA	B

2.CEFIXIME
Indication: See under cefpodoxime, uncomplicated gonorrhoea

Adverse effects: See under cefpodoxime

Dose: Adult and Child over 10 years, 200-400 mg daily in 1-2 divided doses. Gonorrhoea: 400 mg as a single dose.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Cefixime 50 mg/5 ml 60 ml D.Syp	Yes	B
Cefixime 100 mg/5 ml 60 ml D.Syp	Yes	B
Cefixime 200 mg Tab	Yes	B
Cefixime 400 mg Tab	Yes	B

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.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Cefotaxime 1 gm Inj	Yes	B
Cefotaxime 500mg Inj	Yes	B
Cefotaxime 250mg Inj	Yes	B

4.CEFTRIAXONE

Longer duration of action.

Indication: See under cefotaxime.

Adverse effects: CNS: headache, dizziness, weakness, fever, seizures**.** GI: nausea, vomiting, deranged LFT, abdominal pain**.** Hematological: leukopenia, thrombocytopenia, agranulocytosis, rash, utricaria, anaphylaxis, toxic epidermal necrolysis.

Contraindications and Precautions: Hypersensitivity, hyperbilirubinemic neonates particularly those who are premature; neonates <28 days if they receive calcium containing iv products. Risk of fatal calcium-ceftriaxone precipitant formation in lungs and kidneys of term and preterm neonates. May increase INR, especially in nutritionally deficient patients.

Dose: 2-4 g daily as a single dose in severe infection, Uncomplicated gonorrhoea, by deep intramuscular injection, 250 mg as a single dose.

Surgical prophylaxis, by deep intramuscular injection or by intravenous injection over 2-4 minutes,

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Ceftriaxone 125 mg Inj	NA	B
Ceftriaxone 250 mg Inj	Yes	B
Ceftriaxone 500 mg Inj	Yes	B
Ceftriaxone 1 gm Inj	Yes	B

FOURTH GENERATION

1. CEFEPIME

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

Adverse effects and cautions: Positive coombs test without haemolysis, rahs, diarrhoea, hypophosphatemia, elevated alanine aminotransferase.

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

CARBAPENEM

1.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.

SULPHONAMIDES AND TRIMETHOPRIM

1.SULFAMETHOXAZOLE AND TRIMETHOPRIM

It blocks two consecutive steps in nucleic acid biosynthesis.

Indication: Uncomplicated lower urinary tract infection, bacterial prostatitis, exacerbation of chronic bronchitis due to H. influenzae and Strep. Pneumoniae, acute otitis media in children and acute maxillary sinusitis in adults due to H. influenzae and Strep. Pneumonia, Pneumocystis carinii pneumonia.

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

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.

2.QUINOLONES

First Generation

1.CIPROFLOXACIN

Indication: Uncomplicated and complicated urinary tract infections, acute and chronic prostatitis, infective chronic airway disease, typhoid fever and gonorrhoea.

Adverse effects and cautions: Nausea, vomiting, pancreatitis, tachycardia, hypotension, tinnitus, and sweating. Use with caution in patients with epilepsy or a history of epilepsy, hepatic or renal impairment, pregnancy, and breastfeeding.

Dose: By mouth, respiratory tract infections, 250-500 mg twice daily; Urinary-tract infections, 250-500 mg twice daily (100 mg twice daily for 3 days in acute uncomplicated cystitis in women). Gonorrhoea, 500 mg as a single dose; chronic prostatitis, 500 mg twice daily for 28 days.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Ciprofloxacin 250 mg Tab	Yes	C
Ciprofloxacin 500 mg Tab	Yes	C
Ciprofloxacin 200 mg/100 ml Inj	Yes	C

2.NORFLOXACIN

Indication: Uncomplicated urinary-tract infections, prophylaxis in recurrent urinary-tract infections, chronic prostatitis.

Adverse effects and cautions: See under ciprofloxacin

Dose: Urinary-tract infections, 400 mg twice daily for 7-10 days (for 3 days in uncomplicated lower urinary- tract infections).

3.OFLOXACIN

Indication: Uncomplicated urinary-tract infections, acute or chronic prostatitis, infective chronic airway disease and gonorrhoea.

Adverse effects and cautions: See under ciprofloxacin

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

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Ofloxacin 200 mg Tab	Yes	C
Ofloxacin 400 mg Tab	Yes	C

SECOND GENERATION

1.LEVOFLOXACIN

Indication: Chronic prostatitis, urinary-tract infections, exacerbation of chronic bronchitis, community-acquired pneumonia, skin and soft tissue infections.

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

Dose: Urinary-tract infections, 250 mg daily for 7-10 days (for 3 days in uncomplicated cases). Exacerbation of chronic bronchitis, 250-500 mg daily for 7-10 days.

Chronic prostatitis, 500 mg once daily for 28 days.

Community-acquired pneumonia: 500 mg once or twice daily for 7-14 days.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Levofloxacin 500 mg Tab	Yes	C
Levofloxacin 750 mg Tab	Yes	C
Levofloxacin 500 mg inj	Yes	C

TETRACYCLINES

1.DOXYCYCLINE

Indication: Susceptible infections (eg, Chlamydia, Rickettsia and Mycoplasma), UTI, acne, syphilis, papulopustular facial rosacea, anthrax, prophylaxis of malaria.

Adverse effects and cautions: Anorexia, anxiety, dry mouth, flushing, fungal superinfection (when used for periodontitis), tinnitus; phototoxicity may occur with prolonged use

Dose: Acne, 100 mg daily for 6-12 weeks or longer. Early syphilis, 100 mg twice daily for 14 days; late latent syphilis 200 mg twice daily for 28 days. Nongonococcal urethritis, 100 mg twice daily for 7 days.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Doxycycline 100 mg Tab	Yes	D
Doxycycline 100 mg Inj	Yes	D

Aminoglycoside

1. GENTAMICIN

Indication: urinary tract infections due to Pseudomonas, meningitis and other CNS infections, septicaemia and neonatal sepsis, endocarditis (with other antibiotics), and surgical prophylaxis.

Adverse effects and cautions: Vestibular damage, reversible nephrotoxicity and respiratory paralysis. Monitoring of blood levels of gentamicin is advisable because both nephrotoxicity and ototoxicity are seen when higher doses are used, particularly in neonates, elderly and renal-impaired patients.

Gentamicin should not be used during pregnancy except when essential.

Contraindication: Myasthenia gravis (may impair neuromuscular transmission).

Does: By intramuscular or by slow intravenous injection over at least 3 minutes or by intravenous infusion, 3-5 mg/kg daily (in divided doses every 8 hours).

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Gentamicin 20mg/ml 2 ml Inj	NA	D
Gentamicin 40 mg/ml 2 ml Inj	Yes	D

2.AMIKACIN

Indication: Serious Gram-negative infections resistant to gentamicin.

Adverse effects and cautions: See under gentamicin but it affects auditory function more than vestibular.

Dose: For adults and children the equivalent of 15 mg of amikacin per kg body-weight daily in 2 divided doses every 12 hours by intramuscular or slow intravenous injection or infusion, up to a maximum of 1.5 g daily in adults; Child 15 mg/kg daily in 2 divided doses; Neonate loading dose of 10 mg/kg then 15 mg/kg daily in 2 divided doses.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Amikacin 100 mg Inj	Yes	D
Amikacin 250 mg Inj	Yes	D
Amikacin 500 mg Inj	Yes	D

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; **Preparation Available:**

MACROLIDES

The macrolides have an antibacterial spectrum that is similar but not identical to that of penicillin; they are thus an alternative in penicillin-allergic patients.

1.AZITHROMYCIN

Indication: Respiratory-tract infections, otitis media, skin and soft tissue infections, non-gonococcal urethritis, multidrug-resistant typhoid; greater action on gram-negative organisms than erythromycin

Adverse effects and cautions: Abdominal discomfort, diarrhoea, nausea, vomiting, pancreatitis, constipation, headache, drowsiness; cautions in electrolyte disturbances (predisposition to QT interval prolongation), may aggravate myasthenia gravis. The drug should be used in pregnancy and breastfeeding 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. Nongonococcal urethritis, 1 g as a single dose. Typhoid, 500 mg once daily for 7 days.

Drug	Health Insurance	Pregnancy Category
Azithromycin 100mg/5ml, 15 ml Susp	Yes	B
Azithromycin 200 mg/5 ml, 15 ml Susp	Yes	B
Azithromycin 250 mg Tab	Yes	B
Azithromycin 500 mg Tab	Yes	B

2.CLARITHROMYCIN

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

Indication: Respiratory-tract infections, mild to moderate skin and soft tissue infections, otitis media, H. pylori eradication, Lyme disease.

Adverse effects and cautions: See under erythromycin; also, tooth and tongue discolouration, headache, smell and taste disturbances.

The drug should be used in pregnancy and breastfeeding if the potential benefit outweighs the risk.

Dose: 250 mg every 12 hours for 7 days (severe infection, 500 mg every 12 hours for up to 14 days); CHILD, mg /kg twice daily.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Clarithromycin 500 mg Tab	Yes	C

LINCOSAMIDES

1. CLINDAMYCIN

Indication: Methicillin-resistant Staphylococcus aureus (MRSA) in bronchiectasis, bone and joint infections, and skin and soft-tissue infections, Erysipelas or cellulitis in penicillin-allergic patients (alternative to macrolides)

Adverse effects and cautions: Abdominal discomfort, antibiotic-associated colitis, diarrhoea, eosinophilia, jaundice; abscess, induration, pain and thrombophlebitis on parenteral use; avoid in acute porphyrias.

Dose: By mouth Child: 3–6 mg/kg 4 times a day (max. per dose 450 mg) Adult: 150–300 mg every 6 hours; increased if necessary up to 450 mg every 6 hours if required, increased dose used in severe infection.

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Clindamycin 300 mg Tab	Yes	B
Clindamycin 150 mg/ml, 4 ml Inj	Yes	B
Clindamycin 150 mg/ml 2 ml Inj	Yes	B

GLYCOPEPTIDE

1. VANCOMYCIN

It inhibits cell wall synthesis through glycopeptide polymerisation 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 the potential benefit outweighs the risk.

Dose: By intravenous infusion, 500 mg every 6 hours or 1 g every 12 hours. Elderly over 65 years, 500 mg every 12 hours or 1 g once daily.

MISCELLANEOUS

1.**CHLORAMPHENICOL**

Indications: Life-threatening infections particularly those caused by H. influenzae

Adverse effects and cautions: Blood disorders, depression, diarrhoea, dry mouth, erythema multiforme, glossitis, headache, nausea, optic neuritis; avoid repeated courses and prolonged treatment.
Dose: Adult: 12.5 mg/kg every 6 hours, in exceptional cases dose can be doubled for severe infections such as septicaemia and meningitis, providing high doses reduced as soon as clinically indicated.

Preparation Available

Drug	Health Insurance	Pregnancy Category
Chloramphenicol 500mg Tab	Yes	NA
Chloramphenicol 5% Ear Drop	Yes	NA

2.LINEZOLID

Indications: active against Gram-positive bacteria including meticillin-resistant Staphylococcus aureus (MRSA), and glycopeptides resistant enterococci; not active against common Gram-negative organisms.

Adverse effects and cautions: Diarrhoea, eosinophilia, headache, nausea, taste disturbances, vomiting; use with caution in acute confusional states, bipolar depression, carcinoid tumour, history of seizures, thyrotoxicosis.

Dose: Adult: 600 mg every 12 hours usually for 10–14 days (maximum duration of treatment 28 days).

3.NITROFURANTOIN

Indication: Acute and chronic UTI, Genitourinary surgical prophylaxis.

Adverse effects and cautions: Nausea, vomiting, diarrhoea, haemolytic anaemia in individuals with G-6 PD deficiency, allergic manifestations such as chills, fever, leucopenia, cholestatic jaundice and peripheral neuropathy. The drug should not be used in acute pyelonephritis, infants less than 3 months old and known hypersensitive to nitrofurantoin. The drug has been used safely in pregnancy.

Dose: Acute uncomplicated infection, 50 mg every 6 hours with food for 7 days; Child over 3 months, 3 mg/ kg daily in 4 divided doses.

Severe chronic recurrent infection, 100 mg every 6 hours with food for 7 days (dose reduced or discontinued if severe nausea).

Preparation Available:

Drug	Health Insurance	Pregnancy Category
Nitrofurantoin 100 mg Tab	Yes	B

8.6 Antiviral

1.ACYCLOVIR

Indication: Herpes infections.

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

The drug should be used with caution in renal impairment and, 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.

Chapter 9 Drugs Used in Allergic Disorders

9.1 Antihistamine

1. CETIRIZINE

It is a non-sedating antihistamine, causing less psychomotor impairment.

Indication: Urticaria, hay fever, insect stings, and pruritus.

Adverse effects and cautions: Headache, but the incidence of sedation and antimuscarinic effects are low. The drug should be used with caution in epilepsy, prostatic hypertrophy, and glaucoma. The drug should be avoided in pregnancy and breastfeeding.

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:

Drug	Under Health Imsurance	Pregnancy Category
Tab Cetrizine 10 mg	Yes	NA
Cetrizine 5mg/5ml 30ml syp	Yes	NA

2. LEVOCETIRIZINE

It is an isomer of cetirizine.

Indication: See under cetirizine.

Adverse effects and cautions: See under cetirizine.

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

Preparation Available:

Drug	Under Health Imsurance	Pregnancy Category
Tab Levocetrizine 5 mg	Yes	B

3.CHLORPHENIRAMINE/CHLORPHENAMINE

Indication: Symptomatic relief of allergy such as urticaria, hay fever, insect stings and pruritus of allergic origin.

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

It should be used with caution in epilepsy, prostatic hypertrophy, urinary retention, and glaucoma.

Dose: 4 mg every 4-6 hours, maximum 24 mg daily; child 1-2 years 1 mg twice daily, 2-5 years 1 mg every 4-6 hours, maximum 6 mg daily, 6-12 years 2 mg every 4-6 hours, maximum 12 mg daily; Infant not recommended.

4. 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:

Drug	Under Health Insurance	Pregnancy Category
Tab Fexofenadine 120 mg	Yes	C
Tab Fexofenadine 180 mg	Yes	C
Fexofenadine 30mg/5ml 60 ml Syp	Yes	C
Fexofenadine 30mg/5ml 100ml Syp	NA	C

5. CYPROHEPTADINE

It has antihistamine and antiserotonergic properties.

Indication: Hay fever, urticarial.

Adverse effects and cautions: See under chlorphenamine. Weight gain and increased growth in children have been observed. The drug should be used in pregnancy and breastfeeding 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:

Drug	Under Health Insurance	Pregnancy Category
Cyproheptadine 2 mg/5 ml 100 ml syp	Yes	B

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 and cautions: Drowsiness, GI disturbance, dry mouth; avoid in acute porphyrias, use with caution in epilepsy, glaucoma (in children), prostatic hypertrophy (in adults).

Dose: Child 5–11 years: 15 mg 3 times a day; Child 12–17 years: 30 mg 3 times a day; Adult: 30 mg 3 times a day.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Tab Cinnarizine 25 mg	Yes	C

8.PHENIRAMINE

Indication, Adverse effects, and cautions: See under chlorphenamine.

Dose: By intramuscular or slow intravenous injection, 25-50 mg.

Preparation Available:

Drug	Under Health Imsurance	Pregnancy Category
Tab Pheniramine 25 mg	Yes	C
Pheniramine 22.75 mg/ml 2ml inj	Yes	C

9.2 Sympathomimetics

1. EPINEPHRINE/ADRENALINE

Epinephrine is a physiological antagonist to histamine and can reverse the tissue to normal functioning. It is therefore useful as a life-saving drug in acute emergencies, brought about by histamine release due to allergy or anaphylaxis.

Indication: Acute anaphylaxis, angioedema, cardiac arrest.

Adverse effects and cautions: Tachycardia, tremor, hypertension, sweating, vomiting, headache.

The drug should be used with caution in hypertension, arrhythmias, diabetes mellitus, heart disease, the second stage of labour, and 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:

Drug	Under Health Insurance	Pregnancy Category
Adrenaline 1:1000 1ml inj	Yes	NA

Chapter 10: Drugs Acting on Genito Urinary Tract

10.1 Obstetrics

LABOUR INDUCTION

1. MISOPROSTOL

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

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

Adverse effects and cautions: Uterine hyperstimulation, uterine rupture, foetal distress, diarrhoea, abdominal pain, rashes, dizziness; use with caution in hypertension. Oxytocin should not be started for 6 hours following administration of a vaginal dose.

Contraindication: Placenta praevia, major cephalopelvic disproportion, foetal malpresentation, foetal distress, history of caesarean section, multiple pregnancy.

Dose: Induction of labour, by vagina, 25 micrograms repeated after 6 hours if necessary, if still no response, increase to 50 micrograms every 6 hours for up to 4 doses.

Medical termination of intrauterine pregnancy of up to 63 days gestation, Oral; 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 followup visit 10-15 days later to verify complete expulsion (if treatment fails, pregnancy must be terminated by another method).

2. OXYTOCIN

Indication: Induction of labour, incomplete or inevitable or missed abortion, prevention and treatment of postpartum and post-abortion haemorrhage.

Adverse effects and cautions: Nausea, vomiting, high dose causes violent uterine contractions leading to rupture, foetal distress, asphyxia and death, arrhythmias, rashes, water intoxication and anaphylactoid reactions; use with caution in hypertension, abnormal presentation, previous caesarean section, caudal block anaesthesia.

Contraindication: Mechanical obstruction to delivery, severe pre-eclamptic toxaemia, foetal distress, hypertonic uterine contraction, and placenta praevia.

Dose: By slow intravenous infusion, induction of labour and augmentation of labour in hypotonic uterine inertia, a solution containing 1 unit per litre, 0.0010.002 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; by slow intravenous infusion, 5 units. Treatment of post-postum haemorrhage, by slow intravenous injection, 5-10 units.

UTERINE RELAXANTS (TOCOLYTICS)

1. ISOXSUPRINE

Indication: To inhibit premature labour

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

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

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

Contraindication: Isoxsuprine is contraindicated following recent arterial haemorrhage.

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

10.2 Bladder and Urinary Tract 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:

Drug	Under health insurance	Pregnancy Category
Tab Flavoxate 200 mg	Yes	B

2. 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.

2. TAMSULOSIN

It blocks alpha-1a receptors in the smooth muscle of the prostate, decreasing bladder neck and urethral resistance.

Indication: Benign prostatic hyperplasia.

Adverse effects and cautions: Refer to the prazosin section.

Contraindications: Refer to the prazosin section.

Dose: 400 micrograms daily as a single dose.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Cap Tamsulosin 0.4 mg	Yes	NA

3. 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:

Drug	Under Health Insurance	Pregnancy category
Tab Finasteride 5 mg	Yes	X

URINARY ALKALIZER

1. DISODIUM HYDROGEN CITRATE

It is an acidic salt of citric acid, which is used as a urinary alkalizer.

Adverse effects: may cause flatulence, diarrhea, stomach cramps or pain, nausea, vomiting

Preparation available:

Drug	Under Health Insurance	Pregnancy Category
Disodium Hydrogen Citrate soln 100ml	Yes	A

Chapter 11 Drugs Used in Anesthesia And Critical Care

11.1 Inhalational anesthetics

1. HALOTHANE

Dosage form and strength: *Volatile liquid:* 50 ml, 200 ml and 250 ml

Indication: Induction and maintenance of general anesthesia

Adverse effects: Nausea and vomiting, acidosis, dehydration and fever in children may predispose to convulsions under ether anesthesia. Use of halothane may cause excessive bleeding during caesarean section and postpartum hemorrhage.

Contraindications/Precautions: History of unexplained jaundice or pyrexia in a patient following exposure to halothane. Avoid repeated exposure to halothane in less than three months. Careful anesthetic history should be taken to determine previous exposure and previous reaction to halothane.

Dosage schedule: Induction done using a special calibrated vaporizer, increased gradually to 2-4% in oxygen or nitrous oxide-oxygen; child: 1.5-2%; maintenance: 0.5-2%.

2.ISOFLURANE

Dosage form and strength: *Volatile liquid:* 100 ml and 250 ml

Indication: Induction and maintenance of general anesthesia.

Adverse effects: Nausea, vomiting, shivering, dose dependent hypotension, arrhythmia, respiratory depression rare, risk of perioperative hyperkalemia and malignant hypertension.

Contraindications/Precautions: Hypersensitivity to isoflurane and halogenated agents, genetic susceptibility to malignant hyperthermia. Coronary artery disease; should not be used as a sole agent of induction in pt. with ventricular dysfunction **,** use cautiously in lactation**.**

Dosage schedule: Using a special calibrated vaporizer.

•Induction*:* increased gradually form 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.

Pregnancy category: C

3.NITROUS OXIDE

Dosage form and strength: *Gaseous form*

Indication: Used as a carrier gas for more powerful general anesthetic drugs like desflurane and sevoflurane.

Adverse effects: Megaloblastic anemia due to Vitamin.B12 and folate deficiency; teratogenic (avoid in 1st and 2nd trimester).

Contraindications/Precautions: Pneumothorax, middle ear or sinus disease, bowel obstruction. Should be used cautiously in 1st and 2nd trimester of pregnancy and in patient with decreased level of consciousness or in violently disturbed psychiatric patient.

Dosage schedule: Mixture with 50% O_2 during labor.

4.OXYGEN

Dosage form and strength: *Inhalational gas (medicinal gas)*

Indication: Along with inhalational anesthesia, cluster headache, hyperbaric oxygen (decompression sickness and air or gas embolism, gas gangrene, radiation therapy), respiratory failure.

Adverse effects: Concentrations greater than 80% have a toxic effect on the lungs leading to pulmonary congestion, exudation and atelectasis. Retinopathy of prematurity. With Hyperbaric oxygen therapy: barotrauma (ear or sinus trauma, tympanic membrane rupture, or rarely pneumothorax or air embolism); oxygen toxicity (CNS toxicity or pulmonary toxicity); and reversible visual changes.

Contraindications/Precautions: High concentrations of oxygen should be avoided in patients whose respiration is dependent upon hypoxic drive. To be stored under pressure in metal cylinder of the type conforming to appropriate safety regulations. Valves and taps should not be lubricated with oil or grease. Any fire or spark is highly dangerous in the presence of increased oxygen concentrations especially when oxygen is used under pressure.

5.SEVOFLURANE

Dosage form and strength: *Volatile liquid:* 0.5-3%

Indication: Anesthesia

Adverse effects: Malignant hyperthermia, dose-dependent hypotension, bradycardia, tachycardia, hypotension, HTN, apnea, increased BUN, increased ALT, respiratory irritation, nephrotoxicity, glycosuria, proteinuria.

Contraindications/Precautions: Should not be used as a sole agent for induction in patients with ventricular dysfunction. Susceptibility to malignant hyperthermia**,** hypersensitivity, lack of ventilator support. In patients with anemia, hepatic impairment, myxedema, renal impairment; myasthenia gravis.

Pregnancy category: B

6.DIAZEPAM

See under Drugs acting on the Central Nervous System

7.KETAMINE

Indication: Induction and maintenance of anesthesia for minor surgical or diagnostic procedures; Analgesia for painful procedures of short duration for patients at risk of hypotension and bronchospasm

Adverse effects: Emergence reactions (dream like state, vivid imagery, hallucinations and/or delirium, hypertension, increased cardiac output, increased ICP, tachycardia, tonic- clonic movements, increased salivation. Dependence and tolerance with prolonged use.

Contraindications/Precautions: In patients with epilepsy, hypertension and in patients with increased ICP. Use cautiously in: CNS abnormalities, CNS masses, or hydrocephalus (may increase ICP), increased intra-ocular pressure, coronary artery disease, catecholamine depletion, hypertension and tachycardia (monitor cardiac function cautiously), chronic alcoholic patients.Too rapid administration will cause respiratory depression. Do not put diazepam or barbiturate in same syringe/bag along with ketamine. Avoid mechanical stimulation of the pharynx if ketamine used alone.

Preparations available:

Drugs	**Under Health Insurance Scheme**	**Pregnancy category**
Ketamine 10mg/ml inj	Yes	B

8.MIDAZOLAM

Indications: Status epilepticus, febrile convulsions, conscious sedation for procedures, sedative in combined anesthesia, premedication, sedation of patient receiving intensive care, confusion and restlessness in palliative care, convulsions in palliative care.

Adverse effects: Decreased respiratory rate, apnea, drowsiness, seizure-like activity, nausea/vomiting, cough, pain at injection site, headache, sedation, hiccoughs, delirium, euphoria**.**

Contraindications/Precautions: CNS depression, compromised airway, severe respiratory depression. Cardiac disease, children (particularly if cardiovascular impairment), concentration of midazolam in children under 15 kg not to exceed 1 mg/mL, debilitated patients (reduce dose), hypothermia, hypovolemia (risk of severe hypotension), neonates, risk of airways obstruction and hypoventilation in children under 6 months (monitor respiratory rate and oxygen saturation), vasoconstriction. Caution in hepatic and renal impairment.

Preparations available:

Drugs	**Under Health Insurance Scheme**	**Pregnancy Category**
Midazolam 5mg/ml inj	Yes	D

9.PROPOFOL

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

Adverse effects: Apnea, bradycardia, hypotension, involuntary movements, injection site burning/ stinging/ pain, respiratory acidosis during weaning, hypertriglyceridemia, nausea, vomiting, hiccups.

Contraindications/Precautions: Lack of ventilator support, severe cardiac dysfunction, documented hypersensitivity, egg allergy, soybean/soy allergy, sedation of ventilated children and adolescents <17 years, use in labor and delivery (cause neonatal depression). Proper aseptic technique imperative (drug vehicle capable of supporting rapid growth of organisms). Risk of potentially fatal propofol infusion syndrome in ICU patients.

Preparations Available

Drugs	Under Health insurance Scheme	Pregnancy Category
Propofol 1% 20ml inj	Yes	B

11.2 Local anesthetics

1.BUPIVACAINE

Indications: local infiltration, peripheral nerve block, epidural block, sympathetic block

Adverse effects Include Headache, bradycardia, hypotension, cardiac arrhythmias, cardiac arrest, anxiety, restlessness, tremors, dizziness, and respiratory arrest. Hypersensitivity reactions manifest as edema, status asthmaticus, or anaphylactoid reaction.

Contraindications/Precautions: Hypersensitivity. The drug should be used with caution in severely debilitated patients and in those with liver disease, renal impairment, pregnancy, impaired cardiac condition, in patients with myasthenia gravis and severe shock.

Pregnancy category: C

2.LIDOCAINE (LIGNOCAINE)

Indications: production of local or regional anesthesia

Adverse effects: redness or flushing of skin, swelling, itching or rash, bradycardia, hypotension, dizziness, light headedness, rarely methemoglobenemia

Contraindications/Precautions: Hypersensitivity, 3rd degree heart block. See Bupivacaine, Pregnancy (B). Lignocaine should be stored at a temperature of 8-15º C. Any of the gel not used in a single application should be discarded.

Preparations available:

Drugs	Under Health insurance Scheme	Pregnancy Category
Lignocaine gel 2%	Yes	B
Lignocaine 2% inj	Yes	B

11.3 Preanaesthetic's medications

ANTICHOLINERGICS

1.ATROPINE
See under Atropine [OP poisoning management]

BENZODIAZEPINES

1.DIAZEPAM
See under 'Drugs acting on the Central Nervous System'

2.LORAZEPAM
See under 'Drugs acting on the Central Nervous System'

3.MIDAZOLAM
See under 'Intravenous anaesthetics'

OPIOID ANALGESICS

1.FENTANYL

Indications: Induction and maintenance of anesthesia, analgesia (preoperative and post-operative).

Adverse effects: confusion, delirium or sometimes paradoxical excitation, post-operative depression and drowsiness, bradycardia, arrest, hypotension or HTN, arrhythmias, respiratory depression, arrest, laryngospasm, blurred vision, double vision, nausea, vomiting, constipation, biliary spasm, urinary retention, rash, diaphoresis, muscle rigidity

Contraindications/Precautions: Hypersensitivity**,** myasthenia gravis**,** Pregnancy, breast feeding, geriatric patients, increased ICP, seizure disorders, cardiac dysrhythmias, severe respiratory disorders. Do not use fentanyl within 2 weeks of use of MAOIs.

Preparations available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Fentanyl citrate 2ml, amp	Yes	C

2.MORPHINE

See under 'Drugs acting on the Central Nervous System'

OTHERS

METOCHLOPRAMIDE

See under 'Drugs used in gastrointestinal system'

OMEPRAZOLE

See under 'Drugs used in gastrointestinal system'

PROMETHAZINE

See under 'Drugs used in gastrointestinal system'

RANITIDINE

See under 'Drugs used in gastrointestinal system'

11.4 Neuromuscular blockers

1.ROCURONIUM BROMIDE

Indications: Neuromuscular blockade (intermediate duration) during surgery/ intubation/ intensive care.

Adverse effects: Acute myopathy (after prolonged use in intensive care), bronchospasm, hypotension, skin flushing, tachycardia, drug and food interaction: With or following an opioid, sedative or anesthetic agent.

Contraindications/Precautions: Avoid in neuromuscular disease, hypersensitive to drug &/or bromides. For use ventilator support is mandatory. Hepatic impairment: reduce dose. Renal impairment: reduce maintenance dose; prolonged paralysis. Pregnancy (C)

Preparations Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Rocuronium 10mg/ml	NA	C

2.VECURONIUM

Dosage form and strength: Solution: 10 mg/ml

Indications: Neuromuscular blockade (intermediate duration) during surgery/ intubation.

Adverse effects: Acute myopathy (after prolonged use in intensive care), bronchospasm, hypotension, skin flushing, tachycardia.

Contraindications/Precautions: Avoid in neuromuscular disease, hypersensitive to drug &/or bromides. For use, ventilator support is mandatory. Hepatic impairment: Reduce dose in severe impairment.

Dose: Neuromuscular blockade (intermediate duration) during surgery and intubation: intravenous injection, adult: 80–100 mcg/ kg; maintenance: intravenous injection: 20–30 mcg/kg, adjusted according to response, maximum dose in caesarean section:100 micrograms/kg. OR, maintenance: intravenous infusion: 0.8–1.4 mcg/kg/minute, adjusted according to response.

To avoid excessive dosage in obese patients, dose should be calculated on the basis of ideal bodyweight.

Reconstitute each vial with 5 mL Water for Injections to give 2 mg/mL solution; alternatively reconstitute with up to 10 mL Glucose 5% or Sodium Chloride 0.9% or Water for Injections- unsuitable for further dilution if not reconstituted with Water for Injections. For continuous intravenous infusion, dilute reconstituted solution to a concentration up to 40 mcg/L with Glucose 5% or Sodium Chloride 0.9%; reconstituted solution can also be given via drip tubing.

Pregnancy category: C

11.5 Anticholinesterase

1.NEOSTIGMINE

Dosage form and strength: Tablet: 15 mg. Solution for injection: 2.5 mg/ml ampoules, 10 mg/ml in 50mg/5ml vials

Indications: Treatment of myasthenia gravis.

Adverse effects: Acute myopathy (after prolonged use in intensive care), bronchospasm, hypotension, skin flushing, tachycardia

Contraindications/Precautions: Renal impairment: reduce dose.

Dose:

• Treatment of myasthenia gravis: oral, adult: Initially 15-30 mg, dose repeated at suitable intervals throughout the day, total daily dose 75–300 mg, maximum dose: 180 mg daily. Subcutaneous injection or by intramuscular injection, adult: 1-2.5 mg, dose repeated at suitable intervals throughout the day (usual total daily dose 5–20 mg)

• Reversal of non-depolarising (competitive) neuromuscular blockade: intravenous injection, adult: 2.5 mg (max. per dose 5 mg), repeated if necessary after or with glycopyronium or atropine, to be given over 1 minute

Pregnancy category: C

Chapter 12 Drugs Used in Skin Disorders

12.1 Antifungal Drugs

1. CLOTRIMAZOLE

Indication: Tinea pedis, T. cruris, T. carports, T. versicolor, cutaneous candidasis, 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:

Drug	Under Health Insurance	Pregnancy Category
Clotrimazole 1% w/v 15 gm Oint	Yes	B

2. LULICONAZOLE

Indication: Tinea corporis, Tinea cruris, Tinea pedis.

Adverse effects and cautions: local irritation, dermatitis.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Luliconazole 1 %, 15 gm Oint	Yes	-

3. KETOCONAZOLE

Indication: Vaginal and vulva candidiasis, fungal skin infection, seborrhoeic dermatitis, and dandruff.

Adverse effects and cautions: Local irritation, burning sensation, erythema, and itching.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category

Ketoconazole 2% w/v 15 gm oint	Yes	C
Ketoconazole shampoo 100ml	Yes	C

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.

12.2 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 tumours.

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

Dose: Apply twice daily for 8 weeks.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Metronidazole 1 % + Chlorhexidine 1 % + Lignocaine 2 %, 10 gm Oint	Yes	A

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-infectives 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-positive organisms (except pseudomonal infections), and MRSA colonisation elimination.

Adverse effects and cautions: Burning sensation, local reactions, pruritus, rash, and urticaria.

Dose: Apply up to 3 times a day for up to 10 days.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Mupirocin 2% w/w 5 gm oint	Yes	NA
Mupirocin 2% w/w 5 gm oint	NA	NA

6. GENTAMICIN

Indication: Active against aerobic Gram –ve bacteria and some Gram-positive bacteria.

Adverse effects and cautions: Erythema and pruritus; overgrowth of non-susceptible organisms, including fungi.

7. SILVER SULFADIAZINE

Indications: Gram-negative infections, infections in burn wounds, infected ulcers 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, breastfeeding, and neonates.

Dose: Apply daily or more frequently if very exudative.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Silver sulfadiazine 1% 25 gm	Yes	C

8. FUSIDIC ACID

Indication: Staphylococcus skin infection, impetigo, sycosis barbae, paronychia, erythrasma.

Adverse effects and cautions: Rashes, eczema, pruritus but frequency not defined.

12.3 Antiviral Drugs

1. 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

Drug	Under Health Insurance	Pregnancy Category
Acyclovir 5% w/w, 5 gm Oint	NA	B

12.4 Drugs for skin inflammatory conditions

1.BECLOMETHASONE / BECLOMETASONE

Indication: Severe inflammatory skin disorders such as eczema, psoriasis.

Adverse effects and cautions: See under hydrocortisone.

2. 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:

Drug	Under Health Insurance	Pregnancy Category
Clobetasol 0.05% 10gm oint	Yes	C

3. 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.

4. FLUTICASONE

Indication: Eczema, psoriasis, atopic dermatitis.

Adverse effects and cautions: Pruritus, dryness, skin irritation, telangiectasia.

Contraindication: Skin atrophy, perioral dermatitis, rosacea, ophthalmic use.

5. HYDROCORTISONE

Indication: Eczema, nappy rash, atopic dermatitis.

Adverse effects and cautions: Skin atrophy, striae, acne form lesions, itching, and pigmentation changes.

Contraindication: Underlying infection, ophthalmic use.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Hydrocortisone 1% 10gm oint	Yes	C

6.MOMETASONE

Indication: Eczema unresponsive to less potent corticosteroid, psoriasis, dermatosis.

Adverse effects and cautions: Burning, itching, pruritus, rosacea.

7.HALOBETASOL

Indications: Eczema unresponsive to less potent corticosteroid, psoriasis, dermatosis

Adverse effects and cautions: Burning, itching, pruritus, rosacea.

8. 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:

Drug	Under Health Insurance	Pregnancy Category
Calamine 8%, 100ml lotion	Yes	-

9. TRIAMCINOLONE

Indication: Topical inflammatory dermatoses.

Adverse effects and cautions: Skin atrophy, striae, acne form lesions, pigmentation changes

12.5 Scabicides and pediculicides

1. LINDANE / GAMMA BENZENE HEXACHLORIDE

Lindane stimulates the nervous system, resulting in seizures and the 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.

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:

Drugs	Under Health Insurance	Pregnancy Category
Permethrin 5% lotion	Yes	B

12.6 Analgesics Drugs

1. DICLOFENAC AND ALLIED COMBINATIONS

Indication, Adverse effects and cautions: Refer to the musculoskeletal and joint disease chapter

Preparation available

Drug	Under Health Insurance	Pregnancy Category
Diclofenac 1% oint	Yes	-

Chapter 13: Drugs Used in Eye Disorders

13.1 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'.

2. CIPROFLOXACIN

Indication: Superficial bacterial infections, corneal ulcers.

Adverse effects and caution: 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).

Preparation Available:

Drugs	Under Health Insurance	Pregnancy category
Ciprofloxacin 0.3 % w/v E/D	Yes	NA

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:

Drug	Under Health Insurance	Pregnancy Category
Ofloxacin 0.3 % w/v E/D	Yes	NA

4. GENTAMICIN

Indication: Superficial infections of the eye, including Pseudomonas.

Adverse effects and cautions: Transient irritation, burning, and itching.

The use of gentamicin may result in overgrowth of nonsusceptible organisms, including fungi. Cross-allergenicity among the aminoglycosides has been demonstrated.

5. TOBRAMYCIN
Indication: Superficial infections of the eye.

Adverse effects and cautions: Transient irritation, lacrimation, conjunctival erythema, oedema of the eye, and itching.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Tobramycin 0.3% w/v E/D	Yes	NA

6.MOXIFLOXACIN

Indication: Bacterial Conjunctivitis

Adverse effects: Swelling, red eye

13.2 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 effects 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.

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.

4. FLURBIPROFEN
Indication: Ocular inflammation
Adverse effects: Ocular hyperaemia, irritation

13.3 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.

2. HOMATROPINE
Indication: Mydriasis and Cycloplegia for Refraction, Dilatation of pupil

Adverse effects and cautions: Blurred Vision,
Photophobia

Contraindication: Narrow angle glaucoma

13.4 Antiglaucoma

1. ACETAZOLAMIDE

It inhibits carbonic anhydrase, hence reducing the formation of hydrogen and bicarbonate in aqueous humour and the water secreted with it, resulting in a decrease in intraocular pressure.

Indication: Open-angle glaucoma, angle-closure glaucoma.

Adverse effects and cautions: anorexia, nausea, vomiting, paresthesia, hypokalaemia, drowsiness, depression, rashes, blood disorders manifested by aplastic anaemia, thrombocytopenia or leucopenia. Electrolyte balance should be maintained in patients receiving acetazolamide. Respiratory acidosis may be precipitated or increased in patients with severe loss of respiratory capacity.

Dose: Closed-angle glaucoma: 500mg PO, followed by 125-250 mg PO at every four-hour interval; Open-angle glaucoma: 250mg to 1 gm PO OD or at a divided dose

Pregnancy Category: C

13.5 Miscellaneous

1. CARBOXYMETHYLCELLULOSE

Indication: Dry Eye.

Adverse effects and cautions: Vision may be temporarily blurred when this product is first used.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Carboxymethylcellulosse 0.5% 10ml Eye Drop	Yes	NA
Carboxymethylcellulosse 1% 10ml Eye Drop	NA	NA

2. KETOROLAC

Indication: Allergic conjunctivitis, postoperative eye inflammation

Adverse effects and cautions: Ocular burning, corneal edema, iritis, blurred vision, corneal erosion, dry eyes

Chapter 14: Vitamins and Minerals

14.1 Minerals

1. CALCIUM

Dosage form and strength: Tablets: 1.25gm calcium carbonate (equivalent to 500mg calcium); Injection: 500mg/5ml, 1gm/10ml (as calcium gluconate) and 100mg/10ml (as calcium chloride)
The daily requirement varies with age and is greater in childhood, pregnancy, lactation, and old age. In osteoporosis, a calcium intake twice the recommended daily amount reduces the rate of bone loss.
Indication: Hypocalcemia in tetany, osteoporosis,
Adverse effects and cautions: Constipation, bradycardia, cardiac arrhythmia, hypotension, and irritation after parenteral administration. Not to be used if allergic to any ingredients of calcium preparations
Dose: 1-2 g between meals; Acute hypocalcemia, by slow intravenous injection, Adult 1-2 g.

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 g to be taken with supper, dose to be adjusted according to serum phosphate concentration; maximum 6.65 g per day

Adverse effects and caution: Arrhythmias, hypomagnesia, hypophosphatemia, hypotension, nausea, pruritus. Constipation may occur. Avoid the intake of oxalate-rich foods (soy, green leafy vegetables, animal protein) to avoid the formation of Ca-Oxalate

3.CALCIUM DOBESILATE

Indication: Diabetic retinopathy, symptoms of hemorrhoidal attack, chronic venous disease

Adverse effects and caution: Nausea, diarrhea, skin rash, fever, headache and vertigo. Use with caution in severe renal impairment

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Calcium Dobesilate 500 mg Tab	Yes	C

4. 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 an inadequate diet or malabsorption; excessive loss of zinc can occur in trauma, burns, and protein-losing conditions.

Indication: Zinc supplementation in zinc-losing conditions

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

Drug	Under Health Insurance Scheme	Pregnancy Category
Zinc 10mg and 20mg tab	Yes	C

14.2 Vitamins

FAT SOLUBLE VITAMINS

1.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 diarrhea and measles in children.

Adverse effects and cautions: Hypervitaminosis A on excessive administration; use with caution in pregnancy and breastfeeding.

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 mobilisation of calcium from bone, and calcium reabsorption in the kidney.

Indication: Prevention and treatment of vitamin D deficiency.

Dose: 400 IU daily for prevention and 800 IU daily for treatment

Preparation Available:

Drug	Under the Health Insurance Scheme	Pregnancy Category
Cholecalciferol 60 K IU Sachet	Yes	A
Cholecalciferol 400 IU/ml Drop	NA	A
Cholecalciferol 800 IU/ml Drop	NA	A
Cholecalciferol 60 K IU Cap	Yes	A

4. ALPHACALCIDOL (1 ALPHA-HYDROXYCHOLECALCIFEROL)

1-alpha hydroxycholecalciferol is a synthetic vitamin D3 analog that is already hydroxylated in the 1 alpha position and is rapidly converted by 25-hydroxylase to 1,25 dihydroxycholecalciferols.

Indication: Prevention of vitamin D deficiency in renal or cholestatic liver disease, patients with renal impairment requiring vitamin D therapy.

Adverse effects and cautions:
Dose: Adult: Initially 1 microgram daily, dose to be adjusted to avoid hypercalcaemia; maintenance 0.25–1 microgram daily

5. CALCITRIOL (1,25-DIHYDROXYCHOLECALCIFEROL)

It is a potent metabolite of the active form of vitamin D, which in turn controls the reabsorption of calcium by the kidneys, controls the intestinal absorption of dietary calcium, decreases excessive serum phosphate levels, bone resorption and parathyroid levels.

Indication: Renal osteodystrophy, established postmenopausal osteoporosis.

Adverse effects and cautions:
Dose: Renal osteodystrophy, initially 250 nanograms daily, adjusted in steps of 250 nanograms every 2–4 weeks if required; usual dose 0.5–1 microgram daily.

6. TOCOPHEROL (VITAMIN E)

Indication: Vitamin E deficiency due to 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:

Drugs	Under Health Insurance Scheme	Pregnancy category
Vitamin E 400 mg Cap	Yes	-

7. Vitamin K

See under Drugs used in blood disorders

WATER-SOLUBLE VITAMINS

1.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), Wemickes's encephalopathy.

Adverse effects and cautions: Non-toxic but may cause allergic reactions, sweating, weakness, a feeling of warmth, and tingling.

Dose: Mild chronic deficiency, 10-25 mg daily; severe deficiency, 200-300 mg daily.
Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy category
Thiamine HCl 200 mg/2ml Inj	NA	A
Thiamine 100 mg Tab	Yes	A

2.RIBOFLAVIN (VITAMIN B2)

It is water soluble and found in vegetables, milk, meat and eggs. Deficiency causes angular stomatitis and other cutaneous manifestations.

Indication: Prophylaxis and treatment of deficiency.

Adverse effects and cautions: Non-toxic, large doses may cause yellow discolouration of urine.

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

3.NIACIN (VITAMIN B3)

Indication: Pellagra, hyperlipidemias (type 4 and 5), peripheral vascular disease

Adverse effects and caution: Paresthesia, headache, dizziness, anxiety, postural hypotension, vasodilation, blurred vision, jaundice, hepatitis, glycosuria. Assess cardiac status, nutritional status, CNS symptoms, and Hyperlipidemia

Contraindication: Pregnancy, breastfeeding, hypersensitivity, peptic ulcer, hepatic disease, severe hypotension, diabetes mellitus, gout, and coronary artery disease

4.PYRIDOXINE (VITAMIN B6)

Indication: Deficiency states causing peripheral neuritis, patients on antituberculous therapy with isoniazid, premenstrual syndrome, idiopathic sideroblastic anaemia.

Adverse effects and cautions: Nausea, headache and paraesthesia.

Dose: Deficiency states, 20-50 mg up to 3 times daily. Isoniazid neuropathy, prophylaxis 10 mg daily, therapeutic, 50 mg three times daily. Premenstrual syndrome, 50-100 mg daily.

5.FOLIC ACID (VITAMIN B9)

Indication: Folic acid deficiency anaemia, prevention of neural tube defects in pregnancy.

Adverse effects and cautions: Rarely rash, itching and bronchospasm.

It should not be given in cases of undiagnosed megaloblastic anaemia without vitamin B12 as there is risk of precipitating subacute combined degeneration of the spinal cord.

Dose: Initially, 5 mg daily for 4 months; maintenance, 5 mg every 1-7 days depending on underlying disease; Child up to 1 year, 500 micrograms/kg daily, over 1 year as adult dose.

Prevention of neural tube defects, 400-500 micrograms daily before conception and during the first 12 weeks of pregnancy.

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Folic acid 5 mg Tab	Yes	A

6.COBALAMINE (VITAMIN B 12)

Indication: Vitamin B12 deficiency states, malabsorption, pernicious anemia, macrocytic anemia

Adverse effects and cautions: Dizziness, rarely diarrhea, itching, urticaria, headache, and nausea.

Parenteral products should be used when the deficiency is due to malabsorption

Dose: Cyanocobalamin, by mouth, for vitamin B12 deficiency of dietary origin, 50-150 micrograms or more daily taken between meals, Child 25-50 micrograms twice daily.

By intramuscular injection, initially 1 mg repeated 10 times at intervals of 2-3 days, maintenance 1 mg every month.

Hydroxocobalamin, pernicious anaemia and other macrocytic anemias without neurological involvement, by intramuscular injection, initially 1 mg repeated 5 times at an interval of 2 days, then 1 mg every 3 months; Child dosage as for adults.

Contraindications: Hypersensitivity to cobalamin, uremia, folate deficiency, concurrent infections, renal dysfunction, and iron deficiency.

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, peripheral neuropathy

Adverse effects and cautions: Stomach upset.
Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Methylcobalamin 1500 mcg Tab	Yes	C

7.ASCORBIC ACID / VITAMIN C

It is water-soluble and found in fruits, especially citrus, tomatoes, and green leafy 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.

Contraindication: Tartrazine, sulfite sensitivity; glucose–6–phosphate deficiency, renal calculi, diabetes

Preparation Available:

Drug	Under Health Insurance Scheme	Pregnancy Category
Vitamin C 500 mg Tab	Yes	A

14.3 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, toxaemia of pregnancy.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Ringer Lactate 500 ml Nipple Head Plastic Bottle	Yes	C
Ringer Lactate 500 ml Plastic Euro Head	Yes	C

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:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Dextrose 5 % 500 ml Plastic Bottle Inj	Yes	C
Dextrose 5 % 500 ml Euro Head Inj	Yes	C
Dextrose 10 % 500 ml Plastic bottle Inj	Yes	C
Dextrose 25 % 25 ml Inj	Yes	C
Dextrose 50 % 25 ml Inj	Yes	C

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, or toxaemia of pregnancy.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Sodium Chloride 0.9 % 100 ml Inj	Yes	NA
Sodium Chloride 0.9 % 500 ml Plastic head Inj	Yes	
Sodium Chloride 0.9 % 1000 ml Plastic head Inj	Yes	

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:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Sodium Chloride 0.9 % + Dextrose 5 % 500 ml Euro head Inj	Yes	C

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 supplement 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:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Potassium Chloride 20 MEQ 10ml, amp inj	Yes	C

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, toxaemia of pregnancy. Periodic laboratory determinations of the patient's acid-base status are recommended to minimise the risk of overdose.

Contraindication: Metabolic or respiratory alkalosis, hypocalcaemia.

Preparation Available:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Sodium Bicarbonate 75 mg/ml 10 ml Inj	Yes	C

7. MULTI-ELECTROLYTE SOLUTION

This preparation consists of potassium chloride, dibasic potassium phosphate, magnesium chloride, sodium acetate, dextrose. These are used in electrolyte imbalance or as supplements.

Drugs	Under Health Insurance Scheme	Pregnancy Category
Multi Electrolyte 500 ml Inj	NA	NA

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:

Drugs	Under Health Insurance Scheme	Pregnancy Category
Magnesium 50 mg/ml Inj, 2 ml Inj	Yes	C

Chapter 15: Drugs used in Poisoning cases

15.1 Identifying Poisoning Cases

Sign	Probable poisoning case
Pinpoint pupils	• May be seen in opioid, mushroom, organophosphorus insecticide or other cholinergic poisoning. • May be a sign of pontine hemorrhage.
Fixed dilated pupils	• May be seen in atropine, tricyclic antidepressants, and antihistamine poisoning.
Hypotension	• Severe poisoning with CNS depressants.
Hypertension	• Sympathomimetic or CNS-stimulating agents poisoning.
Irregular heartbeat	• Acute poisonings (tricyclic antidepressants, antipsychotics, antihistaminics).
Hypothermia	• Especially seen in overdose of barbiturates or phenothiazines.
Hyperthermia	• Especially seen in overdose of CNS stimulants
Patient looks drunk	• It may be a sign of a hypoglycemic state. Consider all hypnotics, sedatives, and antipsychotics.
Metabolic acidosis	• Especially in salicylate poisoning.

15.2 Risk assessment-based approach to poisoning

• Resuscitation (ABCDE)

Airway

Breathing

Circulation

Detect and correct

▪ Hypoglycemia

◦ Check for blood glucose level in patients with altered mental status

◦ Treat if level <4.0 mmol/L: 50 ml 50% dextrose IV.

▪ Seizures

◦ Usually generalized

▫ IV benzodiazepines are first-line

▫ Barbiturates are a second-line therapy

▫ Pyridoxine in case of seizures secondary to isoniazid

▪ Hyper/hypothermia

Emergency antidote administration

• **Risk assessment**

• Agent

• Dose

• Time since ingestion

• Clinical features and course

• Patient factors

- Weight
- Co-morbidities

• **Supportive care and monitoring**

• Initial period of close observation and monitoring in an emergency

• Maintain ABC; correct metabolic, fluid, and electrolyte imbalances

• **Investigations**

• Screening-12-lead ECG

• Drug levels in body fluids

• Other selective investigations that will assist risk assessment or management

• **Decontamination and enhanced elimination**

• **Antidotes**

• **Disposition**

15.3 Decontamination techniques:

1. Skin decontamination

Indications: Poisons that are absorbed via the intact skin, e.g., organophosphorus insecticides. The patient should be stripped of his/her clothes, and their skin should be washed thoroughly with warm water and soap. Attendants should wear

2. Gastrointestinal decontamination

Gastric Lavage

Indications:

• Ingestion of a life-threatening amount of a substance

• Ingestion of a poison within the previous hour

• No other effective means of removal, no availability of specific antidote

Technique:

• Position the patient in the left decubitus position

• Use a large-bore 36-40 G lubricated lavage tube

• Confirm tube position by aspirating gastric contents and auscultating for insufflated air at the stomach

• Administer a 200ml aliquot of warm tap water or NS into the stomach and drain it

• Repeat the procedure until the effluent is clear

• Once complete, activated charcoal may be administered via the tube.

Contraindications:

• Initial resuscitation incomplete

• Risk assessment indicates a good outcome with supportive care and an antidote therapy alone

• Unprotected airway

• Decreased level of consciousness; drowsy or comatose patient

• Corrosive or hydrocarbon ingestion

1.ACTIVATED CHARCOAL

Adsorbs toxic substances or irritants in the gut lumen, thus inhibiting GI absorption. However, this is not a routine practice; it is usually the preferred method of decontamination. It is indicated when the potential benefits outweigh the risks.

Indication:

• Any drug known to be absorbed or after unknown ingestions by patients with protected airways

• Dose: 50 g (adults) or 1 g/kg (children)

Cautions:

• Vomiting and aspiration; treat with an anti-emetic

• Used with caution in drowsy or comatose patients and those with reduced gastrointestinal motility.

Contraindications:

• Initial resuscitation incomplete

• Risk assessment indicates a good outcome with supportive care and antidote therapy alone

• Poisoning with corrosives, alcohols, petroleum distillates, malathion, iron and lithium salts, etc.

2.MULTI-DOSE ACTIVATED CHARCOAL

Indications:

• Ingestion of large doses

• Substances that form bezoars

• Slow-release toxins, sustained-release products

• Toxins that slow gut function

• Toxins with enterohepatic circulation

• Useful to enhance the elimination of certain drugs (e.g. theophylline, phenobarbital, carbamazepine, aspirin)

• Repeat dose: 0.25-0.5 g/kg

Other techniques for enhancing poison elimination

Hemodialysis: For ethylene glycol, lithium, methanol, phenobarbital, salicylates, sodium

valproate, etc.

Alkalinization of urine: For salicylates, barbiturates, and other acidic drug toxicity

15.3 COMMON POISONING CASES AND THEIR MANAGEMENT

1. ORGANOPHOSPHORUS INSECTICIDE POISONING

Management

- Resuscitation, supportive care and monitoring.
- Skin decontamination.
- Activated charcoal usually not useful.
- Antidote.

PRALIDOXIME (2-PAM)

Indication: In all patients with evidence of organophosphate poisoning or nerve agent, anticholinesterase 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 a further 24 hrs.

Preparation Available:

Drug	Under Health insurance	Pregnancy Category
Pralidoxime 500mg inj	Yes	C

ATROPINE

Indication: OP Poisoning, Carbamate Poisoning.

Contraindication: Myasthenia Gravis, Paralytic Ileus, Prostatic Enlargement, Reflux Oesophagitis, Pyloric Stenosis.

Dose:

Adult:

- Inject 1.8-3mg IV bolus and double the dose every 3-5 minutes, depending upon response.
- Continue atropinization until clear chest with no wheeze, dry armpit, dilated pupil, SBP>80 mm Hg, HR>80 bpm,
- Followed by maintenance dose: 10-20% of total initial dose given/hr through IV infusion.
- Child: 20-30 mcg/kg initially with the same procedure as mentioned above.

Preparation Available:

Drug	Under Health Insurance	Pregnancy Category
Atropine sulphate 0.6mg/ml,10 ml	Yes	C

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 the 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 result in hepatotoxicity.

Management:

- Resuscitation, supportive care, and monitoring
- Decontamination
- Activated charcoal may help if the victim presents within the first hour of overdose.

Antidote

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:

Drug	Under Health Insurance	Pregnancy Category
Acetylcysteine 600mg tab	Yes	B
Acetylcysteine 200mg/ml 10ml inj	Yes	B

3.ALUMINIUM PHOSPHIDE POISONING

Phosphine gas is released from tablets of aluminium phosphide in the presence of atmospheric moisture.

Toxic effects:

- Severe pulmonary irritation and pulmonary edema.
- Hepatic and myocardial injury.
- Breathlessness and cyanosis may develop up to 36 hours after exposure.

• Death may occur.

Management:

Management is usually supportive.

• Oxygen should be given to those who develop pulmonary edema.

• Assisted ventilation may be necessary in the most serious cases.

• Patients should be kept under observation.

4.CARBAMATE POISONING

• Reversible acetylcholinesterase inhibitors are used predominantly as insecticides and pesticides.

• The carbamate insecticides propoxur (Baygon), aldicarb produce symptoms closely resembling those of organophosphates.

Management

• Skin decontamination

• Gastric lavage if ingestion has occurred within the past hour.

• Antidote: Atropine (see organophosphates)

• Pralidoxime is not recommended for the treatment.

5.CHLORINATED HYDROCARBON INSECTICIDES POISONING

• Includes DDT, BHC (benzene hexachloride), chlordane, aldrin, dieldrin, gamma BHC, heptachlor, and many others.

Clinical features

• Features of central nervous system depression, cardiac dysrhythmias or sudden death, features of hepatic or renal damage, aspiration with chemical pneumonitis

Management

• Decontamination

• Remove from exposure, remove clothing, wash skin.

• Gastrointestinal decontamination contraindicated.

• Activated charcoal has no role.

• Avoid milk and oils as these facilitate absorption.

• For convulsions, IV infusion of diazepam.

• Monitor renal and liver functions.

6.CORROSIVES

Acids (hydrochloric, sulfuric and nitric acid) and Alkalis (ammonia, caustic soda, caustic potash)

Management

• Prehospital management: dilution with water or milk

• Emesis and gastric lavage are contraindicated.

• Maintain airway, assist ventilation if required.

• Analgesics may be given as required.

• Corticosteroids have been suggested to prevent stricture, along with prophylactic antibiotics.

• Oesophagoscopy can be done shortly after admission to determine if a burn is present.

• If strictures develop, perform endoscopically guided dilation beginning after week 2.

7.INSECT STINGS

• Stings from ants, bees and wasps

• Seldom causes severe toxicity

Features

• Local pain and swelling.

Management

• Cleansing the area with antiseptics.

• Bee stings should be removed as soon as possible.

• Topical corticosteroids and oral antihistaminics may help alleviate inflammation and the associated symptoms.

• Anaphylactic reactions require treatment with adrenaline.

8.MUSHROOM POISONING

Mushroom poisonings occur in four settings:

• Inadvertent ingestion of mushrooms by children;

• Foragers looking for a free meal or a delicacy;

• An attempted homicide or suicide;

• Persons seeking hallucinatory effects.

Clinical presentations

Mushrooms that cause early gastrointestinal symptoms like abdominal pain, cramping, diarrhea, and vomiting

Within 2 hours, and most often within the first hour after ingestion.

▪Management

◦ Adequate fluid and electrolyte replacement.

◦ Antiemetics e.g. promethazine.

Mushrooms that cause delayed gastrointestinal symptoms

▪ Gastrointestinal symptoms usually begin 5–12 hours after ingestion.

▪ Initial: intractable vomiting, watery diarrhea; hypoglycemia

▪ Delayed: hepatotoxicity, fulminant hepatic failure, and death

▪ Management

◦ Emesis or gastric lavage if presents early

◦ Repeated dose activated charcoal may be beneficial

◦ Replace fluid and electrolyte losses

◦ Promptly treat hypoglycemia

◦ Continued monitoring for hypoglycemia is important, as hypoglycemia is a frequent cause of death

◦ Monitor liver function

Mushrooms that cause neurological symptoms

▪ Hallucinations: last 2–6 hours, flashbacks

▪ Loss of coordination, seizures

▪ Management

◦ Supportive

◦ IV benzodiazepines for seizures

9.OPIOID POISONING

Dextropropoxyphene

- 10 mg/kg likely to cause symptoms like delirium and seizures.
- 20 mg/kg may cause CNS depression, seizures and cardiac dysrhythmias.

Tramadol

- Doses >500 mg may cause seizures in adults. The risk of seizures increases in a dose-dependent fashion.
- Deaths occur after ingestion of 3-5 g.
- Implicated in serotonin syndrome.

Pethidine

- The maximum dose should not exceed 600 mg per 24 hours.
- For IV dose is usually 25-50 mg every 3-4 hr as needed.

Management:

- Initial resuscitation and supportive care.
- Carefully monitor respiratory rate, GCS, and oxygen saturation.
- Ventricular dysrhythmias in dextropropoxyphene intoxication,
- Resuscitation includes serum 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.
- Follow 100 mcg IV every 30-60 secs until spontaneous respiration is re-established
- Follow the naloxone infusion rate at 2/3rd of the initial dose given/ hour.
- Monitor the patient for evidence of opioid withdrawal and titrate the infusion according to clinical response.

Child:

- Administer at a rate of 10 mcg/kg
- Followed by 100 mcg/kg if there is no response.

ANNEX 1: Drug Interactions

Drugs	Effects
Acarbose + Escitalopram	May increase the plasma concentration of acarbose
Aceclofenac + Aspirin/ Hydrocortisone/Ibuprofen	Increase the risk of GI bleeding
ACE inhibitors + Lithium	Lithium toxicity
ACE inhibitors + NSAIDs	Reduce the antihypertensive effect
Albendazole + Grapefruit juice	Plasma concentration of albendazole is increased
Albendazole + Oral Contraceptives	Potentiate teratogenicity
Alprazolam + alcohol	Enhanced effects
Allopurinol + Amoxicillin/Ampicillin	Increased risk of rash
Allopurinol + Antacids	Decreased the absorption of allopurinol
Amiodarone + Furosemide	Increased cardiac toxicity
Amiodarone + Warfarin/ Ciprofloxacin/Digoxin/Phenytoin/ Quinidine/ Co-trimoxazole	Prolong QT interval
Amikacin + Furosemide	Increased risk of ototoxicity
Amikacin + Vancomycin	Increased risk of ototoxicity and nephrotoxicity
Amitriptyline + Oral contraceptives	Antagonism of antidepressant effects by estrogens
Amitriptyline + Levothyroxine	Increased effects of amitriptyline
Amlodipine + Oral contraceptives/ hydrocortisone/ dexamethasone/ ibuprofen	Antagonism of hypotensive effects
Antacids + Aspirin	Excretion of acetylsalicylic acid increased in alkaline urine
Note: Antacids should preferably not be taken at the same time as other drugs since they may impair absorption	
ARBs + Potassium-sparing diuretics	Can cause dangerous hyperkalemia
Aspirin + Clopidogrel/ Heparin/ Ethanol/Warfarin	Increased risk of bleeding
Atorvastatin + Clarithromycin	Plasma concentration of atorvastatin increases
Calcium + Digoxin	Potentiate digoxin toxicity
Carbamazepine + Oral Contraceptives/Phenytoin/Sodium Valproate/phenobarbitone	Reduces the effects of co-administered drugs
Dairy Products + Ciprofloxacin	Reduced absorption of ciprofloxacin
Domperidone + Ketoconazole/Itraconazole	Increased risk of ventricular arrhythmias
Ferrous salts + Antacids/ calcium salts/ ciprofloxacin	Decreased absorption of ferrous salts
Fibrates + Warfarin/oral hypoglycemic drugs	Potentiates the effect of warfarin and oral hypoglycemic drugs
Gabapentin + Amitriptyline	Antagonize the anticonvulsant effect of gabapentin
Ketoconazole + Suphonylurea	Hypoglycemia

Drugs	Effects
Ketoconazole + Phenytoin	Phenytoin toxicity
Ketoconazole + Warfarin	Increase the risk of bleeding
Lithium + Frusemide/ thiazide	Lithium toxicity
L-dopa + MAO inhibitor	May precipitate a hypertensive crisis
L-dopa + Metoclopramide	Causes drug-induced Parkinsonism
NSAIDs + Fluoroquinolones	Potentiate the CNS effect of fluoroquinolones
Omeprazole + Clarithromycin	Plasma concentration increased
Omeprazole + Clopidogrel	Reduced antiplatelet activity
Pantoprazole + Warfarin	Enhanced anticoagulant effect
Paracetamol + Metoclopramide	Increased absorption of paracetamol
Pethidine + Fluoxetine/ duloxetine/ paroxetine	Increased serotonergic effect
PPIs + Itraconazole/Iron salts	Decreases the bioavailability of the administered drug
Propranolol + Metformin/ Glibenclamide	May mask the warning signs of hypoglycemia, such as tremor
Propranolol + NSAIDs	Decreases the antihypertensive effects of propranolol
Ranitidine + Metformin	Decreases the excretion of metformin
Rifampin + Oral Contraceptives	Contraceptive failure
Risperidone + TCAs	Increased antimuscarinic side-effects
Risperidone + Escitalopram	Increases the risk of an irregular heart rhythm that may be serious and potentially life-threatening
Sulfasalazine + Folates	Reduces the absorption of sulfasalazine
Sodium Valproate + Phenytoin	Phenytoin toxicity
Sodium valproate + Carbamazepine	Increases the incidence of teratogenicity
Statins + Cyclosporin/erythromycin/azoles (except parastatins)	Increased risk of myopathy
Tetracycline + Daily product/ antacids/ Sucralfate	Reduce absorption of tetracycline
Tinidazole + Alcohol	Disulfiram like reaction

ANNEX 2: SURGICAL ITEMS AVAILABLE IN HOSPITAL PHARMACY

S.N	Name of Products	Unit
1	Absorbable Gelatin Sponge equivalent to Ab gel	Pcs

S.N	Name of Products	Unit
2	Ankle binder L	Pcs
3	Ankle binder M	Pcs
4	Ankle binder S	Pcs
5	Ankle binder XL	Pcs
6	Arm sling pouch L	Pcs
7	Arm sling pouch M	Pcs
8	Arm sling pouch S	Pcs
9	Arm sling pouch XL	Pcs
10	Arm sling pouch XXL	Pcs
11	Coated Polyglactin 1 RB (equivalent to Vicryl)	Pcs
12	Coated Polyglactin 1-0 RB (equivalent to Vicryl)	Pcs
13	Coated Polyglactin 2-0 RB (equivalent to Vicryl)	Pcs
14	Coated Polyglactin 3-0 RB (equivalent to Vicryl)	Pcs
15	Coated Polyglactin 4-0 RB (equivalent to Vicryl)	Pcs
16	Cotton 100 gm	Pcs
17	Cotton 50 gm	Pcs
18	Crepe Bandage 4”	Pcs
19	Crepe Bandage 6”	Pcs
20	ECG lead	Pcs
21	Elastic wrist splint L	Pcs
22	Elastic wrist splint M	Pcs
23	Elastic wrist splint S	Pcs
24	Endo Bronchial Suction Catheter 14	Pcs
25	Endo Bronchial Suction Catheter 16	Pcs
26	Endotracheal tube cuffed 7	Pcs
27	Endotracheal tube cuffed 7.5	Pcs
28	Hernia Kit	Pcs
29	High concentration oxygen mask Adult	Pcs
30	Insulin Syringe	Pcs
31	Intravenous set-Adult	Pcs
32	IV Cannula 16 Single Safety	Pcs
33	IV Cannula 18 Single Safety	Pcs
34	IV Cannula 20 Single Safety	Pcs
35	IV Cannula 22 Single Safety	Pcs
36	IV Cannula 24 Single Safety	Pcs
37	IV Cannula 26 Single Safety	Pcs
38	IV Cannula Fixator	Pcs
39	Knee cap L	Pcs
40	Knee cap M	Pcs
41	Knee cap XL	Pcs
42	Nasogastric Tube 14	Pcs
43	Nasogastric Tube 16	Pcs

S.N	Name of Products	Unit
44	Plaster of Paris 4 “	Pcs
45	Plaster of Paris 6 “	Pcs
46	Polypropylene 2-0 RB(equivalent to Prolene)	Pcs
47	Polypropylene 3-0 RB(equivalent to Prolene)	Pcs
48	Pressure monitoring line (equivalent to PMO line)	Pcs
49	Roller bandage 4"	Pcs
50	Roller Bandage 6"	Pcs
51	Spinal needle 25 G	Pcs
52	Surgical Blade 10	Pcs
53	Surgical Blade 11	Pcs
54	Surgical Blade 15	Pcs
55	Syringe 1 ml	Pcs
56	Syringe 10 ml	Pcs
57	Syringe 20 ml	Pcs
58	Syringe 3 ml	Pcs
59	Syringe 5 ml	Pcs
60	Syringe 50 ml	Pcs
61	Three-way stopcock (3 way cannula)	Pcs
62	Urine collection bag Adult	Pcs
63	Urocatheter (Folyes) 12 G 2 Way	Pcs
64	Urocatheter (Folyes) 14 G 2 Way	Pcs
65	Urocatheter (Folyes) 16 G 2 Way	Pcs
66	Urocatheter (Folyes) 18 G 2 Way	Pcs
67	Zigzag Cotton 100 gm	Pcs
68	Zigzag Cotton 50 gm	Pcs

ANNEX 3: ADR REPORTING FORM

Government of Nepal
Ministry of Health
Department of Drug Administration

Adverse Drug Reactions Reporting Form

Hospital record No. or chart No. or patient ID No. _____

Patient's Name: _____ **Sex: F/ M** **Age** _____

Description of the adverse reaction/s: **Onset date of reaction:** _____

_____

_____

_____

_____

_____

Information on Suspected Medicine				
Medicines (Brand & Generic Name, Manufacturer, Batch No., Dosage Form)	**Daily dosage**	**Date started**	**Date stopped**	**Reason for use**

Additional relevant information (eg. medical history, test result, known allergies, drug interactions)

_____

_____

_____

_____

Reported by: Name:_____ Hospital / Department:_____

Date: _____ Signature: _____

Please return this form to your local Drug Information Unit or Hospital Pharmacy. Thank you for taking the time to fill in this report!