

# **PEDIATRIC DRUG DOSES**

UnitedVRG



# PEDIATRIC DRUG DOSES

Second Edition

**GL Chattri** MBBS MD MHA

*Consultant Pediatrician and Neonatologist*

Mahakoushal Hospital

Seth Mannulal Hospital

Sanjeevan Hospital

154, Tamarhai Chowk, Kotwali Ward

Jabalpur, Madhya Pradesh, India



---

JAYPEE BROTHERS MEDICAL PUBLISHERS (P) LTD

New Delhi • Panama City • London



**Jaypee Brothers Medical Publishers (P) Ltd.**

**Headquarter**

Jaypee Brothers Medical Publishers (P) Ltd  
4838/24, Ansari Road, Daryaganj  
New Delhi 110 002, India  
Phone: +91-11-43574357  
Fax: +91-11-43574314  
**Email: [jaypee@jaypeebrothers.com](mailto:jaypee@jaypeebrothers.com)**

**Overseas Offices**

J.P. Medical Ltd.,  
83 Victoria Street London  
SW1H 0HW (UK)  
Phone: +44-2031708910  
Fax: +02-03-0086180  
**Email: [info@jpmedpub.com](mailto:info@jpmedpub.com)**

Jaypee-Highlights Medical Publishers Inc.  
City of Knowledge, Bld. 237, Clayton  
Panama City, Panama  
Phone: 507-317-0160  
Fax: +50-73-010499  
**Email: [cservice@jphmedical.com](mailto:cservice@jphmedical.com)**

Website: [www.jaypeebrothers.com](http://www.jaypeebrothers.com)

Website: [www.jaypeedigital.com](http://www.jaypeedigital.com)

© 2012, Jaypee Brothers Medical Publishers

All rights reserved. No part of this book may be reproduced in any form or by any means without the prior permission of the publisher.

**Inquiries for bulk sales may be solicited at:** [jaypee@jaypeebrothers.com](mailto:jaypee@jaypeebrothers.com)

This book has been published in good faith that the contents provided by the author contained herein are original, and is intended for educational purposes only. While every effort is made to ensure a accuracy of information, the publisher and the author specifically disclaim any damage, liability, or loss incurred, directly or indirectly, from the use or application of any of the contents of this work. If not specifically stated, all figures and tables are courtesy of the author. Where appropriate, the readers should consult with a specialist or contact the manufacturer of the drug or device.

Publisher: Jitendar P Vij  
Publishing Director: Tarun Duneja  
Cover Design: Seema Dogra

***Pediatric Drug Doses***

*First Edition* : 2010

*Second Edition* : **2012**

ISBN 978-93-5025-505-6

*Printed at*

**Dedicated to**

*In the memory of  
late (Prof) Dr VJ Rajpoot Sir (Indore),  
who taught me the art of pediatrics*



## ***Preface to the Second Edition***

Welcome to this edition of the *Pediatric Drug Doses*. Tradition of this publication began in 2009. I am very thankful to all who accepted and appreciated my first edition. In this edition existing drugs are updated, few drugs are omitted and many more new drugs are added. Quick reference chart for IV medication and administering medication to children had been included which will be very helpful practically to young residents, doctors and practicing pediatricians. I have tried to retain the format of the previous edition to avoid new feeling and shall continue to enjoy the same patronage of the reading in this edition.

**GL Chattri**





## ***Preface to the First Edition***

I am pleased to have the opportunity to write this first edition of *Pediatric Drug Doses*. It is not intended to compete with the already well-established books. This book is designed to be a practical and convenient guide to the dosing and usage of medications in children.

Pediatric doses vary with the age, weight, surface area and disease, etc. Overdosing may lead to side effects and under-dosing will lead to unsatisfactory response or development of resistance in cases of antibiotics.

I did not confine myself to doses only, but expended to provide indications which is a must before knowing doses, and also included the information such as size of feeding tubes, Foley's catheters, endotracheal tubes, laryngoscope blades, oxygen mask according to age and weight; approximate weight and surface area charts; fluid resuscitation formula for burn patients; so that residents do not have to consult too many books while dealing with patients bedside. The aim is to improve the practical utility of the book.

I have made all efforts to check for any mistakes in the text and drug doses, but nobody can be perfect. If you are in any doubt about a treatment or drug doses, always check with another formulary. Due to constant research, it is advised to consult package insert especially for infrequently used drugs and drugs with narrow therapeutic index.

I have written this book for pediatric house officers and registrars particularly keeping in mind but it will also be useful for consultant practicing pediatricians.

**GL Chattri**



## ***Acknowledgments***

First of all I would like to thank my wife Rashmi and my kids Dhruv and Shlok who spare me to spend, from their share of valuable time in writing this book. She was always encouraging me to make my dream come true.

I sincerely thank Mr Bhoopesh Arora, M/s Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India and their staff for publishing this book. I would like to thank Mr Sanjeev Pandey for his professional and personal support.

I am thankful to Dr Sameer Agarwal and Dr Mahesh Maheshwari for useful suggestions for the book. I sincerely thank Shri Jitendar P Vij (Chairman and Managing Director), M/s Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India to publish the book.

Last but not least, I would like to thank Dr Sharad Thora, Dr Hemant Jain, Dr Mahesh Meheswari, Dr Sameer Agarwal, Dr Nivedita Kapoor for their guidance and support.



## ***Structure of the Book***

All the drugs are listed in their respective group and are covered in short to make the book user-friendly. Drug information is presented in a consistent format and provides the following:

**Generic Name:** Indian adopted name.

**Uses:** Information pertaining to appropriate indications or use of the drug.

**Usual Dosages:** The amount of drug to be typically given or taken during therapy in general and in certain specific conditions. For selected drugs, the dosing adjustment in renal and/or hepatic impairment should be made accordingly.

**Brand Names:** Common trade names available in India.

**Combinations:** If any.

So, if one has reached to the final or probable diagnosis, then this book will provide the remaining information—drugs which can be prescribed, dosages, brands and forms available, and mode of administration.



## Contents

1. Analgesics .....	1
2. Antiasthmatics .....	11
3. Antiarrhythmics .....	17
4. Antibiotics .....	21
5. Anticoagulants .....	56
6. Antidepressants .....	58
7. Antidotes/Poisoning .....	61
8. Antiemetics .....	67
9. Antiepileptics .....	71
10. Antifungals .....	82
11. Antigout Agents .....	87
12. Anthelmintics .....	89
13. Antihistamines .....	94
14. Antihypertensives .....	98
15. Antileprotics .....	106
16. Antimalarials .....	107
17. Antimyasthenics .....	112
18. Antiprotozoals .....	114
19. Antipsychotics/Anxiolytics/Sedatives .....	117
20. Antiretrovirals .....	120
21. Antitubercular .....	125
22. Antispasmodics .....	128
23. Antitoxins .....	130
24. Antiulcers/Antisecretory .....	132
25. Antivirals .....	134

26. Cardiac Shocks and Failures .....	140
27. Chelating Agents .....	142
28. Colony Stimulating Factors .....	144
29. Corticosteroids .....	146
30. Diuretics .....	151
31. Drugs Used for Controlling Bleeding .....	155
32. Electrolyte Supplements and Fluid Replacements .....	157
33. H <sub>2</sub> Antagonists .....	161
34. Immunoglobulins .....	162
35. Laxatives/Stool Softeners .....	166
36. Minerals .....	168
37. Nutritional Supplements .....	170
38. Pituitary Hormones .....	173
39. Plasma Volume Expanders .....	175
40. Scabicial Agents .....	177
41. Skeletal Muscle Relaxants .....	178
42. Sympathomimetics .....	180
43. Thyroid and Antithyroid Agents .....	183
44. Vaccines .....	185
45. Vasodilators .....	190
46. Vitamins .....	191
<i>Miscellaneous Drugs</i> .....	197
<i>Appendices</i> .....	209
<i>Index</i> .....	219



## ***Symbols and Abbreviations***

ADHD	Attention Deficit Hyperactivity Disorder
AEDs	Antiepileptic Drugs
AIDS	Acquired Immunodeficiency Syndrome
AOM	Acute Otitis Media
APTT	Activated Partial Thromboplastin Time
BA	Bronchial Asthma
BD	Twice a day
CHF	Congestive Heart Failure
CMV	Cytomegalovirus
CNS	Central Nervous System
CSF	Cerebrospinal Fluid
DCL	Diffuse Cutaneous Leishmaniasis
DM	Diabetes Mellitus
DIC	Disseminated Intravascular Coagulation
ET	Endotracheal Tube
E/E	Eye/Ear
g	Gram
G6PD	Glucose-6-Phosphate Dehydrogenase
GERD	Gastroesophageal Reflux Disease
GI	Gastrointestinal
h/hr	Hour
HSV	Herpes Simplex Virus
HT	Hypertension
ICP	Intracranial Pressure
ID	Intradermal

IgG	Immunoglobulin-G
IM	Intramuscular
ITP	Idiopathic Thrombocytopenic Purpura
IV	Intravenous
IVH	Intraventricular Hemorrhage
IVP	Intravenous Push
JRA	Juvenile Rheumatoid Arthritis
Kg	Kilogram
LAB	Lactic Acid Bacillus
LCL	Localized Cutaneous Leishmaniasis
LMWH	Low Molecular Weight Heparin
LRTI	Lower Respiratory Tract Infection
mcg	Microgram
Mg	Milligram
Min	Minute
ML	Milliliter/Mucosal Leishmaniasis
NB	Newborn
NG	Nasogastric
NS	Normal Saline
NSAID	Nonsteroidal Anti-inflammatory Drug
OD	Once a day
OM	Otitis Media
PCM	Paracetamol
PDA	Patent Ductus Arteriosus
PNA	Postnatal Age
PO	Per Oral
PSVT	Paroxysmal Supraventricular Tachycardia
QID	Four times per day

RDA	Recommended Daily Allowance
RTI	Respiratory Tract Infection
RDS	Respiratory Distress Syndrome
SC	Subcutaneous
SL	Sublingual
SLE	Systemic Lupus Erythematosus
SSTI	Skin and Soft Tissue Infection
TB	Tuberculosis
TDS	Thrice a day
TPN	Total Parenteral Nutrition
URTI	Upper Respiratory Tract Infection
UTI	Urinary Tract Infection
VL	Visceral Leishmaniasis
VZV	Varicella Zoster Virus
<	Less than
>	Greater than
≤	Less than or equal to
≥	Greater than or equal to

# 1

## CHAPTER

# Analgesics

## ANALGESIC—NON-NARCOTIC

### 1. Acetylsalicylic Acid

**Use:** Treatment of inflammation, fever and mild to moderate pain.

**Dosage:** PO

- Pain and fever: 10-15 mg/kg/dose q 4-6 hr.
- Anti-inflammatory: 60-90 mg/kg/day in divided doses.
- Antiplatelet effect: 3-10 mg/kg/day, single daily dose.
- Kawasaki disease: 80-100 mg/kg/day divided q 6 hr.
- Rheumatic fever: 60-100 mg/kg/day divided q 6 hr.

**Brands:** Ecosprin Tab; 75, 150 and 325 mg. Delisprin Tab; 75 and 150 mg. Zosprin Tab; 100 and 150 mg.

- Contraindicated in chicken pox or if there is flu-like symptoms, hepatic failure, bleeding disorder, erosive gastritis, peptic ulcer, bronchial asthma. Discontinue the drug if hearing loss or tinnitus occurs.

### 2. Auranofin

**Use:** Management of active stage of classic or definite rheumatoid, psoriatic arthritis.

**Dosage:** PO; Starting 0.1 mg/kg/day in 2 divided doses.

Maintenance: 0.15 mg/kg/day (Max: 0.2 mg/kg/day).

**Brands:** Cap; Ridaura 3 mg, Tab; Goldar 3 mg.

- Contraindicated in blood dyscrasias, CHF, NEC, SLE, leucopenia, urticaria, etc. Stop therapy if platelet count  $< 100,000/\text{mm}^3$ , WBC  $< 4,000/\text{mm}^3$ .

### **3. Diclofenac Sodium**

**Use:** Mild to moderate pain, juvenile rheumatoid arthritis.

**Dosage:** PO; 2-3 mg/kg/day divided q 4 hr.

**Brands:** 50 and 100 mg Tab; Agile, Diclofam, Diclomax.

- Also available in topical formulation as Gel; Diclonac, Nac, Voveran 1% Gel; transdermal patch, Nupatch. Contraindicated in GI bleeding, ulcer disease, aspirin triad. Use with caution in HT, BA, CHF, fluid retention, dehydration, etc.

### **4. Ibuprofen**

**Use:** Fever, pain, JRA, cystic fibrosis, PDA, Migraine.

**Dosage:** PO

- Fever, pain: 4-10 mg/kg/dose q 6-8 hr (Max: 40 mg/kg/day).
- JRA: 30-50 mg/kg/day in 4 divided doses (Max: 2.4 gm/day).
- Cystic fibrosis: 20-30 mg/kg twice daily for 4 yr.
- PDA: IV: Initial dose of 10 mg/kg, followed at 24 hours intervals by two doses of 5 mg/kg.
- Migraine: 7.5-10 mg/kg/dose.

**Brands:** 100 mg/5 ml Susp; Bren, Ibugesic, Febrilix. 200 and 400 mg Tab; Brufen, Emflam, Ibugesic, Ibugin.

**Combinations:** Ibuprofen + Paracetamol: 400 + 325 mg Tab; Anaflam, Combiflam, Ibucin, Zupar. 100 mg + 125/5 ml

Susp; Anaflam, Zupar. 100 mg + 162.5 mg/5 ml Susp; Combiflam, Ibucin.

- Contraindicated in GI bleeding, ulcer disease, aspirin triad. Use with caution in CHF, HT, dehydration, hepatic and renal patients.

### 5. Indomethacin

**Use:** PDA closure in neonates, rheumatoid arthritis, nephrogenic diabetes insipidus.

**Dosage:**

- Neonates: PDA: IV; 0.2 mg/kg initially followed by 2 doses at 12-24 hours intervals.
- Rheumatoid/Inflammatory disorders: PO; 1-2 mg/kg/day in 2-4 doses (Max: 4 mg/kg/day).
- Nephrogenic diabetes insipidus: PO; 2 mg/kg/day. (For patients having inadequate response to diuretics alone may benefit from its addition).

**Brands:** 25 and 50 mg Cap; Artisid, Indocap, Microcid, etc.

- Contraindicated in premature neonates with NEC, impaired renal functions, IVH, bleeding, thrombocytopenia. It may decrease the antihypertensive effect of diuretics. Hold enteral feeds for 12 hours after last dose.

### 6. Ketorolac

**Use:** Treatment of ocular itch associated with seasonal allergic conjunctivitis.

**Dosage:** Children > 3 yr: 1 drop in eyes 4 times/day; up to 7 days.

**Brands:** 0.5% drop; Acular, Doloket, Ketanav, Ketodrop, etc.

**Administration:** Apply pressure over lacrimal sac for 2 minutes after application to avoid absorption and systemic effects.

## 7. Mefenamic Acid

**Use:** Fever, pain, rheumatoid disorders.

**Dosage:** PO; Should not be given for more than 7 days.

- Fever: 3 mg/kg/dose.
- Rheumatoid disorder: 10-25 mg/kg/day q 6 hr.

**Brands:** 100, 250 and 500 mg Tab; 100 and 50 mg/5 ml Susp; Meftal, Ponstan.

### **Combinations:**

Mefenamic + Paracetamol: 500 + 450 mg Tab; Meftal Forte.

Mefenamic + Dicyclomine: 250 + 10 mg Tab; Meftal Spas.

## 8. Naproxen

**Use:** Fever, pain, inflammation and rheumatoid disorders.

**Dosage:** PO; For children > 2 yr of age.

- Pain: 5-7 mg/kg/dose q 8-12 hr.
- JRA/Inflammatory disease: 10-15 mg/kg/day in two divided doses (Max: 1000 mg/day).

**Brands:** 250 mg Tab; Astagen, Nalyxan, Napryn.

## 9. Paracetamol/Acetaminophen

**Use:** Mild to moderate pain and fever; Migraine. Do not have an anti-inflammatory or antirheumatic effect.

### **Dosage:**

- Neonates: PO; rectal: 10-15 mg/kg/dose q 6-8 hr.
- Infants and children: PO; 10-15 mg/kg/dose q 4-6 hr; Rectal: 10-20 mg/kg/dose q 4-6 hr; IM: 5 mg/kg/dose.

**Brands:** 150 mg/ml Drops; 120 mg/5 ml Sy; 500 and 650 mg Tab; Calpol, Lanol. 80 and 170 mg Suppository; Anamol, Junimol. 150 mg/ml Inj.; Fevastin, Febrinil, Mol.

- Overdoses of paracetamol can be treated with acetylcysteine.

**Combinations:** Paracetamol 325 mg + Tramadol 7.5 mg; Calpol-T tablet.

## 10. Piroxicam

**Use:** Rheumatoid and inflammatory disorders.

**Dosage:** PO; 0.2-0.3 mg/kg/day as single dose (Max: 15 mg/kg/day).

**Brands:** 10 and 20 mg Tab and Cap; Brexic, Minicam, Paricam. Use with caution in infants and children.

## 11. Tolmetin

**Use:** Inflammatory and rheumatoid disorders (JRA).

**Dosage:** Children > 2 yr of age: PO

- Anti-inflammatory: 15-20 mg/kg/day in 3-4 divided doses (Max: 30 mg/kg/day).
- Analgesic: 5-7 mg/kg/dose q 6-8 hr.

**Brands:** 200 mg Tab; 400 mg Cap; Tolectin.



**ANALGESIC—NARCOTIC****1. Codeine**

**Use:** Mild to moderate pain; for nonproductive cough use in lower doses.

**Dosage:**

- Pain: 0.5-1 mg/kg/dose q 4-6 hr (Max: 60 mg/dose).
- Cough: 1-1.5 mg/kg/day divided q 4-6 hr (Not recommended in children < 2 yr of age).

**Brands:** Codeine linctus: Codeine sulphate 15 mg + Menthol 0.2 mg/5 ml. Phensedyl, Codokuff: Codeine Phosphate 10 mg + Chlorpheniramine 4 mg/5 ml. Lincotuss: Codeine Phosphate 15 mg/5 ml.

- Increase fluid and fiber intake to avoid constipation.
- Contraindicated in pre-existing respiratory illness, asthma and raised ICP. Causes constipation, nausea, anorexia, vomiting, sedation, dizziness.

**2. Fentanyl**

**Use:** Sedation, pain relief, preoperative medication, adjunct to anesthesia.

**Dosage:**

- Neonates and infants: IV: Intermittent doses: 1-4 mcg/kg/dose; may be repeated q 2-4 hr; continuous infusion: 0.5-5 mcg/kg/hr.
- Older infants and children: 1-12 yr: Pain: IM, IV: 1-3 mcg/kg/dose; may be repeated after 30 minutes; continuous infusion: 1-5 mcg/kg/hr.
- Children > 12 yr.: Pain: IM, IV: 0.5-1 mcg/kg/dose; may be repeated after ½ to 1 hour.
- Anesthesia: IM, IV: 2-50 mcg/kg.

**Brands:** 50 mcg/ml Inj; Fendrop, Fenilate, Fent, Trofentyl. Patch of 25, 50 and 100 mcg/hr, Duragesic.

**Administration:** For IV administer slowly over 5-10 minutes. Rapid IV infusion may cause skeletal muscle rigidity, impaired ventilation, apnea, laryngospasm.

- Contraindicated in raised ICP, severe respiratory depression, hepatic or renal problems. Physical and psychological dependence may occur with prolonged use.

### 3. Morphine Sulphate

**Use:** Pain relief; relieves dyspnea of left ventricular failure and pulmonary edema; preanesthetic medication.

**Dosage:**

- Neonates: IV, IM, SC: Continuous infusion: 0.01-0.03 mg/kg/hr; Intermittent dose: 0.05-0.1 mg/kg/dose q 2-4 hr.
- Infants and children: IV, IM, SC: 0.1-0.2 mg/kg/dose q 2-4 hr (Max: 15 mg/dose); PO: 0.2-0.5 mg/kg/dose q 4-6 hr.
- > 12 yr: 3-4 mg; may be repeated after 5 min as required.

**Brands:** 10 and 30 mg Tab; Duramor, Morcontin. 10 mg/ml Inj; Morphine Sulphate.

**Administration:** Administer IV over 15-30 min at a final concentration of 0.5-5 mg/ml.

- Contraindicated in respiratory depression, GI obstruction, acute or severe asthma, liver or renal problems. Neonates and infants < 3 months are more susceptible to respiratory depression.

### 4. Pentazocine

**Use:** Relief of moderate to severe pain, sedative prior to surgery.

**Dosage:** Efficacy and safety not confirmed below 12 yr  
Children > 12 yr: PO: 50 mg/dose q 3-4 hr; (Max: 600 mg/day). IV or IM dose is 1/3rd of PO dose.

**Brands:** 25 mg Tab; Fortwin. 30 mg/ml Inj; Fortwin, Pentawin, Susevin.

**Combinations:** Pentazocine + PCM: 15 + 500 mg Tab; Expergesic, Fortagesic.

### 5. Pethidine/Meperidine

**Use:** Pain, adjunct to anesthesia and preoperative sedation.

**Dosage:** IV, IM: 1-1.5 mg/kg/dose q 3-4 hr as needed; 1-2 mg/kg as preoperative medication single dose (Max: 100 mg/dose).

**Brands:** 50 mg/ml Inj; Pethidine hydrochloride.

**Administration:** For IV, dilute to 1-10 mg/ml and to be given over 15-30 minutes.

- Use with caution in head injury, raised ICP and in young children. Pethidine though used in combination with chlorpromazine and promethazine in lytic cocktail; this mixture may have a higher rate of adverse effects compared to alternative sedatives and analgesics.

**ANALGESIC—TOPICAL****1. Benzocaine**

**Use:** Toothache, sore throat pain, hemorrhoids, rectal fissures, minor burns, etc.

**Dosage:** Apply to affected area as needed. Mouth/throat, usage should not exceed 2 days.

**Brand:** 7.5% Gel; T-JEL.

**2. Lidocaine**

**Use:** Local anesthetic, relief of pain in postherpetic neuralgia, ventricular arrhythmias.

**Dosage:**

- Topical: Apply as needed but maximum dose is 3 mg/kg/dose; do not repeat within 2 hr.
- Injectable local anesthetic: As needed but maximum dose is 4.5 mg/kg/dose; do not repeat within 2 hr.
- Arrhythmias: Loading dose: 1 mg/kg; Continuous infusion 20-50 mcg/kg/minute (20 mcg/kg/minute in patients with shock, mild CHF, liver disease, cardiac arrest).
- Postherpetic neuralgia: Apply patch to affected areas (Max: 3 patch).

**Brands:** Gesicain, lignox: 5% Inj; 2% Jelly, 5% Ointment, 4% topical solution. Xylocaine: 1, 2 and 5% Inj; 2% Jelly, 5% Ointment, Spray, 4% Topical solution, 2% Viscous. Xylocard: 50 ml vial (1 ml = 21.3 mg), Shield Ointment.

**Combinations:** Shield Oint; Contains Lidocaine 3%, Hydrocortisone acetate 0.25%, Zinc oxide 5%, Allantoin 0.5%.

**Administration:** For IV, dilution should be 8-20 mg/ml. Lidocaine solutions containing epinephrine should not be used for treatment of arrhythmias and preservative containing solutions should not be used for IV.

**ANALGESIC—URINARY**

---

**Phenazopyridine**

*Use:* Symptomatic relief of urinary burning, frequency and urgency associated with UTI or urologic procedures.

*Dosage:* PO: 12 mg/kg/day divided q 8 hr.

*Brands:* Pyridium 200 mg Tab.

*Combinations:* Phenazopyridine + Nitrofurantoin: 200 + 50 mg Tab; Nephrogesic.

- It is not an antibiotic and don't treat infections. May discolor urine to orange or red.

# 2

## CHAPTER

# Antiasthmatics

### 1. Adrenaline/Epinephrine

See under sympathomimetic.

### 2. Aminophylline

**Use:** As bronchodilator, apnea of prematurity, increase diaphragmatic contractility.

**Dosage:**

- Acute bronchospasm: IV; Loading dose of 6 mg/kg diluted to 1 mg/ml and infuse over 30 min followed by 0.5-1 mg/kg/hr as continuous infusion, if already on oral therapy, omit loading dose. PO; 15-20 mg/kg/day divided q 8 hr.
- Apnea of prematurity: PO, IV; Loading dose of 6 mg/kg followed by maintenance dose of 2.5-3 mg/kg/dose q 12 hr.

**Brands:** 100 mg Tab; 25 mg/ml Inj; Aminophylline.

- May cause seizures, tachyarrhythmias, feeding intolerance in neonates, gastroesophageal reflux, vomiting, CNS irritability. With hold dose for heart rate greater than 180 beats/min.

### 3. Beclomethasone

**Use:** Long-term control of asthma.

**Dosage:** Inhalation: 100 to 800 mcg/day in divided doses depending on severity.

**Brands:** 50, 100, 200 and 250 mcg/actuation; Beclate inhaler. 50, 100, 250 mcg/actuation; Becoride inhaler. 100 and 200 mcg rotacap; Beclate, Bevent.

**Combinations:** Beclomethasone + Salbutamol: 50 + 100 mcg Inhaler. 100 + 400 mcg Rotacaps; Aerocort, Vent-plus.

- To reduce chances of oral candidiasis, rinse mouth after inhalation. Use spacer device for inhalational corticosteroids in children for better lung delivery and less local toxicity.

#### 4. Budesonide

**Use:** Allergic rhinitis, long-term prophylaxis and maintenance therapy of asthma.

**Dosage:** 100-200 mcg/day in divided doses depending upon severity. Nasal spray 2 times/day.

**Brands:** 0.5 and 1 mg/2 ml respule; Budate, Budecort. 100 and 200 mcg/actuation inhaler; Budecort. 100 and 200 mcg rotacaps; Budecort. 50 mcg/dose nasal spray; Pulmicort.

- Use with precautions in patient with pulmonary TB, systemic infection and ocular herpes.

#### 5. Doxophylline

**Use:** Maintenance therapy in patient suffering with asthma.

**Dosage:** PO; > 2 yr; 12-18 mg/kg/day in single or two divided doses (Max: 200 mg BD). If nocturnal symptoms are more prefer single evening dose.

**Brands:** 100 mg/5 ml Syrup; 400 mg Tab; Doxoril, Doxovent, Doxobid.

- May cause N/V, dyspepsia, palpitation, tremor, insomnia.

## 6. Fluticasone

*Use:* Chronic asthma.

*Dosage:* Depends upon severity and systemic corticosteroids use. 100-600 mcg/day divided q 12 hr.

*Brands:* 0.5 mg respule; 25, 50 and 125 mcg/actuation inhaler; 50, 100 and 250 mcg rotacaps; Flohale.

- May cause oral candidiasis, change of voice, adrenal suppression, growth retardation, cataracts.

## 7. Formoterol

*Use:* Treatment and prophylaxis of asthma.

*Dosage:* >5 yr of age: 12 mcg twice daily 12 hr apart.

*Brands:* 12 mcg rotacaps and inhaler; Foratec.

*Combination:* Formoterol + Budesonide: 6 + 200 mcg and 6 + 400 mcg rotacaps and inhaler; Foracort, Vent-FB.

## 8. Ipratropium

*Use:* Acute and chronic asthma.

*Dosage:*

- Neonates: 25 mcg/kg/dose 3 times/day as nebulization.
- Infants and Children: 125-250 mcg as nebulization or 1-2 puffs 2-3 times/day.

*Brands:* 250 mcg/ml solution for nebulization; Ipramist, Ipravent. 20 mcg/actuation inhaler; 40 mcg rotacaps; Ipravent and Ipratop.

- May cause tachycardia, drowsiness, xerostomia, blurred vision.



## 9. Montelukast

**Use:** Prophylaxis and chronic treatment of asthma; symptomatic relief of seasonal allergic rhinitis.

**Dosage:** 1-5 yr: 4 mg/day; 6-14 yr: 5 mg/day; >14 yr: 10 mg/day; given as once evening dose.

**Brands:** 4, 5 and 10 mg Tab; Emlucast, Montair, Romilast. 4 mg granules; Montair.

- May cause palpitations, headache, elevated liver enzymes, myalgia, fatigue.

## 10. Salbutamol

**Use:** Prevention and relief of bronchospasm in asthma.

**Dosage:**

- Nebulization: Neonates; 0.1-0.5 mg/kg/dose or q 2-6 hr. Children; 0.15-2.5 mg/dose or q 4-6 hr (Min: 2.5 mg).
- Inhaler: 100-800 mcg/day in divided dose.
- PO; Neonates: 0.1-0.3 mg/kg/dose q 6-8 hr. Children; < 6 yr: 0.1-0.2 mg/kg/dose TDS, 6-12 yr: 2 mg/dose TDS or QID, >12 yr: 2-4 mg TDS or QID.

**Brands:** 2 and 4 mg Tab; 2 mg/5 ml Syrup; 100 mcg/actuation inhaler; Asthalin, Ventorlin. 2.5 mg/2.5 ml respule; Asthalin, Derihaler. 200 and 400 mcg rotacaps; Asthalin.

**Combinations:** Salbutamol + Beclomethasone: 100 + 50 mcg Inhaler; Aerocort, Salbair-B. 200 + 100 mcg rotacaps; Aerocort.

- May cause tachycardia, palpitation, hyperglycemia, tremor, CNS stimulation, insomnia, flushing.

### 11. Salmeterol

*Use:* Maintenance treatment of asthma.

*Dosage:* 25-50 mcg twice daily in children > 4 yr of age.

*Brands:* 25 mcg/actuation inhaler; 50 mcg rotacaps; Serobid.

### 12. Sodium Cromoglycate

*Use:* Prophylaxis for chronic asthma, allergic rhinitis, vernal keratoconjunctivitis.

*Dosage:* Nebulization; 20 mg 2-3 times/day. Inhaler; 1-2 puffs 3-4 times/day. Intranasal in > 2 yr of age, 1 spray 3-4 times/day. Ophthalmic in > 4 yr of age: 1-2 drop 3-4 times/day.

*Brands:* 5 mg/actuation inhaler; 20 mg/2 ml respule; 20 mg rotacaps; 2% eye drop; Cromal. 1 mg/actuation; 2% eye drop; Fintal. 2.8 mg/dose nasal spray; Fintal, Cromal AQ.

### 13. Terbutaline

*Use:* Bronchodilator in asthma.

*Dosage:* PO; 0.05 mg/kg/dose q 8 hr (Max: 5 mg). SC: 0.005-0.01 mg/kg/dose; may be repeated in 15-20 minutes for 3 doses (Max: 0.4 mg/dose). Nebulization: 0.01-0.03 mg/kg (Min: 0.1 mg). Inhalation: 1-2 puffs q 6-8 hr.

*Brands:* 2.5 mg Tab; Asmaterb, Bricanyl, Brontaline. 1.5 mg/5 ml Syrup; Bricaline, Bricanyl. 0.5 mg/ml Inj; Bricanyl, Terbutaline Sulphate. 250 mcg/actuation inhaler; 10 mg/ml nebulizing solution; Bricanyl. 5ml Syrup; Dilo-BM Terbutaline Sulphate 1.25 mg; Ambroxol Hydrochloride 30 mg, Guaiphenesin 30 mg, flavored syrup base containing menthol color.

- May cause tachycardia, flushing, headache, tremor, hypokalemia, dry throat.

#### 14. Theophylline

**Use:** Treatment of reversible airway obstruction due to asthma.

**Dosage:** PO; 6 months to 1 yr: 12-18 mg/kg/day; 1-9 yr: 20-25 mg/kg/day; 9-12 yr: 15 mg/kg/day; given divided q 8 hr.

**Brands:** 400 and 600 mg Tab; Odyphyllin, Phyloday, Theoday. 100 and 200 mg Tab; Theo PA. 250 mg Tab; Codiphyllate. 80 mg/15 ml elixir; Broncodril.

**Combinations:** Theophylline + Etophylline: 115 + 35 mg and 231 + 69 mg Tab; Cordiophyllin, Deriphyllin retard. 14 + 46.5 mg/5 ml Syrup; Deriphyllin, Theotablin.

Theophylline + Salbutamol: 200 + 4 mg Tab; 50 + 1 mg/5 ml Syrup; Theoasthacare.

- May cause tachycardia, hyperactivity, irritability, vomiting, nausea, feeding intolerance, arrhythmias, seizures.

#### 15. Zafirlukast

**Use:** Prophylaxis and treatment of chronic asthma.

**Dosage:** 7-11 yr: 20 mg/day divided q 12 hr. Administer 1 hr before or 2 hr after meals.

**Brands:** 10 and 20 mg Tab; Zuvair.

# 3

## CHAPTER

# Antiarrhythmics

### 1. Adenosine

**Use:** Treatment of paroxysmal supraventricular tachycardia (PSVT).

**Dosage:** Neonates and Children: Initial dose of 0.05 mg/kg then increase by 0.05 mg/kg q 2 minutes until a PSVT is terminated or a maximum dose of either 0.25/kg or 12 mg is given.

**Brands:** 3 mg/ml Inj; Adinacor, Adenoject.

- Contraindicated in second or third degree A-V block, sick sinus syndrome. Use with caution in asthmatics, patient taking Digoxin, Verapamil. Always administer by IV site closest to the heart as administration into lower extremities may result in failure of therapy or requirement of higher doses and follow each bolus by saline flush.

### 2. Amiodarone

**Use:** Life threatening ventricular arrhythmias.

**Dosage:**

- PO; < 1 yr of age; 600-800 mg/1.73 m<sup>2</sup>/day divided q 12 hr  
> 1 yr; 10-20 mg/kg/day divided q 12 hr for 10 days, then 5-10 mg/kg/day. Either arrhythmias are controlled or after 1-4 wk of treatment doses are reduced to half.

- IV: Loading dose of 5 mg/kg over half to one hour; may be repeated up to maximum of 15 mg/kg/day.

**Brands:** 100 and 200 mg Tab; 50 mg/ml Inj; Cardarone, Duron, Tachyra.

- For IV use dilute to 1.5 mg/ml in D-5%. May cause proarrhythmia, nightmares, behavioral changes, hyperglycemia, pneumonitis, skin color changes.

### 3. Atropine Sulphate

**Use:** Preanesthetic medication to inhibit salivation and secretions, sinus bradycardia, organophosphate poisoning, refraction testing in children, uveitis.

**Dosage:**

- Preanesthesia: IV, IM, SC; < 5 kg: 0.02 mg/kg/dose half an hour before then every 4-6 hr as needed. > 5 kg: 0.01-0.02 mg/kg/dose (Max: 0.4 mg/dose).
- Sinus bradycardia: Neonates and children: IV, Intratracheal; 0.02 mg/kg (Min: 0.1 mg and Max: 0.5 mg) may be repeated after 5 minutes once.
- Organophosphate poisoning: IV, IM: 0.02-0.05 mg/kg q 10-20 minutes until dry flushed skin, tachycardia, mydriasis, fever is observed then q 1-4 hr for at least 24 hr.
- Bronchospasm in children: Inhalation; 0.03-0.05 mg/kg/dose 3-4 times/day (Max: 2.5 mg/dose).

**Brands:** 0.6 mg/ml Inj; Atropine sulphate, Tropine. 1% drop and ointment; Atro.

- Give IV by rapid IV push as slow injection may result in paradoxical bradycardia. For intratracheal use dilute with saline to 2-5 ml then give positive pressure ventilations. Contraindicated in thyrotoxicosis, tachycardia, obstructive disease of GI tract, obstructive uropathy.

- Effective oxygenation and ventilation must precede atropine treatment of bradycardia.

#### 4. Disopyramide

**Use:** Treatment of ventricular arrhythmias and atrial tachyarrhythmias.

**Dosage:** PO; <1 yr: 10-30 mg/kg/day divided q 6 hr  
1-4 yr: 10-20 mg/kg/day divided q 6 hr  
4-12 yr: 10-15 mg/kg/day divided q 6 hr.

**Brands:** 100 mg Tab; Regubeat 100 and 150 mg Cap; Norpace.

- Contraindicated in IInd and IIIrd degree A-V block, cardiogenic shock, avoid along with Erythromycin and Clarithromycin. May cause urinary retention, malaise, constipation, hepatic cholestasis, blurred vision, dizziness.

#### 5. Lidocaine

See under topical analgesic.

#### 6. Mexiletine

**Use:** Ventricular arrhythmias.

**Dosage:** PO; 1-4 mg/kg/dose q 8 hr. Start at lower doses and increase according to effect.

**Brands:** 50 and 150 mg Cap; 25 mg/ml Inj; Mexitil.

- Contraindicated in IInd or IIIrd degree block. May cause bradycardia, hypotension, paresthesias, blurred vision, tinnitus, convulsions.

#### 7. Phenytoin

See under antiepileptic.

## 8. Procainamide

**Use:** Ventricular tachycardia, premature ventricular contractions, atrial fibrillation and paroxysmal atrial tachycardia.

**Dosage:**

- PO; 15-50 mg/kg/day divided q 3-6 hr (Max: 4g/day).
- IV: Loading dose of 3-6 mg/kg/dose to be given over 5 minutes (Max: 100 mg/dose); may be repeated q 5-10 minutes as needed to maximum of 15 mg/kg. Maintenance dose is 20-80 mcg/kg/minute (Max: 2 g/day).

**Brands:** 250 mg Tab; 100 mg/ml Inj; Pronestyl.

- May cause hypotension, arrhythmias, agranulocytosis, neutropenia, hepatomegaly, lupus like syndrome.

## 9. Propranolol

See under antihypertensive.

## 10. Quinidine Sulfate

**Use:** Supraventricular tachycardia, paroxysmal ventricular tachycardia, ventricular ectopics.

**Dosage:** Test dose is given in 2 mg/kg followed by dose of 30 mg/kg/day divided q 6 hr. Test dose is given for idiosyncratic reaction, intolerance, syncope, thrombocytopenia.

- May cause hypotension, heart block, bone marrow suppression, thrombocytopenia.

## 11. Sotalol

**Use:** Supraventricular and ventricular arrhythmias.

**Dosage:** 2-8 mg/kg/day divided q 8-12 hr.

**Brands:** 40 and 80 mg Tab; Sotagard.

## CHAPTER

## AMINOGLYCOSIDES

*Few indications for serum concentration monitoring include:*

- Treatment duration > 5 days
- Patients with impaired renal functions
- Infants < 3 months of age
- Signs of nephrotoxicity and ototoxicity
- Use of other nephrotoxic agents.

## 1. Amikacin

**Use:** Active against gram -ve bacilli, especially *E. coli*, *Klebsiella*, *Proteus*, *Enterobacter*, *Serratia*, *Pseudomonas*, *Mycobacterium tuberculosis* and *Atypical mycobacteria*.

***Dosage: IV/IM:***

Neonates: PNA  $\leq$  7d: 1200-2000 g : 7.5 mg/kg q 18-24 hrly;  
 > 2000 g : 10 mg/kg q 12 hrly.

PNA > 7d: 1200-2000 g : 7.5 mg/kg q 12-18 hrly;  
> 2000 g : 10 mg/kg q 12 hrly.



Infants and children: 15-20 mg/kg/day divided q 8-12 hrly.

Antitubercular dose: 15-30 mg/kg/day (Max dose: 1 g).

**Brands:** 100, 250, 500 mg/2 ml Vial; Amicin, Ami kef, Amitex, etc.

**Administration:** Administer IV slowly over 30 to 60 min; dilution should be 10 mg/ml.

## 2. Gentamicin Sulfate

**Use:** Active against gram-negative bacilli, specially *E. coli*, *Klebsiella*, *Proteus*, *Enterobacter*, *Serratia*, *Pseudomonas* and gram-positive *Staphylococcus*.

**Dosage:** IV/IM:

Neonates: PNA  $\leq$  7d: 1200-2000 g : 2.5 mg/kg q 12-18 hrly;

> 2000 g : 2.5 mg/kg q 12 hrly;

PNA > 7d: 1200-2000 g : 2.5 mg/kg q 8-12 hrly;

> 2000 g : 2.5 mg/kg q 8 hrly;

Infants and children : 2.5 mg/kg/dose q 8 hrly.

Intrathecal : Preservative free preparation for intraventricular or intrathecal use.

Neonates: 1 mg/24 hrly. Children;  
1-2 mg/24 hrly.

Topical solution: Instill 1-2 drop every 2-4 hrly, up to 2 drops/hr for severe infections.

**Brands:** 20, 40, 80 mg/Vial; Garamycin, Genticyn, Brogaracin, etc.

Topical: Genticyn and Garamycin eye/ear drop 0.3%

**Combinations:** Gentamicin + Hydrocortisone- E/E drop.

Gentamicin + Clotrimazole + Beclomethasone + Lignocaine-Ear drop.

Gentamicin + Dexamethasone-E/E drop.

Gentamicin + Beclomethasone-E/E drop.

**Administration:** Final concentration for IV should not exceed 10 mg/ml.

### 3. Kanamycin Sulfate

**Use:** Active against *Shigella*, *Klebsiella*, *E. coli*, *Serratia*, *Proteus*, etc. Used as anti-mycobacterial along with other agents.

**Dosage:** IV/IM: 15 mg/kg/day divided 12 hrly.

Antitubercular: 15-30 mg/kg/day (Max dose: 1 g).

**Brands:** 1 g/Vial; Kanamycin and Kancin.

### 4. Neomycin

**Use:** PO before surgery to decrease GI flora and for hyperammonemia to treat diarrhea; used topically for minor skin infections.

**Dosage:** PO; Infants: 50 mg/kg/day divided q 6 hrly.  
Children: 50-100 mg/kg/day divided q 6-8 hrly.

Preoperative bowel antisepsis: 90 mg/kg/day divided 4 hrly for 2 day. Hepatic Coma: 2.5-7 g/m<sup>2</sup>/day divided every 4-6 hrly for 5 to 6 days, not to exceed 12 g/day.

Topical: Apply oint; 1-3 times/day.

**Brands:** 350 mg Cap; Neomycin Sulphate.

**Combinations:** Neomycin + Polymyxin-B-Eye drops.

Neomycin + Betamethasone-E/E drops.

Neomycin + Dexamethasone-E/E drops.

Neomycin + Hydrocortisone-Ear drops.

## 5. Netilmicin Sulfate

**Dosage:** IV/IM

Newborns: <1200 g, 0-4 wk : 2.5 mg/kg q 18-24 hrly;

1200-2000 g, 0-7 days : 2.5 mg/kg q 12-18 hrly;

1200-2000 g, > 7 days : 2.5 mg/kg q 8-12 hrly;

> 2000 g, 0-7 days : 2.5 mg/kg q 12 hrly;

> 2000 g, > 7 days : 2.5 mg/kg q 8 hrly;

Infants: 7.5-10 mg/kg/day/divided 8-12 hrly.

**Brands:** 10, 25, 50, 100, 200, 300 mg/Vial; Netilmicin and Netromycin.

## 6. Streptomycin

**Use:** Used in combination therapy of active TB and in combination with other agents for treatment of streptococcal or enterococcal endocarditis.

**Dosage:** IM

Neonates: 10 to 20 mg/kg/day.

Children: 20 to 40 mg/kg/day divided 12 hrly or single dose; not to exceed 1 g/day.

**Brands:** 0.75 g, 1 g/Vial; Ambistryn-S.

**Administration:** Select large muscle for IM; concentration not to exceed 500 mg/ml; rotate injection sites.

## 7. Tobramycin

**Use:** Active against gram-negative bacilli, specially *E. coli*, *Enterobacter*, *Klebsiella*, *Serratia*, *Proteus* and *Pseudomonas*; ophthalmic infections.

***Dosage:*** IV/IM

Neonates: PNA < 7 days: 1200-2000 g: 2.5 mg/kg q 12-18 hrly;

> 2000 g: 2.5 mg/kg q 12 hrly;

PNA > 7 days: 1200-2000 g: 2.5 mg./kg q 8-12 hrly;

> 2000 g: 2.5 mg/kg q 8 hrly.

Children: 5 to 7.5 mg/kg/day.

0.3% Ophthalmic solution: 1-2 drops every 1 to 4 hr depending upon severity of infection.

0.3% Ophthalmic ointment: Apply 0.5" ribbon 2-3 times/day.

***Brands:*** 20, 60, 80 mg/Vial; Tobacin, Tobasafe, Tocin.

***Combinations:*** Tobramycin + Benzalkonium-E/E drops.

Tobramycin + Dexamethasone-E/E drops.

***Administration:*** Final concentration should not exceed 10 mg/ml.

**CARBAPENEM****1. Imipenem**

**Use:** Active against gram-positive cocci and gram-negative bacilli including *P. aeruginosa* and anaerobes.

**Dosage:** Neonates: IV, IM

PNA  $\leq$  7 days: < 1200 g : 20 mg/kg divided q 18-24 hrly;

> 1200 g : 40 mg/kg/day divided q 12 hrly;

PNA > 7 days: 1200-2000 g : 40 mg/kg/day divided q 12 hrly;

> 2000 gm : 60 mg/kg/day divided q 12 hrly.

Children: 60-100 mg/kg/day divided q 6-8 hrly.

**Brands:** 500 mg, 1000 mg and 1500 mg Inj; Primaxin (equivalent to 250, 500 and 750 mg respectively).

**Administration:** IV: Final concentration should not exceed 5 mg/ml.

- Seizures may occur when used in patients with CNS infection. Pseudomembranous colitis may occur.

**2. Meropenem**

**Use:** Active against gram-positive and gram-negative aerobic and anaerobic pathogens including *S. aureus*, *S. pneumoniae*, *H. influenzae*, *N. meningitidis*, *E. coli*, *Klebsiella*, etc.

**Dosage:** Neonates: IV

PNA 0-7 days: 20 mg/kg/dose q 12 hrly.

PNA > 7 days: 20 mg/kg/dose q 8-12 hrly.

Children: 60 mg/kg/day divided q 8 hrly; meningitis: 120 mg/kg/day divided q 8 hrly (Max: 6 g/day).

**Brands:** 500 mg and 1000 mg Inj; Meronem and Ronem.

**Administration:** Concentrations should not exceed 50 mg/ml.

## CEPHALOSPORINS

Active against both gram-negative and gram-positive but as we move to higher generation, activity against gram-negative goes on decreasing. Probenecid may decrease their renal tubular secretion and increases serum concentration. Third generation are highly resistant to  $\beta$ -lactamase.

### 1. Cefadroxil

**Use:** Streptococcal pharyngitis, Tonsillitis; SSTI caused by streptococci or staphylococci, UTI caused by *Klebsiella*, *E. coli* and *Proteus mirabilis*.

**Dosage:** 30 mg/kg/day divided q 12 hrly PO (Max: 2 g/day).

**Brands:** 500 mg Cap; 125, 250, 500 mg Tab; 125 mg/5 ml Susp; Bludrox, Cefadrox, Cefadur, Droxy, etc.

**Combinations:** Cefadroxil + Ambroxol, Cefadroxil + Probenecid, Cefadroxil + LAB.

### 2. Cefazolin

**Use:** Treatment of RT, SSTI, UTI, Biliary tract, bone and joint infections; and septicemia due to susceptible gram-positive cocci (except enterococcus), preoperative prophylaxis; bacterial endocarditis prophylaxis for dental and upper respiratory tract procedure.

**Dosage:** IV/IM

Neonates: PNA  $\leq$  7 days: 40 mg/kg/day divided q 12 hrly.

PNA > 7 days :  $\leq$  2000 g: 40 mg/kg/day divided q 12 hrly.

> 2000 g : 60 mg/kg/day divided q 8 hrly

Infants and children: 50-100 mg/kg/day divided q 8 hrly (Max: 6 g/day).

Bacterial endocarditis prophylaxis for dental and upper respiratory procedures in penicillin allergic patients: 25 mg/kg 30 minutes before procedure (Max: 1 g).

**Brands:** 250, 500, 1000 mg/Vial; Cezolin, Orizolin, Reflin.

### 3. Cefaclor

**Use:** *Staph. aureus*, *S. pneumoniae*, *H. influenzae*; treatment of otitis media, sinusitis and SSTI, bone and joint infections; UTI caused by *E. coli*, *Klebsiella* and *Proteus*.

**Dosage:** 20-40 mg/kg/day divided q 8-12 hrly PO; (Max: 2 g). Twice daily option is for otitis media and pharyngitis.

**Brands:** 250, 500 mg Cap; 125, 250 mg Tab; 125 mg/5 ml Syrup; Distaclor, Keflor.

### 4. Cefuroxime

**Use:** *Staphylococci*, *Group B Streptococci*, *Pneumococci*, *H. influenzae* (type A and B), *E. coli*, *Enterobacter* and *Klebsiella*; treatment of URTI and LRTI, Otitis media, acute bacterial sinusitis, UTI, SSTI, bone and joint infection and sepsis.

**Dosage:** IV/IM: Neonates: 40-100 mg/kg/day divided q 12 hrly. Children: 200-240 mg/kg/day divided q 8 hrly.

PO; Infants and Children; Pharyngitis, tonsillitis: 20-30 mg/kg/day divided q 8 hrly (Max: 500 mg/day). Acute otitis media, acute bacterial sinusitis, impetigo: 30 mg/kg/day divided q 8 hrly (Max: 1 g/day).

Adolescents: Uncomplicated UTI: 125-250 mg q 12 hrly.

Uncomplicated gonorrhea: Single 1 g dose.

**Brands:** 125, 250, 500 mg Tab; 125 mg/5 ml Susp; 250, 750 mg/Vial; Altacef, Cetil, Zocef, etc.

**Combinations:** Cefuroxime + Probenecid.

**Administration:**  $\geq 30$  mg/ml for IV and should be administered over 15-30 minutes. For intravenous push administer over 3-5 minutes at a maximum concentration of 100 mg/ml.

## 5. Cefotaxime

**Use:** LRTI, SSTI, Bone and joint, Intra-abdominal and genitourinary tract infections; Meningitis due to susceptible organisms such as *H. influenzae* and *N. meningitidis*; *Neisseria gonorrhoeae*, etc.

**Dosage:** IM/IV

Neonates:  $< 1200$  g: 100 mg/kg/day divided q 12 hrly. 1200-2000 g: 100-150 mg/kg/day divided q 8-12 hrly.

Infants and Children 1 month to 12 yr:

$< 50$  kg: 100-200 mg/kg/day divided q 6-8 hrly.

Meningitis: 200 mg/kg/day divided q 6 hrly.

$\geq 50$  kg: Moderate to severe infection: 1-2 g q 6-8 hrly; life-threatening infection: 2g/dose q 4 hrly (Max: dose: 12 g/day).

**Brands:** 125, 250, 500, 1000 mg/Vial; C-Tax, Omnicef, Taxim, Udicef.

**Combinations:** Cefotaxime + Sulbactam.

**Administration:** In a concentration ranging from 20-100 mg/ml over a period of 5-30 min. For IM 250 mg/ml.

## 6. Ceftriaxone

**Use:** Treatment of sepsis, meningitis, LRTI, SSTI, bone and joint, intra-abdominal and UTI. Active against *H. influenzae*, *Neisseria*, and *Enterobacteriaceae*; gonococcal infection or chancroid; periorbital or buccal cellulitis, salmonellosis or



shigellosis, pneumonia of unestablished etiology (< 5 yr of age), otitis media, etc.

**Dosage:** IM/IV

Neonates:  $\leq 2000$  g: 50 mg/kg/day q 24 hrly.

> 2000 g: 50 to 75 mg/kg/day q 24 hrly.

Gonococcal infection: 25-50 mg/kg/day q 24 hrly for 7 days.

Infants and children: 50-75 mg/kg/day divided q 12-24 hrly.

Meningitis: 80-100 mg/kg/day divided q 12-24 hrly; loading dose of 75 mg/kg may be administered at the start of therapy (Max: dose: 4 g/day).

Chancroid: IM, 50 mg/kg as a single dose (Max: dose: 250 mg).

Acute epididymitis: IM, 250 mg in a single dose.

Acute otitis media: 50 mg/kg in a single dose (Max 1 gm)

**Brands:** 125, 250, 500, 1000 g/Vial; C-Tri, Cefaxone, Monocef.

**Combinations:** Ceftriaxone + Sulbactam.

**Administration:** Use Cefotaxime in place of ceftriaxone in hyperbilirubinemic neonates. IV push over 2-4 minutes at a maximum concentration of 40 mg/ml. For IM 250 mg/ml.

## **7. Cefoperazone**

**Use:** RTI, SSTI, UTI and Sepsis. Active against *E. coli*, *Klebsiella* and *Haemophilus* but variable activity against *Streptococcus* and *Staphylococcus* species.

**Dosage:** IV/IM: Neonates: 100 mg/kg/day divided q 12 hrly. Children: 100-150 mg/kg/day divided q 12 hrly (Max: 12 g/day).

**Brands:** 250, 500, 1000 mg/Vial; Magnamycin, Myticef.

**Combinations:** Cefoperazone + Sulbactam.

**Administration:** For IM  $\geq$  250 mg/ml and IV 5-50 mg/ml over 30 min.

- Concomitant use of anticoagulants may increase the risk of severe hemorrhage. Cefoperazone may decrease vitamin K synthesis by suppressing GI flora and Vitamin 'K' deficiency may occur.

## 8. Ceftazidime

**Use:** RTI, UTI, SSTI, intra-abdominal, osteomyelitis, sepsis and meningitis caused by *Enterobacteriaceae* and *Pseudomonas*; empirical therapy for febrile, agranulocytopenic patients.

**Dosage:** IM/IV.

Neonates: 1200-2000 g: 100 mg/kg/day divided q 12 hrly.

> 2000 gm: 150 mg/kg/day divided q 8 hrly.

Infants and Children: 100-150 mg/kg/day divided q 8 hrly.

Meningitis: 150 mg/kg/day divided q 8 hrly (Max: 6 g/day).

**Brands:** 250, 500, 1000 mg/Vial; C-zid, Tizime, Zidime.

**Administration:** For IM  $\geq$  300 mg/ml and for IV 40-180 mg/ml.

## 9. Cefdinir

**Use:** Respiratory tract, SSTI, and OM; susceptible organisms are *S. pneumoniae*, *H. influenzae*, *M. catarrhalis* and *S. aureus*, etc.

**Dosage:** PO;  $\geq$  6 months-12 yr: 14 mg/kg/day divided q 12 hrly for 5-10 days in OM, pharyngitis/tonsillitis, SSTI, acute maxillary sinusitis (Max: 600 mg/day).

**Brands:** 125 mg Tab; 300 mg Cap; 125 mg/5 ml Susp; Aldinir, Rtist, Sefdin.

- Administer with food, administer at least 2 hrly before or after antacids or iron supplements (as they decrease absorption by 40 and 80% respectively).

## 10. Cefepime

**Use:** LRTI, SSTI, UTI by various gram-positive and gram-negative organisms.

**Dosage:** IV/IM: 100-150 mg/kg/day divided q 8-12 hrly.

**Brands:** 500 mg, 1 and 2 gm/Vial; Cepime, kefage, Novapime.

**Administration:** 40-100 mg/ml for IV and 300 mg/ml for IM.

- Not compatible with metronidazole, vancomycin, aminoglycosides and aminophylline.

## 11. Cefixime

**Use:** UTI, OM, RTI; Susceptible organisms are *Streptococcus*, *H. influenzae*, *M. catarrhalis*, *N. gonorrhoeae*, etc.

**Dosage:** PO; 8 mg/kg/day divided q 12 hrly (Max: 400 mg/day). Enteric fever: 20 mg/kg/day q 12 hrly for 7 days. Shigellosis: 8 mg/kg/day q 12 hrly for 5 days. UTI: 16 mg/kg/day q 12 hrly on day 1, then 8 mg/kg/day for 13 days.

**Brands:** 100, 200 mg Tab; 50 mg/5 ml Susp; Cefi, Cefspan, Extacef, Fixx.

- Cefixime may increase warfarin (increase PT) and carbamazepine levels.

## 12. Cefpodoxime

**Use:** Pneumonia, Uncomplicated gonorrhea, SSTI, AOM, Pharyngitis, Tonsillitis, UTI; active against *S. aureus*, *Streptococcus*, *H. influenzae*, *N. gonorrhoeae*, *E. coli*, *Klebsiella* and *Proteus*.

**Dosage:** PO; 10 mg/kg/day divided q 12 hrly (Max: 400 mg/day), Uncomplicated gonorrhea: 200 mg single dose.

**Brands:** 50, 100, 200 mg Tab; 50 and 100 mg/5ml Susp; Cepodem, Doxcef, Monocef-O.

- Serum levels and absorption is reduced by antacids and H<sub>2</sub>-receptor antagonists.

## 13. Cefprozil

**Use:** RTI, SSTI, OM; active against *S. aureus*, *Streptococcus*, *H. influenzae*, *E. coli*, *Klebsiella* and *Proteus*.

**Dosage:** PO; 30 mg/kg/day divided q 8-12 hrly (Max: 1 gm/day). Pharyngitis/tonsillitis: 15 mg/kg/day q 12 hrly. SSTI: 20 mg/kg once daily.

**Brands:** 250, 500 mg Tab; Refzil-O, Zemetril. 125, 250 mg/5 ml Susp; Refzil-O.

## 14. Ceftizoxime

**Use:** UTI, SSTI, RTI, Sepsis; active against gram-positive and gram-negative infections.

**Dosage:** IV/IM: ≥ 6 months and Children: 30-60 mg/kg/day q 6-8 hrly. In severe infections up to 100-150 mg/kg/day.

**Brands:** 250 mg, 1 gm/Vial; Cefizox, Eldcef.

**Administration:** 50 mg/ml for IV

- Sodium content of 1 gm ceftizoxime: 60 mg (2.6 mEq).

**15. Cefpirome**

**Use:** Gram-positive, active against *Pseudomonas*, *Staphylococci*, *Enterococcus*; UTI, LRTI, SSTI, Septicemia, etc.

**Dosage:** IV/IM: 30-60 mg/kg/day divided q 12 hrly.

**Brands:** 250, 500 mg Tab; Refzil-O, Zemetril. 125, 250 mg/5 ml Susp; Refzil-O.

**16. Cephalexin**

**Use:** Group A- $\beta$ -haemolytic *Streptococcus*, *Staphylococcus*, *Klebsiella pneumonia*, *E. coli* and *Proteus*. Used to treat RT, SSTI, Bone and Joint, Genitourinary and Otitis media.

**Dosage:** PO: 25-100 mg/kg/day divided q 6-8 hrly (Max: 4 g/day).

**Brands:** 250 and 500 mg Cap; 125 and 250 mg Tab; 125 and 250 mg/5 ml Susp; 100 mg/ml Drops; Ceff, Nufex, Phexin, Sporidex.

## LINCOSAMIDES

### 1. Clindamycin

**Use:** Active against aerobic gram-positive *Staphylococci* and *Streptococci*; *Fusobacterium*, *Bacteroids* and *Actinomyces*. Topically for acne vulgaris.

**Dosage:** PO; 10-30 mg/kg/day divided q 6 hrly (Max: 1.8 g/day).

IV/IM: 25-40 mg/kg/day divided q 6-8 hrly (Max: 4.8 g/day).

**Brands:** 150 mg, 300 mg Cap.; 50 mg/ml Inj; Clinan, Dalacin C. 1% Cream; Acnecin, Mimosee.

### 2. Lincomycin

**Use:** URTI and osteomyelitis. Topically for acne vulgaris.

**Dosage:** PO: 30-60 mg/kg/day divided q 8 hrly. IV/IM: 10-20 mg/kg/day divided q 8-12 hrly.

**Brands:** 250 mg, 500 mg Cap; 125 mg/5 ml Syp; 300 mg/ml Inj; Lycin and lynx 2% Gel; Link and Lynx.

**MACROLIDES****1. Azithromycin**

**Use:** Mild to moderate URTI and LRTI, Pneumonia, SSTI, AOM, Urethritis and Cervicitis due to susceptible strains of *C. trachomatis*, *N. gonorrhoeae*, *M. catarrhalis*, *H. influenzae*, *S. aureus*, *S. pneumoniae*, *Mycoplasma*, *Streptococcus* and *Legionella*; endocarditis prophylaxis, *Salmonella*.

**Dosage:** PO/IV:

Children > 6 months: RTI: 10 mg/kg on day 1 (Max: 500 mg/day) followed by 5 mg/kg/day once daily for 5 days (Max: 250 mg/day). Otitis Media: 10 mg/kg once daily for 3 days (Max: 500 mg/day) or 10 mg/kg on day 1, followed by 5 mg/kg once daily for 2-5 days ≥ 2 years: Pharyngitis, tonsillitis: 12 mg/kg once daily for 5 days (Max: 500 mg/day). Chancroid: Single dose of 20 mg/kg (Max: 1 g). Uncomplicated chlamydial trachomatis: Single dose of 20 mg/kg (Max: 1 g). Endocarditis prophylaxis: 15 mg/kg/dose 1 hr before procedure. Typhoid: 20 mg/kg/day.

**Brands:** 100, 250, 500 mg Tab; 100, 200 mg/5 ml Susp; ATM, Azithral, Zithrocin. 500 mg Inj; Azithral.

**Combinations:** Azithromycin + Ambroxol.

**Administration:** Administer IV at a final concentration of 1 mg to 2 mg/ml over 1 to 3 hr.

**2. Clarithromycin**

**Use:** URTI, LRTI, AOM, SSTI due to susceptible strains of *S. aureus*, *S. pyogenes*, *S. pneumoniae*, *H. influenzae*, *M. catarrhalis*, *Mycoplasma pneumoniae*, *C. trachomatis* and *Legionella species*; treatment of *H. pylori* infection; prophylaxis of bacterial endocarditis in penicillin allergic patients.

**Dosage:** PO

- Infants and Children: AOM: 15 mg/kg/day divided q 12 hrly for 10 days. Respiratory, SSTI: 15 mg/kg/day divided 12 hrly for 7-14 days. Prophylaxis for bacterial endocarditis: 15 mg/kg 1 hrly before procedure.
- Adolescents: *H. pylori* (Combination therapy with omeprazole or with bismuth subsalicylate, tetracycline and H<sub>2</sub>-receptor antagonist): 250 mg twice, up to 500 mg 3 times/day.

**Brands:** 125, 250, 500 mg Tab; 125 mg/5 ml Syrup; Clarie, Crixan, Maclar.

- Concomitant use with terfenadine, astemizole, cisapride may result in QT interval prolongation, tachycardia, hypotension. Safety not established below 6 month of age. Clarithromycin increases serum levels of theophylline, carbamazepine, digoxin, cisapride.

**3. Erythromycin**

**Use:** URTI, LRTI, pharyngitis, skin infections due to *streptococci* and *staphylococci*; *mycoplasma*, *Legionella*, *Diphtheria*, *Pertussis*, *Cholera*, *acne*, *chancroid*; to improve feeding intolerance in preterm infants.

**Dosage:** PO:

Neonate: ≤ 7 days: 20 mg/kg/day divided q 12 hrly > 7 days: 30-40 mg/kg/day divided q 6-8 hrly. Chlamydial pneumonia: 50 mg/kg/day divided q 6 hrly for 14 days.

Infants and Children: 30-50 mg/kg/day divided q 6-8 hrly (Max: 2g/day).

Chlamydial trachomatis: 50 mg/kg/day divided q 6 hrly for 10-14 days.

Feeding Intolerance: 5 mg/kg/dose q 6 hrly.



Cholera: 40 mg/kg/day along with other antimicrobials.

Diphtheria: 40-50 mg/kg/day along with antitoxin therapy for 14 days.

Pertussis: 40-50 mg/kg/day for 14 days.

Rheumatic fever prophylaxis: 250 mg twice daily in penicillin allergic patients.

**Brands:** 125, 250 mg Tab; 125 mg/5ml Syp; Althrocin, Erythrocin. 3% Erytop cream and lotion for topical application in Acne.

**Combinations:** Erythromycin + Bromhexine.

- Erythromycin decreases clearance of carbamazepine, cisapride, theophylline, digoxin and may lead to their toxicity (do not use it concurrently). Avoid milk and acidic beverages 1 hr before or after a dose; administer after food to decrease GI discomfort.

#### **4. Roxithromycin**

**Use:** Respiratory, ENT, SSTI, genital tract infection caused by *Staphylococcus*, *Streptococcus*, *Corynebacterium*, *Listeria*, *Legionella*, *Mycoplasma*.

**Dosage:** 5-8 mg/kg/day in divided doses 12 hrly.

**Brands:** 50, 150 Tab; 50 mg/5 ml Syrup; Arbid, Roxid, Roximal.

**Combinations:** Roxithromycin + Ambroxol.

## PENICILLINS

### 1. Amoxicillin

**Use:** Active against *Salmonella*, *Shigella*, *Neisseria*, *E. coli*, *P. mirabilis*, *H. influenzae*. Used to treat OM, Sinusitis, RTI, Enteric fever, etc.

**Dosage:** PO; Neonates: 20-30 mg/kg/day divided q 12 hrly. Infants and Children: 20-50 mg/kg/day divided q 8-12 hrly. AOM: 80-90 mg/kg/day.

Endocarditis prophylaxis: 50 mg/kg 1 hr before procedure.

Enteric fever: 100 mg/kg/day for 14 days.

**Brands:** 125 and 250 mg Tab; 250 and 500 mg Cap; 125 mg/5 ml Syrup; 100 mg/ml drops; Novamox, Mox, Lamoxy, etc.

**Combinations:** Amoxicillin + Cloxacillin, Amoxicillin + LAB

### 2. Amoxicillin + Clavulanic Acid

**Use:** Same as amoxicillin in addition  $\beta$ -lactamase producing *M. catarrhalis*, *H. influenzae*, *Neisseria* and *S. aureus*, *Klebsiella*, etc.

**Dosage:** (Amoxycillin base)

Neonates: 30 mg/kg/day divided q 12 hrly. PO.

Infants and Children: 20-45 mg/kg/day divided q 8-12 hrly. PO; 50-100 mg/kg/day divided q 6-8 hrly IV.

**Brands:** 228.5 mg (200 + 28.5 mg), 375 mg (250 + 125 mg) and 625 mg (500 + 125 mg) Tab; 228.5 mg (200 + 28.5 mg) and 157.2 mg (125 + 32.2 mg) Susp; 150 mg (125 + 25 mg), 300 mg (250 + 50 mg), 600 mg (500 + 100 mg), 1200 mg (1 gm + 200 mg) Inj; Augmentin, Clavam.

### 3. Ampicillin

**Use:** Active against *Streptococci*, *Pneumococci*, *Enterococci*, some strains of *H. influenzae*, *Salmonella*, *Shigella*, *E. coli* and *Klebsiella*.

**Dosage:** IV/IM: Neonates (Use two times the recommended doses for meningitis).

PNA  $\leq$  7d:  $\leq$  2000 gm: 50 mg/kg/day divided q 12 hrly.

> 2000 gm: 75 mg/kg/day divided q 8 hrly.

PNA > 7 d:  $\leq$  2000 gm: 75 mg/kg/day divided q 8 hrly.

> 2000 gm: 100 mg/kg/day divided q 6 hrly.

Infants and Children: 100-200 mg/kg/day divided q 6 hrly. (For meningitis use twice the usual doses) Max: 12 g/day.

Endocarditis prophylaxis: 50 mg/kg 30 min before procedure (Max: 2 gm).

**Brands:** 125 mg and 250 mg Tab; 250 and 500 mg Cap; 125 mg/5 ml Susp; 100 mg/ml Drops; 250 and 500 mg Inj; Ampillin, Aristocillin, Brodicillin, Roscillin.

**Combinations:** Ampicillin + LAB, Ampicillin + Cloxacillin, Ampicillin + Sulbactam.

**Administration:** For IV 30-100 mg/ml and can be given over 15-30 min. Do not give simultaneously with aminoglycosides.

### 4. Ampicillin + Sulbactam

**Use:** Addition of sulbactam enhances activity against penicillinase producing bacteria, i.e. *S. aureus*, *Streptococcus*, *H. influenzae*, *E. coli*, *Klebsiella*, *B. fragilis*.

**Dosage:** Based on ampicillin component: IV/IM:

Infants > 1 mth: 100-150 mg/kg/day divided q 6 hrly.

Children: 100-200 mg/kg/day divided q 6 hrly.

**Brands:** Ampicillin 1 gm + Sulbactam 0.5 gm/Vial; Ampitum, Betamp, Sulbacin.

## 5. Carbenicillin

**Use:** Active against susceptible strains of *P. aeruginosa*, *E. coli*, Indole positive *Proteus* and *Enterobacter*.

**Dosage:** IV/IM:

Neonates:

PNA  $\leq$  7 days:  $< 2000$  g: 225 mg/kg/day divided q 8 hrly.

$> 2000$  g: 300 mg/kg/day divided q 6 hrly.

PNA  $> 7$  days: 300-400 mg/kg/day divided q 6 hrly.

Children: 400-600 mg/kg/day divided q 4-6 hrly.

**Brands:** 1 and 5 g/Vial; Carbelin, Pyoper.

## 6. Cloxacillin

**Use:** Active against penicillinase resistant *S. aureus* and other gram-positive cocci except *Enterococcus* and coagulase negative *Staphylococci*.

**Dosage:** IV/PO; Children  $> 1$  month: 50-100 mg/kg/day divided q 6 hrly (Max: 4 g/day).

**Brands:** 125 mg/5 ml Syrup; 250 and 500 mg Cap; 250 and 500 mg Inj; Biodox, Cloclilin, klox.

**Combinations:** Cloxacillin + Ampicillin

Cloxacillin + Ampicillin+ LAB.

## 7. Penicillin G Aqueous (Crystalline Penicillin)

**Use:** Active against most gram-positive cocci except *S. aureus*, some gram-negative organisms such as *N. gonorrhoeae*, *N. meningitidis* and some anaerobes and Spirochetes.

**Dosage:** IV/IM:

Neonates: For meningitis use twice the usual doses.

PNA  $\leq$  7 days: 1.2-2 kg: 50,000 units/kg/day divided 12 hrly.

> 2 kg: 75,000 units/kg/day divided 8 hrly.

PNA > 7 days: 1.2-2 kg: 75,000 units/kg/day divided 8 hrly.

> 2 kg: 100,000 - units/kg/day divided 6 hrly.

Children: 100,000-250,000 units/kg/day divided 4-6 hrly (Max: 400,000 units/kg/day). Rheumatic fever prophylaxis and pneumococcal infections: 200,000 units BD.

**Brands:** Penicillin G sodium 5 lac and 10 lac units/Vial; Benzyl penicillin. Penicillin G potassium 2, 4 and 8 lac units Tab; Pentids.

**Administration:** For IV 100,000-500,000 units/ml and should be given over 30-60 min. For neonates, it is 50,000 units/ml. Don't administer orally along with meals.

- Use with caution in pre-existing seizure disorder.  
Penicillin G potassium content is 1.7 mEq/million units.  
Penicillin G sodium content is 2 mEq/million units.

## **8. Penicillin G Benzathine**

**Use:** Useful for treatment of infections responsive to persistent, low concentration of penicillin, e.g. Streptococcus pharyngitis, rheumatic fever prophylaxis.

**Dosage:** IM: Neonates: > 1.2 kg: 50,000 units/kg once.

Children: 300,000-1.2 million units/kg q 3-4 wk (Max: 1.2-2.4 million units/dose).

Secondary rheumatic fever prophylaxis:

< 6 yr: 6 lac units q 3 wk, > 6 yr: 12 lac units q 3 wk.

**Brands:** 6, 12 and 24 lac units/Vial; Longacillin, Penidura.

**Administration:** Do not give at the same site repeatedly as it may cause fibrosis and atrophy.

- Use penicillin G benzathine and penicillin G procaine combination to achieve early peak levels in acute infections.

## 9. Penicillin G Procaine

**Use:** Active against *T. pallidum* and organisms susceptible to low but prolonged serum levels.

**Dosage:** IM: Neonates: > 1.2 kg: 50,000 units/kg/day once (Avoid in this age group as sterile abscesses and procaine toxicity may occur).

Children: 25,000-50,000 units/kg/day divided q 12-24 hrly (Max: 4.8 million units/day).

**Brands:** Inj; Procaine penicillin 4,00,000 units/Vial.

## 10. Penicillin V Potassium

**Use:** Active against most gram-positive cocci; *S. pneumoniae*, *Streptococcus*, and some gram-negative bacteria *N. gonorrhoeae*, *N. meningitidis*.

**Dosage:** PO: Children: < 12 yr: 25-50 mg/kg/day divided q 6-8 hrly (Max: 3 g/day), > 12 yr: 125-500 mg q 6-8 hrly.

Primary prevention of rheumatic fever: 250 mg 2-3 times/day for 10 days.

Prophylaxis of pneumococcal infections in children with sickle cell disease: < 3 yr: 125 mg BD, > 3 yr: 250 mg BD.

**Brands:** 125 and 250 mg Tab; Kaypen.

- Use with caution in patients with history of seizures. Each 250 mg penicillin V. contain 0.7 mEq of potassium. Each 250 mg = 400,000 units of penicillin.

### 11. Piperacillin

**Use:** Active against *P. aeruginosa*, *E. coli*, *Serratia*, *Enterobacter* and *Bacteroids*.

**Dosage:** IV/IM:

Neonates: PNA < 7 d: 150 mg/kg/day divided q 8-12 hrly.  
≥ 7 d: 200 mg/kg/day divided q 6-8 hrly.

Children: 200-300 mg/kg/day divided q 4-6 hrly.

**Brands:** 1 and 2 g/Vial; Pipralin, Piprapen.

**Administration:** For IV, 200 mg/ml can be given over 3-5 minutes.

- Sodium content of 1 g = 1.85 mEq.

### 12. Piperacillin + Tazobactam

**Use:** Tazobactam expands activity of piperacillin to B-Lactamase producing strains of *S. aureus*, *H. influenzae*, *B. fragilis*, *E. coli* and *Acinetobacter*.

**Dosage:** Based on piperacillin component.

Infants ≤ 6 mth: 150-300 mg/kg/day divided q 6-8 hrly.

Infants and Children > 6 mth: 300-400 mg/kg/day divided q 6-8 hrly.

**Brands:** Available in 8:1 combination. 2.25 g (2 g + 250 mg) and 4.5 g (4 g + 500 mg) Inj; Piptaz, Tazact, Torbac.

**Administration:** Can be given over 30 minutes at a maximum concentration of 200 mg/ml.

### 13. Ticarcillin

**Use:** Extended spectrum molecule active against *E. coli*, *Enterobacter*, *P. aeruginosa* and *Bacteroides*.

***Dosage:*** IV:

Neonates: < 2 kg: 150 mg/kg/day divided q 12 hrly.

> 2 kg: 225 mg/kg/day divided q 8-12 hrly.

Infants and Children: 200-300 mg/kg/day divided 4-6 hrly.

***Brands:*** 3 and 5 gm/Vial; Ticar.

***Combinations:*** Ticarcillin + Clavulanate.

***Administration:*** Can be given IV at a maximum 100 mg/ml concentration over 30 minutes.

- Use with caution in patients with CHF due to high sodium content (1 g contain 5.2-6.5 mEq).



**QUINOLONES****1. Ciprofloxacin**

**Use:** Active against *Shigella*, *Salmonella*, *Neisseria*, *P. aeruginosa*, *Enterobacter*, *H. influenzae*, *S. aureus*, *Streptococcus*. Topically for corneal ulcers and conjunctivitis.

**Dosage:** PO; IV: Children: 15-30 mg/kg/day divided 12 hrly (Max: PO; 1.5 gm/day IV; 800 mg/day).

**Brands:** 250, 500, 750 mg Tab; 2 mg/ml Infusion; Alcipro, Cebran, Cifran, Ciplox.

**Combinations:** Ciprofloxacin + Ornidazole: PO.

Ciprofloxacin + Tinidazole: PO.

Ciprofloxacin + Benzalkonium: Eye drops.

Ciprofloxacin + Dexamethasone: E/E drops.

**Administration:** For IV it can be given over 30 mins at a maximum concentration of 2 mg/ml.

- Use with caution in patients with seizures and renal problems. Avoid use along with dairy products, mineral supplements and antacids.

**2. Gatifloxacin**

**Use:** Active against gram-positive, gram-negative pathogens; some anaerobes and atypical mycobacteria.

**Dosage:** 10 mg/kg/day single dose orally.

**Brands:** 200, 400 mg Tab; Gaity, Gatifquin, Zigat.

**Combinations:** Gatifloxacin + Ornidazole: PO.

Gatifloxacin + Dexamethasone: Eye drops.

### 3. Levofloxacin

**Use:** UTI, Pneumonia, Otitis media, SSTI.

**Dosage:** PO; IV (Max dose: 500 mg/day).

- 6 mth to < 5 yr: 10 mg/kg/dose twice daily.
- 5-12 yr: 10 mg/kg/dose twice daily.

**Brands:** 250, 500 mg Tab; 500 mg/ml Inj; Glevo, L-cin, Levobact.

- Give IV over 1½ hr, rapid infusion may cause hypotension. Use with caution in diabetes, seizures, children < 18 yr.

### 4. Nalidixic Acid

**Use:** Lower UTI caused by *E. coli*, *Enterobacter*, *Klebsiella* and *Proteus*.

**Dosage:** PO; Children: > 3 mth: 50-55 mg/kg/day divided q 6 hrly.

Prophylaxis of UTI: 25-30 mg/kg/day divided q 8 hrly.

**Brands:** 250, 500 mg Tab; 300 mg/5 ml Syrup; Dix and Gramoneg.

### 5. Norfloxacin

**Use:** Primarily used for urinary and genital tract infections and bacterial diarrheas. Topically for eye and ear infections.

**Dosage:** PO; 6-12 mg/kg/day divided q 12 hrly.

**Brands:** 100, 200, 400 mg Tab; Norbactin, Norbid, Utibid. 100 mg/5 ml Susp; Tamflox, Wyflox.

**Combinations:** Norfloxacin + Tinidazole. PO

Norfloxacin + Metronidazole. PO

**6. Ofloxacin**

**Use:** Active against gram-positive, anaerobes and chlamydia. Useful for corneal ulcers, conjunctivitis, otitis externa and CSOM.

**Dosage:** PO; 15 mg/kg/day divided q 12 hrly.

IV: 5-10 mg/kg/day divided q 12 hrly.

**Brands:** 200 and 400 mg Tab; 50 mg/5 ml Susp; 2 mg/ml Infusion; Bioff, Oflox, Zanolcin, Zenflox, etc.

**Combinations:** Ofloxacin + Metronidazole. PO

Ofloxacin + Ornidazole. PO

Ofloxacin + Tinidazole. PO

Ofloxacin + Dexamethasone-Ear drops.

## TETRACYCLINES

### 1. Doxycycline

**Use:** Active against gram-positive cocci except *Enterococcus*, many gram-negative bacilli, anaerobes, *Mycoplasma* and *Chlamydia*.

**Dosage:** PO: 2-5 mg/kg/day divided q 12-24 hrly (Max: 200 mg/day). Cholera: 5 mg/kg single dose.

**Brands:** 100 and 200 mg Tab; Doxy-1, Vibazine

- Contraindicated in children < 8 yr due to associated retardation in skeletal development, permanent discoloration of teeth and enamel hypoplasia. Administration along with iron, calcium and milk decreases its absorption.

### 2. Minocycline

**Dosage:** 4 mg/kg/day divided q 12 hrly.

**Brands:** 50 mg, 100 mg Tab; CNN and Minolin.

- Avoid in children < 8 yr of age as for Doxycycline.

### 3. Tetracycline

**Use:** Treatment of rocky mountain spotted fever, acne vulgaris, lyme disease and mycoplasma disease.

**Dosage:** 25-50 mg/kg/day divided q 6 hrly (Max: 3 g/day).

**Brands:** 250 mg, 500 mg Cap; Hostacycline, Subamycin, Tetracycline.

- Contraindication as for Doxycycline. Administer 1 hrly. before or 2 hrly after meals.

**MISCELLANEOUS ANTIMICROBIALS****1. Aztreonam**

**Use:** UTI, LRTI, Septicemia, SSTI, etc. Active against gram-negative aerobic bacteria, *Enterobacteriaceae*, *Pseudomonas*, *H. influenzae*, etc.

**Dosage:** IV/IM.

Neonates:

PNA  $\leq$  7 days:  $\leq$  2000 g: 60 mg/kg/day divided q 12 hrly.

> 2000 g: 90 mg/kg/day divided q 8 hrly.

PNA > 7 days:  $\leq$  2000 g: 90 mg/kg/day divided q 8 hrly.

> 2000 g: 120 mg/kg/day divided q 6-8 hrly.

Children: 90-120 mg/kg/day divided q 6-8 hrly.

**Brands:** 0.5, 1 and 2 g/Vial; Azenam, Aztreo.

**Administration:** For IV 20-60 mg/ml; can be given over 10-60 min.

- Probenecid and furosemide increases serum levels.

**2. Chloramphenicol**

**Use:** Active against *Bacteroides*, *H. influenzae*, *N. meningitidis*, *S. pneumoniae*, *Salmonella*, *Mycoplasma*, etc. Topically for conjunctivitis and otitis externa.

**Dosage:** Infants and Children: 50-75 mg/kg/day divided q 6 hrly IV or PO. Meningitis: IV; Infants and Children: 75-100 mg/kg/day divided 6 hrly.

**Brands:** 250, 500 mg Cap; 125 mg/5 ml Susp; 1 gm/Vial; Enteromycetin, Paraxin.

**Combinations:** Chloramphenicol + Betamethasone-E/E drops.

Chloramphenicol + Dexamethasone-E/E drops.

Chloramphenicol + Polymyxin-E/E drops.

Chloramphenicol + Sulphacetamide-Eye drops.

- Three major toxicities are: Aplastic anemia, Bone marrow suppression and Grey baby Syndrome. Rifampicin, phenytoin and phenobarbitone may decrease serum levels. Use with caution in G6PD deficiency. May decrease absorption of vitamin B<sub>12</sub>.

### 3. Colistin Sulfate

**Use:** For gram-negative bacillary diarrhea and pseudomonal enteritis.

**Dosage:** 5-15 mg/kg/day divided q 6-8 hrly. PO.

**Brands:** 12.5 mg/5 ml, 25 mg/5 ml Susp; Colistop, Gdsafe, Furoxone Suspension/Tablets, Walamycin.

**Combination:** Furazolidone IP 25 mg/5 ml, Furazolidone IP 100 mg

### 4. Furazolidone

**Use:** For enteritis and protozoal diarrhea; active against *salmonella*, *shigella*, *giardia*, etc.

**Dosage:** Infants >1 mth and children: PO; 5-9 mg/kg/day; divided q 6 hrly (Max: 400 mg).

**Brands:** 25 mg/5 ml Syp; 100 mg Tab; Furoxone.

- Avoid in G6PD deficiency. Use in infants < 1 mth may cause hemolytic anemia. Urine color is changed to orange during its use.

## 5. Linezolid

**Use:** Treatment of pneumonia, SSTI, bacteremia caused by vancomycin resistant *Enterococcus*, *Streptococcus pneumoniae*, *Staph. aureus*, etc.

**Dosage:** Infants and Children: IV or PO; 10 mg/kg/dose q 8-12 hrly.

**Brands:** 600 mg Tab; 2 mg/ml infusion; Linx, Lizolid, Lizomed.

**Administration:** For IV: Infuse over 30-120 mth.

- May cause pseudomembranous colitis and myelosuppression.

## 6. Nitrofurantoin

**Use:** Prevention and treatment of UTI caused by *E. coli*, *Klebsiella*, *Enterobacter*, *S. aureus*, etc.

**Dosage:** Infants > 1 month and Children: 5-7 mg/kg/day divided q 6 hrly (Max: 400 mg/day). UTI prophylaxis: 1-2.5 mg/kg/day single dose (Max: 100 mg/day).

**Brands:** 50 mg, 100 mg Tab; 25 mg/5 ml Susp; Furadantin.

- Should not be used to treat UTI in febrile infants and young children in whom renal involvement is likely. Use with caution in anemia, G6PD and Vitamin B deficiency, DM, etc.

## 7. Polymyxin-B Sulfate

**Use:** Treatment of otitis externa. Rarely used parenteral for enteral and systemic infections.

**Dosage:** PO: 50,000 to 1,50,000 units/kg/day divided q 6-8 hrly. IV/IM: 15,000 - 25,000 units/kg/day divided q 12 hrly (Max: 2,000,000 units/day). Topical: 0.1 to 0.3% solution.

**Brands:** 5 lac iu/Vial; Aerosporin.

**Combinations:** Neosporin power (Polymyxin 5000 U + Bacitracin 400 U + Neomycin 3400 U/gm), Neosporin oint (Polymyxin 5000 U + Bacitracin 400 U + Neomycin 3400 U/gm), Neosporin-H oint (same as Neosporin oint + Hydrocortisone 10 mg/gm), Neosporin eyedrop (Polymyxin 5000 U + Neomycin 1700 U + Gramicidin 25 U/ml), Neomycin-H ear drop (Polymyxin 10,000 U + Neomycin 3400 U + Hydrocortisone 10 mg/ml).

**Administration:** Infuse slowly at a concentration of 1000-1600 units/ml.

- 1 mg of Polymyxin B = 10,000 units. IM route is not recommended due to severe pain.

## 8. Teicoplanin

**Use:** Active against gram-positive organisms only (Staphylococci, Streptococci and Enterococci).

**Dosage:** IM/IV: 10 mg/kg 12 hrly. For 3 doses followed by 6-10 mg/kg/day.

**Brands:** 200 mg and 400 mg/Vial; Targocid and Ticocin.

## 9. Trimethoprim + Sulfamethoxazole

**Use:** Prophylaxis and treatment of *P. carinii* pneumonia; UTI caused by *E. coli*, *Klebsiella*, *P. mirabilis*, *Enterobacter*; susceptible Shigellosis and Typhoid.

**Dosage:** Children > 2 mth PO.

- Mild to moderate infections: 6-12 mg of TMP/kg/day divided q 12 hrly.
- Severe infection: 15-20 mg of TMP/kg/day divided q 6-8 hrly.



- Prophylaxis of pneumocystis: 5 mg/kg of TMP single dose on alternate day.
- UTI prophylaxis: 2 mg of TMP/kg/dose daily or 5 mg TMP/kg/dose twice weekly.

**Brands:** TMP + SMZ, 160 + 800, 80 + 400 and 20 + 100 mg Tab; 40 + 200 mg/5 ml Susp; Bactrim, Septran. 160 + 800 mg Tab; Sepmax.

**Combination:** Trimethoprim IP 160/80/20 mg, Sulphamethoxazole IP 800/400/100 mg, Trimethoprim IP 40 mg + Sulphamethoxazole IP 200 mg/5 ml.

- CI in folate deficiency megaloblastic anemia. May cause Stevens Johnson Syndrome, Agranulocytosis, Hepatic necrosis.

## 10. Vancomycin

**Use:** Active against gram-positive pathogens including *Staphylococcus* (including MRSA and coagulase negative staphylococci), *S. pneumoniae*, *Enterococcus* and *Clostridium difficile* associated colitis.

**Dosage:** IV:

Neonates: PNA < 7 days:

1200-2000 gm: 15 mg/kg/day divided q 12-18 hrly;

> 2000 gm: 30 mg/kg/day divided q 12 hrly;

PNA > 7 days:

1200-2000 gm: 15 mg/kg/day divided q 8-12 hrly;

> 2000 gm : 45 mg/kg/day divided q 8 hrly;

Infants > 1 mth and Children: 40-60 mg/kg/day divided q 6 hrly (Max: 1 gm/dose).

Clostridium associated colitis: PO; 40-50 mg/kg/day divided q 6-8 hrly.

**Brands:** 500 mg and 1 gm Vial; Vancocin CP and Vancogen. 125 mg Cap; Vancocin CP.

**Administration:** IV: Concentration should not exceed 5 mg/ml.

- Rapid infusion is associated with Red Man Syndrome; administration of antihistamines just before infusion may prevent or minimize this reaction.

# 5

## CHAPTER

# Anticoagulants

### 1. Enoxaparin

**Use:** Treatment and prophylaxis of venous thromboembolism.

**Dosage:** SC; Treatment; 1-1.5 mg/kg q 8-12 hr. Prophylaxis: 0.5-0.75 mg/kg q 8-12 hr.

**Brands:** 10 mg/0.1 ml Inj; Clexane, LMWX, Lupenox.

- May cause hemorrhage, thrombocytopenia, GI symptoms. Do not rub after SC injection as bruising may occur. Therapy should be discontinued if platelet count falls below 1 lakh/mm<sup>3</sup>. Accidental overdosage may be treated with protamine sulfate.

### 2. Heparin

**Use:** Treatment and prophylaxis of thromboembolic disorders.

**Dosage:**

- IV: Loading dose of 50 units/kg given over 10 minutes followed by continuous infusion of 15-35 units/kg/hr as maintenance dose.
- For arterial lines and TPN: 0.5-1 units/ml is added.
- For line flushing: 10-100 units/ml (volume used is 2-5 ml/flush).

**Brands:** 1000 and 5000 units/ml Inj; Beparine, Heparin, V-parin.

- To reverse the effect of heparin use protamine. Contraindicated in severe thrombocytopenia, bacterial endocarditis, intracranial hemorrhage, shock. Maintain APTT to 1.5 to 2.5 times of control.

### 3. Warfarin

**Use:** Treatment and prophylaxis of venous thromboembolic disorders and pulmonary embolism; arterial thromboembolism in patient with prosthetic heart valves or atrial fibrillation.

**Dosage:** Loading dose of 0.2 mg/kg once then followed by 0.1 mg/kg/day. Dose is titrated according to prothrombin time value.

**Brands:** 1, 2 and 5 mg Tab; Uniwarfin, Warf.

- Overdose can be treated with vitamin K. May cause hemoptysis, hemorrhage, skin necrosis, GI symptoms.

# 6

## CHAPTER

# Antidepressants

### 1. Amitriptyline

**Use:** Depression, migraine prophylaxis, analgesic for neuropathic pain.

**Dosage:**

- Depression: 1-1.5 mg/kg/day divided q 8 hr.
- Analgesic and migraine prophylaxis: 0.5 mg/kg at bedtime can be increased gradually over 2-3 wk to 2mg/kg at bedtime.

**Brands:** 10, 25, 50 mg Tab; Nildep, Tryptomer.

- May cause postural hypotension, drowsiness, confusion, constipation, weight gain, tremor, urine discoloration, blurred vision, dry mouth, urinary retention. Do not stop abruptly in patient on chronic therapy.

### 2. Bupropion

**Use:** Depression, ADHD.

**Dosage:** PO; 75-100 mg/day in 3 divided doses.

**Brands:** 150 mg Tab; Bupep, Zyban.

### 3. Doxepin

**Use:** Depression, relief from neuropathic pain.

**Dosage:** 1-3 mg/kg/day in 1-2 divided doses.

**Brands:** 25 mg Tab; Dox, Saliter. 10, 25 and 75 mg Cap; Dox, Spectra.

- May cause excessive sedation, postural hypotension, anticholinergic effect.

#### 4. Fluoxetine

*Use:* Depression and obsessive compulsive disorder.

*Dosage:* > 5 yr: 5-10 mg starting dose and can be gradually increased to maximum dose of 20 mg/kg/day once daily.

*Brands:* 10 and 20 mg Tab; Flunat, Flunil, Nuzac, Prodep.

- May cause headache, nervousness, anxiety, insomnia, diarrhea, anorexia, constipation. Evening dose can be given before 4 pm to avoid insomnia.

#### 5. Imipramine

*Use:* Depression, enuresis.

*Dosage:*

- Depression: 1.5 mg/kg/day, if required may be increased to 1 mg/kg every 3-4 days to a maximum of 5 mg/kg/day in divided doses.
- Enuresis: > 6 yr: Start at 10-25 mg at bedtime, if adequate response is not seen after 1 week then can be increased gradually to 50 mg for 6-12 yr of age and 75 mg for > 12 years of age.

*Brands:* 25 mg Tab; 75 mg Cap; Antidep, Depsonil, Imipramine.

- Side effect same as amitriptyline.

#### 6. Lithium

*Use:* Acute manic episodes, depression, bipolar disorders.

*Dosage:* 15-60 mg/kg/day in 3-4 divided doses (Max: 900 mg/day). Start at lower doses and adjust weekly.

*Brands:* 250, 300, 400 mg Tab; Lithium, Lithosun. 150 mg Tab; Intalith.

- May cause polydipsia, weight gain, impaired taste, tremor, leucocytosis, vision problem, fatigue, hypotension, seizures.

## **7. Nortriptyline**

*Use:* Antidepressant, nocturnal enuresis.

*Dosage:*

- Nocturnal enuresis: 10-20 mg/day, titrate upward to a maximum of 40 mg/day. Give dose 30 minutes before bedtime.
- Depression: 1-3 mg/kg/day divided q 6 hr.

*Brands:* 25 mg Tab; Daventyl, Nordep, Sensival.

- May cause postural hypotension, tachycardia, weight gain, xerostomia, urinary retention, tremor, blurred vision.

## **8. Sertraline**

*Use:* Depression, obsessive compulsive disorder, panic disorder, attention deficit disorder, post-traumatic stress disorder.

*Dosage:*

- 6-12 yr: Initial 25 mg/day, can be increased by 25 mg weekly up to a desired response (Max: 200 mg/day)
- > 12 Years: Initial 50 mg/day, increase 25-50 mg weekly up to a desired response (Max: 200 mg/day).

*Brands:* 25, 50 and 100 mg Tab; Serlift, Serne, Serta, Setral.

- May cause dry mouth, GI disturbances, tremor, insomnia, fatigue, urinary incontinence.

# 7

## CHAPTER

# Antidotes/Poisoning

There are only very few specific antidotes available; other only modify the symptoms.

### 1. Acetylcysteine

*Use:* Acetaminophen (paracetamol) toxicity.

*Dosage:* PO; Initial dose of 140 mg/kg followed by 70 mg/kg q 4 hr for 68 hr (17 doses). IV; Initial dose of 150 mg/kg over 1/2-1 hr followed by 50 mg/kg over 4 hr, then 100 mg/kg over 16 hr.

*Brands:* 600 mg Tab; 200 mg/ml solution (20%) for injection; Mucomix.

- Acute flushing and erythema may occur within half to one hour after IV infusion. Use with caution in patient with asthma or prior history of bronchospasm.

### 2. Atropine

See under antiarrhythmic.

### 3. Benztropine

*Use:* Treatment of drug induced extrapyramidal effects and acute dystonic reaction.

*Dosage:* 0.02-0.05 mg/kg/dose BD; IV or PO in children > 3 yr of age (Max: 4 mg).

*S/E:* Sedation, blurred vision, dry mouth, tachycardia.



**4. Cyanide KIT (Amyl Nitrate, Sodium Nitrite, Sodium Thiosulphate)**

*Use:* Cyanide and hydrogen sulphide (nitrite only) poisoning.

*Dosage:* Amyl nitrite: 0.3 ml inhalation for 15-30 sec of each minute followed by rest. Sodium nitrite: 0.33 ml/kg of 3% solution slowly IV (Max: 10 ml). Sodium thiosulphate: 1.65 ml/kg of 25% solution IV at a rate of 2.5-5 ml/minute (Max: 50 ml).

*S/E:* Methemoglobinemia (avoid levels more than 30%).

**5. Charcoal**

See under miscellaneous drugs.

**6. Chlorpromazine**

*Use:* Amphetamine toxicity.

*Dosage:* IM, IV: 1 mg/kg.

*Brands:* 25 mg/ml Inj; Megatil.

**7. Deferiprone**

See under chelating agents.

**8. Desferrioxamine**

See under chelating agents.

**9. Digoxin Immune Fab**

*Use:* Digitalis glycoside toxicity.

*Dosage:* Depends upon body load of digoxin, it can be determined as; mg of digoxin ingested  $\times$  0.8. One vial binds 0.6 mg of digitalis glycoside.

*Brands:* 38 mg/Vial; Digibind.

**10. Dimercaprol (Bal)**

See under Chelating Agents.

**11. Dimercaptosuccinic Acid (Succimer, DMSA)**

*Use:* Lead poisoning.

*Dosage:* PO; 10 mg/kg/dose q 8 hr for 5 days, then 10 mg/kg 12 hr.

**12. Diphenhydramine**

*Use:* Phenothiazine induced dystonic reactions.

*Dosage:* PO; 5 mg/kg/day divided q 8 hr (Max: 300 mg/day).

*Brands:* 12.5 mg/5 ml Syrup; Benadryl.

*S/E:* Sedation, paradoxical agitation, ataxia.

**13. D-Penicillamine**

See under chelating agents.

**14. Edetate Calcium Disodium (EDTA)**

*Use:* Lead, Manganese, Nickel and Zinc toxicity.

*Dosage:* IM; IV: 50-75 mg/kg/day or 1-1.5 gm/m<sup>2</sup>/day divided q 6 hr as 0.2-0.4% solution for 5 days.

*Brands:* Available as 200 mg/ml Injection.

- IM route is preferred over IV. Avoid rapid IV infusion as it may lead to fatal elevation of ICP. May cause HT, allergic reaction, nephrotoxicity.

**15. Ethanol**

*Use:* Ethylene glycol and methyl alcohol ingestion.

**Dosage:**

- Ethylene glycol ingestion: 10 ml/kg of 10% solution IV or 1 ml/kg of 95% solution PO. Maintenance dose is 1.5 ml/kg/hr of 10% solution IV or 3 ml/kg/hr of 10% solution during hemodialysis.
- Methanol ingestion: 10 ml/kg of 10% solution IV as loading dose followed by 1.5 ml/kg/hr infusion.
- Target of treatment is to achieve methanol/ethylene glycol blood level 100-130 mg/dl.

**16. Flumazenil**

**Use:** Benzodiazepine toxicity.

**Dosage:** IV: Given in incremental doses of 0.1, 0.2, 0.3 mg at 1 min interval until desired effect is achieved (Max: 1 mg).

- Do not use in unknown or antidepressant ingestion.

**17. Glucagon**

See under miscellaneous drugs.

**18. Hyperbaric Oxygen**

**Use:** Carbon monoxide poisoning.

**Dosage:** Half life of carboxyhemoglobin is 5 hr in room air but in 100% oxygen half life is 1.5 hr. Give until carboxyhemoglobin level comes to less than 10%.

**19. Methylene Blue**

**Use:** Methemoglobinemia (drug induced).

**Dosage:** 0.1 to 0.2 ml/kg of 1% solution by slow infusion, may be repeated after 30-60 minutes.

**Brands:** Available as 10 mg/ml Injection.

**20. Naloxone**

**Use:** Morphine and other opioid poisoning.

**Dosage:** IV: 0.1 mg/kg/dose may be repeated q 2-3 minutes if required till the reversal of toxic effect (Max: 2 mg/dose and total Max: 10 mg).

**Brands:** 0.4 mg/ml Inj; Nalox, Narcotan.

## 21. Octreotide

**Use:** Sulfonylureas poisoning.

**Dosage:** 1 mcg/kg/dose q 12 hr.

**Brands:** 50 and 100 mcg/ml Inj; Actide, Octate.

- During Octreotide therapy, also required simultaneously high dose glucose.

## 22. Physostigmine

**Use:** Anticholinergic stress (Datura poisoning), baclofen and atropine toxicity.

**Dosage:** IM, IV: 0.02 mg/kg, may be repeated q 5-10 minutes to maximum 2 mg or till the desired effect occur.

- May cause bradycardia, asystole, seizure.

## 23. Pilocarpine

**Use:** Atropine toxicity.

**Dosage:** 2-4 mg, PO.

**Brands:** 10 mg Tab; Pilomax.

## 24. Pralidoxime (PAM)

**Use:** Organophosphorus (Insecticide) poisoning.

**Dosage:** IM, IV: 25-50 mg/kg as 5% solution over 15-20 min. The dose may be repeated after 1-2 hr and then at 10-12 hr interval if cholinergic crisis recur.

**Brands:** 1 mg Inj; Clopam, Lyphe.

**S/E:** Tachycardia, bronchospasm, seizure.

**25. Protamine**

See under drug used for controlling bleeding.

**26. Pyridoxine**

See under vitamins.

**27. Vitamin K (Phytomenadione)**

*Use:* Warfarin poisoning.

*Dosage:* 5-10 mg IM or IV.

*Brands:* 10 mg/ml Inj; Kenadion.

*Additional Antidotes:*

- **Calcium Gluconate:** Used in calcium channel blocker overdose and in hydrofluoric acid poisoning.
- **D-25 and 50%:** Used in insulin overdoses.
- **Edrophonium, Neostigmine:** Used in neuromuscular blocking agent poisoning.
- **Sodium Bicarbonate:** Phenothiazine and tricyclic antidepressant poisoning.
- **Calcium Folate:** Methotrexate, pyrimethamine, trimethoprim toxicity.

# 8

## CHAPTER

# Antiemetics

### 1. Dimenhydrinate

**Use:** Prevention and treatment of nausea, vomiting and vertigo associated with motion sickness.

**Dosage:** PO, IV, IM: Not indicated below 2 yr.

2-5 yr: 12.5-25 mg q 6-8 hr (Max: 75 mg/day).

6-12 yr: 25-50 mg q 6-8 hr (Max: 150 mg/day).

**Brands:** 50 mg Tab; Draminate, Gravol. 15.6 mg/5 ml Syrup; 50 mg/ml Inj; Draminate.

- May cause excitation in young children; use with precautions in patients with seizure disorder. May lead to masking of signs and symptoms of ototoxicity in patients on aminoglycosides, furosemide therapy.

### 2. Domperidone

**Use:** Nausea and vomiting, reflux esophagitis, dyspepsia.

**Doses:** PO: 0.3 mg/kg/dose q 4-8 hr.

**Brands:** 10 mg Tab; 1 mg/ml Syrup; Domperon, Domstal, Normetic. 1 mg/ml drops; Vomistop.

**Combinations:** Domperidone + PCM: 10 + 500 mg Tab; Dompar, Domstal-P, Motinorm-P.

Domperidone + Pantoprazole: 10 + 20 mg Tab; Dompan.

Domperidone + Ranitidine: 10 + 150 mg Tab; Gaspaz.

- Contraindicated in GI obstruction or perforations. May increase prolactin secretion leading to gynecomastia in males and galactorrhea in females.

### **3. Granisetron**

*Use:* Antiemetic in chemotherapy, radiation related and postoperated nausea and vomiting.

*Dosage:* IV: Children > 2 yr: 10-20 mcg/kg half an hour before chemotherapy; 2-3 doses may be given. PO: adults: 1 mg BD or 2 mg OD 1 hour before chemotherapy.

*Brands:* 1 and 2 mg Tab; 1 mg/ml Inj; Granicip, Topit. 1 mg/ml drops; Graniset.

- May cause hypo or hypertension, arrhythmias, agitation.

### **4. Meclizine**

*Use:* Motion sickness, vertigo, nausea and vomiting.

*Dosage:* PO  $\geq$  12 yr.

- Vertigo: 25-100 mg/day in divided doses.
- Motion sickness: 25-50 mg 1 hour before journey.

*Brands:* Available in combination.

Meclizine 12.5 mg + Nicotinic acid 50 mg: Diligan Tab.

Meclizine 12.5 mg + Vitamin B<sub>6</sub> 50 mg: PNV Tab.

### **5. Metoclopramide**

*Use:* Gastroesophageal reflux, prevention of nausea and vomiting due to various causes, symptomatic treatment of diabetic gastric stasis.

*Dosage:*

- GE reflux: PO, IV, IM: 0.4-0.8 mg/kg/day divided q 6-8 hr.

- Postoperative nausea and vomiting: IV: 0.1-0.2 mg/kg/dose.
- Chemotherapy induced vomiting: PO, IV: 1-2 mg/kg/dose q 2-4 hr as required.

**Brands:** 100 mg Tab; 5 mg/ml Syrup; 5 mg/ml Inj; Maxeron, Perinorm, Reglan, etc.

- Contraindicated in GI obstruction, past history of seizures. Causes extrapyramidal reactions and these can be prevented and treated with diphenhydramine.

## 6. Ondansetron

**Use:** Prevention of nausea and vomiting of various etiology.

**Dosage:** PO: < 4 yr, 1-3 mg; 4-11 yr, 4 mg; >11 yr, 8 mg q 8 hrly. IV: 0.15-0.45 mg/kg/dose q 8 hr.

**Brands:** 4 and 8 mg Tab; 2 mg/5 ml Syrup; 4 mg/ml Inj; Emeset, Ondem, Periset.

**Combinations:** Ondansetron + PCM and Ondansetron + Ranitidine.

**Administration:** For IV dilute to 1 mg/ml and be given over 15 minutes.

## 7. Prochlorperazine

**Use:** Nausea, vomiting, vertigo, severe intractable migraine.

**Dosage:**

- Not indicated in < 2 yr or < 9 kg. PO: 0.4 mg/kg/day divided q 6-8 hr. IM: 0.1-0.15 mg/kg/day divided q 8-12 hr.

**Brands:** 5 mg Tab; Bemetil, Stemetil, Vometil. 12.5 mg/ml Inj; Stemetil, Steminol.

- Chances of extrapyramidal reactions are high in children so always use lowest possible dose.



## 8. Promethazine

**Use:** Allergic conditions, motion sickness, antiemetic and sedation.

**Dosage:** Not indicated below 2 yr of age.

- Antihistamine: PO: 0.1 mg/kg/dose q 6 hr (Max: 12.5 mg/day).
- Antiemetic: PO, IM, IV: 0.25-1 mg/kg/dose q 6 hr (Max: 25 mg/dose).
- Sedation: PO, IV, IM: 0.5-1 mg/kg/dose q 6 hr (Max: 50 mg/dose).
- Motion sickness: PO: 0.5 mg/kg half an hour before journey, can be repeated after 12 hr as needed.

**Brands:** 10 and 25 mg Tab; 5 mg/5 ml Elixir; Phenergan, Prometh, Promet. 5 mg/ml Inj; Phenergan.

- IM route is preferred, avoid IV use. May cause hypotension in fast IV and hypertension in slow IV use. Children with dehydration are prone to develop dystonic reactions.

Chlorpromazine and hydroxyzine also have antiemetic actions. Dexamethasone and Lorazepam are used as adjunctive antiemetic.

# 9

## CHAPTER

# Antiepileptics

### 1. ACTH

**Use:** Infantile spasms, muscle weakness in myasthenia gravis.

**Dosage:** IM, SC; Infantile spasms: 5-60 units/kg/day for 1 week to 12 months.

**Brands:** 60 units/ml Inj; Actonprolongatum. 40 and 80 units/ml Inj; Corticotrophin.

- Prednisolone 2 mg/kg/day is equally efficacious as ACTH for infantile spasms. Don't administer live vaccine while on ACTH therapy.

### 2. Carbamazepine

**Use:** Prophylaxis of generalized tonic-clonic, partial, mixed partial or generalized seizures; to relieve pain in trigeminal neuralgia or diabetic neuropathy; treatment of bipolar disorders; myotonic muscular dystrophy.

**Dosage:** Dosage must be adjusted according to patients response and serum concentrations.

< 6 yr: Initial 5 mg/kg/day in 2-4 divided doses; may increase q 5-7 days by 5 mg/kg based on effect (Max: 35 mg/kg/day).

> 6 yr: Initial 10 mg/kg/day in 2-4 divided doses; increase by 100 mg or 5 mg/kg/day at weekly intervals until desired levels are achieved; usual maintenance: 400-800 mg/day.

**Brands:** 100, 200, 400 mg Tab; Carbatol, Mazetol, Tegrital. 100 mg/5 ml Susp; Mazetol, Tegrital.

- A high fat meal may increase the rate of absorption and reduce time to peak concentration. Children < 12 yr who receive > 400 mg/day may be converted to extended release preparations using the same total daily dosage. Administer with food to decrease GI upset. Observe patient for excessive sedation especially when starting or increasing therapy. It is not effective in absence, myoclonic, akinetic or febrile seizures; exacerbation of certain seizure types have been seen after initiation of therapy in children with mixed seizure disorders.

### **3. Clobazam**

**Use:** Add on therapy for complex partial, generalized clonic and tonic, absence, myoclonic, etc.

**Dosage:** PO: 0.25 to 1 mg/kg/day divided twice or thrice daily.

**Brands:** 5, 10, 20 mg Tab; Cloba, Clozam, Frisium.

### **4. Clonazepam**

**Use:** Alone or add on drug for absence, akinetic, Lennox-Gastaut, myoclonic and infantile spasms.

**Dosage:** PO: Initial daily dose: 0.01-0.03 mg/kg/day divided 2-3 doses (Max dose: 0.05 mg/kg/day); increase by maximum of 0.5 mg every third day until seizures are controlled or adverse effects seen. Maintenance dose: 0.1-0.2 mg/kg/day divided 3 times/day (Max: dose 0.2 mg/kg/day).

**Brands:** 0.25, 0.5, 1 and 2 mg Tab; Clonotril, Lonazep, Melzep.

- Prolonged use may lead to loss of efficacy.

## 5. Diazepam

**Use:** Status epilepticus, skeletal muscle relaxant in tetanus, general anxiety, febrile seizures, preoperative sedation.

**Dosage:**

Status epilepticus: IV: Neonates (Not as a first line drug) 0.1 to 0.3 mg/kg/dose given over 3-5 minutes, every 15-30 minutes to a maximum total dose of 2 mg. Infants and children: 0.05-0.3 mg/kg/dose given over 3-5 minutes, every 15-30 minutes to a maximum total dose of 5 to 10 mg.

Rectal: 0.5 mg/kg, then 0.25 mg/kg in 10 minutes if needed.

Sedation: PO: 0.2-0.3 mg/kg (Max: 10 mg); IM/IV: 0.04-0.3 mg/kg/dose (Max: 0.6 mg/kg every 8 hrly if required).

Febrile seizures prophylaxis: PO: 0.1 mg/kg/day divided every 8 hrly; initiate therapy at the first sign of fever and continue for 24 hr after fever is gone.

Neonatal tetanus: 0.5 to 5 mg/kg/every 2-4 hrly IV along with chlorpromazine.

**Brands:** 2 mg/5 ml Susp; Calmpose 2 mg, 5 mg, 10 mg Tab; Anxol, Calmpose, Valium. 5 mg/ml Inj; Anxol, Valium, Zepose. 2 mg/ml Direc 2 rectal diazepam.

- Rapid IV push may cause sudden respiratory depression, apnea or hypotension. Do not exceed 1-2 mg/minute for IV push.

## 6. Ethosuximide

**Use:** Used for absence, myoclonic and akinetic seizures.

**Dosage:** PO: Children < 6 yr: Initial: 15 mg/kg/day in 2 divided doses (Max: 250 mg/dose); increase every 4-7 days; Maintenance dose: 15-40 mg/kg/day in 2 divided doses; Children > 6 yr: Initial: 250 mg twice daily; increase by 250 mg/day every 4-7 days (Max: 1.5 g/day).

**Brands:** 250 mg Cap; 50 mg/ml Susp; Zorantin.

- Ethosuximide may increase tonic-clonic seizures in mixed seizure disorder. May cause blood dyscrasias.

## 7. Fosphenytoin

**Use:** Management of generalized status epilepticus; used for prevention and management of seizures responsive to phenytoin.

**Dosage:** Loading dose is 15-20 mg/kg. May substitute IV or IM for phenytoin maintenance doses.

**Brands:** 75 mg/ml Inj; Fosphen, Fosolin.

- Fosphenytoin sodium 1.5 mg is equivalent to phenytoin sodium 1 mg. Abrupt withdrawal of fosphenytoin may precipitate status epilepticus. Consider the amount of phosphate delivered by fosphenytoin in patients who require phosphate restriction (each 1.5 mg delivers 0.0037 mmol of phosphate). More water soluble than phenytoin.

## 8. Gabapentin

**Use:** Add on therapy for partial and secondary generalized seizures; neuropathic pain; migraine.

**Dosage:** PO: Children 3 to 12 yr: 15-35 mg/kg/day in 3 divided doses (Max dose: 50 mg/kg/day). Children > 12 yr: Start by 300 mg daily; then increase by 300 mg/day to maximum of 900-3600 mg/day in 3 divided doses.

**Brands:** 300, 400 mg Tab; Gabapin, Neurontin.

- Antacids reduce the bioavailability by 20%. May impair ability to perform activities requiring mental alertness.

## 9. Lamotrigine

**Use:** Add on therapy of partial seizures and generalized seizures of Lennox-Gastaut syndrome.

**Dosage:** PO: Children 2-12 yr on valproic acid: 0.15 mg/kg/day in 2 divided doses for 2 wk; then 0.3 mg/kg/day for next 2 wk; Maintenance dose is 1-5 mg/kg/day (Max dose: 200 mg/day).

Children 2-12 yr on enzyme inducing AED's: 0.6 mg/kg/day in 2 divided doses for 2 wk, then 1.2 mg/kg/day for next 2 wks; Maintenance dose is 5-15 mg/kg/day (Max: 400 mg/day).

**Brands:** 5, 25, 50 and 100 mg Tab; Lamitor.

- Fatal rashes may occur if high initial doses or rapid dosage increment is done. May cause swelling of glands and photosensitivity.

## 10. Levetiracetam

**Use:** Adjunctive therapy in partial, myoclonic and tonic-clonic seizure.

**Dosage:** PO;

- 4-12 yr: Start at 10 mg/kg/dose twice daily, can be increased every 2 wk by 10 mg/kg up to a maximum dose of 30 mg/kg/dose twice daily.
- > 12 yr: Start at 10 mg/kg/dose twice daily, can be increased every 2 wk to maximum of 1500 mg twice daily.

**Brands:** 250, 500, 750 mg Tab; Levtam, Levipil. 100 mg/ml Solution; Levroxa.

- Do not stop abruptly. May cause drowsiness, fatigue and aggressive behavior.

## 11. Lorazepam

**Use:** Status epilepticus, anxiety, sedation and add on antiemetic therapy.

**Dosage:**

Status epilepticus: IV: Neonates: 0.05 to 0.2 mg/kg/dose over 2-5 min; may repeat in 10-15 min. Infants and children:

0.1 mg/kg/dose over 2-5 min; repeat after 10-15 min if required in a dose of 0.05 mg/kg.

Anxiety/Sedation: IV: Neonates: 0.1 to 0.4 mg/kg/dose every 4-6 hrly as needed. Infants and children: 0.05 to 0.1 mg/kg/dose q 4-8 hrly.

Antiemetic therapy: IV: 0.04-0.08 mg/kg/dose every 6 hrly as needed.

**Brands:** 1 mg, 2 mg Tab; 2 mg/ml Inj; Anxilor, Calmese, Lopez.

**Administration:** IV: Don't exceed 0.05 mg/kg over 2-5 minutes or 2 mg/min; dilute with equal volume of compatible diluent.

- Do not use in comatose patient, pre-existing CNS depression, hypotension and narrow angle glaucoma.

## 12. Midazolam

**Use:** Status epilepticus, sedation, continuous IV for sedation of intubated and mechanically ventilated patients.

**Dosage:** IV:

Neonates: Conscious sedation during mechanical ventilation; continuous infusion: 0.15-0.5 mcg/kg/min.

Infants > 2 mth and children:

Status epilepticus: Loading dose: 0.15 mg/kg followed by continuous infusion of 1 mcg/kg/minute.

Sedation: 0.05 - 0.2 mg/kg loading dose; may be repeated after 1-2 hr if required or continuous infusion of 1-2 mcg/kg/min.

**Brands:** 1 mg/ml and 5 mg/ml Inj; Fulsed, Midosed, Shortal.

**Administration:** For IV administer at a concentration of 1-5 mg/ml to be given over 2-5 minutes.

- Sodium content of injection is 0.14 mEq/ml. Contraindicated in shock, pre-existing CNS depression.

### 13. Nitrazepam

**Use:** Absence, myoclonic, infantile spasms, insomnia, partial epilepsy.

**Dosage:** PO: Start with 0.2 mg/kg/day then gradually increase up to 1 mg/kg/day as required divided every 12 hr. or HS.

### 14. Oxcarbazepine

**Use:** Add on or monotherapy for partial and generalized tonic-clonic seizures.

**Dosage:** Not recommended in < 3 yr; PO; Children 3-17 yr: Initial 8-10 mg/kg/day in 2 divided doses (Max dose: 600 mg/24 hr); increase over 2 wk to 30-45 mg/kg/day as per response.

**Brands:** 150, 300 and 600 mg Tab; Oxcarb, Oxeptal, Oxrate, etc. 300 mg/5 ml Susp; Selzic.

- Significant hyponatremia may occur with its use.

### 15. Paraldehyde

**Use:** Add on therapy for refractory status epilepticus; and as sedative.

**Dosage:** IM: 0.15 ml/kg/dose; may repeat after 4-6 hr. PR: 0.3 ml/kg/dose mixed with 3:1 in coconut oil; may repeat after 4-6 hr.

**Brands:** 1 gm/ml Inj; Paraldehyde.

**Administration:** May cause nerve damage during IM use, inject carefully. Drug react with plastic; use glass syringe.



## 16. Phenobarbital

**Use:** Management of generalized tonic-clonic and partial seizures; neonatal seizures; febrile seizures in children; sedation; may also be used for prevention and treatment of neonatal hyperbilirubinemia and lowering of bilirubin in chronic cholestasis.

**Dosage:** Anticonvulsant: Status epilepticus: Loading dose: IV: 15-20 mg/kg in a single or divided doses.

[In selected patients, be given additional 5 mg/kg/dose every 15-30 minutes until seizure is controlled or a total dose of 30 mg/kg is reached; be prepared to support respiration] Maintenance dose: PO, IV: (Usually starts 12 hr after loading dose). 5 to 6 mg/kg/day in 2 divided doses.

Sedation: PO: 2 mg/kg 3 times/day.

Hyperbilirubinemia: PO: 3-8 mg/kg/day in 2-3 divided doses.

**Brands:** 30, 60 mg Tab; 200 mg/ml Inj; Fenobarb, Gardenal. 20 mg/5 ml Syrup; Gardenal.

- Do not give IV faster than 1 mg/kg/min with a maximum of 30 mg/min for infants and children. Abrupt withdrawal may precipitate status epilepticus. Dietary requirements of vitamins D, K, C, B<sub>12</sub> folate and calcium may be increased with long-term use. May adversely affect the cognitive performance of children treated on a long-term basis.

## 17. Phenytoin

**Use:** Management of generalized tonic-clonic, simple partial and complex partial seizures; prevention of seizures following head trauma/neurosurgery; ventricular arrhythmias, including those associated with digitalis intoxication; myotonic muscular dystrophy.

**Dosage:**

- Status epilepticus: IV: Loading dose; Neonates: 15-20 mg/kg in a single or divided dose. Infants and children: 15-18 mg/kg in a single or divided dose. Maintenance dose: Start after 12 hr of loading dose: 6-8 mg/kg/day.
- Anticonvulsant: Infants and children: PO: Loading dose: 15-20 mg/kg in 3 divided doses. Maintenance dose: Same as IV maintenance dose.
- Arrhythmias: Loading dose: IV: 1.25 mg/kg every 5 minutes, may repeat up to total loading dose of 15 mg/kg. Maintenance dose: Oral: 5-10 mg/kg/day in 2-3 divided doses.

**Brands:** 50, 100 mg Tab; 50 mg/ml Inj; Dilantin, Epsolin. 125 mg/5 ml Susp; Dilantin.

**Administration:** Neonates: Do not exceed IV infusion rate of 0.5 mg/kg/minute; Infants, children: Do not exceed IV infusion rate of 1-3 mg/kg/minute; maximum rate: 50 mg/minute; IV injections should be followed by NS flushes to avoid local irritation of the vein. Dilute with NS to a concentration of 1-10 mg/ml and start infusion immediately after preparation. Avoid using in central lines.

**18. Primidone**

**Use:** Generalized tonic-clonic, complex partial and simple partial seizures.

**Dosage:** PO: Neonates: 12-20 mg/kg/day divided 8-12 hrly; may start with lower dosage and titrate upward. Children < 8 yr: 10-25 mg/kg/day divided 8-12 hrly. Children > 8 yr: Initial: 125-250 mg/day at bedtime; increase by 125-250 mg/day q 3-7 days (Max: 2 gm/day).

**Brands:** 250 mg Tab; Mysoline.

- May increase the metabolism of vitamin K and D; dietary requirement of vitamin D, K, B<sub>12</sub>, folate and calcium may increase with long-term use.

### **19. Pyridoxine**

*Use:* Pyridoxine dependent seizures in infants.

*Dosage:* Neonates: 10-100 mg/day. Infants: 50-100 mg/day.

- When giving large IV doses, monitor respiratory rate, heart rate and BP.

### **20. Thiopental**

*Use:* Intractable seizures; induction of anesthesia; raised ICT.

*Dosage:* IV:

Seizures: 2-3 mg/kg; repeat as needed in 1 mg/kg/dose.

Increased ICT: Children: 1.5 to 5 mg/kg/dose; repeat as needed.

Induction of anesthesia: 3-4 mg/kg.

*Brands:* 500 mg and 1 gm Inj; Anesthal, Pentothal, Pentone.

*Administration:* For IV maximum concentration allowed is 50 mg/ml to be given over 1 hr. Rapid IV may cause hypotension or decreased cardiac output.

- Use with caution in patients with asthma or pharyngeal infections because cough, laryngospasm or bronchospasms may occur.

### **21. Topiramate**

*Use:* Add on therapy of primary generalized tonic-clonic or partial onset seizures; Lennox-Gastaut syndrome in patients > 2 yr of age; *migraine*.

*Dosage:* PO: Children 2-16 yr: Initial 1-3 mg/kg/day divided 12 hr; increase q 1-2 wk by 1-3 mg/kg/day. Maintenance dose is 5-10 mg/kg/day.

**Brands:** 25, 50 and 100 mg Tab; Nextop, Topamate, Topex.

- Hyperchloremic metabolic acidosis may occur in some patients. Somnolence and fatigue are the most common CNS adverse effects in children.

## 22. Valproate Sodium

**Use:** Simple and complex partial seizures, simple and complex generalized seizures, mixed seizures type.

**Dosage:** PO, IV: Neonates: Loading dose for refractory seizures: 20 mg/kg followed by 10 mg/kg/dose q 12 hr. Children: Initial: 10-15 mg/kg/day in divided doses; increase by 5-10 mg/kg/day at weekly intervals until desired levels are achieved. Maintenance: 30-60 mg/kg/day. Total IV dose is equivalent to the total daily oral dose, however, it should be given divided every 6 hrly.

**Brands:** 200, 300, 500 mg Tab; Epirate, Varparin, Valparin. 100 mg/ml IV infusion; Encorate. 200 mg/5 ml Syrup; Valparin, Epilex.

**Administration:** For IV maximum concentration allowed is 20 mg/min. Syrup can be used as retention enema in 1:1 dilution with water.

- Higher doses up to 100 mg/kg/day may be required if used along with phenytoin, carbamazepine, etc. Hepatic failure and pancreatitis resulting in death may occur in children < 2 yr of age.

## 23. Vigabatrin

**Use:** Partial seizures and infantile spasms.

**Dosage:** PO: Start with 20-40 mg/kg/day; titrate slowly up to 80-150 mg/kg/day in two divided doses.

**Brands:** 500 mg Tab; Sobril.

- Do eye examination every 3-6 months if on vigabatrin therapy.

### 1. Amphotericin-B

**Use:** Severe systemic infections and meningitis caused by candida, aspergillus and mucor species, etc. Treatment of visceral leishmaniasis. Liposomal Amp B is useful in cases refractory to or intolerant to conventional Amp B therapy.

**Dosage:** Conventional is started in a test dose of 0.1 mg/kg/dose to a maximum of 1mg infused over 1 hr. If test dose is tolerated then therapeutic dose of 0.4 mg/kg can be given on the same day. The daily dose then can be increased in 0.25 mg/kg increments to a dose of 1.5 mg/kg/day. Liposomal amphotericin can be used in higher doses upto 2.5-5 mg/kg/day.

Liposomal Amphotericin-B: Empiric therapy in systemic fungal infection; 3 mg/kg/day as once daily infusion. Visceral leishmaniasis; Day 1 to 5; 3 mg/kg once and for day 14 and 21, 3 mg/kg once.

**Brands:** 50 mg Vial; Amfocare, Ampholip, Fungizone.

**Administration:** Can be given over 2-3 hr in a concentration of 0.1-0.5 mg/ml.

- May cause hypokalemia, hypomagnesemia, azotemia, muscle and joint pain, neuropathy. Fever, chills, flushing, hypotension etc. can be avoided by prior medication with Meperidine and Acetaminophen.

## 2. Clotrimazole

**Use:** Oropharyngeal, cutaneous and vulvovaginal candidiasis, superficial mycosis, dermatophytoses.

**Dosage:** Topical: Apply twice or thrice daily.

- Vaginal: Apply applicator full of 1% cream daily at bedtime for 7-10 day or 100-200 mg vaginal tablet for 3-7 days. Avoid in < 3 yr of age.

**Brands:** Mouth paint, cream, powder, lotion, spray all 1%; Candid 100 and 200 mg vaginal Tab; Candid, Triben. 1% Ear drop, Clotrin.

**Combinations:**

- Chloramphenicol 5% + Clotrimazole 1% + Lidocaine 2% + Beclomethasone 0.025%; Candibiotic ear drop.
- Clotrimazole 1% + Lignocaine 2%; Candid and Surfaz ear drop.

## 3. Fluconazole

**Use:** Systemic, oropharyngeal, esophageal and vaginal candidiasis; Cryptococcal meningitis. Fungal infection of eyes, *T. cruris*, *T. corporis*, etc.

**Dosage:** PO; IV

- Systemic Candidiasis: 6-12 mg/kg/day for 28 days.
- Oropharyngeal, esophageal candidiasis: 6 mg/kg on day 1, then 3 mg/kg/day for 14-21 days.
- Cryptococcal meningitis: 12 mg/kg on day 1, then 6 mg/kg/day for 10-12 weeks.
- In neonates < 14 days, dosages are same except given q 48-72 hr.

**Brands:** 50, 150 and 200 mg Tab; 2 mg/ml Inj; Forcan, Zocon. 0.3% eye drop; Syscan, Zocon. 2% Zocon dusting powder.

#### 4. Griseofulvin

**Use:** Tinea infection of skin, hair and nails caused by microsporum, epidermophyton, trichophyton.

**Dosage:** PO; Micronized is used in a dosage of 10-15 mg/kg/day in 2-3 divided doses, whereas ultra-micronized is used in dosages of 5-10 mg/kg/day. Duration of Therapy: *T. corporis*: 2-4 wk; *T. capitis*: 4-6 wk; *T. pedis*: 4-8 wk; *T. unguium*: 3-6 mth.

**Brands:** 125, 250 and 500 mg Tab; Dermonorm, Grisovin, Nufulvin.

#### 5. Gentian Violet

**Use:** Mucocutaneous and cutaneous infection caused by *Candida albicans*.

**Dosage:** Apply solution under the tongue or on lesion after feeding. Apply to lesion with cotton, avoid application over ulcerative lesions of face.

**Brands:** 1 and 2% Gentian violet solution.

#### 6. Hamycin

**Use:** Candidal oral thrush.

**Dosage:** Apply 2-3 times/day for 7-10 days.

**Brands:** Hamycin suspension 2 lac. unit/ml.

#### 7. Itraconazole

**Use:** Active against *Candida*, *Cryptococcus*, *Aspergillus* and *Histoplasma*.

**Dosage:** 3-5 mg/kg/day once daily.

**Brands:** 100 mg Cap; Candistat, Canditral, Itracan.

- Decreased effect occurs with Rifampicin, Carbamazepine, Phenytoin, Omeprazole.

## 8. Ketoconazole

**Use:** Candidiasis, blastomycosis, histoplasmosis, oral thrush; topically for *T. corporis*, *T. cruris*, *T. versicolor* and cutaneous candidiasis. Shampoo is used for dandruff.

**Dosage:** PO; 3.3-6.6 mg/kg/day once daily.

**Brands:** 200 mg Tab; Fungicide, Ketozole, Nizral. 2% Shampoo; Danruf, Funginoc, Nizral. 2% solution; Arcolane, Dandoff. 2% Oint; Funginoc, Phytoral.

- Avoid antacids, H<sub>2</sub> blockers within 2 hr of use of ketoconazole as gastric acidity is necessary for good absorption of ketoconazole.

## 9. Miconazole

**Use:** Vulvovaginal candidiasis, topical treatment of superficial fungal infection.

**Dosage:** Topically apply twice daily. Vaginal apply 1 applicator full of cream at bedtime for 7 days.

**Brands:** 2% oint; powder and lotion; Zole. 2% vaginal cream; gynodactrin.

## 10. Nystatin

**Use:** Mucocutaneous, oral, vaginal fungal infection.

**Dosage:** Neonates: 100,000 units QID; Infants: 200,000 units QID; Children: 400,000-600,000 units QID. Topically: Apply twice or four times/day.



**Brands:** 500,000 units Tab; Mycostatin. 100,000 units vaginal Tab; Mycostatin vaginal.

### **11. Terbinafine**

**Use:** Onychomycosis and ringworm.

**Dosage:** PO; For < 20 kg: 62.5 mg/day once; 20-40 kg: 125 mg/day; > 40 kg: 250 mg/day. Topically: Apply twice.

**Brands:** 125, 250 mg Tab; 1% cream; Exifine, Terbifin.

**Duration:** Finger nails infection 6 wk; Toe nails 12 wk and Tinea for 2 wk.

### **12. Tolnaftate**

**Use:** *T. pedis*, *T. cruris*, *T. corporis*, *T. manuum* and *T. versicolor*.

**Dosage:** Apply 2-3 times/day for 2-4 wk.

**Brands:** Cream and solution; Tinaderm, Tinavate.

### **13. Voriconazole**

**Use:** Invasive aspergillosis, esophageal candidiasis, infections caused by *Fusarium*, *Malassezia*.

**Dosage:** IV; 6 mg/kg/dose q 12 hr for 2 doses followed by 4 mg/kg/dose q 12 hr. PO; 3-5 mg/kg/dose q 12 hr.

**Brands:** 200 mg Tab; 200 mg vial; Voraze.

**Administration:** Given IV over 1-2 hr at a rate of 3 mg/kg/hr; final concentration should be 0.5-5 mg/ml.

# 11

## CHAPTER

# Antigout Agents

### 1. Allopurinol

**Use:** To prevent attacks of gouty arthritis and nephropathy; treatment of secondary hyperuricemia during chemotherapy of tumors or leukemia.

**Dosage:**  $\leq 10$  yr: 10 mg/kg/day divided q 8 hr  $> 10$  yr: 200-600 mg/day divided q 8 hr.

**Brands:** 100 and 300 mg Tab; Aloric, Ciploric, Zyloric, Zyloric Tablets 100 mg/300 gm.

- Administer with plenty of fluids. May cause rashes, exfoliative dermatitis, leucopenia, thrombocytopenia, hepatitis, peripheral neuropathy. Discontinue drug use at first sign of rash.

### 2. Colchicine

**Use:** Acute and chronic gouty arthritis.

**Dosage:** Acute attack; 0.5-0.6 mg q 2 hr till the pain is relieved or GI toxicity occur (Max: 8 mg/day).

**Brands:** 0.5 mg Tab; Colijoy, Zycolchin.

- Side effects as of allopurinol.

### 3. Probenecid

**Use:** Prevention of gouty arthritis; also prolongs serum level of penicillin/cephalosporins.

**Dosage:** Initial dose of 25 mg/kg as single dose followed by 40 mg/kg/day divided q 6 hr (Max single dose: 500 mg).

**Brands:** 500 mg Tab; Bencid.

- Contraindicated in < 2 yr of age, blood dyscrasias, uric acid renal stones. Drink plenty of fluids to reduce the risk of uric acid stones.

### 1. Albendazole

**Use:** Active parenchymal neurocysticercosis lesions of *Taenia solium*; cystic hydatid disease of liver, lung and peritoneum caused by *E. granulosus*; Ascariasis, *A. duodenale*, *Necator americanus*, *Enterobius*, *Trichuris trichura*, Giardiasis.

**Dosage:**

Neurocysticercosis: 15 mg/kg/day in 2 divided doses for 28 days (Max: 800 mg/day).

Hydatid disease: 15 mg/kg/day in 2 divided doses for 1-6 mth (Max: 800 mg/day).

Ascariasis, hookworm, whipworm: 400 mg as a single dose in more than 2 yr of age and 200 mg single in less than 2 yr of age.

Cutaneous larva migrans: 400 mg once daily for 3 days.

Enterobius: 400 mg as a single dose; repeat in 2 weeks.

Trichinosis: 400 mg twice daily for 8-14 days.

Visceral larva migrans: 400 mg twice daily for 5 days.

Giardiasis: 400 mg once a day for 5 days.

**Brands:** 400 mg Tab; 200 mg/5 ml Syrup; Albendal, Nemazole, Zentel, Zental Tabs 400 mg.

**Combinations:** Albendazole + Ivermectin.

- Use carefully in impaired hepatic function and decreased TLC. Corticosteroids should be administered 1-2 days before initiating albendazole therapy in patients with neurocysticercosis and should be followed by concurrent steroid and anticonvulsant therapy for the first week. Retinal lesions with neurocysticercosis is a contraindication for albendazole therapy. Bioavailability is increased with fatty meal.

## **2. Diethyl Carbamazine (DEC)**

**Uses:** Lymphatic filariasis (*B. malayi*, *B. timori*, *Wuchereria bancrofti*), Tropical eosinophilia, Loeffler's pneumonia due to ascariasis.

**Dosage:** Due to dose related complications, dose of DEC should be increased gradually.

For patients with high microfilaria levels: 1 mg/kg single dose on day 1; 1 mg/kg tid on day 2; 1 to 2 mg/kg tid on day 3; 6 mg/kg/day tid divided on days 4-14. For patients with no microfilaria in the blood: 6 mg/kg/day divided tid for 4-14 days.

Tropical eosinophilia: 10 mg/kg/day q 8 hr for 1 mth.

Loeffler's Pneumonia: 15 mg/kg/day single dose for 4 days.

**Brands:** 50, 100 mg Tab; 120 mg/5 ml Syrup; Banocide  
Hetrazan 50 mg/5 ml Syrup; Banocide.

**Combinations:**

DEC + Chlorpheniramine Maleate: 250 + 5 mg; Unicarbazan forte.

DEC + Cetirizine

### 3. Ivermectin

**Use:** Ascariasis, enterobiasis, strongyloidosis, filariasis, onchocerciasis, scabies, pediculosis.

**Dosage:** PO; 150 mcg/kg single dose.

**Brands:** 3 and 6 mg Tab; Ivermectol, Scavista, Vermin.

### 4. Levamisole

**Use:** Ascariasis, hookworms, mixed infestations and as immunomodulator.

**Dosage:** PO

Ascariasis: 2 mg/kg/day single dose.

Hookworm: 50 mg q 6 hr for 4 doses.

Immunomodulator: 2 mg/kg/day q alternate day for 1 mth.

**Brands:** 50 and 150 mg Tab; Dewormis, Levomol, Vermisol. 50 mg/5 ml Syrup, Vermisol.

### 5. Mebendazole

**Use:** Enterobiasis, trichuriasis, ascariasis, hookworm infections.

**Dosage:** PO

Pinworms: 100 mg single dose; may need to repeat after 2 weeks.

Whipworms, roundworms, hookworms: 100 mg twice daily for 3 days, if not cured within 3-4 weeks, a second course may be given.

Capillariasis: 200 mg twice a day for 20 days.

**Brand:** 100 mg Tab; 100 mg/5 ml Syrup; Mebex, Wormin, etc.

## 6. Niclosamide

**Use:** Treatment of tapeworm infections (beef, fish, dog and cat).

**Dosage:** Avoid below 2 yr of age.

Beef and fish tapeworms: 40 mg/kg once (Max: 2 g).

Dwarf tapeworms: 40 mg/kg/day for 7 days (Max: 2 g/day).

**Brands:** 750 mg/5 ml Syrup; 500 mg Tab; Antepar.

## 7. Piperazine

**Use:** Pinworms and roundworms.

**Dosage:** PO

Pinworms: 65 mg/kg/day once daily for 7 days.

Roundworms: 75 mg/kg/day once daily for 2 days.

**Brands:** 750 mg/5 ml Syrup; 500 mg Tab; Piperazine citrate, Antepar.

## 8. Praziquantel

**Use:** Schistosomiasis (all stages), many intestinal tapeworms and trematode infections.

**Dosage:** PO

Schistosomiasis: 20 mg/kg/dose q 8 hr for 1 day.

Cysticercosis: 50 mg/kg/day q 8 hr for 15 days.

Tapeworm: 5-10 mg/kg single dose.

**Brands:** 500 mg Tab; Cysticide. 600 mg Tab; Prazine.

- Contraindicated in spinal and ocular cysticercosis. Use steroids prior to starting praziquantel in neurocysticercosis; dexamethasone is recommended for patients with numerous cysts.

## 9. Pyrantel Pamoate

**Use:** Ascariasis, hookworm, pinworm and trichostrongyliasis infections.

**Dosage:** Contraindicated below 2 yr of age.

Pinworm, roundworm, trichostrongyliasis: 100 mg once; may repeat in 2 weeks.

Hookworms, roundworms, whipworms: 11 mg/kg single dose (Max dose: 1 g); may repeat in 2 wk for pinworm.

**Brands:** 250 mg Tab; 250 mg/5 ml Susp; Nemocid, Expent.



# 13

## CHAPTER

# Antihistamines

### 1. Astemizole

**Use:** Allergic rhinitis and conjunctivitis, chronic allergic dermatological problems, etc.

**Dosage:** PO; given once daily.

< 6 yr: 0.2 mg/kg; 6-12 yr: 5 mg; >12 yr: 10-30 mg.

**Brands:** 10 mg Tab; 5 mg/5 ml Symp; Acemiz, Stemiz.

- Avoid abrupt discontinuation.

### 2. Azatadine

**Use:** Allergic rhinitis, allergy, urticaria, etc.

**Dosage:** PO; > 12 yr and adults: 1-2 mg two times/day.

**Brands:** 0.5 mg/5 ml Syrup; 1 mg Tab; Zadine.

### 3. Cetirizine

**Use:** Allergic rhinitis, chronic idiopathic urticaria, various allergies.

**Dosage:** PO; Avoid below 2 years of age.

2-5 yr: 2.5 mg/day once or 2 divided doses.

> 6 yr: 5-10 mg/day once or 2 divided doses.

**Brands:** 10 mg Tab; 5 mg/5 ml Syrup; Alerid, Cetiriz, Cetzine, Hicet, Zyrtec.

- Also available in combinations in anticold preparations.

**Combinations:** Cetirizine 5 mg + Ambroxol 60 mg; Cetzine-A Tab.

#### 4. Chlorpheniramine Maleate

*Use:* Allergic rhinitis, motion sickness, various allergic symptoms.

*Dosage:* PO

2-5 yr: 1 mg q 4-6 hr, 6-11 yr: 2 mg q 4-6 hr (Max: 12 mg).

> 12 yr: 4 mg q 4-6 hr (Max: 24 mg).

*Brands:* 4 mg Tab; Cadistin, Piriton.

*Combinations:* Chlorpheniramine maleate 2.5 mg + Ammonium chloride 125 mg + Sodium citrate 55 mg/5 ml; Piriton Expectorant. Chlorpheniramine maleate 4 mg + Dextromethorphan 10 mg + Menthol/5 ml; Piriton-CS.

- Available in combination with CPM, phenylephrine, PCM, dextromethorphan in anticold preparations.

#### 5. Clemastine Fumarate

*Use:* Allergic rhinitis and various allergic symptoms.

*Dosage:* PO

1-6 yr: 0.3-0.5 mg/kg/day divided 8-12 hr (Max: 1 mg).

6-12 yr: 0.5-1.2 mg/kg/day divided 12 hr (Max: 2 mg).

>12 yr: 1.3-2.5 mg/kg/day divided 12 hr (Max: 5 mg).

*Brands:* 1 mg Tab; 0.5 mg/5 ml Syrup; Clamist, Travegyl.

#### 6. Cyproheptadine Hydrochloride

*Use:* Various allergic symptoms, appetite stimulant, migraine prophylaxis.

*Dosage:* PO; 0.25 mg/kg/day divided 8-12 hr, or

2-6 yr: 2 mg q 8-12 hr, > 6 yr: 4 mg q 8-12 hr.

Migraine: 0.2-0.4 mg/kg at bed time.

*Brands:* 4 mg Tab; 2 mg/5 ml Syrup; Ciplactin, Peritol, Practin.

#### 7. Desloratadine

*Use:* Allergic rhinitis, chronic idiopathic urticaria.

*Dosage:* PO; 2-5 yr: 1.25 mg/day OD;

6-12 yr: 2.5 mg/day OD;

>12 yr: 5 mg/day OD.

**Brands:** 5 mg Tab; Desent, Loreta, Neoloridin.

## 8. Diphenhydramine

**Use:** Allergic symptoms, mild night time sedation, motion sickness, antitussive, phenothiazine induced dystonic reactions.

**Dosage:** PO

- Dystonic reactions and allergic reactions: 5 mg/kg/day divided q 6-8 hr (Max: 300mg/day).
- Antitussive: 2-6 yr: 6.25 mg; 6-12 yr: 12.5 mg; > 12 yr: 25 mg q 4 hr.
- Night time sleep: 2-12 yr: 1 mg/kg/dose (Max: 5 mg/dose) > 12 yr: 50 mg.

**Brands:** 25 mg Cap; 12.5 mg/5 ml Syrup; Benadryl 12.5 mg Tab; 12.5 mg/5 ml Syrup; Cofryl.

## 9. Fexofenadine

**Use:** Seasonal allergic rhinitis, chronic idiopathic urticaria.

**Dosage:** PO; 6-12 yr: 30 mg OD, >12 yr: 60 mg BD or 180 mg OD.

**Brands:** 30, 60 and 120 mg Tab; 60 mg/5 ml Syrup; Altiva. 120 and 80 mg Tab; 30 mg/5 ml Syrup; Fexidine.

- Erythromycin and Ketoconazole increases Fexofenadine plasma levels by decreasing its metabolism.

## 10. Hydroxyzine

**Use:** Allergy, anxiety, preoperative sedation and antiemetic.

**Dosage:** PO; 2 mg/kg/day divided q 6-8 hr, IM: 0.5-1 mg/kg/dose q 4-6 hr.

**Brands:** 10 and 25 mg Tab; 10 mg/5 ml Syrup; 6 mg/ml drops; 25 mg/ml Inj; Atarax, Hicope, Hyzer.

**11. Loratidine**

*Use:* Allergic rhinitis, chronic idiopathic urticaria.

*Dosage:* PO; 2-5 yr: 5 mg OD, >5 yr: 10 mg OD.

*Brands:* 10 mg Tab; 5 mg/5 ml Syrup; Alaspan, Loridin, Roletra.

- Macrolides, Ketoconazole, Theophylline decreases its metabolism.

**12. Pheniramine**

*Use:* Allergic rhinitis, urticaria, pruritis, drug rash.

*Dosage:* PO, IM, IV: 0.3-0.5 mg/kg/day divided q 8 hr.

*Brands:* 25 and 50 mg Tab; 22.75 mg/ml Inj; Avil.

**13. Promethazine**

See under antiemetic.

**14. Pseudoephedrine**

*Use:* Nasal congestion due to common cold, upper respiratory allergies and sinusitis, also helps in sinus and nasal drainage.

*Dosage:* PO; < 2 yr: 4 mg/kg/day divided q 6 hr.  
2-5 yr: 15 mg q 6 hr; Max: 60 mg/day.  
6-12 yr: 30 mg q 6 hr; Max: 120 mg/day.  
> 12 yr: 60 mg q 6 hr; Max: 240 mg/day.

*Brands:* 60 mg Tab; 30 mg/5 ml Syrup; Sudafed.

**Combinations:**

Pseudoephedrine 60 mg + PCM 500 mg Tab; Coldeez, Sine-Aid.

Pseudoephedrine 60 mg + Cetirizine 10 mg Tab; Alcold, Alerid-D.

Pseudoephedrine 60 mg + Chlorpheniramine 4 mg + PCM 500 mg Tab; Alerfri, Coscold.

# 14

## CHAPTER

# Antihypertensives

### 1. Atenolol

**Use:** Hypertension, alone or in combination; antiarrhythmic.

**Dosage:** PO; 0.8-1.5 mg/kg/day (Max: 2 mg/kg and do not exceed 100 mg/day).

**Brands:** 25, 50 and 100 mg Tab; Aten, Atenova, Betacard, Tenolol.

**Combinations:** Atenolol 50 mg + Nifedipine 20 mg Tab; Depten, Presolar.

- Contraindicated in pulmonary edema, cardiogenic shock, bradycardia, heart block, uncompensated CHF. Discontinue drug over 1-2 weeks and always avoid abrupt withdrawal. May mask signs of hyperthyroidism.

### 2. Captopril

**Use:** Hypertension and CHF.

**Dosage:** Must be titrated according to patient response.

- Neonates: 0.05-0.1 mg/kg/dose q 8-24 hr (Max: 0.5 mg/kg/day).
- Infants: 0.15-0.3 mg/kg/dose q 8-24 hr (Max: 6 mg/kg/day)
- Children: 0.3-0.5 mg/kg/dose q 8-24 hr (Max: 6 mg/kg/day).

**Brands:** 12.5 and 25 mg Tab; Aceten, Capace, Capotril.

**Combinations:** Captopril 25 mg + Hydrochlorthiazide 15 mg Tab; Angiotril-DU, Captopril-H.

- May cause neutropenia, agranulocytosis, cough, angioedema. Long term use may lead to zinc deficiency.
- Food decreases absorption by approximately 50%. Administration time need to be consistent.

### 3. Clonidine

**Use:** Hypertension, alternate agent for ADHD, aid in the diagnosis of pheochromocytoma and growth hormone deficiency.

**Dosage:** Children: PO

- Hypertension: 5-10 mcg/kg/day divided q 8-12 hr (Max: 0.9 mg/day).
- ADHD: Start at 0.05 mg/day, increase q 3-7 days by 0.05 mg/day, given divided q 3-4 hr (Max: 0.4 mg/day).
- Clonidine tolerance test: (Test of growth hormone release from pituitary) 4 mcg/kg as single dose.

**Brands:** 100 mcg Tab; Arkamin. 150 mcg Tab; Catapres. 150 mcg Inj; Arkamin, Catapres.

- Abrupt withdrawal may lead to rapid increase in blood pressure and symptoms of sympathetic over activity, so taper gradually over more than a week.

### 4. Diazoxide

**Use:** Emergency lowering of blood pressure, hypoglycemia related to hyperinsulinism.

**Dosage:**

- Hypertension: Children: IV: 1-3 mg/kg, may be repeated in 5-15 minutes (Max: 150 mg/dose).
- Hyperinsulinemic hypoglycemia: PO.

Newborns and Infants: 8-15 mg/kg/day divided q 8-12 hr.

Children: 3-8 mg/kg/day divided q 8-12 hr.

If beta blockers, hydralazine, nitrates are already in use in a patient, then use of diazoxide is not recommended within 6 hours.

### **5. Diltiazem**

*Use:* Hypertension, atrial fibrillation or flutter, PSVT.

*Dosage:* PO

Children: 1.5-2 mg/kg/day in 3-4 divided doses.

*Brands:* 30 and 60 mg Tab; Cardem, Dicard, Dilzam, Masdil.

- Contraindicated in IInd or IIIrd degree heart block, sick sinus syndrome. Should not be stopped abruptly. May lead to bradycardia, hypotension, CHF, hepatic injury.

### **6. Enalapril**

*Use:* Hypertension, CHF.

*Dosage:* PO

- Neonates: 0.1 mg/kg/day in divided doses (Max: 0.4 mg/day).
- Infants and children: 0.1-0.5 mg/kg/day in 2 divided doses.

*Brands:* 2.5, 5 and 10 mg Tab; Enam, Envas, Minipril, Vasopril.

- Side effects are similar to other ACE inhibitors

### **7. Hydralazine**

*Use:* Hypertension, CHF.

*Dosage:*

IM, IV: 0.1-0.2 mg/kg/dose q 4-6 hr (Max: 3.5 mg/kg/day).

PO: 0.75-1 mg/kg/day in 2-4 divided doses (Max: 7.5 mg/kg/day).

**Brands:** 25 mg Tab and 20 mg/ml Inj; Apresoline.

- For IV administration maximum rate permitted is 0.2 mg/kg/minute.

## 8. Labetalol

**Use:** Hypertension, used IV in hypertensive emergencies.

**Dosage:**

PO; 4 mg/kg/day in 2 divided doses (Max: 40 mg/day).

IV: Starting dose 0.2-1 mg/kg/dose (Max: 20 mg/dose).

Continuous infusion: 0.4-1 mg/kg/hr (Max: 3 mg/kg/hr).

**Brands:** 10 mg Tab, 5 mg/ml Inj; Lobet. 50, 100 and 200 mg Cap; Normadate.

- Contraindicated in asthma, uncomplicated CHF, bradycardia, pulmonary edema.

## 9. Methyldopa

**Use:** Hypertension.

**Dosage:** Start at 10 mg/kg/day divided 2-4 hourly, may be increased every 2 days if required to a maximum dose of 65 mg/kg/day.

**Brands:** 250 mg Tab; Alphasopa, Amdopa, Sembrina.

## 10. Metoprolol

**Use:** Hypertension, arrhythmias, idiopathic hypertrophic subaortic stenosis, migraine prophylaxis.

**Dosage:** PO; 1-5 mg/kg/day.

**Brands:** 25, 50 and 100 mg Tab; Betaloc, Metolar, Topol-XL.

- Abrupt discontinuation should be avoided. Contraindicated in sinus bradycardia, CHF, cardiogenic shock.



## 11. Minoxidil

**Use:** Hypertension, topically for alopecia (male pattern).

**Dosage:**

- Hypertension: PO; Start at 0.1-0.2 mg/kg single dose; Max: 5 mg/day; can be increased every 3 day to 0.25-1 mg/kg/day in 2 divided doses to a maximum of 50 mg/day.
- Alopecia: Apply twice daily.

**Brands:** 2.5, 5 and 10 mg Tab; Loniten. 2 and 5% solution; Coverit, Pilagro, Regrow.

- Minoxidil use should be reserved for patients not responding to maximum dose of diuretics and 2 other antihypertensive agents. May cause pericarditis, pericardial effusion and tamponade.

## 12. Nifedipine

**Use:** Hypertension, hypertrophic cardiomyopathy.

**Dosage:** PO; SL:

- Infants and Children: 0.25-0.5 mg/kg/dose (Max: 10 mg/dose or 1-2mg/kg/day).
- Hypertrophic cardiomyopathy: 0.6-0.9 mg/kg/day in 3-4 divided doses.

**Brands:** 5 mg Cap., 10 and 20 mg Tab; Angioblock, Cardipin, Depin, Myogard.

- More rapid effect is seen if drug is administered empty stomach. May lead to hypotension, tachycardia, flushing. Concurrent beta blocker use may lead to increase in cardiovascular side effects. Nifedipine increases phenytoin, digoxin and cyclosporine serum levels.

### 13. Nitroprusside

**Use:** Hypertensive crises, CHF, controlled hypotension during anesthesia.

**Dosage:** IV, Initial dose is 0.3-0.5 mcg/kg/minute, titrate to a desired effect up to maximum dose of 8 mcg/kg/minute.

**Brands:** 50 mg/ml Inj; Nipress, Pruside, Sonide.

**Administration:** Dry powder for injection should only be dissolved in 5% dextrose water and should be protected from light. Left over should be discarded after 24 hr of reconstitution. Overdose or prolonged use may lead to cyanide or thiocyanate toxicity.

### 14. Phenoxybenzamine

**Use:** Symptomatic treatment of sweating and HT in patient with pheochromocytoma.

**Dosage:** PO; 0.2-2 mg/kg/day as single dose.

**Brands:** Fenoxene 10 mg Cap and 50 mg/ml Inj.

- May cause nasal congestion, dizziness, constricted pupils.

### 15. Phentolamine

**Use:** Diagnosis and treatment of pheochromocytoma, used locally for extravasation of drugs with alpha adrenergic effects (dopamine, dobutamine, epinephrine, phenylephrine).

**Dosage:**

- Extravasation: Dilute 2.5-5 mg in 10 ml NS and then infiltrate by multiple injections (Max: 0.1 mg/kg).
- Pheochromocytoma: IM, IV: 0.05-1 mg/kg/dose (Max: 5 mg).

**Brands:** Fentanor 10 mg/ml Inj.

## 16. Prazosin

**Use:** Hypertension, severe CHF.

**Dosage:** PO; 0.1 mg/kg/dose q 6 hr, can be increased slowly up to a maximum dose of 0.4 mg/kg/day.

**Brands:** 2.5 and 5 mg Tab; Minipress, Prazocip XL, Prazopress.

- First dose of a drug may cause marked hypotension, syncope and loss of consciousness. This effect is more commonly seen in patient of salt or water depletion, receiving beta blocker, diuretics.

## 17. Propranolol

**Use:** Hypertension, arrhythmias, tetralogy of fallot cyanotic spells, migraine prophylaxis and short term adjunctive therapy of thyrotoxicosis.

**Dosage:**

- Hypertension, Arrhythmias: PO; 0.5-1 mg/kg/day divided 6-8 hr, titrated slowly upward up to 2-5 mg/kg/day. IV: 0.01-0.1 mg/kg/dose to be given over 15 minutes; Maximum dose 1 mg in infants and 3 mg in children.
- Migraine prophylaxis: PO; 0.6-1.5 mg/kg/day divided q 6-8 hr (Max: 4 mg/kg/day).
- Tetralogy Spells: Starting is 1-2 mg/kg/dose every 6 hr., can be titrated upward slowly every 24 hour to maximum of 5 mg/kg/day.
- Thyrotoxicosis: PO; 2 mg/kg/day divided q 6-12 hr.

**Brands:** 10, 40 and 80 mg Tab; Ciplar, Inderal. 1 mg/ml Inj; Propranol.

- Give IV slowly at a rate of 1 mg/minute. Taper slowly over 2 weeks. Not indicated in patients with CHF, bradycardia, heart block, asthma. Cimetidine, Ciprofloxacin, Fluconazole, Isoniazid, Theophylline may increase propranolol levels and toxicity.

## 18. Verapamil

**Use:** Hypertension, supraventricular tachyarrhythmias.

**Dosage:** Not indicated below 2 years of age.

- IV: 0.1-0.2 mg/kg/dose (Max: 5 mg/dose). Second dose can be repeated after 30 min if required.
- PO: 4-8 mg/kg/day divided q 8 hr.

**Brands:** 40 and 80 mg Tab; Vasopten, Veramil. 25 mg/ml Inj., Calaptin, VPL.

**Administration:** Monitor BP and ECG during IV use. Calcium Chloride should be ready to treat hypotension if occurs.

### 1. Clofazimine

**Use:** Multibacillary dapsone sensitive leprosy, lepromatous leprosy, erythema nodosum leprosum.

**Dosage:** PO; 1 mg/kg/day; maximum 50 mg/day for daily schedule and 4 mg/kg, maximum 300 mg for once monthly doses. Given in combination with dapsone and rifampicin.

**Brands:** 50 and 100 mg Cap; Clofozine, Hansepran.

- May discolor skin, conjunctiva, tears, sweat. Use with caution in patient with gastrointestinal problems.

### 2. Dapsone

**Use:** Leprosy, dermatitis herpetiformis, prophylaxis against *Pneumocystis carinii* pneumonia as an alternative drug.

**Dosage:** PO; 1-2 mg/kg/day once daily in combination with other agents (Max: 100 mg/day).

**Brands:** 25, 50 and 100 mg Tab; Dapsone, Navophone.

- Contraindicated in G6PD deficiency. May cause hemolysis, leukopenia, cholestatic jaundice, photosensitivity.

### 3. Rifampicin

See under antitubercular drugs.

### 1. Arteether

**Use:** Severe and complicated malaria including cerebral malaria caused by *Plasmodium falciparum*.

**Dosage:** IM: 3 mg/kg/day once daily for 3 days.

**Brands:** 75 mg/ml Inj. containing  $\alpha$  and  $\beta$ -arteether; E-mal, Falcigard, Match, Rapither.

### 2. Artemether

**Use:** Severe falciparum malaria, cerebral malaria, multidrug resistant malaria.

**Dosage:**

- Severe malaria: IM, PO: 3.2 mg/kg loading dose on first day, followed by 1.6 mg/kg daily for 6 days (Max total: 9.6 mg/kg). This course should be followed by 2nd line drug for 7 days.
- Uncomplicated malaria: PO; 4 mg/kg once a day for 3 days plus mefloquine as single dose on second or third day.

**Brands:** 40 and 80 mg Cap; 80 mg/ml Inj; Larither, Malither, Paluther.

### 3. Artemether and Lumefantrine

**Use:** Treatment of *P. falciparum* malaria or mixed infection including *P. falciparum*.

**Dosage:** PO; Artemether and Lumefantrine is available in fixed combination ratio of 1:6. Dose can be calculated by artemether content, i.e. 4 mg/kg/day in two divided doses for 3 days.

New and recrudescence infection can be treated with a second course.

**Brands:** 20+120/5 ml Syrup; 20+120, 40+240, 80+480 Tab; Lumerax, Lumart.

- May cause HA, dizziness, myalgia, abdominal pain.

#### **4. Artesunate**

**Use:** Severe malaria and chloroquine resistant falciparum malaria.

**Dosage:**

- Severe malaria: IM, IV: Loading dose of 2.4 mg/kg as a single dose followed by 1.2 mg/kg/dose at 12 and 24 hr, then 1.2 mg/kg/day for 6 days. If patient can take orally shift to oral formulation in a dose of 2 mg/kg/day. This should be followed by second line drug for 7 days.
- Uncomplicated malaria: PO; 4 mg/kg single dose on day 1, followed by 2 mg/kg daily for 4 days plus mefloquine single dose on 2nd or 3rd day.

**Brands:** 50 mg Tab; 60 mg Vial; Falcigo, Falciquine, Uleria.

**Administration:** 60 mg dry powder for injection is dissolved in 0.6 ml of 5% sodium bicarbonate, this is then diluted to 3-5 ml with 5% dextrose and give immediately by IV bolus.

- Antagonistic effect is seen if used along with pyrimethamine and sulfonamides.

#### **5. Chloroquine**

**Use:** Chemoprophylaxis in sensitive areas, treatment of uncomplicated malaria due to susceptible *Plasmodium species*, extraintestinal amoebiasis.

**Dosage:**

- Acute attack: PO; 10 mg base/kg loading dose followed by 5 mg/kg after 6 hr and then at 24 and 48 hr (Total dose: 25 mg/kg) IM: 5 mg base/kg (Max: 200 mg base); may be repeated after 6 hr (Max: 10 mg/kg/day).
- Malaria prophylaxis: PO; 5 mg base/kg/week on the same day each week; start 1-2 weeks before exposure and continue for 4 weeks after leaving an endemic area (Max: 300 mg base/wk).
- Extraintestinal amoebiasis: PO; 10 mg base/kg/day single dose for 2-3 weeks (Max: 300 mg base/day).

**Brands:** 250 and 500 mg Tab; (base is 150 and 300), 50 mg/5 ml Syrup; 40 mg/ml Inj; Cloquin, Emquine, Nivaquin-P, Resochin.

- Parenteral dose should not exceed 5 mg base/kg. Use with caution in liver disease, seizure disorder, auditory damage, psoriasis, G6PD deficiency should not be given empty stomach and in high fever. If vomiting occur within 45 minutes of a dose, that particular dose is to be repeated after taking care of vomiting.

**6. Mefloquine**

**Use:** Treatment and prophylaxis of falciparum malaria.

**Dosage:** PO;

- Treatment: Loading dose of 15 mg base/kg as single dose followed by 10 mg/kg 8-12 hr later for 1 day (Max: 500 mg).
- Chemoprophylaxis: 5 mg base/kg weekly (Max: 250 mg/week). Started 1 week before and continued for 4 week after last exposure.

**Brands:** 250 mg Tab; Mefax, Meff, Mefque.

- May cause anxiety, hallucination, bradycardia, sinus arrhythmias.



## 7. Primaquine

**Use:** Radical cure and prevention of relapse in vivax and ovale malaria. In case of falciparum it may be given for terminal prophylaxis.

**Dosage:** PO; Radical cure; For vivax and ovale only. 0.3 mg base/kg/day for 14 days as single daily dose; after an adequate course of chloroquine (Max: 15 mg). Terminal prophylaxis/gametocytocidal action in falciparum: 0.7 mg of base/kg as single dose.

**Brands:** 2.5, 7.5 and 15 mg Tab; Leoprime, Malarid.

- Use with caution in G6PD deficiency, in cases of borderline deficiency once weekly dose of 0.6-0.8 mg/kg is given for 6 weeks. Should not be given along with other drugs causing hematological disorders, e.g. Chloromycetin, Sulphadoxine + Pyrimethamine.

## 8. Pyrimethamine and Sulphadoxine

**Use:** Prophylaxis and treatment of malaria.

**Dosage:** PO

- Acute attack: 1 mg/kg of PM or 20 mg/kg of SD as single dose on last day of quinine therapy.
- Malaria prophylaxis: Not recommended due to side effects. Started 2 week before entering the endemic area where chloroquine resistant falciparum exists. 2-12 months. 1/4 Tab; 1-3 yr: 1/2 Tab; 4-8 yr: 1 Tab; 9-14 yr: 2 Tab; > 14 yr: 3 Tab.

**Brands:** PM 25 mg +SD 500 mg Tab and PM 12.5 mg + SD 250 mg/5 ml Susp; Pyralfin, Reziz.

- Use with precautions in folate deficiency, asthma, seizure disorder, G6PD deficiency. Contraindicated in

megaloblastic anemia, renal insufficiency, < 2 mth of age. Folic acid supplements should be delayed for 1 week after PM and SD treatment to avoid inhibitory effect on antimalarial efficacy.

## 9. Quinine

**Use:** Chloroquine resistant falciparum malaria, severe complicated falciparum malaria.

**Dosage:** PO; as quinine sulphate: 30 mg/kg/day divided q 8 hr for 7 days. IV, as quinine dihydrochloride: 20 mg/kg loading dose over 4 hr, then 10 mg/kg over 4 hr; every 8 hourly, until can be given orally, for 7-10 days (Max: 1800 mg/day). Quinine should always be used in combination with second line antimalarial drugs. For example:

Tetracycline: 5 mg/kg q 6 hr for 7 days.

Clindamycin: 20-40 mg/kg/day divided q 8 hr for 5 days.

Doxycycline: 3 mg/kg twice a day for 7 days.

Pyrimethamine + Sulphadoxine: 1 mg/kg of pyrimethamine or 20 mg/kg of sulphadoxine.

Tetra and doxycycline are not indicated in < 8 years of age. Single dose of primaquine is given at the end of therapy as quinine is not effective against gametocytes of falciparum.

**Brands:** 150 mg/5 ml Susp; 100, 300 and 600 mg Tab; 300 mg/ml Inj; Cinkona, QST, Quinorsol.

**Administration:** IV dose should be given diluted in 5-10% dextrose in a concentration of 1 mg/ml. 12 mg of dihydrochloride salt is equivalent to 10 mg base, maintenance dose is started after 12 hr of loading dose.

- May cause cinchonism, hypoglycemia, hypotension.

# 17

## CHAPTER

# Antimyasthenics

### 1. Edrophonium

**Use:** Diagnosis of myasthenia gravis.

**Dosage:** IV:

- Infants: Initial dose of 0.1 mg, if no response then followed by 0.4 mg, total dose is 0.5 mg.
- Children: 0.04 mg/kg given over 1 minute, if no response within 45 seconds then followed by 0.16 mg/kg (Max: 10 mg total).

**Brands:** 10 mg ampoule; Tensilon.

- May cause arrhythmias, hypotension, seizures, drowsiness, laryngospasm, bronchospasm, diaphoresis. Keep atropine ready for treatment of cholinergic crises resulting from overdoses.

### 2. Neostigmine

**Use:** Treatment of myasthenia gravis, reversal of non-depolarizing neuromuscular blocking agents.

**Dosage:**

- Myasthenia gravis: Diagnosis: IM, 0.025-0.04 mg/kg as a single dose. Treatment: IM, SC; 0.01-0.04 mg/kg q 2-4 hr and oral dose is 2 mg/kg/day q 3-4 hr (Max: 375 mg/day).

- Reversal of nondepolarizing neuromuscular blockade: 0.025-0.1 mg/kg/dose (total dose: 5 mg). Use in conjunction with atropine or glycopyrrolate.

**Brands:** 15 mg Tab; Prostigmin, Tilstigmin. 0.5 mg Inj; Myostigmin, Prostigmin.

- Does not antagonize succinylcholine. Use with caution in patients of epilepsy, bradycardia, hypothyroidism, asthma.

### 3. Pyridostigmine

**Use:** Treatment of myasthenia gravis, reversal of neuromuscular blocking agents.

**Dosage:**

- Myasthenia gravis: In children 7 mg/kg/day in 5-6 divided doses.
- Reversal of nondepolarizing neuromuscular blockade: 0.1-0.25 mg/kg/dose preceded by atropine or glycopyrrolate.

**Brands:** 30 and 60 mg Tab, Myestin.

- May cause seizures, headache, bradycardia, salivation, miosis, urinary frequency.

# 18

## CHAPTER

# Antiprotozoals

### 1. Amphotericin-B

See under antifungal.

### 2. Chloroquine:

See under antimalarial.

### 3. Metronidazole

**Use:** Amoebiasis, giardiasis, trichomoniasis, SSTI, CNS infection, intra-abdominal infection, systemic anaerobic infections.

**Dosage:**

- Amoebiasis: PO: 35-50 mg/kg/day divided q 8 hr for 10 days.
- Other parasites: PO: 15-30 mg/kg/day divided q 8 hr.
- Anaerobic infection: PO, IV: 30 mg/kg/day divided q 6 hr (Max: 4g/day).

**Brands:** 200 and 400 mg Tab; 200 mg/5 ml Susp; Aristogyl, Flagyl, Metrogyl. 5 mg/ml Infusion; Flagyl, Metron.

**Combinations:** : Metronidazole + Diloxinate Furate; 400 + 500 mg Tab; 200 + 250 mg Susp; Entamizole. Metronidazole + Furazolidone; 100 + 300 mg Tab; 75 + 250 mg Susp; Metrogyl-F. Metronidazole + Furazolidone; 100 + 300 mg Tab; 25 + 75 mg Susp; Dependal-M.

- May cause metallic taste, nausea. Administer IV slowly over 1/2-1 hr.

#### 4. Nitazoxanide

**Use:** Amoebiasis, giardiasis, helminth infections.

**Dosage:** PO; 1-4 yr: 100 mg BD; 4-10 yr: 200 mg BD; > 10 yr: 500 mg BD for 3 days.

**Brands:** 200 and 500 mg Tab; 100 mg/5 ml Syrup; Nitacure, Nizonide, Nixide.

**Combinations:**

Nitazoxanide + Ofloxacin 500 + 200 mg Tab, 50 + 100 mg/5 ml Syrup; Nitazet-O, Nizonide-O.

- Avoid in < 1 yr. May cause increase in SGPT and creatinine, dizziness, discolored urine and pale yellow eyes.

#### 5. Ornidazole

**Use:** Acute intestinal and extraintestinal amoebiasis, giardiasis, anaerobic infections.

**Dosage:** PO: 40 mg/kg once a day; 3 days for amoebiasis and 2 days for giardiasis.

**Brands:** 500 mg Tab; 125 mg/5 ml Susp; 5 mg/ml Infusion; Dazolic, Ornida.

#### 6. Pentamidine

**Use:** Visceral leishmaniasis, *P. carinii* pneumonia prevention and treatment.

**Dosage:** IV, IM:

- *P. carinii* pneumonia treatment: 4 mg/kg/day OD for 14 days and for prophylaxis 4 mg/kg/dose q 2-4 wk.
- Leishmaniasis: 2-4 mg/kg/day OD for 15 days.

**Brands:** 300 mg Vial; Pentacarinat, Pentam.

- Vancomycin, Aminoglycoside and Amphotericin-B may cause additive toxicity. Give IV slowly over a period of 1 hr in a concentration of 6 mg/ml.

## **7. Secnidazole**

*Use:* Amoebiasis and giardiasis.

*Dosage:* 30 mg/kg single dose (Max: 2 gm).

*Brands:* 500 mg and 1 gm Tab; Ambiform, Etisec, Secnil, Seczol.

## **8. Sodium Stibogluconate**

*Use:* Leishmaniasis.

*Dosage:* IV, IM: 20 mg/kg/day for 20 days in LCL and DCL and 28 days for ML and VL. Repeated courses may be required in patients with severe cutaneous lesions, ML or VL cases.

*Brands:* 100 mg Inj; Sodium Stibogluconate.

- May cause myalgias, arthralgias, abdominal discomfort, elevated liver enzymes and hematologic changes.

## **9. Tinidazole**

*Use:* Giardiasis and amoebiasis.

*Dosage:*

- Amoebiasis: 60 mg/kg/day single dose for 3 days.
- Giardiasis: 50 mg/kg single dose once.

*Brands:* 300 and 500 mg Tab; Fasigyn, Tini, Tiniba. 150 mg/5 ml Susp; Tini.

- May cause metallic taste, dark urine, neuropathy, seizures, leukopenia.

# 19

## CHAPTER

# Antipsychotics/ Anxiolytics/Sedatives

### 1. Chlordiazepoxide

*Use:* Anxiety, preanesthetic medication, behavioral disorders, emotional disturbances.

*Dosage:* 0.3-0.5 mg/kg/day in divided doses.

*Brands:* 10 and 25 mg Tab; Dibrium, Librium.

- May cause drowsiness, dizziness, drug dependence.

### 2. Chlorpromazine

*Use:* Nausea and vomiting, mania, behavioral problems, neonatal tetanus, to relieve restlessness and apprehension prior to surgery.

*Dosage:* PO; IM, IV: 0.5-1mg/kg/dose q 6-8 hr. In neonatal tetanus more frequent dosing can be used.

*Brands:* 25, 50 and 100 mg Tab; 25 mg/ml Inj; Megatil, Chlorpromazine.

- May cause hypotension with IV use, tachycardia, extrapyramidal reactions, rash, dry mouth, constipation.

### 3. Haloperidol

*Use:* Psychosis, severe behavioral problems, sedation, choreiform movements.



***Dosage:***

- 3-12 yr: PO; Initial dose of 0.25-0.5 mg/day given in divided doses, can be increased by 0.25-0.5 mg q week to maximum of 0.15 mg/kg/day.
- 6-12 yr: IM: 1-3 mg/dose q 6-8 hr (Max: 0.15 mg/kg/day).

**Brands:** 0.25, 1.5 and 5 mg Tab; Depidol, Halidol, Serenace. 50 mg/ml Inj; Depidol-LA.

- May cause tachycardia, hypo- and hypertension, sweating, extrapyramidal reactions, bronchospasm, seizures, visual disturbances, leukopenia, anemia.

**4. Thioridazine**

**Use:** Psychotic disorders, depressive neurosis, behavioral problems.

**Dosage:** PO; 0.5-3 mg/kg/day divided q 8 hr.

**Brands:** 10, 25 and 50 mg Tab; Delnil, Ridazin, Thioril.

- Use with caution in patients of cardiovascular problems and seizures.

**5. Triclofos**

**Use:** Insomnia, as sedative in convulsions, recurrent colic.

**Dosage:** PO; 20 mg/kg/dose.

**Brands:** 500 mg/5 ml Syrup; Pedicloryl, Pedicalm.

- May cause rash, nausea, GI disturbances.

**6. Trifluoperazine**

**Use:** Hallucination, delusions, schizophrenia.

**Dosage:** PO in 6-12 years of age group. 1 mg/day in 2 divided doses can be increased gradually to required effect (Max: 15 mg/day).

**Brands:** 1 and 5 mg Tab; Schizonil, Trinicalm. 5 and 10 mg Tab; Neocalm, Trazine.

**Combinations:** Trifluoperazine + Isopropamide: 1 + 5 mg Tab; Gastabid, Stelbid.

- May cause hypotension, arrhythmias, dystonias, constipation, dry mouth.

These agents are used for treatment of HIV infection.

### NUCLEOSIDE/NUCLEOTIDE REVERSE TRANSCRIPTASE INHIBITORS

Common side effects are nausea, vomiting, rash, discoloration, fever, anorexia, diarrhea, headache, bone marrow suppression; less common side effect are hypersensitivity, lactic acidosis, hepatic steatosis, pancreatitis, peripheral neuropathy, retinal depigmentation.

#### 1. Abacavir

**Dosage:** PO: Children >3 mth and < 50 kg; 8 mg/kg q 12 hr. Children > 50 kg; 20 mg/kg q 12 hr (Max: 300 mg/dose).

**Brands:** 300 mg Tab; Abamune, Abavir.

#### 2. Didanosine

**Dosage:** PO: Children 2 wk to 8 mth: 50-100 mg/m<sup>2</sup>/day divided q 12 hr. 8 mth to 13 yr: 120 mg/m<sup>2</sup>/day divided q 12 hr. > 13 yr: 125 mg BD.

**Brands:** 25, 50 and 100 mg Tab; Dinex. 250 mg Cap; Dinex, Virosine-DR.

- Food decreases bioavailability, antacids and gastric acid antagonist may increase bioavailability.

### 3. Lamivudine

**Dosage:** PO: Neonates < 30 days; 2 mg/kg/dose twice daily. Infants and children: 4 mg/kg/dose twice daily (Max: 300 mg/day).

**Brands:** 150 and 300 mg Tab; Heptavir, Lamuvid. 50 mg/5 ml Sy; Lamivir.

**Combinations:**

- Lamivudine + Stavudine: 150 + 30 and 150 + 40 Tab; Lamistar.
- Lamivudine + Zidovudine: 150 + 300 mg Tab; Combivir.

Combination with Zidovudine prevent its resistance.

### 4. Stavudine

**Dosage:** PO: < 30 kg; 2 mg/kg/day divided q 12 hr. 30-60 kg; 30 mg twice daily.

**Brands:** 30 and 40 mg Tab; Virostav. 30 and 40 mg Cap; Stag, Stavir.

- Combination with Zidovudine should not be used as it antagonizes the effect.

### 5. Zidovudine

**Dosage:** PO:

- Prophylaxis: Premature infants; 4 mg/kg/day divided q 12 hr. for up to 4 wk, then q 8 hr. Term neonates; 8 mg/kg/day divided q 6 hr.
- Treatment: Children 6 wk to 12 yr; 480 mg/m<sup>2</sup>/day divided q 8 hr. Adolescents; 200 mg thrice daily.

**NON-NUCLEOSIDE REVERSE  
TRANSCRIPTASE INHIBITORS**

---

**1. Efavirenz**

**Dosage:** PO: Children > 3 yr; 10-15 kg: 200 mg; 15-20 kg: 250 mg; 20-25 kg: 300 mg; 25-32.5 kg: 350 mg; 32.5-40 kg: 400 mg; > 40 kg: 600 mg; given once daily.

**Brands:** 200 mg Tab; Viranz. 200 and 600 mg Cap; Efavir, Effervien.

**2. Nevirapine**

**Dosage:** PO:

- Neonates: 240 mg/m<sup>2</sup>/day once daily for 14 days, then same dose divided q 12 hr for next 14 days, followed by 400 mg/m<sup>2</sup>/day divided q 12 hr.
- Childrens: 4 mg/kg once daily for 14 days (Max: 400 mg/day).

**Brands:** 200 mg Tab; Neve, Nevimune. 50 mg/5 ml Sy; Nevimune.

- Should not be given with fatty foods.

## PROTEASE INHIBITORS

These agents may cause hyperglycemia, hyperlipidemia, lipodystrophy, increases bleeding tendency, increase in liver enzymes, bone marrow suppression, nephritis, nephrolithiasis, hepatitis, etc.

### 1. Amprenavir

**Dosage:** PO: Children 4-16 yr and wt < 50 kg; 22.5 mg/kg BD.

### 2. Indinavir

**Dosage:** PO: 1500 mg/m<sup>2</sup>/day divided q 8 hr.

**Brands:** 400 mg Tab; Virodin. 400 mg Cap; Indivan, Indivir.

- Avoid fatty meals, drink plenty of fluid daily to resolve drug induced renal colic due to nephrolithiasis.

### 3. Lopinavir

**Dosage:** PO: <40 kg; 40 mg/kg/day divided q 12 hr. > 40 kg; 800 mg/day divided q 12 hr.

**Brands:** Lopinavir + Ritonavir: 133.3 + 33.3 mg Cap; Lupimune, Ritomax-L.

### 4. Nelfinavir

**Dosage:** PO (investigational):

- Neonates and Children < 2 yr: 30 mg/kg/day divided q 8 hr.
- Children 2-13 yr: 60-100 mg/kg/day divided q 8 hr.

Administer with meal to optimize absorption.

**Brands:** 250 mg Tab; NEL, Nelfin.

## 5. Ritonavir

**Dosage:** PO: 400 mg/m<sup>2</sup>/day divided q 12 hr; titrate upward in 50 mg/m<sup>2</sup>/dose increment to 800 mg/m<sup>2</sup>/day divided q 12 hr.

**Brands:** 100 mg Cap; Ritomax, Ritomune.

- Adminster with food.

### 1. Cycloserine

**Use:** Adjunctive treatment in pulmonary and extra-pulmonary TB.

**Dosage:** 10-20 mg/kg/day divided q 12 hr (Max dose: 1000 mg/day).

**Brands:** 250 mg Cap; Coxerin, Cyclorine, Myser.

- Contraindicated in epilepsy, depression, anxiety, confusion. May increase daily requirement of vitamin B<sub>12</sub> and folic acid. Concomitant use of pyridoxine may prevent neurotoxic effects.

### 2. Ethambutol

**Use:** *M. tuberculosis* and other mycobacterial diseases.

**Dosage:** 15-20 mg/kg/day once daily (Max: 1000 mg/day).

**Brands:** 200, 400 and 800 mg Tab; Albutol, Combutil, Mycobutil, Themibutil.

- May cause optic and retrobulbar neuritis, hepatotoxicity. Those children whose visual acuity can be determined accurately should be given ethambutol.

### 3. Ethionamide

**Use:** *M. tuberculosis* and other mycobacterial diseases.



**Dosage:** 15-20 mg/kg/day once daily (Max: 1000 mg/day).

**Brands:** 250 mg Tab; Ethide, Ethomid, Myobit.

- May cause hepatotoxicity, peripheral neuropathy, tremor and optic neuritis. If used along with cycloserine and isoniazid may increase nervous system adverse effects. Administer with pyridoxine to prevent neurotoxic effects.

#### **4. Isoniazid**

**Use:** *M. tuberculosis*.

**Dosage:** 5-10 mg/kg/day once daily (Max: 300 mg/day).

**Brands:** 100 and 300 mg Tab; Isonex, Solonex. 100 mg/5 ml Susp; Siozide.

- May cause hepatitis, peripheral neuropathy, dizziness, seizures. Administer 1 hr before or 2 hr after meals. Advise patients to report prodromal symptoms of hepatitis, tingling or numbness of extremities.

#### **5. Para-aminosalicylic Acid**

**Use:** *M. tuberculosis*.

**Dosage:** 200-300 mg/kg/day divided q 8 hr.

**Brands:** 1 gm Tab; Monospas.

- May cause hepatitis, hypokalemia, leukopenia and goitrous hypothyroidism.

#### **6. Pyrazinamide**

**Use:** *M. tuberculosis*.

**Dosage:** 30-35 mg/kg/day once daily (Max: 1000 mg/day).

**Brands:** 500, 750 and 1000 mg Tab; Cavizide, Pyzina, PZA-CIBA. 250 mg/5 ml Syrup; PZA-CIBA.

- May cause arthralgia, hepatotoxicity, gout.

## 7. Rifampicin

**Use:** *M. tuberculosis*; Meningococcal and *H. influenzae* prophylaxis.

**Dosage:**

- Tuberculosis: 10 mg/kg/day empty stomach single dose.
- Meningococcal Prophylaxis: In neonates 10 mg/kg/day divided q 12 hr; in infants and children 20 mg/kg/day divided q 12 hr for 2 days.
- *H. influenzae* prophylaxis: In neonates 10 mg/kg/day once daily and in infants and children 20 mg/kg/day once daily for 4 days.

**Brands:** 150, 300 and 450 mg Cap; R-cin, Rimactane, Ticin. 100 mg/5 ml Susp; R-cin, Rimactane, Rimpin.

- May cause hepatotoxicity, gastritis, flu like illness. May discolor urine, sweat, tears and other body fluid to red orange color.

## 8. Amikacin, Clarithromycin, Kanamycin, Quinolones, Streptomycin are also Used for Tuberculosis

For details see under respective section.

### 1. Dicyclomine

**Use:** Functional disturbances of GI motility.

**Dosage:** PO; Infants > 6 mth, 5 mg/dose 3-4 times/day; Children, 10 mg/dose 3-4 times/day. IM: 20 mg/dose.

**Brands:** 20 mg Tab; Coligon. 10 mg/ml Inj; Centwin, Clomin.

**Combinations:**

Dicyclomine 20 mg + PCM 500 mg Tab; Spasmoflexon, Spasmax.

Dicyclomine 20 mg + Diclofenac 50 mg Tab; Cataspa, Onaspas.

Dicyclomine 10 mg + Dimethicone 40 mg: Per ml drop and per 5 ml Susp; Colimex.

- Contraindicated in GI obstruction, tachycardia, urinary tract obstruction and infant < 6 mth of age. Children of Down's syndrome, spastic paralysis or brain damage are more susceptible to adverse effects.

### 2. Drotaverine

**Use:** As spasmolytic in nephrolithiasis, cholelithiasis, spastic constipation.

**Dosage:** 1-5 yr: 20 mg 3 times/day; 6-12 yr: 40 mg 3 times/day.

**Brands:** 40 and 30 mg Tab; Dotarin, Drotin, Drot. 20 mg/ml Inj; Drot, Tavan.

### **3. Hyoscine Butylbromide**

**Use:** Spasmodic GI tract disorders, adjunctive therapy of peptic ulcer, hypermotility of lower urinary tract, infant colic.

**Dosage:** PO; Children > 6 yr, 10-20 mg, 3 times/day. Inj; 5 mg 3 times/day.

**Brands:** 10 mg Tab; 20 mg/ml Inj; 7.5 and 10 mg Suppository; Buscopan.

- Contraindicated in megacolon, GI mechanical stenosis, tachycardia.

### **4. Propantheline Bromide**

**Use:** Adjunctive therapy of pancreatitis, ureteral and urinary bladder spasm, peptic ulcer.

**Dosage:** 1-2 mg/kg/day in 3-4 divided doses.

**Brands:** 15 mg Tab; Probanthine, Spastheline.

### 1. Anti-snake Venom

**Use:** Snake bite along with required medical management.

**Dosage:** IV; Mild cases: 5 vials. Moderate cases: 5-15 vials. Severe cases: 15-20 vials. Smaller children may require higher dose due to large dose of venom injected per unit body weight.

**Brands:** Available in lyophilized form and neutralizes Cobra, Russel's viper, Sawscaled viper and krait venom. 10 ml Polyvalent Inj; by BE, Bharat serum, Haffkine.

**Administration:** If time permits, do exclude equine serum allergy by intradermal injection of 0.02 ml of 1:10 diluted antivenom. The antivenom is given diluted in 250 ml of normal saline at a rate of 20 ml/kg/hr.

### 2. Diphtheria Antitoxin/Antidiphtheric Serum (ADS)

**Use:** Diphtheria along with required medical management.

**Dosage:** Doses remain same in all age groups IV.

- Nasal diphtheria: 20,000 IU.
- Tonsillar and pharyngeal diphtheria: 40,000-80,000 IU.
- Laryngeal diphtheria: 120,000 IU.
- Severe disease of 3 days or more with neck swelling: 80,000-120,000 IU.

**Brands:** Enzyme refined globulin solution 10,000 IU/vial by Haffkine.

**Administration:** Test for hypersensitivity. Amount to be given is diluted in 1:20 isotonic normal saline and given at the rate of 1 ml/minute.

- Diphtheria immunoglobulin (DIG) can be used in place of ADS in a dose of 0.6 ml/kg.

### **3. Gas Gangrene Antitoxin**

**Use:** Gas gangrene infection caused by Clostridia bacteria.

**Dosage:** IV, IM, SC: 30,000-75,000 IU.

**Brands:** 10,000 IU/Vial; AGGS by Bharat serum.

### **4. Tetanus Antitoxin**

**Use:** Prophylaxis and treatment of tetanus in cases where tetanus immunoglobulin is not available.

**Dosage:** IM, SC:

- Prophylaxis, <30 kg: 1500 units. > 30 kg: 3000-5000 units
- Treatment; 50,000-100,000 units.

**Brands:** 750, 1500, 5000, 10000, 20000, 50000 IU Inj; by Bengal immunity. 1500, 10000, 20000, IU Inj; by Haffkine.

**Administration:** Should be given after sensitivity test. For treatment given half IV and half IM.

### 1. Proton Pump Inhibitor

These agents decrease gastric acid secretion by selectively inhibiting the proton pump, also demonstrate activity against *H. pylori*. These agents may cause constipation, headache, abdominal pain, dizziness, rash, leukopenia. Useful for duodenal ulcers, erosive gastritis, esophagitis, hypersecretory conditions, prevention and treatment of NSAIDs associated gastric ulcers, adjuvant therapy in the treatment of *H. pylori* infection. Administer before eating. Also available in combination with domperidone.

#### *a. Lansoprazole*

**Dosage:** PO; 0.5 mg/kg once daily in > 1 yr of age.

**Brands:** 15 and 30 mg Cap; Lan, Lanzap, Lanzol

- Decreases vitamin B<sub>12</sub> absorption.

#### *b. Omeprazole*

**Dosage:** PO in > 2 yr of age; 0.6-0.7 mg/kg once daily. Titrate to desired effect.

**Brands:** 10 and 20 mg Cap; Lomac, lomecid, Ocid.

#### *c. Pantoprazole*

**Dosage:** PO in > 6 yr of age; 0.5 mg/kg once daily.

**Brands:** 20 and 40 mg Tab; Lupipan, Pan, Pantocid.

## 2. Sucralfate

**Use:** Duodenal and gastric ulcer, prevention of stress ulcer, NSAIDs associated mucosal damage, topically for chemotherapy induced stomatitis, burns.

**Dosage:**

- PO; 40 - 80 mg/kg/day divided q 6 hr.
- Stomatitis: 5-10 ml of 1 gm/10 ml, Swish and spit or swish and swallow 4 times/day.

**Brands:** 0.5 gm/5 ml; Sucral kid, Pepsigard-p. 1 gm/5 ml Syrup; Pepsigard, Sucral. 1 gm Tab; Pepsigard, Sucral.

- Interferes with absorption of vitamin A, D, E and K may cause constipation, dry mouth, hypophosphatemia, vertigo, headache.



### 1. Acyclovir

**Use:** Cutaneous herpes simplex, HSV encephalitis, HZV infection, varicella zoster.

**Dosage:**

- Neonatal herpes: 20 mg/kg/dose q 8 hr IV for 14-21 day.
- HSV encephalitis: 10-20 mg/kg/dose q 8 hr IV for 14-21 day.
- Genital herpes: PO: 40-80 mg/kg/day divided q 8 hr for 5-7 day.
- Recurrent or suppression of genital herpes: 40-80 mg/kg/day divided q 8 hr for 12 mth.
- Varicella zoster, initiate treatment within 24 hr of onset of rash: PO: 20 mg/kg/dose, 4 times/day for 5 day.

**Brands:** 200, 400, 800 mg Tab; 25 mg/ml Inj; Acivir, Axovir.

- Incompatible with blood products and protein containing solutions. Adequate hydration should be maintained during therapy. Administer slowly to prevent renal damage. Use with caution in liver disease and epilepsy. Do not refrigerate solution because it can cause precipitation of the drug.

### 2. Amantadine

**Use:** Prophylaxis and treatment of influenza-A virus infection.

**Dosage:** PO: 5 mg/kg/day divided q 12 hr. Max 150 mg/day in 1-9 yr and 200 mg/day in 10-20 yr of age group.

**Brands:** 100 mg Cap; Amantrel, Neaman.

- Administer within 24-48 hr of onset of symptoms and duration of treatment is 2-5 day.

### 3. Cidofovir

**Use:** CMV retinitis; CMV, HSV, VZV infections resistant to first line drug; recurrent respiratory papillomatosis.

**Dosage:** IV: For CMV retinitis: 5 mg/kg/dose once by slow infusion.

- Oral probenecid must be accompanied before and after IV cidofovir along with adequate NS hydration.

### 4. Famciclovir

**Use:** HSV and VZV infection.

**Dosage:** Can be used in older children in a dose of 200-500 mg/day for 5-7 day.

**Brands:** 250 and 500 mg Tab; Famtrex, Penvir, Virovir.

- May cause urinary retention, hypotension, electrolyte imbalance.

### 5. Foscarnet

**Use:** Treatment of CMV, VZV infection resistant to first line drug; CMV retinitis.

**Dosage:**

- CMV retinitis: Induction; 180 mg/kg/day divided q 8 hr for 14-21 day. Maintenance; 90-120 mg/kg/day once daily.
- Resistant HSV: 40 mg/kg/dose q 8 hr for 3 wk.

## 6. Gancyclovir

**Use:** First choice drug for CMV infection, CMV retinitis, also active against HSV-1 and 2.

**Dosage:** Slow IV infusion:

- Congenital CMV infection: 15 mg/kg/day BD.
- CMV retinitis: > 3 mth: Induction therapy; 10 mg/kg/day twice a day for 14-21 day. Maintenance; 5 mg/kg/day twice a day for 5 days in a week.
- Other CMV infection: Initial dose of 10-15 mg/kg/day twice a day for 14-21 day followed by 5 mg/kg/day single daily dose.
- Oral (following induction by IV) 30 mg/kg/dose q 8 hr with food.

**Brands:** 250 and 500 mg Cap; Ganguard, Ganvir.

- Use with caution in patient with bone marrow suppression. May cause pancreatitis, hematuria, hypertension, electrolyte imbalance, neutropenia.

## 7. Idoxuridine

**Use:** Topical therapy for herpes simplex keratitis.

**Dosage:** Apply Oint 5 times/day and Solution 7-10 times/day.

**Brands:** 0.1% Oint; Toxil. 0.1% drop; Idurin, Ridinox.

## 8. Interferon Alfa

**Use and Dosage:** SC:

- Hemangiomas of infancy: 1-3 million units/m<sup>2</sup>/day once daily.
- Chronic hepatitis-B: 3-10 million units/m<sup>2</sup>/day, 3 times/week.

- Chronic hepatitis-C: 3 million units/m<sup>2</sup>/day, 3 times/week.

**Brands:** 3 million units/vial (Alfa-2a); Intron-a, Roferon-A. 3 and 5 million units/vial (Alfa-2b), Shanferon, Realfa.

- Use with caution in patient with seizure disorder, myelosuppression, asthma, renal impairment. Should not be used in autoimmune hepatitis.

## 9. Lamivudine

**Use:** HIV infection, chronic hepatitis-B infection associated with evidence of viral replication and active liver inflammation.

**Dosage:** PO:

- Neonates: 2 mg/kg/day divided q 12 hr.
- Infants > 3 mth and children: 4 mg/kg/dose twice daily (Max: 150 mg/dose).
- Chronic hepatitis-B: 3 mg/kg/dose once daily (Max: 100 mg/day).

**Brands:** 100 and 150 mg Tab; Lamivir, Lamuvid, Shanvudin.

- Use with caution in patients with pancreatitis, hepatic failure. May cause HT, peripheral neuropathy, bone marrow suppression.

## 10. Oseltamivir

**Use:** Uncomplicated acute illness due to influenza A and B.

**Dosage:** Treatment should begin within 2 days of onset of symptoms.

Children: 1-12 yr: < 15 kg, 30 mg BD; > 15 kg to 23 kg, 45 mg BD; > 23 kg to 40 kg, 60 mg BD; > 40 kg, 75 mg BD; for 5 days.

- May cause anemia, hepatitis, myalgia, rash, hematuria.

## 11. Ribavirin

**Use:** RSV lower respiratory tract infection with compromising conditions (BPD, CLD, CHD); acute illness due to influenza A and B, adenovirus; oral preparation in combination with interferon Alfa-2b in chronic hepatitis-C in children > 3 yr of age.

**Dosage:** PO; Inhalation:

- Aerosol inhalation (dissolve 6 gm powder in 300 ml of sterile water). Continuous inhalation: 12-18 hr/day for 3-7 day. Intermittent inhalation: 2 gm over 2 hr, 3 times/day for 3-7 day.
- Oral: Chronic hepatitis-C in children >3 yr of age; 15 mg/day divided q 12 hr (Max: 200 mg BD).

**Brands:** 100 and 200 mg Tab; Virazide. 50 mg/5 ml Sy; Ribavin, Virazide.

- Do not use in patients of hemoglobinopathies, autoimmune hepatitis. Use in well ventilated room, drug may precipitate in ventilator tubing, best results are seen in early initiation of treatment.

## 12. Rimantadine

**Use:** Prophylaxis (all ages) and treatment (>13 yr) of influenza-A viral infection.

**Dosage:**

- Prophylaxis: 1-9 yr up to 40 kg; 5 mg/kg/day divided q 12 hr (Max: 150 mg/day). More than 10 yr or above 40 kg; 100 mg in 2 divided dose.
- Treatment: 100 mg twice a day.

**13. Trifluridine**

**Use:** Treatment of primary keratoconjunctivitis or recurrent epithelial keratitis caused by HSV type 1 and 2.

**Dosage:** 1 drop 2-4 hr for 7-21 day.

**Brands:** 1% Ophthalmic drop; Viroptic.

**14. Valacyclovir**

**Use:** Treatment of herpes zoster, herpes labialis, initial and recurrent episode of genital herpes.

**Dosage:** 20-30 mg/kg/dose three times/day.

**Brands:** 500 and 1 gm Tab; Valcivir.

- May cause HT, rash, bronchospasm, hemolytic anemia, emotional disturbances, visual disturbances, etc.

## 1. Amrinone

**Use:** Treatment of low cardiac output states.

**Dosage:** Initial dose of 0.75 mg/kg over 2-3 min followed by 5-10 mcg/kg/min as continuous infusion.

**Brands:** 5 mg/ml Inj; Amicor, Cardiotone.

- May cause hypotension, thrombocytopenia, dizziness, etc.

## 2. Digoxin

**Use:** Treatment of systolic heart failure and supraventricular tachyarrhythmias.

**Dosage:**

- Neonate: 10-30 mcg/kg loading dose followed by 5-10 mcg/kg/day as maintenance dose.
- 1 mth-2 yr: 30 mcg/kg loading dose followed by 10-15 mcg/kg/day as maintenance dose.
- 2-10 yr: 30 mcg/kg loading dose followed by 5-10 mcg/kg/day as maintenance dose.
- > 10 yr: 10 mcg/kg loading dose followed by 2-5 mcg/kg/day as maintenance dose.

Give half of the total digitalizing dose stat, then 1/4 after 8 hr and second 1/4 after 16 hr. Maintenance dose is given divided 12 hr in < 10 yr and once daily in > 10 yr of age.

**Brands:** 0.25 mg Tab; Cardioxin, Digoxin, Dixin, Lanoxin. 0.25 mg/ml Inj; Cardioxin, Digoxin, Dixin 1.5 mg/ml Syrup; Lanoxin.

**Administration:** Avoid rapid IV push, as it may cause systemic and coronary arteriolar vasoconstriction.

- May cause bradycardia, arrhythmias, blurred vision, GI disturbances, vertigo, hypokalemia, diplopia.
- Toxicity is enhanced by hypokalemia.

### 3. Milrinone

**Use:** Short-term treatment of acute decompensated heart failure.

**Dosage:** IV: Loading dose of 50 mcg/kg given slowly over 15 minutes followed by a continuous infusion of 0.5 mcg/kg/minute.

**Brands:** 1 mg/ml Inj; Milicor, Myolong.

- May cause arrhythmias, tremor, hypokalemia, rash.

### 4. Vasopressin

**Use:** Diabetes insipidus, GI hemorrhage or esophageal varices bleed, vasodilatory shock with hypotension not responding to catecholamines or fluid resuscitation.

**Dosage:**

- Vasodilatory shock with hypotension: IV: 0.0003-0.002 units/kg/minute titrate to effect.
- Diabetes insipidus: IM, SC: 2.5-10 units/dose can be given 2-4 times/day.
- GI hemorrhage: Continuous IV infusion of 0.002-0.01 units/kg/minute.

**Brands:** 20 units/ml Inj; Petressin, Cpressin-P.

- Use with caution in patients of asthma, seizure disorder, cardiac disease. May cause hypertension, bradycardia, arrhythmias, vertigo, bronchoconstriction, sweating, tremor, water intoxication.



### 1. Deferiprone

**Use:** Transfusional hemosiderosis, acute iron poisoning, iron overload in hemolytic anemia.

**Dosage:** PO; 75 mg/kg/day divided q 8 hr.

**Brands:** 250 and 500 mg Tab; Kelfer.

- May cause neutropenia, urine discoloration, musculoskeletal pain, GI disturbances.

### 2. Desferrioxamine

**Use:** Acute iron poisoning, chronic iron overload in patient requiring multiple blood transfusion.

**Dosage:**

- Acute iron intoxication: IM; 90 mg/kg/dose q 8 hr. IV; 15 mg/kg/hr (Max: 6 g/day).
- Chronic iron overload: IV; 15 mg/kg/hr (Max: 12 g/day). SC; 20-40 mg/kg/day over 8-12 hr via infusion device. (Max: 2 g/day).
- In thalassemics: 15 mg/kg by IV infusion per unit of blood transfusion by separate line.

**Brands:** 500 mg/Vial; Desferal.

- May cause flushing, hypotension, urticaria, hearing loss, blurred vision, fever, urine discoloration. Periodic eye

and auditory examinations are recommended while on chronic therapy.

### 3. Dimercaprol

*Use:* Antidote to arsenic, gold and mercury poisoning, adjunct in lead poisoning.

*Dosage:* Deep IM: 2.5 to 4 mg/kg/dose q 4-6 hr for 2 days followed by 2.5 mg/kg dose q 12 hr for 10 days.

*Brands:* 100 mg/Vial; BAL.

### 4. D-Penicillamine

*Use:* Wilson's disease, copper and lead poisoning, rheumatoid arthritis.

*Dosage:* PO

- Wilson's disease: 20 mg/kg/day in divided doses (Max: 1 g/day).
- Lead poisoning: 20-30 mg/kg/day in divided doses (Max: 1.5 gm/day). Treatment duration 4-12 wk.
- Rheumatoid arthritis: 3 mg/kg/day for 3 mth then 6 mg/kg/day in 2 divided doses for 3 mth (Max: 10 mg/kg/day).

*Brands:* 250 mg Cap; Cilamin, Distamin, Penamine,

- Pyridoxine in a dose of 25-50 mg/day should be supplemented while on D-penicillamine therapy.

## Colony Stimulating Factors

### 1. Erythropoietin/rHuEPO/EPO

**Use:** Anemia of prematurity, neoplasia, end stage renal disease, chemotherapy induced, associated with AIDS and its therapy.

**Dosage:** IV, SC: Dosing schedules need to be individualized.

- Anemia of prematurity: 100-500 units/kg/dose, 3 times/wk.
- Chronic renal failure: 50-100 units/kg/dose, 3 times/wk.
- Cancer patients: 150 units/kg/dose, 3 times/wk.
- HIV patients: 100 units/kg/dose, 3 times/wk.

**Brands:** 2000 and 4000 IU/Vial; Epotin, Hemax.

- Iron, B<sub>12</sub>, folic acid deficiency limits marrow response and EPO may be ineffective and these need to be supplemented. Avoid shaking the vial as this may denature the glycoprotein rendering it ineffective. May cause HT, headache, seizure, edema, arthralgia.

### 2. Granulocyte Colony Stimulating Factor (G-CSF)

**Use:** Neonatal, congenital and idiopathic neutropenia; patients with malignancies receiving drugs associated with severe neutropenia and fever.

**Dosage:** IV, SC

- Neonates: 5 mcg/kg/day for 3-5 days once daily.
- Children: 5-10 mcg/kg/day once daily for up to 14 days.

**Brands:** 300 mcg/ml vial; Neupogen.

- Do not administer 24 hr prior to or within 24 hr following chemotherapy. After discontinuation of therapy ANC decreases by 50% within 2 days and returns to pretreatment level within 1 wk, WBC count return to normal range in 4-7 days.

### **3. Granulocyte Macrophage Colony Stimulating Factor (GM-CSF)**

**Use:** Acceleration of myeloid recovery from chemotherapy or marrow insult or after bone marrow transplantation.

**Dosage:**

- Neonates: 10 mcg/kg/day once daily for 5 days.
- Children: 250 mcg/m<sup>2</sup>/day once daily for 21 days.

**Brands:** 500 mcg/ml Inj; Leukine.

Systemic steroids are contraindicated in active untreated infections and should be administered with food to decrease GI side effects. Taper gradually on long-term use. May cause edema, HT, pseudotumor cerebri, cushings syndrome, pituitary adrenal axis suppression, growth retardation, sodium retention, muscle weakness, osteoporosis, peptic ulcer. Topical use may cause thin fragile skin, hyper or hypopigmentation, skin atrophy. Patient may require diet rich in potassium, calcium, zinc, vitamin A, B, C, D; low in sodium content. Don't apply occlusive dressing after topical use and do not apply to face or inguinal areas.

### 1. Betamethasone

**Use:** Stimulate fetal lung maturation in preterm labor, congenital adrenal hyperplasia, brain edema, severe asthma; systemic and topical anti-inflammatory or immunosuppressant.

**Dosage:** Depends upon disease severity and patient response.

- IM, PO; 0.01-0.2 mg/kg/day divided q 6-8 hr.
- Stimulate lung maturation: IM, Given to pregnant mother in 2 doses of 12 mg q 24 hr. or 4 doses of 6 mg q 12 hr.
- Topical: Apply thin film 1-2 times/day.

**Brands:** 0.5 and 1 mg Tab; Betnesol, Cortil. 0.5 mg/ml oral drops; 4 mg/ml Inj; Betnesol, Celestone Stemmin. 0.05%

Cream; Betamil, Diprovate. 0.1% E/E drop; Betnesol, Milbeta.

**Combinations:** Betamethasone 0.1% + Chloramphenicol 5% + Lignocaine 2% each ml; Otina ear drop. Betamethasone 0.1% + Neomycin 0.5% each ml; Bentor ear drop, Betnesol-N ear drop.

## **2. Cortisone**

**Use:** Adrenocortical insufficiency.

**Dosage:** PO; 0.5-0.7 mg/kg/day divided q 8 hr. IM: 0.25-0.35 mg/kg/day.

**Brands:** 25 mg Tab; 50 mg/ml Inj; Cortone.

## **3. Doflazacort**

**Use:** Juvenile chronic arthritis, Asthma, Nephrotic Syndrome, Immune Suppression in transplantation.

**Dosage:** PO. Usual range is 0.25-1.5 mg/kg/day

**Brands:** 1, 6, 24 mg Tab; Defnalon, Enzocort.

- Use the lowest effective doses and titrate dose depending upon response. Alternate day administration may be appropriate.

## **4. Dexamethasone**

**Use:** Cerebral edema, septic shock, bacterial meningitis; systemically and locally for inflammation; allergic, autoimmune and neoplastic diseases.

**Dosage:**

- Physiologic replacement: PO; IM, IV; 0.03-0.15 mg/kg/day divided q 6-12 hr.
- Cerebral edema: PO; IM, IV; loading dose of 1-2 mg/kg, then 1-1.5 mg/kg/day divided q 4-6 hr.

- Bacterial meningitis: IV, 0.6 mg/kg/day divided q 6 hr for first 4 days of antibiotic.
- Anti-inflammatory: PO; IM, IV; 0.05-0.5 mg/kg/day in divided doses.
- Topical: Apply thin film 1-2 times/day.
- Eye drop: 1-2 drop q 4 hr then taper off gradually.

**Brands:** 0.5 mg Tab; 4 mg/ml Inj; Decdan, Dexacip, Dexona, Wymosone. 0.1% cream; Millicortenol. 0.01% eye drop; Decolite, Losone.

## **5. Fludrocortisone**

**Use:** Partial replacement therapy for adrenal insufficiency.

**Dosage:** 0.05-0.1 mg/day single oral dose.

**Brands:** 100 mcg Tab; Floricot.

## **6. Hydrocortisone**

**Use:** Adrenal insufficiency, congenital adrenal hyperplasia, toxic shock, status asthmaticus, anti-inflammatory or immunosuppressive in dermatosis.

**Dosage:** IV

- Adrenal insufficiency: 1-2 mg/kg bolus followed by 25-150 mg/day in divided doses.
- Congenital adrenal hyperplasia: Initial dose of 0.5-0.7 mg/day followed by maintenance dose of 0.3-0.4 mg/kg/day; given 1/4 in morning, 1/4 at noon and 1/2 at night.
- Shock: Initial dose of 35-50 mg/kg followed by 50-150 mg/kg/day divided q 6 hr for 2-3 days.
- Status asthmaticus: 4-8 mg/kg/day in divided doses.
- Anti-inflammatory: 1-5 mg/kg/day divided q 12 hr.
- Topical: apply 2-3 times/day.

**Brands:** 100 mg/vial; Efcorlin, Hycort, Lycortin, Wycort. 0.1% Cream; Elderoid, Lipo. 0.5% Cream; Tendrone. 2.5% Oint; Wycort.

**Combinations:** Efcorlin nasal drops contains, Hydrocortisone 0.02% + Naphazoline 0.025%.

## **7. Methylprednisolone**

**Use:** Anti-inflammatory or immunosuppressant in variety of allergic, inflammatory, autoimmune and neoplastic disorders; acute spinal cord injury.

**Dosage:**

- Anti-inflammatory or immunosuppressant: PO; IM, IV: 0.5-2 mg/kg/day in divided doses. Pulse therapy; 15-30 mg/kg/dose given slowly once daily for 3 days.
- Status asthmaticus: IV; loading dose of 2 mg/kg/dose then 0.5-1 mg/kg/dose q 6 hr.
- Acute spinal cord injury: IV; 30 mg/kg over 15 min followed 45 min later by continuous infusion of 5 mg/kg/hr for one day.

**Brands:** 4, 8 and 16 mg Tab; Ivepred, Medrol, Predmet. 40, 125, 500 mg and 1 gm Inj; Mypred, Solu-medrol, Succimed.

## **8. Mometasone**

**Use:** As anti-inflammatory and anti-pruritic in eczema, atopic and contact dermatitis; psoriasis.

**Dosage:** Cream and ointment : > 2 yr : Apply a thin film to affected area BD. Safety and efficacy for > 3 wk use is not established in pediatric patients.

**Brands:** 0.1% cream and Oint; Cutizone, Elocon, Momtas.

- Avoid contact/application to face eyes under arms, groin and open skin.



## 9. Prednisolone

**Use:** Treatment of rheumatic carditis, infantile spasms, collagen diseases, skin diseases, allergic problem, nephrotic syndrome, asthma, endocrine and neoplastic disorders.

**Dosage:** Depends upon disease severity and patient response. Use alternate day therapy for prolonged use.

PO; IV: 0.5-2 mg/kg/day divided q 6-8 hr.

**Brands:** 5, 10 and 20 mg Tab; Predone, Prid, Wysolone. 5 mg/5 ml Syrup; Kidpred, Predone. 40 mg/ml Inj; Unidrol, MPA.

## 10. Triamcinolone

**Use:** Various allergic and inflammatory conditions.

**Dosage:** 6-12 yr: IM; 0.03-0.2 mg/kg q 1-7 days. Intra-articular, intrabursal; 2.5-15 mg may be repeated as needed.

>12 yr of age: PO; 4-50 mg/day in divided doses.

**Brands:** 4 mg Tab; Kenacort, Ledercort, Tricort. 10 and 40 mg/ml Inj; Comcort, Kenacort, Tricort.

### 1. Acetazolamide

**Use:** Diuretic, reduce CSF production in hydrocephalus, reduce increased intraocular pressure in glaucoma, as adjunct in refractory seizures.

**Dosage:**

- Edema: 5 mg/kg/day once daily.
- Refractory seizures and glaucoma: 8-30 mg/kg/day in divided doses.
- Hydrocephalus: 25-75 mg/kg/day divided q 8 hr.

**Brands:** 250 mg Tab; Acetamide, Diamox.

- Furosemide is used along with acetazolamide in hydrocephalus. May cause drowsiness, hypokalemia, hyperchloremic metabolic acidosis, hyperglycemia, dysuria, hepatic insufficiency.

### 2. Amiloride

**Use:** Edema due to CHF, hepatic cirrhosis and hyperaldosteronism, hypertension.

**Dosage:** 6-20 kg: 0.6 mg/kg/day once daily (Max: 10 mg/day). > 20 kg: 5-10 mg/day (Max: 20 mg/day).

**Brands:** Amiloride 2.5 mg + Hydrochlorothiazide 25 mg; Biduret Tablets.

**Combinations:** Amiloride + Hydrochlorthiazide: 5 + 50 mg, 2.5 + 25 mg Tab; Biduret and Biduret-L.

- May cause hypotension, palpitation, headache, electrolyte imbalances, dehydration, muscle cramps, visual disturbances.

### 3. Bumetanide

**Use:** Edema or fluid overload secondary to CHF, renal or hepatic disease.

**Dosage:** 0.015-0.1 mg/kg/dose q 6-24 hr (Max: 10 mg/day).

**Brands:** 1 mg Tab, Bumet.

- May cause electrolyte imbalances, hyperglycemia, hypotension, dizziness, GI disturbances. 1 mg of Bumetanide is as potent as 40 mg of Furosemide.

### 4. Chlorthalidone

**Use:** Fluid overload and mild hypertension.

**Dosage:** 1-2 mg/kg once daily.

**Brands:** 100 mg Tab; Hythalon.

### 5. Ethacrynic Acid

**Use:** Edema due to renal or hepatic disease, CHF and hypertension.

**Dosage:** PO; 1-3 mg/kg/day; IV: 0.5-1 mg/kg/dose q 8-24 hr.

**Brands:** 50 mg Tab; 50 mg/Vial; Edecrin.

- May cause hypotension, headache, fluid and electrolyte imbalances, ototoxicity, tinnitus.

## 6. Furosemide

**Use:** Edema associated with CHF and hepatic or renal disease; hypertension, cerebral edema, forced diuresis in poisoning.

**Dosage:** IV: 1-2 mg/kg/dose q 6-12 hr.

PO: 1-4 mg/kg/dose q 6-12 hr.

Continuous infusion: 0.05 mg/kg/hr and titrate to response.

**Brands:** 40 mg Tab; 10 mg/ml Inj; Frusenex, lasix.

- May cause hypotension, dizziness, fluid and electrolyte imbalance, ischemic hepatitis.

## 7. Hydrochlorothiazide

**Use:** Mild to moderate hypertension, edema states due to CHF, bronchopulmonary dysplasia, prevention of recurrent renal calcium stones.

**Dosage:** Neonates and infants < 6 mth: 2-4 mg/kg/day divided q 12 hr.

Infants > 6 mth and children: 2 mg/kg/day divided q 12 hr.

**Brands:** 12.5 and 25 mg Tab; Aquazide, Hydride.

## 8. Mannitol

**Use:** Reduction of increased ICP, promotion of diuresis in the prevention and treatment of oliguria or anuria due to ARF.

**Dosage:** IV: Test dose of 200 mg/kg (over 3-5 minutes to evaluate urine output of at least 1 ml/kg/hr for 1-3 hr) followed by initial dose of 0.5-1 g/kg, then maintenance dose of 0.25-0.5 g/kg q 4-6 hr.

**Brands:** 20% mannitol is available in 100 ml bottles by Albert David, Cadila and Core.

- Contraindicated in severe renal disease, dehydration, active intracranial bleed, severe pulmonary edema or congestion.

### **9. Spironolactone**

**Use:** Hypertension, edema associated with CHF, chronic liver disease and nephrotic syndrome.

**Dosage:** 1-3 mg/kg/day once daily or in divided doses.

**Brands:** 25 and 100 mg Tab; Aldactone.

- May cause fluid and electrolyte imbalances, GI disturbance, numbness or paresthesia of limbs.

### **10. Triamterene**

**Use:** Hypertension, edema due to CHF, hepatic or renal disease.

**Dosage:** 2-4 mg/kg/day divided q 12 hr (Max: 6 mg/kg/day).

**Brands:** Triamterene 50 mg + Benzthiazide 25 mg: Tab Ditide.  
Triamterene 50 mg + Furosemide 40 mg: Tab. Frusemene.

# 31

## CHAPTER

# Drugs Used for Controlling Bleeding

### 1. Aminocaproic Acid

**Use:** Treatment of excessive bleeding resulting from systemic hyperfibrinolysis, traumatic ocular hyphema.

**Dosage:** PO; IV: Loading dose of 100-200 mg/kg, maintenance dose is 100 mg/kg q 6 hr (Max: 30 gm). In traumatic hyphema: 100 mg/kg q 4 hr.

**Brands:** 500 mg Tab; 250 mg/ml Inj; Hemostat.

- C/I in DIC. May cause hypotension, bradycardia, headache, seizure, hypokalemia, nasal congestion.

### 2. Antihemophilic Factor

**Use:** Factor VIII deficiency in hemophilia.

**Dosage:** IV: 20-50 U/kg/dose q 12 hr and titrate to required effect.

**Brands:** 25 IU Vial; Factor VIII.

### 3. Ethamsylate

**Use:** Prevention and treatment of periventricular hemorrhage in LBW neonates.

**Dosage:** Neonates: IM, IV: 12.5 mg/kg q 6 hr.

**Brands:** 250 and 500 mg Tab; 125 mg/ml Inj; Dicynene, Ethasyl, Sylate.

- Not helpful in thrombocytopenia.

#### 4. Protamine

**Use:** Antidote to bleeding due to heparin overdose.

**Dosage:** 1 mg of protamine neutralizes 100 units of heparin (LMWH) (Max: 50 mg). Adjust the protamine dosage depending upon the duration of heparin administration.

<i>Time since last heparin dose</i>	<i>Dose of protamine to neutralize 100 units of heparin</i>
<30 min	1 mg
30-60 min	0.5-0.75 mg
60-120 min	0.3-0.5 mg

**Brands:** 1% Inj; Protamine sulphate.

- Excess dosage should be avoided as it can itself cause anticoagulation.

#### 5. Tranexamic Acid

**Use:** Prevention of excessive bleeding after tonsillectomy, recurrent epistaxis, short-term use in hemophilia, prevention of GI hemorrhage and hemorrhage following ocular trauma.

**Dosage:** IV: 10 mg/kg/dose. PO; 25 mg/kg/dose 3-4 times/day.

**Brands:** 500 mg Tab; 100 mg/ml Inj; Clip, Pause, Tranfib, Traxamic.

## Electrolyte Supplements and Fluid Replacements

### 1. Calcium Gluconate

**Use:** Hypocalcemia; hyperkalemia; cardiac arrest in the presence of hyperkalemia or hypocalcemia or calcium channel blocking agents toxicity.

**Dosage:** IV, 10% solution (100 mg/ml) is equivalent to 9 mg elemental calcium/ml or 0.46 mEq calcium/ml.

- Hypocalcemia: 200-800 mg/kg/day as continuous infusion or in 4 divided doses.
- Cardiac arrest and hyperkalemia: 60-100 mg/kg/dose. (Max: 3 g/dose).

**Brands:** 10% solution for Inj; Calcium gluconate.

- IV solution should be diluted to 50 mg/ml and be given slowly over 1 hr under monitoring. Use with caution in patient on digitalis therapy. May cause hypotension, bradycardia, arrhythmias, hypercalcemia, hypophosphatemia.

### 2. Calcium Phosphate

**Use:** Calcium deficiency states, rickets, chronic renal failure.

**Dosage:** PO

- Neonate: 20-80 mg/hg/day divided q 28 hr.
- Children: 45-65 mg/hg/day divided q 26-8 hr.



**Brands:** Ostocalcium Syp each 5 ml contains calcium 82 mg + Vit D<sub>3</sub> 200 unit + Vit B<sub>12</sub> 2.5 mcg. Ostocalcium Tab contains 125 mg of elemental calcium + Vit D<sub>3</sub> 400 unit. Sovical-L Syp each 5 ml contain elemental calcium 200 mg + Vit D<sub>3</sub> 200 U.

### 3. Magnesium Sulfate

**Use:** Treatment of hypomagnesemia, hypertension, seizures associated with acute nephritis in children, adjunctive therapy in bronchodilatation.

**Dosage:** IV; 50% solution (500 mg/ml) is equivalent to 49 mg elemental magnesium/ml or 4 mEq/ml.

- Hypomagnesemia: 25-50 mg/kg/dose q 8 hr in neonates and q 6 hr in children for 3-4 doses (Max: 2000 mg).
- Seizures and hypertension: 20-100mg/kg/dose q 4-6 hr as required.
- Bronchodilator: 25 mg/kg/dose as single dose (Max: 2000 mg).

**Brands:** 50% solution for Inj; Magnesium Sulfate.

- Dilute to 50-200 mg/ml for IV use and infuse over 2-4 hr. Use with caution in digitalized and renal impairment patient. May cause hypotension, hypermagnesemia, GI disturbances, CNS depression, muscle weakness, respiratory paralysis.

### 4. Potassium Chloride

**Use:** Hypokalemia; prevention and treatment.

**Dosage:** IV doses should be added to maintenance fluids and PO doses should be diluted to 8 times in water.

- Hypokalemia: PO, IV: 2-5 mEq/kg/day in divided doses.
- Prevention of hypokalemia during diuretic therapy: PO; 1-2 mEq/kg/day in 2 divided doses.

**Brands:** 600 mg Tab; K-gard. 10% Syrup; Keylyte, Potasol. 15% ampoule for Inj; Potassium chloride.

- Rapid administration may cause arrhythmias and cardiac arrest, hypotension. Injectable should only be given in patient with adequate urine flow. Tab provide 8 mEq; Inj; 2 mEq/ml and Syrup; 20 mEq/15ml.

## 5. Dextrose

**Use:** To correct hypoglycemia, provide calories and fluid replacement, as adjunctive in treatment of hyperkalemia.

**Dosage:** IV:

- Hypoglycemia: Neonates; 0.1-0.2 g/kg/dose (1-2 ml/kg/dose of 10% solution) followed by 4-6 mg/kg/min. Infants and children: 0.5-1 g/kg/dose (2-4 ml/kg/dose of 25% solution).
- Hyperkalemia: 0.5-1 g/kg of 25% or 50% solution combined with 1 unit of regular insulin for q 5 g dextrose, to be infused over 2 hr.

## 6. Sodium Bicarbonate

**Use:** Metabolic acidosis, life-threatening hyperkalemia, correction of acid base imbalance in cardiac arrest.

**Dosage:** 7.5% solution (75 mg/ml) is equivalent to 0.9 mEq/ml. If acid base status is not available then in older children empirical dose is 1-2 mEq/kg of 7.5% solution. Subsequent dose is calculated as follows;  $\text{HCO}_3^-$  (mEq) = Base deficit  $\times$  wt in kg  $\times$  0.6. Patient should be adequately ventilated before administering sodium bicarbonate in cardiac arrest.

**Brands:** 7.5% ampoule for Inj; Sodium bicarbonate.

- Contraindicated in hypocalcemia, hyponatremia, inadequate ventilation. May cause cerebral hemorrhage, metabolic alkalosis, hyponatremia, hypokalemia,

hypocalcemia, pulmonary edema. For IV use dilute in equal volume of sterile water.

## 7. Sodium Chloride

**Use:** Hyponatremia, restores moisture to nasal membrane.

**Dosage:** Normal saline (0.9%) is equivalent to 154 mEq/L and 3% NaCl is equivalent to 513 mEq/L.

- Acute symptomatic hyponatremia: Given as follows;  
 $\text{Sodium mEq} = \text{wt in kg} \times 0.6 \times (\text{desired sodium-actual sodium}).$

In asymptomatic cases correct gradually as compared to symptomatic ones. Hypertonic NaCl should only be used for acute symptomatic hyponatremia. Dosage may vary depending upon fluid, electrolyte and acid base balance coupled with clinical conditions.

**Brands:** 0.9% and 3% Inj; NaCl. 0.9% Nasal spray; 0.65% gel for nasal application; Nasoclear.

- Hypertonic saline should be given via central line only. For acute correction use 125 mEq/L as the desired sodium level.

### 1. Human Anti-D (Rho-D) Immunoglobulin

*Use:*

- a. Suppression of Rh isoimmunization (In mother): Used when the mother is Rho-D negative, father is either Rho-D positive or Rho-D unknown, baby is either Rho-D positive or Rho-D unknown. During delivery of Rho-D positive infant, abortion, chorionic villus sampling, amniocentesis, abdominal trauma, ruptured tubal pregnancy, transplacental hemorrhage.
- b. Treatment of idiopathic thrombocytopenic purpura (ITP): Used in Rho-D positive nonsplenectomized children with acute or chronic ITP (Investigational).

*Dosage:* IM

- Pregnancy: 300 mcg at 28 wk and following delivery, preferably within 72 hr of delivery.
- Postpartum: 300 mcg within 72 hr.
- Threatened abortion: 300 mcg as soon as possible.
- Abortion, miscarriage, termination of ectopic pregnancy.  
<13 wk: 100 mcg and  $\geq 13$  wk: 300 mcg; within 72 hr.

*Brands:* 300 mcg/Vial; Gyne-D, Rhesuman, Rhogam.

- It has no role in already sensitized Rho-D negative women. Use with precautions in patient with bleeding

disorders or thrombocytopenia or patient with hemoglobin < 8 gm%.

## 2. Human Hepatitis B Immunoglobulin

**Use:** Prophylaxis of hepatitis B in babies born to HBsAg positive mothers, children acutely exposed to HBsAg positive blood or blood products.

**Dosage:** IM

- Neonates: First dose of 100-200 IU given soon after delivery, followed by second dose of 32-48 IU/kg after 2-3 mth. Hepatitis B vaccine should be given concurrently.
- Children: 32-48 IU/kg soon after exposure.

**Brands:** 100 IU/0.5 ml; Hepabig, Hepaglob.

## 3. Human Normal Immunoglobulin (IVIG)

**Use:** Immunodeficiency syndrome, ITP, Kawasaki disease, Guillain-Barre syndrome, acute bacterial or viral infections in immunosuppressed patient, demyelinating neuropathy, pediatric HIV infection.

**Dosage:** IM, IV

- Immunodeficiency: 300-400 mg/kg/dose q 2-4 wk. Maintain IgG level > 500 mg/dl.
- ITP: 400-1000 mg/kg/day for 2-5 day then q 3-6 wk based on platelet count and clinical response.
- Kawasaki disease: 2 gm/kg single dose.
- Guillain-Barre syndrome: 400 mg/kg/day for 4 day.
- Severe systemic viral or bacterial infection: Neonates: 500 mg/kg/day for 2 day. Children: 500-1000 mg/kg/wk.

**Brands:** 0.5, 1, 2.5 and 5 gm/Vial; Gamma IV, Intraglobin-CP, IV Globulin.

- Doses should be based on ideal body weight. Protection usually lasts for 1-3 months.

#### **4. Human Rabies Immunoglobulin**

*Use:* All proven and suspected rabid animal bite/exposure.

*Dosage:* 20 Units/kg (Max: 3000 IU).

*Brands:* 300 IU/Vial; Berirab-P, Imogam rabies, Rabglob. 750 IU/Vial; Berirab-P.

*Administration:* If patient reports within 24 hr of exposure, give maximum dose for infiltration and rest is given IM over deltoid. If reports after 24 hr to 7 day then give total dose IM. Do skin sensitivity test. Rabies vaccine should be used concurrently.

#### **5. Human Tetanus Immunoglobulin (TIG)**

*Use:* Prophylaxis in nonimmunized children and treatment of tetanus.

*Dosage:*

- Prophylaxis: 250 IU; IM or 4 units/kg.
- Treatment: 3000-6000 IU; IM and or 250 IU intrathecal.

*Brands:* 250 and 500 IU Inj: Immunotant, Tetglob.

#### **6. Respiratory Syncytial Virus Immunoglobulin (RSV-IGIV)**

*Use:* Prophylaxis in infants and children with severe immunodeficiency or immunosuppression; RSV infection in children < 2 yr of age with bronchopulmonary dysplasia or history of prematurity.

*Dosage:* IV; 750 mg/kg given monthly from the beginning to the end of RSV infection season.

**Brands:** 50 mg/ml Inj; Respigam.

- Immunization with live viral vaccine should be avoided for 9 mth.

## **7. Varicella Zoster Immunoglobulin (VZIG)**

**Use:** Prophylaxis in immunocompromised children, newborn exposed to maternal varicella, pregnant women.

**Dosage:** IM; 125 units/kg soon after exposure or within 96 hr (Max: 625 units).

**Brands:** > 25 IU/ml Inj; Varitect-CP. 125 units/Vial; VZIG.

These agents are used for acute or chronic constipation or to evacuate bowel before surgery. Lactulose in addition is used for hepatic encephalopathy to lower ammonia levels.

## 1. Bisacodyl

**Dosage:** PO; 3-12 yr: 5 to 10 mg single dose/day >12 yr: 5-15 mg single dose/day.

Rectal: < 2 yr, 5 mg/day and > 2 yr, 5-10 mg/day single dose.

**Brands:** 5 mg Tab; Dulcolax, Julax, Relax. 5 and 10 mg rectal Suppository; Dulcolax, Conlax.

- Do not use in patient with abdominal pain, obstruction, appendicitis. Should not be used regularly for > a week.

## 2. Docusate

**Dosage:** In > 6 mth is recommended. < 6 yr: 20-40 mg/day and in > 6 yr 20-60 mg/day in 1-4 doses.

**Brands:** 100 mg Tab; 50 mg/5 ml Syrup ; 0.25%, 50 ml enema; Laxicon.

- Should not be used along with liquid paraffin.

## 3. Lactulose

**Dosage:** PO; Infants: 2.5-10 ml/day and in children 40-90 ml/day in 3-4 divided doses.



**Brands:** 10 g/15 ml Liquid; Duphalac, Evict, Lactulax.

- Target in hepatic encephalopathy is to produce 2-3 soft stools/day. Contraindicated in galactosemia or patient requiring low galactose diet. There occurs accumulation of hydrogen gas in intestine during therapy, could result in explosion if patient were to undergo electrocautery procedure.

#### 4. Liquid Paraffin

**Dosage:** In children > 18 mth; initial 1 ml/kg can be increased up to 3 ml/kg once daily.

**Brands:** Liquid paraffin + Milk of magnesia; 3.75 ml + 11.25 ml per 15 ml; Cremaffin, Cremalax, Trulax.

- Chronic use leads to deficiency of fat soluble vitamins.

## 1. Fluoride

**Use:** Prevention of dental caries.

**Dosage:** Toothpaste once a day, rinse once or twice weekly, gel once each night.

**Brands:**

- Potassium nitrate 5%, fluoride toothpaste; Fludent-kF, Sensodent-k.
- Sodium Fluoride 0.2% + Potassium nitrate 3% Gel; Senquel-AD. Sodium Fluoride 0.1% + Zinc sulphate 0.025%; Hydent gel.
- Sodium Fluoride 0.2% Rinse; Fludent-M, Sensodent-F.

Do not swallow-rinse, paste or gel.

## 2. Iron

**Use:** Treatment of microcytic hypochromic anemia.

**Dosage:** RDA: 5-10 mg/day of elemental iron.

- Prophylaxis: PO; 1-2 mg/kg/day of elemental iron (Max: 15 mg/day).
- Deficiency: PO; 3-6 mg/kg/day of elemental iron in 2 divided doses. IM, IV=Hb deficit (g/dl) x weight in kg x 0.0476 + 1 ml/per 5 kg (Max: 14 ml of Iron Dextran).

**Brands:**

- 100 mg Tab; 50 mg/5 ml Syrup; 50 mg/ml drops, elemental iron; Feritin, Feritone, Ferium, Feroxe. 80 mg/

5 ml pediatric Syrup; 25 mg/ml elemental iron drops; Tonoferon. 60 mg/5 ml Syrup; 20 mg/ml elemental iron drops; Ferrochelate. 25 mg and 50 mg Tab; 25 mg/5 ml elemental iron in Syrup; Rarecap.

- May cause GI irritation, nausea, diarrhea, dark stools, constipation, urine discoloration, teeth staining. Avoid in patient requiring frequent blood transfusion. When using for iron deficiency anemia, treat for additional 3-4 months after Hb return to normal in order to replenish total body iron stores.

### 3. Zinc

**Use:** Prevention and treatment of zinc deficiency, maintenance treatment of Wilson's disease (zinc acetate), acrodermatitis enteropathica, anemia; increase wound healing in deficiency states, diarrhea.

**Dosage:** RDA; < 1 yr: 5 mg/day. 1-10 yr: 10 mg/day.

>10 yr: 15 mg/day of elemental zinc.

- Deficiency: PO; 0.5-1 mg/kg/day in 2-3 divided doses.
- Acrodermatitis enteropathica; 6 mg/kg/day.

**Brands:** 20 mg/5 ml Syrup; Zinconia, Emzinc.  
10 mg Tab; Zinconia, Emzinc.

**Combinations:** Elemental zinc 22.5 mg + Thiamine mononitrate 10 mg + Riboflavin 10 mg + Nicotinamide 50 mg + Pyridoxine 2 mg + Calcium pantothenate 12.5 mg + Tocopheryl 15 mg + Ascorbic acid 150 mg in each Cap; ZBC, Zevit.

- Zinc may decrease penicillamine, quinolone and tetracycline absorption. Iron and H<sub>2</sub> blockers decrease zinc absorption.

### 4. Magnesium and Potassium

See under electrolyte supplement.

### 1. Alfacalcidol

**Use:** Treatment of hypocalcemia (renal rickets, Vit D deficiency rickets).

**Dosage:** PO

- Premature neonates and infants: 0.05-0.1 mcg/kg/day
- Children: < 20 kg, 0.05 mcg/kg daily.

**Brands:** Alfacalcidol 0.25 mcg + Calcium 200 mg Tab; Alcalci, Alfa-arocal.

### 2. Calcium Phosphate

**Use:** Strong bone growth, inhibits the progression of enamel subsurface lesions and prevents calcium deficiency in children.

**Dosage:**

- Children: 5 ml Syrup after meals BO.

**Brands:** 200 ml Syrup: Ostocalcium B<sub>12</sub> Syrup B/F; Each 5 ml contains. Vitamin D<sub>3</sub> 200 iu; Vitamin B<sub>12</sub>, 2.5 mg; Calcium 82 mg. Ostocalcium B<sub>12</sub> syrup L/L; Each 5 ml contains. Vitamin D<sub>3</sub> 200 iu; Vitamin B<sub>12</sub> Calcium 82 mg. Ostocalcium Tablet; Vitamin D<sub>3</sub> 400 iu, 2.5 mg; Tribasic calcium phosphate IP 0.323g (equivalent to 125 mg of calcium).

### 3. Carnitine

**Use:** Treatment of carnitine deficiency, to improve IV fat emulsions utilization by premature neonates, cardiomyopathy, myopathy, long-term hemodialysis.

**Dosage:**

- Premature neonates: IV: 10-20 mg/kg/day in parenteral nutrition solution.
- Children: PO, IV: 50-100 mg/kg/day in divided doses.

**Brands:** 330 and 500 mg Tab; 500 mg/5 ml Syrup; 200 mg/ml Inj; Carnitor.

### 4. Fat Emulsion

**Use:** Source of calories and essential fatty acids for patients requiring parenteral nutrition of prolonged duration.

**Dosage:** IV

- Premature infants: Starting dose of 0.25-0.5 g/kg/day, increase by 0.25 g/kg/day to a maximum of 3 g/kg/day.
- Infant and children: Starting dose of 0.5-1 g/kg/day, increase by 0.5 g/kg/day to a maximum of 4 g/kg/day.

**Administration:** Maximum rate of infusion in neonates is 0.15 g/kg/hr or 0.75 ml/kg/hr of 20% solution. In infants and children, it is 0.25 g/kg/hr or 1.25 ml/kg/hr of 20% solution. Heparin may be added in a dose of 1-2 units/ml.

- Fat calories should not exceed 60% of the total daily calories. 10%=1.1 k cal/ml and 20% = 2 k cal/ml.

**Brands:** Intralipid IV: Contain soyabean oil 100 mg/ml (10%) or 200 mg/ml (20%) + fractioned egg phospholipid 12 g + Glycerol 22.5 g/100 ml. 10% in 100 and 500 ml bottle and 20% in 100 and 250 ml bottle.

**5. Medium Chain Triglycerides (MCT Oil)**

**Use:** Nutritional supplement in infants for those who cannot digest long chain fats, induce ketosis as a prevention for seizures.

**Dosage:**

- Infants: Start at 0.5 ml with every other feeding, then increase with every feeding. Children for seizures: About 40 ml with each meal or 50-70% of total calories.

**Brands:** Simyl MCT oil by FDC.

- May cause sedation, narcosis, ketosis, diarrhea.

**1. Adrenocorticotropin (ACTH)**

**Use:** Infantile spasms, as immunosuppressant, severe muscle weakness in myasthenia gravis.

**Dosage:**

- Infantile spasms: IM, SC: Initial dose of 20 units/day for 2 wk if required effect occur then taper and discontinue over 1 wk, if not responding increase to 30 units/day for 2 wk and then taper and discontinue over 1 wk (Range: 5-160 units/kg/day).
- Immunosuppression: IV, IM, SC; 0.8 unit/kg/day divided q 12-24 hr.

**Brands:** 60 units/ml Inj; Actonprolongatum. 40 and 80 units/ml Inj; Corticotrophin.

- May cause HT, acne, Cushing's syndrome, sodium and water retention, hypokalemia. Do not stop abruptly.

**2. Desmopressin**

**Use:** Primary nocturnal enuresis, diabetes insipidus.

**Dosage:**

- Diabetes insipidus: PO; 0.05 mg starting dose and titrate to effect. Intranasal; 5-30 mcg/day in divided doses. SC, IV; 2-5 mcg/day in divided doses.

- Enuresis: > 6 yr of age; Intranasal; 20 mcg/day as starting dose can be increased up to 40 mcg. PO; 0.05-0.1 mg at bedtime.

**Brands:** 0.1 mg Tab; 4 mcg/ml Inj; Minirin. 1 mcg/ml, Nasal spray; D-Void, Minirin.

- Avoid intranasal use in patient of nasal edema, discharge, atopic rhinitis, obstruction. May cause facial flushing, tachycardia, headache, dizziness, hyponatremia.

### **3. Somatropin (Growth Hormone)**

**Use:** Growth failure due to inadequate growth hormone secretion, chronic renal failure, short stature in Turner syndrome.

**Dosage:** IM, SC: 0.06-0.16 IU/kg 3 times/wk.

**Brands:** 16 IU/Vial; Genotropin. 4, 16, 18, and 36 IU/Vial; Humatrope.

- May cause headache, intracranial hypertension with papilloedema, local lipoatrophy, reversible hypothyroidism.

### **4. Vasopressin**

See under cardiac shock and failure.



## 1. Albumin

**Use:** Hypovolemia, plasma volume expansion and maintenance of cardiac output, hypoproteinemia, neonatal jaundice.

**Dosage:**

- Hypoproteinemia: 0.5 g/kg/dose, may be repeated q 1-2 days.
- Hypovolemia: 0.5 g/kg/dose, may be repeated as needed (Max: 1 g/kg/day in neonates and 6 g/kg/day in children).

**Brands:**

- 20% Human albumin in 50 and 100 ml bottles; Albudac, Albumeon, Albupan.
- 5% Human albumin in 100 ml bottle; Sii human albumin.
- 25% Human albumin in 50 and 100 ml bottles; Albudac.

**Administration:** Rapid infusion may result in vascular overload. Rate of infusion should be 2-4 ml/min of 5% and 1 ml/min of 25% albumin. Albumin 5% should be used for hypovolemic patients and 25% should be used for patient with fluid or sodium restriction. Use lowest possible concentration in neonates.

## 2. Dextran

**Use:** Fluid replacement and blood volume expander in shock or impending shock; Dextran 40 may be used for prophylaxis of venous thrombosis and pulmonary embolism.

**Dosage:** Dose and infusion rate must be individualized and be calculated depending upon the patient's fluid status. Total dose on day 1 is 20 ml/kg, second day onward it is 10 ml/kg/day and do not use for > 5 days.

**Brands:** Dextran 40, 10% in NS or in 5% dextrose; Rallidex, Microspan-40. Dextran 70, 6% in NS or in 5% dextrose; Lamodex-70.

- Contraindicated in CHF, renal failure, hypervolemia, thrombocytopenia, bleeding disorder; keep ready epinephrine and antihistamines to treat any anaphylactic reactions.

These agents should be applied from head to toe in children for 2-3 days followed by thorough bath after 8-12 hr of application. Avoid contact with eyes, face, mucus membranes, urethral meatus and do not apply to inflamed or raw skin. These agents are also helpful in treatment of pediculosis. Course can be repeated after 7-10 days if required. Give antibiotic for secondary infection and also antipruritic agents if required.

### 1. Benzyl Benzoate

*Brands:* 25% lotion; Benzyl benzoate.

### 2. Crotamiton

Also useful in pruritic skin conditions.

*Brands:* 10% Cream and lotion; Crotorax.

### 3. Gamma Benzene Hexachloride (GBHC)

*Brands:* 1% lotion; Scaboma, Welscab.

### 4. Permethrin

*Brands:* 5% Cream; Clerkin, Permarid, Permite 5% lotion; Permisol, Scabitol-p.

# 41

## CHAPTER

# Skeletal Muscle Relaxants

### 1. Baclofen

**Use:** Treatment of cerebral spasticity, spinal cord lesions spasticity, trigeminal neuralgia.

**Dosage:** PO; IM: > 2 yr of age; 10-15 mg/day divided q 8 hr and titrate dose q 3 days to maximum of 40 mg/day.

**Brands:** 10 and 25 mg Tab; Liofen, Riclofen, Spinofen. 50 mg/ml Inj; Liofen.

- When used along with benzodiazepines, opiates, tricyclic antidepressants, increased CNS depression is seen.

### 2. Chlorzoxazone

**Use:** Symptomatic treatment of muscle spasm and pain.

**Dosage:** PO; 20 mg/kg/day in 3-4 divided doses.

**Brands:** Chlorzoxazone + PCM: 250 + 300 mg Tab; Duodil, Myospaz, Parafon.

- May color urine orange or red, fever, rash, anorexia, hepatitis, drowsiness.

### 3. Dantrolene

**Use:** Treatment of spasticity associated with UMN lesions (Spinal cord injury, stroke, CP)

**Dosage:** PO

Initial: 0.5 mg/kg/dose twice daily, can be increased weekly upto a maximum of 3 mg/kg/dose.

**Brands:** 25, 50, 100 mg Cap; Dantrium.

#### **4. Methocarbamol**

**Use:** Supportive therapy in tetanus, muscle spasm associated with acute painful musculoskeletal condition.

**Dosage:** IV: Tetanus; 15 mg/kg/dose q 6 hr for 3 days only.

**Brands:** 100 mg/ml Inj; Robinax. Methocarbamol + PCM: 400 + 325 mg Tab; Flexinol, Neuromol-MR.

- May cause hypotension, bradycardia, drowsiness, headache, nausea.

### 1. Adrenaline/Epinephrine

**Use:** Cardiac arrest, bronchospasm, anaphylactic reaction.

**Dosage:**

- Neonates: IV, Intratracheal: 0.01-0.03 mg/kg q 3-5 min as needed (0.1-0.3 ml/kg of 1: 10,000 solution).
- Infants and Children:

SC: 0.01 mg/kg (0.01 ml/kg of 1:1000 solution).

IV: 0.01 mg/kg (0.1 ml/kg of 1:10,000 solution). Max: 1 mg, may be repeated q 3-5 min as needed.

Intratracheal: 0.1 mg/kg (0.1 ml/kg of 1:1000 solution) Max: 0.2 ml/kg.

Continuous infusion: 0.1-1 mcg/kg/min.

Inhalation: 0.1 ml/kg of 1:10,000 solution by nebulizer diluted in 3 ml of NS.

**Brands:** 1 mg/ml of 1:1000 dilution Inj; Adrenaline, Vasocon.

- May cause pallor, tachycardia, HT, headache, tremor, nausea, etc.
- Incompatible with sodium bicarbonate.

### 2. Dobutamine

**Use:** Treatment of hypotension persisting after adequate fluid volume replacement.

**Dosage:** 5-20 mcg/kg/minute as continuous infusion and titrate to response (Max: 40 mcg/kg/minute).

**Brands:** 250 mg/Vial; Cardiforce, Cardiject, Dobustat.

- Diluted in NS or dextrose, maximum recommended concentration is 5000 mcg/ml (5 mg/ml). May cause ectopics, tachycardia, tachyarrhythmias, leg cramps, paresthesias. Do not administer via umbilical arterial catheter in neonates.

### 3. Dopamine

**Use:** Treatment of shock and hypotension unresponsive to adequate fluid volume replacement.

**Dosage:** 1-20 mcg/kg/minute continuous infusion, titrate to desired response (Max: 20 mcg in neonates and 50 mcg/kg/min in infants and children).

**Brands:** 40 mg/ml Inj; Dopacard, Dopa-plus, Dopar.

- If dose more than 30 mcg/kg/min is required then direct acting agents like epinephrine and norepinephrine may be more beneficial. Maximum concentration allowed for IV use 3200 mcg/ml. May cause ectopics, tachycardia, vasoconstriction, ventricular arrhythmias, decreased urine output in high doses. Do not administer via umbilical arterial catheter in neonates.

### 4. Ephedrine

**Use:** Nasal congestion.

**Dosage:** 2 drops in each nostril 2-3 times/day.

**Brands:** Ephedrine 0.75% and 0.5% + Menthol 0.5% + Camphor 0.5% + Eucalyptol 0.5% + Castor oil 0.5%, Drop Endrine and Endrine mild.

**5. Norepinephrine**

*Use:* As Dopamine

*Dosage:* 0.05-0.1 mcg/kg/minute, titrate to required effect (Max: 2 mcg/kg/minute).

*Brands:* 1 mg/ml base Inj; Adrenor, Levonor.

- May cause arrhythmias, bradycardia, tachycardia, organ ischemia due to vasoconstriction etc.

**6. Oxymetazoline**

*Use:* Symptomatic relief of nasal congestion.

*Dosage:* 2-12 yr: 0.025%, 2-3 drop 3 times/day.

> 12 yr: 0.05%, 2-3 drop 3 times/day.

*Brands:* 0.025 and 0.05% nasal drop; Nasivian and Sinarest.

**7. Phenylephrine**

*Use:* Symptomatic relief of nasal and nasopharyngeal mucosal congestion, as a mydriatic in ophthalmic procedure.

*Dosage:* Nasal congestion: 1-2 drop/nostril q 6 hr, should not be used for > 5 days.

Ophthalmic procedure: 1 drop 15-30 min before procedure.

*Brands:* 0.25% Nasal drop; Andre and Fenox. 5% eyedrop; Efrosyn, Fenilefrina.

- Causes rebound congestion on prolonged nasal use.

**8. Pseudoephedrine**

See under antihistaminic.

**9. Xylometazoline**

*Use:* Symptomatic relief of nasal congestion.

*Dosage:* 2-12 yr: 2-3 drop of 0.05% solution q 8 hr.

> 12 yr: 2-3 drop of 0.1% solution q 8 hr.

*Brands:* 0.05 and 0.1% pediatric and adult nose drop; Decon, Otrivin.



# 43

## CHAPTER

# Thyroid and Antithyroid Agents

### 1. Carbimazole

**Use:** Hyperthyroidism, in thyrotoxicosis prior to thyroidectomy.

**Dosage:** PO; 1-2 mg/kg/day divided q 8 hr.

**Brands:** 5, 10 and 20 mg Tab; Neomercazole, Thyrocab.

- May cause hypothyroidism, GI disturbances, rash, agranulocytosis.

### 2. Liothyronine

**Use:** Replacement therapy in congenital or acquired hypothyroidism.

**Dosage:** PO; Initial dose of 5 mcg/day, may be increased by 5 mcg q 3 days to a maximum of 20 mcg/day for <1 yr; 50 mcg/day for 1-3 yr and 75 mcg/day for more than 3 years.

**Brands:** 20 mcg Tab; Tetroxin. 20 mcg Inj; Triiodothyronine.

- May cause palpitations, arrhythmias, HT, weight loss, tremor, diaphoresis, insomnia.

### 3. Propylthiouracil

**Use:** Hyperthyroidism, thyrotoxic crisis.

**Dosage:** PO; 5-7 mg/kg/day divided q 8 hr and titrate to the required effect. Maintenance dose usually begins after

2 mth and it is 1/3 to 2/3 of the initial dose, given divided q 8-12 hr.

**Brands:** 50 mg Tab; PTU.

#### **4. Thyroxine**

**Use:** As liothyronine.

**Dosage:** PO; 0-6 mth: 10-15 mcg/kg; 6-12 mths: 6-8 mcg/kg; 1-5 yr: 5-6 mcg/kg; 6-12 yr: 4-5 mcg/kg; >12 yr: 2-3 mcg/kg.

**Brands:** 25 and 50 mcg Tab; Thyrochek, Thyrox, Thyronorm. 100 mcg Tab; Eltroxin, Roxin.

**1. BCG**

Live attenuated vaccine of bovine strain, contains 0.1-0.4 million mycobacteria. Given 0.1 ml intradermal, use within 4 hr of reconstitution, given from birth to 60 days.

**Brands:** 10 dose/vial by Aventis and Serum.

**2. DPT**

Available as either whole cell or highly purified acellular component vaccine. Primary doses at 6, 10, 14 wk and booster at 18 mth and 5 yr. Given 0.5 ml deep IM. Contain D. toxoid > 20 to < 30 Lf, T. toxoid > 5 to < 40 Lf and B. Pertussis 20,000 million killed bacteria per dose. Acellular vaccine has lower incidence of side effects.

**Brands:** Triple antigen (whole cell); Single and multidose Vial; Infanrix, Tripacel (acellular); Single dose 0.5 ml Inj.

**3. DT**

Indicated in children where pertussis component is contraindicated. Contain D. toxoid 20-30 Lf and T. toxoid 5-25 Lf, given 0.5 ml IM.

**Brands:** Dual antigen; Single and multidose vial.

#### 4. Hepatitis-B

Is a purified surface antigen vaccine, either genetically engineered or plasma derived. Contain 10 mcg/0.5 ml, given IM. Primary doses at birth, 6, 14 wk or 6, 10, 14 wk or 0, 1, 6 months.

**Brands:** Bevac, Engerix-B, Genevac-B, Single and multidose vial.

#### 5. Hepatitis-A

Available as inactivated and live attenuated forms. Given after one year of age in two primary doses at 6 mth interval.

**Brands:** Havrix; 720 ELISA units/0.5 ml and 1440 ELISA units/1 ml of HM-175 inactivated antigen. Avaxim; 80 U/0.5 ml and 160 U/1 ml of inactivated GBM strain. Biovac-A; 6.5 LgCCID<sub>50</sub>/1 ml of H<sub>2</sub> attenuated strain. Havrix and Avaxim given IM and Biovac-A SC.

#### 6. *Haemophilus Influenzae* Type-B Conjugate

Conjugate of purified capsular polysaccharide to either diphtheria or tetanus toxoid (PRP-D, PRP-T). Given IM 0.5 ml in 3 doses when started below 6 mth, 2 doses between 6 to 12 mth and 1 dose between 12 to 15 mth. Booster between 15-18 mth. Between 18 mth to 5 yr single primary dose.

**Brands:** Hiberix, Act-hib, Novohib; 10 mcg of PRP-T/0.5 ml. Hibtitre, Vaxemhib; 10 mcg of PRP-D/0.5 ml.

#### 7. Influenza Virus Vaccine

Is an inactivated vaccine. Given IM, children between 6 mth-3 yr 0.25 ml single dose if previously vaccinated otherwise

2 doses at 4 wk interval, if > 3 yr dose is 0.5 ml. Revaccinate every year with strain adjusted vaccine.

**Brands:** Vaxigrip; 7.5 mcg of A+7.5 mcg of B Virus antigen/0.25 ml.

## 8. IPV

Is an inactivated Salk strain vaccine. Given IM, 3 primary doses at 6, 10, 14 wk or 8, 12, 16 wk; booster at 15 mth (at an interval of 6 mth from 3rd dose).

**Brands:** Imovax, Polprotec; Contain type 1 > 40 DU + type 2 > 08 DU + type 3 > 32 DU/0.5 ml.

## 9. Measles

Live attenuated Edmonston-Zagreb strain vaccine. Given SC at 7-9 mth of age as single dose.

**Brands:** M-VAC; 1000 CCID<sub>50</sub>/0.5 ml.

## 10. MMR

Live attenuated vaccine. Given SC at 15-18 mth of age.

**Brands:** Tresivac; Measles E-Z strain > 1000 CCID<sub>50</sub> + Mumps L-Z strain > 5000 CCID<sub>50</sub> + Rubella RA 27/3 strain > 1000 CCID<sub>50</sub> per 0.5 ml. Inj Priorix; Measles Schwarz strain > 1000 CCID<sub>50</sub> + Mumps RIT 4385 > 1000 CCID<sub>50</sub> + Rubella RA 27/3 > 1000 CCID<sub>50</sub>/0.5 ml, Inj.

## 11. Meningococcal

An inactivated capsular polysaccharide vaccine. Given IM in > 2 yr of age during an epidemic, single dose followed by booster q 2 yr.

**Brands:** Mancevax Inj; each 0.5 ml dose contain 50 mcg of A, C, W and Y serotype. Meningococcal Inj; each 0.5 ml dose contain 50 mcg of A and C serotype.

## 12. OPV

Live attenuated Sabin strain vaccine. Given PO 2 drops at birth, 6, 10 and 14 wk. Booster at 18 mth and 5 yr.

**Brands:** OPV 20 dose vial by Haffkine and GSK, contain type 1  $> 10^6$ , Type 2  $> 10^5$  Type 3  $> 10^{5.5}$  CCID<sub>50</sub> per dose.

## 13. Pneumococcal Vaccine

Is a polysaccharide vaccine available in 7 and 23 valent forms. Recommended in  $> 2$  yr, 23 valent is given 0.5 ml IM or SC single dose followed by booster after 3-5 years. For 7 valent primary doses are given at 6, 10, 14 wk followed by booster at 12-15 mth.

**Brands:** Pneumo-23, Pneu-immune 23, 0.5 ml dose contain 25 mcg of each serotype. Prevenar is a 7 valent and contain 2 mcg of each serotype.

## 14. Rabies

Is an inactivated tissue culture vaccine. Available as human diploid cell vaccine (HDCV), purified chick embryo vaccine (PCEV) and purified verocell rabies vaccine (PVRV). Given IM, pre-exposure prophylaxis consist of 3 doses at 0, 7 and 28 days and postexposure schedule is 0, 3, 7, 14, 28 and 90 days.

**Brands:** Rabipur Inj; (PCEV) 0.5 ml/dose; Rabivax Inj; (HDCV) 0.5 ml/dose. Verorab Inj; (PVRV) 0.5 ml/dose.

## 15. Rotavirus Vaccine

Live attenuated human rotavirus RIX 4414 strain vaccine containing not less than  $10^6$  CCID<sub>50</sub>. Given PO, 2 doses at 4 wk interval starting from 6 wk of age onwards.

**Brands:** Rotarix; Single dose 1 ml.

**16. Td**

Is a low dose diphtheria vaccine combined with tetanus toxoid, recommended in > 7 yr of age and should replace TT at 10 and 16 yr. Given 0.5 ml IM.

**Brands:** Td vac Inj; Contain D. toxoid < 5 Lf and T. Toxoid > 5 Lf/dose.

**17. Typhoid**

Is a purified Vi capsular polysaccharide vaccine. Given IM after 2 years of age and booster every 3 years.

**Brands:** Biovac, Typbar, Typhim Vi Inj; Contain 25 mcg of Salmonella type 2 (Vi antigen).

**18. TT**

Is an alum precipitated toxoid vaccine, contain 5-25 Lf of toxoid. Given 0.5 ml IM.

**Brand:** Inj. BETT single dose ampoule.

**19. Varicella/Chicken Pox Vaccine**

Live attenuated Oka strain vaccine. Given SC, single dose in 1-13 yr and 2 doses in > 13 yr with a gap of 4 wk.

**Brands:** Varivax Inj; Contain  $\geq 2000$  PFU/dose. Okavax Inj; Contain  $\geq 1000$  PFU.

### 1. Nitroglycerine

**Use:** Shock, portal hypertension, CHF, hypertensive emergencies.

**Dosage:** In children by continuous infusion.

Initial 0.25-0.5 mcg/kg/minute; titrate by 0.5-1 mcg/kg/min q 3-5 min to maximum of 5 mcg/kg/min.

**Brands:** 5 mg/ml Inj; NIG, Nitrocin, Nitroject.

- For IV use dilute in D-5% or NS to 50-100 mcg/ml. Vasodilates veins more than arteries. May cause flushing, hypotension, reflex tachycardia, dizziness, headache.

### 2. Tolazoline

**Use:** Treatment of persistent pulmonary hypertension.

**Dosage:** Neonates; IV; 1-2 mg/kg loading dose followed by 1-2 mg/kg/hr continuous infusion.

- May cause hypotension, tachycardia, increased respiratory and gastrointestinal secretions, GI bleed, flushing, pulmonary hemorrhage.

### 3. Diazoxide, Hydralazine, Minoxidil, Nitroprusside, Phenoxybenzamine, Phentolamine, Prazocin

For details of these drugs see under antihypertensives.



## VITAMINS

**1. Biotin**

**Use:** Nutritional biotin deficiency, primary biotinidase deficiency.

**Dosage:** RDA: 10-200 mcg/day.

Biotinidase deficiency: 5-10 mg once daily.

Biotin deficiency: 5-20 mg once daily.

**Brands:** 5 mg Tab; H-Vit, Oltin.

**2. Cyanocobalamin/Vitamin B<sub>12</sub>**

**Use:** Megaloblastic anemia, nutritional supplement, increased B<sub>12</sub> requirement due to hemorrhage, liver or kidney disease.

**Dosage:** RDA: 0.3-2 mcg/day.

- Megaloblastic anemia: IM; 30-50 mcg/day to total dose of 1000-5000 mcg and then 100 mcg per month.
- Deficiency: 100 mcg/day for 15 days then once or twice weekly for several month.

**Brands:** 1000 mcg B<sub>12</sub> in 2 ml ampoule along with vitamin B<sub>1</sub> and B<sub>6</sub>; Bevidex, Macrabarin.

- Severe hypokalemia may occur after conversion of megaloblastic anemia to normal erythropoiesis so serum potassium level should be monitored.

### 3. Folic Acid

**Use:** Megaloblastic and macrocytic anemia, tropical sprue.

**Dosage:** RDA: Neonates to 6 mth; 30 mcg/day. 6 mth-3 yr; 50 mcg/day. 4-6 yr; 75 mcg/day. 7-10 yr; 100 mcg/day. > 11 yr; 150 mcg/day.

Deficiency: 5 mg/day

**Brands:** 5 mg Tab; Fol-5, Folet, Folium, Folvite.

- Large doses may mask the hematologic effect of B<sub>12</sub> deficiency while allowing the neurologic complication due to deficiency to progress.

### 4. Niacin/Vitamin B<sub>3</sub>

**Use:** Treatment of pellagra, dietary supplement, hyperlipidemia.

**Dosage:** RDA: 5-15 mg/day.

Pellagra: 50-100 mg/dose 3 times/day.

Hyperlipidemia: 10 mg/kg/day is maximum dose.

### 5. Pyridoxine/Vitamin B<sub>6</sub>

**Use:** Prevention and treatment of B<sub>6</sub> deficiency, pyridoxine dependent seizures, treatment of drug induced deficiency, e.g. isoniazid, cycloserine, hydralazine.

**Dosage:** RDA: 0.5-1.5 mg/day.

- Pyridoxine dependent seizures: PO, IV, IM; 50-100 mg initial dose, maintenance dose: 50-100 mg/day, PO.
- Dietary deficiency: 5-15 mg/day for 3-4 wk then 2.5-5 mg/day.
- Drug induced neuritis: PO; For treatment 10-50 mg/day and for prophylaxis 1-2 mg/kg/day.

**Brands:** 40 mg Tab; Benadon. 100 mg Tab; B-Long, Pyricontin. 100 mg pyridoxine + B<sub>1</sub> + B<sub>6</sub> Inj; Bevidox, Neurokem. Pyridoxine 3 mg + Nicotinamide 100 mg + Cyanocobalamin 15 mcg + Folic acid 1500 mcg + Chromium picolinate 250 mcg + Selenium 100 mcg per cap; Cobadex. Cobadex-Z in addition contain elemental zinc 22.5 mg per cap.

- Sensory neuropathy may occur after chronic administration of large doses and large IV doses may precipitate seizures.

## 6. Riboflavin/Vitamin B<sub>2</sub>

**Use:** Prevention and treatment of riboflavin deficiency.

**Dosage:** RDA: 0.5-1 mg/day.

Deficiency: 2.5-10 mg/day in divided doses.

**Brands:** 20 mg Tab; Lipabol.

## 7. Thiamine/Vitamin B<sub>1</sub>

**Use:** Beriberi, Wernicke's encephalopathy, peripheral neuritis.

**Dosage:** RDA: 0.2-1 mg/day or 0.5 mg/1000 kcal diet.

- Beriberi: PO, IM, IV; 10-30 mg/day for 2 wk then 5-10 mg PO/day for 1 mth.
- Encephalopathy: IM, IV; 100 mg/day until consuming a regular balanced diet.

**Brands:** 75 mg Tab; Benalgis. 100 mg Tab; Beneuron forte, Berin. Thiamine 10 mg + Vit B<sub>2</sub> 10 mg + Vit B<sub>12</sub> 15 mcg + Folic acid 1500 mcg + Calcium pantothenate 50 mg + Vit C 150 mg, Cap; Glace-X. 100 mg/ml Inj; Berin.

- Rapid IV administration may lead to cardiovascular collapse and death.

## **8. Vitamin A**

*Use:* Treatment and prevention of vitamin A deficiency, supplementation in children with measles.

*Dosage:* RDA: 1000-3000 IU/day as per age.

- Deficiency: PO; > 1 yr: 200, 000 IU for 2 days and then 1-4 wk later. 6-12 mth, 1/2 of above dose and in < 6 mth 1/4 of the above dose and schedule.
- Prophylaxis in patient at risk (malnutrition, severe infection, recurrent diarrhea, pneumonia). In < 1 yr; 100,000 units and in > 1 yr; 200,000 units given PO q 4-6 mth.

*Brands:* 50,000 units Tab; and Cap; 50,000 units/ml Inj; Vitamin A.

- Hypervitaminosis-A may occur with massive doses or with large doses given over long period and manifest as nausea, vomiting, drowsiness, papilledema, symptoms of raised ICP.

## **9. Vitamin C/Ascorbic Acid**

*Use:* Scurvy, urinary acidification.

*Dosage:* RDA: 30-50 mg/day.

- Scurvy: 100-300 mg/day.
- Urinary acidification: 500 mg q 6 hr.
- To increase iron excretion during desferrioxamine therapy: 100-200 mg/day.

*Brands:* 100 and 500 mg Tab; Celin, Cell-C. 100 mg/ml Drops; Cecon, Celin. 100 mg/ml Inj; Redoxon, Tildoxon.

## 10. Vitamin D

*Use:* Rickets

*Dosage:* PO and IM; 1500 mcg or 600,000 IU. If no signs of healing on skiagram after 3-9 wk of therapy then repeat the dose.

*Brands:* 60,000 IU/Sachet; Calcirol granules (Alfacalcidol). 3 lakh (7.5 mg) and 6 lakh (15 mg) IU/ml Inj; Arachitol (Vitamin D<sub>3</sub>).

- High dose of vitamin D<sub>3</sub> given over long period may cause anorexia, vomiting, hypotonia, polydipsia, polyuria, hypercalcemia, hypercalciuria.

## 11. Vitamin E/α Tocopherol

*Use:* Vitamin E deficiency treatment and prevention, nocturnal muscle cramps, prevention of retinopathy of prematurity.

*Dosage:* (1 mg = 1.5 units)

- Prevention: Neonates; 5 units/day. Children; 10-20 units/day. Patients of cystic fibrosis, beta-thalassemia, sickle cell anemia require higher daily maintenance doses.
- Deficiency: Neonates; 25-50 units/day. Children; 1 unit/kg/day.

*Brands:* 200 and 400 mg Cap; Evion, Evit, Tocofer, 50 mg/ml drops; Evion.

## 12. Vitamin K

*Use:* Nutritional supplement, hemorrhagic disease of the newborn, prevention and treatment of hypoprothrombinemia caused by vitamin K deficiency or anticoagulant induced hypoprothrombinemia.

***Dosage:***

- HDN: 0.5 mg for preterm and 1 mg for term neonate within 1 hr of birth.
- Children: IM, IV, SC; 1-2 mg/dose: PO; 2.5-5 mg/dose.

***Brands:*** 10 mg/ml Inj; Kapilin (Vit K analog menaphthone) 1 mg/0.5 ml and 10 mg/ml Inj; 10 mg Tab; Kenadion. (Phytomenadione).

- Not effective in hypoprothrombinemia due to severe liver disease and hereditary hypoprothrombinemia.

# Miscellaneous Drugs

---

## 1. Alprazolam

*Use:* Treatment of anxiety and panic disorder.

*Dosage:* PO: 0.005-0.02 mg/kg/dose 3 times/day.

*Brands:* 0.25 and 0.5 mg Tab; Alprax, Alzolam, Restyl.

- Abrupt discontinuation may result in withdrawal symptoms. Safety not established in < 18 yr.

## 2. Atorvastatin

*Use:* Hypercholesterolemia in patient not responding adequately to diet and other measures.

*Dosage:* PO: Children > 6 yr: 10-80 mg/day once daily. Adjust dose as per lipid levels.

*Brands:* 10 and 20 mg Tab; Astin, Astorlip, Atorva, Lilo.

- May cause hepatitis, pancreatitis, gastritis, hyperglycemia.

## 3. Azathioprine

*Use:* Adjunct with other agents in prevention of transplant rejection, as immunosuppressant in autoimmune diseases like SLE, nephrotic syndrome.

*Dosage:* PO, IV

- Transplantation: Initial 2-5 mg/kg/dose once daily and maintenance dose is 1-3 mg/kg/dose once daily.
- Other condition: 1 mg/kg/dose once daily for 6-8 wk.

*Brands:* 50 mg Tab; Azimune, Azoprime, Immuran. 100 mg/Vial; Immuran.

- If used along with allopurinol reduce dose by 25-33%. Chronic immunosuppression increases risk of lymphoma and skin cancers. May cause irreversible bone marrow suppression.

#### **4. Caffeine Citrate**

*Use:* Idiopathic apnea of prematurity.

*Dosage :* Neonate: IV

- Loading dose: 10-20 mg/kg (5-10 mg/kg as caffeine base).
- Maintenance dose: 5 mg/kg/day (2.5 mg/kg/day as caffeine base) once daily, started 24 hr after the loading dose. Adjust maintenance dose based on patient response.

*Brands :* 25 mg/ml Inj; Cafirate, Cafcit.

- Give loading dose over at least 30 min and maintenance dose over 10 min diluted in D 5%.

#### **5. Charcoal**

*Use:* Emergency treatment in poisoning by certain drugs and chemicals, in overdoses of certain drugs to enhance their excretion (phenobarbitol, quinine, carbamazepine).

*Dosage:* 1-2 g/kg or 5-10 times the weight of the ingested poison, may be given q 4-6 hr.



**Brands:** 400 mg activated charcoal + 80 mg Simethicone: Tab; Distenil.

- If given along with milk, ice cream may reduce its effectiveness.
- May cause vomiting, constipation, black stools, intestinal obstruction.

## 6. Chlorhexidine

**Use:** As antibacterial, hand and dental rinse, surgical scrub.

**Dosage:** Oral rinse: 5-15 ml twice daily. Cleanser: 5 ml per scrub or handwash.

**Brands:** 0.2% mouth wash; Clohex, Hexitrin, Rexidin. 4% solution; 0.2% Lotion; Harifresh. 0.5% solution; Microgard.

- Avoid eating for 2-3 hr after oral rinse. May cause skin and tongue irritation, staining of oral surface.

## 7. Cholestyramine Resin

**Use:** Hypercholesterolemia, pruritis associated with elevated bile acids, diarrhea associated with excess fecal bile acids.

**Dosage:** PO: 240 mg/kg/day divided q 8 hr.

**Brands:** 4 gm sachet; Questran.

- Avoid in biliary obstruction or atresia. For long-term therapy, multivitamin, iron and folic acid is recommended in addition. May cause constipation, malabsorption of fat soluble vitamins, hyperchloremic acidosis.

## 8. Colostrum

**Use:** As immune modulator to provide antibodies.

**Dosage:** PO: 44 mg/kg/day in divided doses.

**Brands:** 90 gm pack; Pedimune powder.

It is a premilk fluid produced in the first 48 hr after giving birth.

## 9. Dextromethorphan

**Use:** Symptomatic relief in nonproductive cough.

**Dosage:** 2-6 yr: 2.5-7.5 mg q 8 hr (Max: 30 mg/day).

7-12 yr: 5-10 mg q 8 hr (Max: 60 mg/day).

> 12 yr: 10-30 mg q 8 hr (Max: 120 mg/day).

**Brands:** 10 mg Tab; 30 mg/5 ml Sy; Lastuss. 10 mg/5 ml Sy; Suppressa.

- May cause drowsiness, dizziness, nausea.

## 10. Doxapram

**Use:** Treatment of apnea of prematurity not responding to theophylline therapy.

**Dosage:** Initial dose of 2.5 mg/kg followed by continuous infusion of 1 mg/kg/hr (Max: 2.5 mg/kg/hr).

**Brands:** 20 mg/ml Inj; Caropram.

- C/I in seizures, cerebral edema, respiratory problem. May cause HT, tachycardia, CNS stimulation.

## 11. Glucagon

**Use:** Hypoglycemia, beta-blocker overdosage.

**Dosage:** IV, IM, SC

- Neonates, infants and children  $\leq 20$  kg: 0.02-0.03 mg/kg or 0.5 mg.
- Children  $> 20$  kg: 1 mg.

**Brands:** 1 mg/ml Vial; Glucagon novo.

## 12. Glycopyrrolate

**Use:** Inhibition of salivation and excessive secretions of the respiratory tract, reversal of muscarinic effects of cholinergic agents.

**Dosage:**

- Control of secretions: PO: 40-100 mcg/kg/dose 3-4 times/day. IM, IV; 4-10 mcg/kg/dose q 3-4 hr.
- Preoperative: IM: 4-5 mcg/kg 30-60 min; before procedure.
- Reversal of muscarinic effects: IV; 0.2 mg for each 1 mg of neostigmine and 5 mg of pyridostigmine administered.

**Brands:** 0.2 mg/ml Inj; Glyprolate, Pyrolate.

- Infants with Down's syndrome, spastic paralysis or brain damage may be hypersensitive to its effects.

## 13. Guaifenesin

**Use:** Symptomatic treatment of cough (expectorant).

**Dosage:** PO: <2 yr: 12 mg/kg/day in divided doses. 2-5 yr: 50-100 mg/kg/day. > 6y: 100-200 mg q 4 hr.

**Brands:** Axalin Exp: Guai. 50 mg + Dextromethorphan 5 mg + CPM 2.5 mg + Ammonium chloride 60 mg/5 ml. Codicoff Exp: Guai. 100 mg + Dextromethorphan 10 mg/5 ml. Dilo-BM expectorant: Ambroxol 30 mg + Guaiphenesin 30 mg + Terbutaline 1.25 mg/5 ml.

- Administer with large quantity of fluid to ensure proper action.

## 14. Insulin

**Use:** Treatment of insulin dependent diabetes mellitus, hyperkalemia, diabetic ketoacidosis.

**Dosage:** Only regular insulin can be given IV or IM.

- Neonates: Regular insulin 0.01-0.1 unit/kg/hr continuous infusion or 0.1-0.2 unit/kg q 6-12 hr SC.

- Children: 0.5-1 unit/kg/day in divided doses SC, adjust dose as per blood glucose level.
- Diabetic ketoacidosis: IV; Loading dose of 0.1 unit/kg followed by maintenance continuous infusion of 0.1 unit/kg/hr, adjust as per blood glucose level.
- Hyperkalemia: (Treat with IV calcium and sodium bicarbonate before giving insulin). Add 1 unit of regular insulin in 5 gm of dextrose solution, infuse at a rate of 0.5-1 gm/kg over 30 min followed by 0.1 unit/kg SC or IV.

**Brands:** 40 unit/ml (neutral) Inj; Actrapid. 40 and 100 unit/ml (isophane) Inj; Human Insulatard. 30% soluble + 70% isophane insulin 40 unit/ml Inj; Huminsulin 30:70, Humstard 30:70. 50% soluble + 50% isophane insulin 40 and 100 unit/ml Inj; Huminsulin 50:50.

- May cause hypoglycemia leading to palpitation, pallor, fatigue, confusion, nausea, numbness of mouth, tremor and hypokalemia. Do not change brand once the blood glucose level is regulated.
- Flush the tubing with 25 ml of insulin solution before beginning the infusion to reduce insulin loss due to adsorption.

## 15. Ketamine

**Use:** Anesthesia for short procedure.

**Dosage:** Give half an hour before procedure. IM; 3-7 mg/kg. IV; 0.5 -2 mg/kg. Continuous infusion; 5-20 mcg/kg/min.

**Brands:** 10 and 50 mg/ml Inj; ketalar, ketam, ketmin.

- Contraindicated in raised ICT, HT, CHF, psychotic disorders. Used in combination with anticholinergic agents to decrease salivation.

## 16. Loperamide

**Use:** Short-term use for symptomatic relief in noninfective acute and chronic diarrhea.

**Dosage:** PO; 2-5 yr: 1 mg TDS. 6-8 yr: 2 mg BD. 8-12 yr: 2 mg TDS.

**Brands:** 2 mg Tab; Andial, Imodium, Ridol. 1 mg/5 ml Sy; Andial.

- May cause toxic megacolon and paralytic ileus.

## 17. Mupirocin

**Use:** Impetigo, folliculitis, furunculosis, minor wounds, burns caused by *S. aureus* and *S. pyogenes*. Used intranasal to eradicate *S. aureus* carriers.

**Dosage:** Apply cream or ointment 2-3 times/day for 5-14 days.

**Brands:** 2% Cream; Bactroban, Mupinova, 2% Oint; Bactroban, Mupirax, T-Bact.

## 18. Pancreatin

**Use:** Pancreatic insufficiency.

**Dosage:** Depends upon patient need. Varies from 5000 to 10,000 units. Swallow tablet whole. Take with a meal or snack.

**Brands:** Pancreatin 175 mg + Simethicone 50 mg + Charcoal 50 mg; Tab; Medizyme. Pancreatin 192 mg + Bile constituents 25 mg + Dimethicon 40 mg; Tab; B-zyme.

- Inadequate dosing may lead to steatorrhea and overdoses to impaction.

**19. Piracetam**

**Use:** Adjunct therapy in cerebral vascular accidents and cerebral insufficiencies; mental retardation; enhance memory and learning.

**Dosage:** PO: 50 mg/kg/day in 3 divided doses (Max: 400 mg/dose).

**Brands:** 500 mg/5 ml Syrup; 400 and 800 mg Tab; Ceretam, Nootropil, Sumocetam.

- May cause epigastric distress, CNS stimulation, excitement, sleep disturbance.

**20. Prostaglandin E<sub>1</sub>**

**Use:** To maintain patency of ductus in ductus dependent congenital heart diseases.

**Dosage:** 0.05-0.1 mcg/kg/min by continuous infusion. Maintenance dose is 0.01 mcg/kg/min.

**Brands:** 500 mcg/ml Inj; Alpostin, Prostin VR.

**21. Racecadotril**

**Use:** Symptomatic relief in diarrhea.

**Dosage:** PO: 1.5 mg/kg 3 times/day.

**Brands:** 100 mg Cap; 10 and 30 mg sachet; Racedot, Raceloc, Zedott.

**22. Saccharomyces Boulardi**

**Use:** Acute infectious/antibiotic induced diarrhea, irritable bowel syndrome, diarrhea in tube fed infants.

**Dosage:** PO: 250-500 mg/day for 5-7 days in single or two divided doses.

**Brands:** Each lyophilized sachet contain 282.5 mg of *S.boulardi* equivalent to 250 mg of yeast; Solib, Stibs.

- Generally safe in normal, previously healthy infants and children but should be avoided in very ill and immunocompromised individuals.

### 23. Selenium Sulfide

**Use:** Seborrheic dermatitis, tinea versicolor, dandruff.

**Dosage:** Topical in > 2 yr:

- Dandruff, Seborrhea: Apply twice weekly for 2 wk then once weekly for 4 wk. Apply and leave for 5-10 min and then rinse.
- Tinea versicolor: Apply and leave for 30 min and then rinse.

**Brands:** 2.5% liquid; Selsun, Seldan.

- Avoid contact with eyes and inflamed skin.

### 24. Sildenafil

**Use:** Pulmonary hypertension (limited data available).

**Dosage:** PO

Neonate : 0.3-1 mg/kg/dose q 8-12 hr.

Infant and children: 0.25-0.5 mg/kg/dose q 8 hr.

**Brands:** 25, 50 mg Tab; Alsigra, Progra, Silagra.

- Use with caution in sepsis, hepatic and renal problems.

### 25. Simethicone (Activated Dimethicone)

**Use:** Relieves flatulence, functional gastric bloating, post-operative gas pain.

**Dosage:** PO; < 2 yr: 20 mg/dose q 4-6 hr; 2-12 yr 40 mg/dose q 6 hr. > 12 yr: 40-120 mg q 6 hr.

**Brands:** 40 mg/ml Drops; Dimol, Siflat. 40 mg Tab; Dimol. Simethicone 80 mg + Charcoal 400 mg Tab; Gasnil.

## 26. Sucrose Solution

**Use:** As analgesic in preterm and term infants.

**Dosage:** PO

Preterm: <28 wk; 0.2 ml. 28-32 wk; 0.2-2 ml. >32 wk; 2 ml.

Term: 1.5-2 ml.

- Give the required dose over 1-2 min; dose may be repeated once if required. Analgesic effect may last for up to 8 min; wait for 2 min before starting procedure.

## 27. Surfactant (Bovine)

**Use:** Prophylaxis and treatment of RDS in premature neonates.

**Dosage:**

- Prophylactic therapy: 4ml/kg/dose intratracheally as soon as possible; up to 4 doses can be given at 6 hr interval during the first 48 hr of life.
- Rescue therapy: 4ml/kg/dose intratracheally, immediately following the diagnosis of RDS. May repeat 4 dose as needed at 6 hr interval.

**Brands:** Suspension for inhalation,; 25 mg/ml; Surfacta.

**Method of administration:** Suction infant prior to administration. Give via a 5 f feeding tube. Each dose is divided into four 1 ml/kg aliquots; administer 1 ml/kg in each of four different positions over 2-3 sec.

- May cause bradycardia, pallor, hypotension, apnea, pulmonary air leak, etc.



## 28. Tacrolimus

**Use:** As immunosuppressant in organ transplant, topically for severe atopic dermatitis.

**Dosage:** Children: PO; 0.2 mg/kg q 12 hr Topical; Apply 0.02% oint locally twice.

**Brands:** 1 and 5 mg Tab; Crolium. 0.5, 1 and 5 mg Cap; Tacromus. 0.02% Oint; Tacroderm, Tacrovate.

## 29. Tinocardia

Promote leukocytosis with prominent effect on neutrophils and also enhances phagocytic capacity.

**Use:** Adjuvant in chronic illness (recurrent tonsilitis, chronic otitis media, tuberculosis, bronchial asthma, etc.)

**Dosage:** PO: 100 mg thrice daily in children > 3 yr.

**Brands:** 100 and 500 mg Tab; 200 mg/5 ml Syp; Immumod.

## 30. Ursodeoxycholic Acid

**Use:** Prevention and dissolution of small cholesterol gallstones, cholestatic conditions like primary biliary cirrhosis.

**Dosage:** PO; 10-15 mg/kg/day in 1-2 divided doses.

**Brands:** 150 and 300 mg Tab; Udihep, Udiliv, Urso. 75 mg Tab; Actibile.

- C/I: Calcified cholesterol stones, gallstones > 15 mm, hepatic impairment, biliary obstruction.



# Appendices

## Appendix–1: Tables

Table 1: Equipment for resuscitation in various age group

Equipment	Premature	NB	6 mth	1-2 yr	5 yr	8-10 yr
Chest tubes	10-14 F	12-18 F	14-20 F	14-24 F	20-32 F	28-38 F
N-G tubes	5 feeding	5-8 feeding	8 F	10F	10-12 F	14-18 F
Foley's	5 feeding	5-8 feeding	8 F	10 F	10-12F	12F
O <sub>2</sub> masks	NB	NB	Pediatric	Pediatric	Pediatric	Adult
ET tubes	2.5 to 3.0	3 to 3.5	3.5 to 4.5	4.0 to 4.5	5.0 to 5.5	5.5 to 6.5
Arm boards	6 inch	6 inch	6-8 inch	8 inch	8-15 inch	15 inch
BP cuffs	NB	NB	Infant or child	Child	Child	Child or adult
Laryngo-scope blade	0	1	child	1	2	Adult

Table 2: Fasting guidelines for sedation or anesthesia

Food	Hours of fasting required
Clear liquids	2
Breast milk	2-4
Formula or light meal (No fat)	6
Full meal	8

**Table 3:** Sedation techniques suggested for children

<i>Procedure</i>	<i>Sedation and analgesia technique</i>
Lumbar puncture	* Local anesthesia with minimal/moderate sedation. Local anesthetics: Lidocaine/EMLA Cream. Minimal/Moderate Sedation: Midazolam or sometimes
Painful procedures: Biopsy of liver/kidney, bone marrow aspiration. Fracture reduction. Drainage of abscess. Burn debridement. Laceration repair	* Deep sedation: Fentanyl/Midazolam or Ketamine Deep sedation combined with local anesthesia: As above
IV catheter placement	Local anesthesia with minimal/moderate/deep sedation: As above Local anesthesia and sometimes minimal/moderate sedation: As above

Table 4: Drip calculations

Drug	Dose	Calculation	Rate and dose
Dobutamine	5-20 mcg/kg/min	6 x body wt (kg) is the mg added to make 100 mL	1 mL/hr = 1 mcg/kg/min
Dopamine	2-20 mcg/kg/min	6 x body wt (kg) is the mg added to make 100 mL	1 mL/hr = 1 mcg/kg/min
Epinephrine	0.1-1 mcg/kg/min	0.6 x body wt (kg) is the mg added to make 100 mL	1 mL/hr = 0.1 mcg/kg/min
Isoproterenol	0.1-1 mcg/kg/min	0.6 x body wt (kg) is the mg added to make 100 mL	1 mL/hr = 0.1 mcg/kg/min
Lidocaine	20-50 mcg/kg/min	120 mg in 100 mL of D-5%	1 mL/kg/hr = 20 mcg/kg/min

- Patients ≤ 40 kg and those requiring fluid restriction may need more concentrated solutions in order to deliver less fluid per hour. In those cases or as an alternative to the listed calculations above, use the following equation:

Rate (mL/hr) = 
$$\frac{\text{Dose (mcg/kg/min} \times \text{weight (kg)} \times 60 \text{ min/h)}}{\text{Concentration (mcg/mL)}}$$

Table 5: Treatment for drug extravasation

<i>Medication extravasated</i>	<i>Cold/Warm pack</i>	<i>Treatment</i>
<b>Ischemic inducer:</b>		
Dobutamine	None	Phentolamine: Mix 5 mg with 9 mL of NS. Inject a small amount of this solution into extravasated area. Blanching should reverse immediately. Monitor site, if blanching recur, additional injections of phentolamine may be needed.
Dopamine		
Epinephrine		
Norepinephrine		
Phenylephrine		
Vasopressin		
<b>Miscellaneous agents:</b>		
Aminophylline	Cold	Hyaluronidase: Add 1 mL NS to 150 units to make 15 units/mL. Administer 0.2 mL SC or intradermally into the extravasated site.
Calcium salts		
Dextrose		
Mannitol		
Phenytol		
Contrast media		
Sodium bicarbonate		
Sodium chloride		
Tetracycline		

**Table 6:** Estimation of total body surface area of burn involvement (% by site and age)

<i>Site</i>	<i>0-1 yr</i>	<i>1-4 yr</i>	<i>5-9 yr</i>	<i>10-14 yr</i>	<i>15 yr</i>	<i>Adult</i>
Head	9.5	8.5	6.5	5.5	4.5	3.5
Neck	0.5	0.5	0.5	0.5	0.5	0.5
Trunk	13	13	13	13	13	13
Upper arm	2	2	2	2	2	2
Forearm	1.5	1.5	1.5	1.5	1.5	1.5
Hand	1.5	1.5	1.5	1.5	1.5	1.5
Perineum	1	1	1	1	1	1
Buttock	2.5	2.5	2.5	2.5	2.5	2.5
Thigh	2.75	3.25	4	4.25	4.5	4.75
Leg	2.5	2.5	2.75	3.00	3.25	3.5
Foot	1.75	1.75	1.75	1.75	1.75	1.75

1. The total body surface area of burn involvement is determined by the sum of the percentages of each site.
2. Applicable to second and third degree burns.
3. Percentage for each site is only for a single extremity with anterior or posterior involvement. Percentage should be doubled if both anterior and posterior involvement of a single extremity.

### Parkland Fluid Replacement Formula

A guideline for replacement of deficits and ongoing losses (Note: For infants, maintenance fluids may need to be added to this): Administer 4 ml/kg/% burn of Ringer's lactate (glucose may be added but beware of stress hyperglycemia) over the first 24 hours; half of this total is given over the first 8 hours calculated from the time of injury; the remaining half is given over the next 16 hours. The second 24 hours fluid requirements average 50 to 75% of first day's requirements. Concentrations and rates best determined by monitoring weight, serum electrolytes, urine output, NG losses, etc.

Colloid may be added after 18-24 hours (1g/kg/day of albumin) to maintain serum albumin > 2 g/100 ml.

Potassium is generally withheld for the first 48 hours due to the large amount of potassium that is released from damaged tissues. To manage serum electrolytes, monitor urine electrolytes twice weekly and replace calculated urine losses.

**Table 7:** Average weight and surface area

<i>Age</i>	<i>Average weight (kg)<sup>1</sup></i>	<i>Approximate surface area (m<sup>2</sup>)</i>
Weeks gestation		
26	0.9-1	0.1
30	1.3-1.5	0.12
32	1.6-2	0.15
38	2.9-3	0.2
40 (term infant at birth)	3.1-4	0.25
Months		
3	5	0.29
6	7	0.38
9	8	0.42
Years		
1	10	0.49
2	12	0.55
3	15	0.64
4	17	0.74
5	18	0.76
6	20	0.82
7	23	0.90
8	25	0.95
9	28	1.06
10	33	1.18
11	35	1.23
12	40	1.34
Adult	70	1.73

<sup>1</sup>Weights from age 3 months and over are rounded off to the nearest kilogram.



**Table 8:** Calculation of surface area from weight

<i>Weight range</i>	<i>Surface area</i>
1-5 kg	$(0.05 \times \text{weight}) + 0.05$
6-10 kg	$(0.04 \times \text{weight}) + 0.10$
11-20 kg	$(0.04 \times \text{weight}) + 0.20$
21-40 kg	$(0.02 \times \text{weight}) + 0.40$

In infants and children risk of fluid overload is always a consideration when giving IV medications. Following table provides maximum concentrations and the maximum rate at which the medications can be given.

**Table 9:** Quick reference chart for IV medication

<i>Drug</i>	<i>Maximum concentration</i>	<i>Maximum rate</i>
Acyclovir	10 mg/ml	Give over 1hr
Adenosine	3 mg/ml	Give over 1-2 sec
Amikacin	10 mg/ml	Give over 30 min
Aminophylline	25 mg/ml	25 mg/min
Amphotericin-B	0.1 mg/ml	Give over 2-6 hr
Ampicillin	100 mg/ml	10 mg/kg/min
Atropine	1 mg/ml	Give over 1 min
Cal gluconate	100 mg/ml	100 mg/min
Cefazolin	20 mg/ml	Give over 10-60 min
Cefepime	160 mg/ml	Give over 30 min
Cefotaxime	60 mg/ml	Give over 10-30 min
Ceftazidime	40 mg/ml	Give over 10-30 min

---

Ceftriaxone	40 mg/ml	Give over 10-30 min
Cefuroxime	30 mg/ml	Give over 15-60 min
Dexamethasone	10 mg/ml	Doses <10 mg give over 1-4 min Doses >10 mg give over 10-20 min
Diazepam	5 mg/ml	2 mg/min
Digoxin	100 mcg/ml	Give over 5 min
Fosphenytoin	25 mg/ml	3 mg/kg/min
Gentamicin	40 mg/ml	Give over 30 min
Hydrocortisone	5 mg/ml	Give over 20-30 min
Ketamine	2 mg/ml	0.5 mg/kg/min
Lorazepam	4 mg/ml	0.05 mg/kg over 2-5 min
Meropenem	50 mg/ml	Give over 15-30 min
Methylprednisolone	2.5 mg/ml	Give over 20-60 min
Metoclopramide	5 mg/ml	Give over 1-2 min
Metronidazole	8 mg/ml	Give over 1 hr
Midazolam	5 mg/ml	Give over 20-30 sec (5 min in neonates)
Ondansetron	2 mg/ml	Give over 2-15 min
Phenobarbital	130 mg/ml	2 mg/kg/min
Phenytoin	50 mg/ml	3 mg/kg/min
Piperacillin	20 mg/ml	Give over 20-30 min
Ranitidine	2.5 mg/ml	10 mg/min
Vancomycin	5 mg/ml	Give over 60 min

---

## **Appendix-2: Administering Medicines to Children**

Medication administration to a pediatric population is a very difficult job. One child may take the particular product and form of medicine easily but the another child may not accept the same.

Nurses and residents should learn following points for administering medicines to children.

- In children oral route is preferred over parenteral. If not accepting one type of oral form try another form.
- Special equipments are available for administering oral medicines, e.g. measuring cups and spoons, oral syringes, oral droppers, cylindrical dosing spoons. Parents should be taught to use calibrated devices provided with product rather than using household utensils.
- In young children, it is better to give part of the dose at a time into the side of the cheek away from the bitter taste buds at the back of the tongue.
- Prefer liquid preparation in children < 5 yr of age and in > 5 yr of age give dispersible or chewable form of medicines.
- Maximum volume allowed in parenteral administration is; subcutaneous = 0.5, intradermal = 0.01-1 ml, intramuscular 0.5-1 ml, intravenous = use smallest recommended diluent for dilution.
- For IM prefer shorter ( $\frac{1}{2}$ -1 inch) and smaller (23-30 G) needles.
- Give IV via pediatric drip set with microdrip chamber.

- For ID route use 1 ml syringes calibrated in 0.01 ml units 26-27 G needles.
- For SC route use 1 ml syringes calibrated in 40 or 80 units and 25 G needles.
- Always compare the ordered dose with the recommended formulary dose based on a child's weight or BSA. Ordered dose is considered safe if it is less than or equal to the recommended formulary dose.

# Index

## A

- Abacavir 120
- Acetaminophen 4
  - toxicity 61
- Aceten 98
- Acetylcysteine 4, 61
- Acetylsalicylic acid 1
- ACTH 71
- Active parenchymal neurocysticercosis 89
- Acute
  - and chronic
    - asthma 13
    - gouty arthritis 87
  - attack 109, 110
  - bronchospasm 11
  - epididymidis 30
  - flushing and erythema 61
  - intestinal and extraintestinal
    - amoebiasis 115
  - iron
    - intoxication 142
    - poisoning 142
  - manic episodes 59
  - otitis media 30
  - spinal cord injury 149
  - symptomatic hyponatremia 160
- Acyclovir 134, 215
- Adenoject 17
- Adenosine 17, 215
- Adinocor 17
- Adrenal insufficiency 148
- Adrenocortical insufficiency 147
- Adrenocorticotropin 173
- Aerocort 12, 14
- Albendazole 89, 90
- Albumin 175
- Alcipro 46
- Aldinir 32
- Alfacalcidol 170
- Allantoin 9
- Allergic
  - conjunctivitis 3
  - rhinitis 12, 15, 94
    - and conjunctivitis 94
    - and various allergic symptoms 95
- Allergy 94
- Allopurinol 87
- Alprazolam 197
- Althrocin 38
- Amantadine 134
- Ambroxol 27, 36, 38
  - hydrochloride 15
- Amicin 22

- Amikacin 21, 127, 215  
Amikef 22  
Amiloride 151  
Aminocaproic acid 155  
Aminoglycosides 21  
Aminophylline 11, 215  
Amiodarone 17  
Amitex 22  
Amitriptyline 58, 59  
Amoebiasis 115, 116  
Amoxicillin 39  
Amphotericin-B 82, 114, 215  
Ampicillin 40, 41, 215  
Amprenavir 123  
Amrinone 140  
Anaerobic infection 114  
Anafam 2, 3  
Analgesic and migraine  
    prophylaxis 58  
Anemia of prematurity 144  
Anesthesia 6  
Anorexia 6  
Anthelmintics 89  
Antiarrhythmics 17  
Antiasthmatics 11  
Antibiotics 21  
Anticholinergic stress 65  
Antidiphtheric serum 130  
Antiemetic 70  
Antiepileptics 71  
Antifungals 83  
Antigout agents 87  
Antihemophilic factor 155  
Antihistamines 95  
Antihypertensives 99  
Antileptotics 106  
Antimalarials 107  
Antimyasthenics 113  
Antiprotozoals 115  
Anti-snake venom 130  
Apnea of prematurity 11  
Aristocillin 40  
Arkamin 99  
Arrhythmias 9  
Arteether 107  
Artemether 107  
Artesunate 108  
Artisid 3  
Ascariasis 89, 91  
Ascorbic acid 194  
Asmaterb 15  
Astagen 4  
Astemizole 94  
Asthalin 14  
Asthma 6, 13, 147  
Atenolol 98  
Atorvastatin 197  
Atropine 61, 215  
    sulphate 18  
    toxicity 65  
Atypical mycobacteria 21  
Augmentin 39  
Auranofin 1  
Azatadine 94  
Azathioprine 197  
Azenam 50  
Azithral 36  
Azithromycin 36  
Aztreo 50  
Aztreonam 50

**B**

Baclofen 178  
 Bacterial  
   endocarditis prophylaxis 28  
   meningitis 147, 148  
 Bacteroides 50  
 BCG 185  
 Beclate inhaler 12  
 Beclomethasone 11, 12, 14, 22, 23  
 Becoride inhaler 12  
 Benzalkonium 25, 46  
 Benzocaine 9  
 Benzodiazepine toxicity 64  
 Benztropine 61  
 Benzyl benzoate 177  
 Beparine 56  
 Betamethasone 23, 146  
 Bevent 12  
 Bioff 48  
 Biotin 191  
 Bisacodyl 166  
 Blastomycosis 85  
 Bleeding disorder 1  
 Bludrox 27  
 Blurred vision 13, 19, 61  
 Bone marrow suppression 20  
 Bovine 206  
 Bradycardia 19  
 Bricaline 15  
 Bricanyl 15  
 Brodicillin 40  
 Brogaracin 22  
 Bromhexine 38  
 Bronchial asthma 1  
 Bronchodilator 11, 158  
   in asthma 15

Bronchospasm 65, 180  
   in children 18  
 Broncodril 16  
 Brontaline 15  
 Brufen 2  
 Budate 12  
 Budecort 12  
 Budesonide 12, 13  
 Bumetanide 152  
 Bupep 58  
 Bupropion 58

**C**

Caffeine citrate 198  
 Calcium  
   deficiency states 157  
   folinate 66  
   gluconate 66, 157  
   phosphate 157, 170  
 Candidiasis 85  
 Capace 98  
 Capillariasis 91  
 Captopril 98  
 Carbamazepine 71  
 Carbapenem 26  
 Carbenicillin 41  
 Carbimazole 183  
 Carbon monoxide poisoning 64  
 Cardarone 18  
 Cardiac  
   arrest 180  
   and hyperkalemia 157  
   shocks and failures 140  
 Cardiogenic shock 19  
 Carnitine 171  
 Catapres 99

- Cebran 46  
Cedofovir 135  
Cefaclor 28  
Cefadrox 27  
Cefadroxil 27  
Cefadur 27  
Cefaxone 30  
Cefazolin 27, 215  
Cefdinir 31  
Cefepime 32, 215  
Cefixime 32  
Cefizox 33  
Cefoperazone 30, 31  
Cefotaxime 29, 215  
Cefpirome 34  
Cefpodoxime 32  
Cefprozil 33  
Ceftazidime 31, 215  
Ceftizoxime 33  
Ceftriaxone 29, 216  
Cefuroxime 216  
Cephalexin 34  
Cephalosporins 27  
Cepime 32  
Cerebral  
    edema 147, 148  
    malaria 107  
Cetrizine 94  
Cezolin 28  
Chancroid 30  
Charcoal 62, 198  
Chemoprophylaxis 109  
Chickenpox 1  
    vaccine 189  
Chlamydial trachomatis 37  
Chloramphenicol 50, 51, 83  
Chlordiazepoxide 117  
Chlorhexidine 199  
Chloroquine 108, 114  
    resistant falciparum malaria 111  
Chlorpheniramine 6  
    maleate 95  
Chlorpromazine 62, 117  
Chlorthalidone 152  
Chlorzoxazone 178  
Cholera 38  
Cholestyramine resin 199  
Chronic  
    asthma 12  
    hepatitis-  
        B 136  
        C 137  
    idiopathic urticaria 95, 97  
    overload 142  
    renal failure 144  
Cifran 46  
Cimetidine 161  
Ciplox 46  
Ciprofloxacin 46  
Clarithromycin 19, 36, 127  
Clavam 39  
Clavulanate 45  
Clavulanic acid 39  
Clemastine fumarate 95  
Clexane 56  
Clindamycin 35, 111  
Clobazam 72  
Clofazimine 106  
Clonazepam 72  
Clonidine 99  
    tolerance test 99  
Clotrimazole 22, 83



- 
- Cloxacillin 39-41  
 CMV retinitis 135  
 CNS  
     irritability 11  
     stimulation 14  
 Codeine 6  
     linctus 6  
     phosphate 6  
     sulphate 6  
 Codiphyllate 16  
 Codokuff 6  
 Colchicine 87  
 Colistin sulfate 51  
 Colony stimulating factors 144  
 Colostrum 199  
 Combiflam 2, 3  
 Congenital adrenal hyperplasia 148  
 Constipation 6, 19  
 Continuous infusion 6, 7, 180  
 Copper and lead poisoning 143  
 Cordiophyllin 16  
 Cortisone 147  
 Cough 6  
 Crotamiton 177  
 Cryptococcal meningitis 83  
 Crystalline penicillin 41  
 Cutaneous  
     herpes simplex 134  
     larva migrans 89  
 Cyanide  
     and hydrogen sulphide 62  
     kit 62  
 Cyanocobalamin 191  
 Cycloserine 125  
 Cyproheptadine hydrochloride 95  
 Cystic fibrosis 2  
 Cysticercosis 92
- D**
- 
- Dantrolene 178  
 Dapsone 106  
 Daventyl 60  
 Deferiprone 62, 142  
 Definite rheumatoid 1  
 Delusions 118  
 Dental caries 168  
 Depression 58-60  
 Depressive neurosis 118  
 Derihaler 14  
 Deriphyllin 16  
 Dermatitis 106  
 Desferrioxamine 62, 142  
 Desloratadine 95  
 Desmopressin 173  
 Dexamethasone 23, 25, 46, 147, 216  
     ear drops 48  
 Dextromethorphan 200  
 Dextrose 159  
 Dhatura poisoning 65  
 Diabetes insipidus 141, 173  
 Diagnosis of myasthenia gravis 112  
 Diazepam 73, 216  
 Diazoxide 99, 190  
 Diclofenac sodium 2  
 Dicyclomine 4, 128  
 Didanosine 120  
 Diethyl carbamazine 90  
 Digoxin 140, 216  
 Diltiazem 100  
 Dimenhydrinate 67  
 Dimercaprol 62, 143

Dimercaptosuccinic acid 63  
Diphenhydramine 63, 96  
Diphtheria 38  
    antitoxin 130  
Disopyramide 19  
Diuretic therapy 158  
Dizziness 6, 19  
Dobutamine 180  
Docusate 166  
Doflazacort 147  
Doloket 3  
Domperidone 67  
Domperon 67  
Domstal 67  
Dopamine 181  
Doxapram 200  
Doxepin 58  
Doxobid 12  
Doxophylline 12  
Doxoril 12  
Doxovent 12  
Doxycycline 49, 111  
D-penicillamine 63, 143  
DPT 185  
Drotaverine 128  
Drowsiness 13  
Droxyl 27  
Drugs used for controlling  
    bleeding 155  
Dry  
    mouth 61  
    throat 15  
Duragesic 7  
Dyspepsia 12  
Dystonic reactions and allergic  
    reactions 96

---

**E**

---

*E. coli* 21, 22  
Ecosprin 1  
Edetate calcium disodium 63  
Edrophonium 66, 112  
Efavirenz 122  
Eldcef 33  
Electrolyte supplements and fluid  
    replacements 157  
Elevated liver enzymes 14  
Emergency  
    lowering of blood pressure 99  
    treatment in poisoning 198  
Emflam 2  
Emlucast 14  
Enalapril 100  
Endocarditis prophylaxis 39, 40  
Enoxaparin 56  
Enteric fever 39  
Enterobacter 21  
Enterobiasis 91  
Enterobius 89  
Enteromycetin 50  
Enuresis 59, 174  
Ephedrine 181  
Erosive gastritis 1  
Erythrocine 38  
Erythromycin 19, 37  
Erythropoietin 144  
Esophageal candidiasis 83, 86  
Ethacrynic acid 152  
Ethambutol 125  
Ethamsylate 155  
Ethanol 63  
Ethionamide 125

Ethosuximide 73  
 Ethylene glycol ingestion 63, 64  
 Etophylline 16  
 Expergesic 8  
 Extraintestinal amoebiasis 109  
 Extravasation 103

## F

Falciparum malaria 109  
 Famciclovir 135  
 Famotidine 161  
 Fat emulsion 171  
 Fatigue 14  
 Febrilix 2  
 Febrinil 4  
 Feeding intolerance 37  
     in neonates 11  
 Fendrop 7  
 Fenilate 7  
 Fentanyl 6  
 Fevastin 4  
 Fever 4  
 Fexofenadine 96  
 Filaria 91  
 Fluconazole 83  
 Fludrocortisone 148  
 Flumazenil 64  
 Flunat 59  
 Flunil 59  
 Fluoride 168  
 Fluoxetine 59  
 Flushing 14  
 Fluticasone 12  
 Folic acid 192  
     deficiency 144  
 Foracort 13

Formoterol 13  
 Fortagesic 8  
 Fortwin 8  
 Foscarnet 135  
 Fosphenytoin 74, 216  
 Functional  
     disturbances of GI motility 128  
     gastric bloating 205  
 Furazolidone 51  
 Furosemide 153

## G

Gabapentin 74  
 Gamma benzene hexachloride 177  
 Gancyclovir 136  
 Garamycin 22  
 Gas gangrene  
     antitoxin 131  
     infection 131  
 Gastroesophageal reflux 11, 68  
 Gatifloxacin 46  
 Genital  
     herpes 134  
     tract infection 38  
 Gentamicin 23, 216  
     sulfate 22  
 Gentian violet 84  
 Genticyn 22  
 Gesicain 9  
 GI  
     hemorrhage 141  
     obstruction 7  
     tract 18  
 Giardiasis 89, 115, 116  
 Glucagon 64, 200  
 Glycopyrrolate 200

- Gonococcal infection 30  
Granisetron 68  
Granulocyte  
    colony stimulating factor 144  
    macrophage colony  
        stimulating factor 145  
Griseofulvin 84  
Growth hormone 174  
Guaifenesin 201  
Guillian-Barre syndrome 163
- 
- ## H
- 
- Haemophilus influenzae* 186  
Hallucination 118  
Haloperidol 117  
Hamycin 84  
Headache 14, 15  
Heart block 20  
Helminth infections 115  
Hemangiomas of infancy 136  
Hemorrhoids 9  
Heparin 56  
Hepatic  
    cholestasis 19  
    failure 1  
Hepatitis-  
    A 186  
    B 186  
Herpes labialis 139  
Herpetiformis 106  
Histoplasmosis 85  
Hookworm 89, 91, 93  
Hostacycline 49  
HSV encephalitis 134  
Human  
    anti-D immunoglobulin 162  
    hepatitis B immunoglobulin 163  
    normal immunoglobulin 163  
    rabies immunoglobulin 164  
    tetanus immunoglobulin 164  
Hydatid disease 89  
Hydralazine 100, 190  
Hydrochlorothiazide 153  
Hydrocortisone 22, 148, 216  
    acetate 9  
    ear drops. 23  
Hyoscine butylbromide 129  
Hyperbaric oxygen 64  
Hypercholesterolemia 199  
Hyperglycemia 14, 18  
Hyperinsulinemic hypoglycemia 99  
Hyperkalemia 157, 159  
Hypertension 98, 99, 102, 104, 154  
Hypocalcemia 157  
Hypoglycemia 159, 200  
Hypokalemia 15, 158  
Hypomagnesemia 158  
Hyponatremia 160  
Hypoproteinemia 175  
Hypotension 19  
Hypovolemia 175
- 
- ## I
- 
- Ibucin 2, 3  
Ibugesic 2  
Ibugin 2  
Ibuprofen 2  
Idiopathic apnea of prematurity 198  
Idoxuridine 136  
Imipenem 26  
Imipramine 59  
Indinavir 123  
Indocap 3  
Indomethacin 3

Infantile spasms 71, 173  
 Inflammation and rheumatoid  
     disorders 4, 5  
 Inflammatory  
     disease 4  
     disorders 3  
 Influenza virus vaccine 186  
 Inhaler 14  
 Insecticide poisoning 65  
 Insomnia 14  
 Insulin 201  
 Invasive aspergillosis 86  
 Ipramist 13  
 Ipratropium 13  
 Ipravent 13  
 Iron 168  
 Isoniazid 126  
 Itraconazole 84  
 Ivermectin 90, 91

## J

Juvenile chronic arthritis 147

## K

Kanamycin 23, 127  
     sulfate 23  
 Kawasaki disease 1, 163  
 Kaypen 43  
 Kefage 32  
 Ketamine 202, 216  
 Ketanav 3  
 Ketoconazole 85  
 Ketodrop 3  
 Ketorolac 3  
*Klebsiella* 21

## L

Labetalol 101  
 Lactulose 166  
 Lamivudine 121, 137  
 Lamotrigine 74  
 Lamoxyl 39  
 Lansoprazole 132  
 Laxatives/stool softeners 166  
 Lead poisoning 63, 143  
 Leishmaniasis 115, 116  
 Leprosy 106  
 Levamisole 91  
 Levetiracetam 75  
 Levofloxacin 47  
 Lidocaine 9, 19  
 Life-threatening  
     hyperkalemia 159  
     ventricular arrhythmias 17  
 Lignox 9  
 Lincomycin 35  
 Lincosamides 35  
 Lincotuss 6  
 Linezolid 52  
 Liothyronine 183  
 Liquid paraffin 167  
 Lithium 59  
 Lithosun 59  
 Live attenuated vaccine of bovine  
     strain 185  
 Loeffler's pneumonia 90  
 Longacillin 43  
 Long-term  
     control of asthma 11  
     prophylaxis 12  
 Loperamide 202  
 Lopinavir 123

Loratidine 97  
Lorazepam 75, 216  
Lumefantrine 107, 108  
Lupenox 56

## **M**

---

Macrolides 36  
Magnamycin 31  
Magnesium 169  
    sulfate 158  
Maintenance  
    therapy of asthma 12  
    treatment of asthma 14  
Malaise 19  
Malaria prophylaxis 109, 110  
Measles 187  
Mebendazole 91  
Meclizine 68  
Medium chain triglycerides 172  
Mefenamic acid 4  
Mefloquine 109  
Meftal 4  
    forte 4  
    spas 4  
Meningitis 30, 31, 40  
Meningococcal prophylaxis 127  
Menthol 6  
Meperidine 8  
Meronom 26  
Meropenem 26, 216  
Metabolic acidosis 159  
Methanol ingestion 64  
Methemoglobinemia 64  
Methocarbamol 179  
Methyl alcohol ingestion 63  
Methyldopa 101

Methylprednisolone 149, 216  
Metoclopramide 68, 216  
Metoprolol 101  
Metronidazole 32, 47, 48, 114, 216  
Mexiletine 19  
Mexitil 19  
Miconazole 85  
Microcid 3  
Midazolam 76, 216  
Migraine 2, 4  
    prophylaxis 58, 104  
Milrinone 141  
Minocycline 49  
Minor burns 9  
Minoxidil 102, 190  
MMR 187  
Mometasone 149  
Monocef 30  
Montair 14  
Montelukast 13  
Morphine sulphate 7  
Motion sickness 68, 70, 95  
Mucocutaneous and cutaneous  
    infection 84  
Multibacillary dapsone sensitive  
    leprosy 106  
Muscle spasm and pain 178  
Myalgia 14  
Myasthenia gravis 113  
Mycobacterial diseases 125  
*Mycobacterium tuberculosis* 21  
Myticef 31

## **N**

---

Nalidixic acid 47  
Naloxone 64

Nalyxan 4  
 Naproxen 4  
 Napryn 4  
 Nasal congestion 181, 182  
 Nausea 6  
 Nebulization 14, 15  
 Nelfinavir 123  
 Neomycin 23  
     sulphate 23  
 Neonatal herpes 134  
 Neosporin power 53  
 Neostigmine 66, 112  
 Nephrogenic diabetes insipidus 3  
 Nephrotic syndrome 147  
 Netilmicin 24  
     sulfate 24  
 Netromycin 24  
 Neurocysticercosis 89  
 Nevirapine 122  
 Niacin 192  
 Niclosamide 92  
 Nifedipine 102  
 Nightmares 18  
 Nitazoxanide 115  
 Nitrazepam 77  
 Nitrofurantoin 10, 52  
 Nitroglycerine 190  
 Nitroprusside 103, 190  
 Nocturnal enuresis 60  
 Non-nucleoside reverse  
     transcriptase inhibitors 122  
 Norepinephrine 182  
 Norfloxacin 47  
 Nortriptyline 60  
 Novamox 39  
 Novapime 32  
 Nuzac 59  
 Nystatin 85

## O

Obsessive compulsive disorder  
     59, 60  
 Obstructive disease of GI tract 18  
 Octreotide 65  
 Odyphyllin 16  
 Oflox 48  
 Ofloxacin 48  
 Omeprazole 132  
 Omnicef 29  
 Onchomycosis 86  
 Ondansetron 69, 216  
 Ophthalmic  
     ointment 25  
     solution 25  
 Opioid poisoning 64  
 Organophosphate poisoning 18  
 Organophosphorus poisoning 65  
 Orizolin 28  
 Ornidazole 46, 48, 115  
 Oseltamivir 137  
 Otitis media 47  
 Oxcarbazepine 77  
 Oxymetazoline 182

## P

*P. carinii* pneumonia 115  
 Pain 4, 6, 8  
     relief 7  
 Palpitation 12, 14  
 Pantoprazole 132  
 Para-aminosalicylic acid 126  
 Paracetamol 2, 4, 5  
 Paradoxical bradycardia 18  
 Paraldehyde 77  
 Paraxin 50

- Parkland fluid replacement  
    formula 213
- PDA closure in neonates 3
- Penicillin G  
    aqueous 41  
    benzathine 42  
    procaine 43  
    sodium 42
- Penicillin V potassium 43
- Penicillinase resistant 41
- Penidura 43
- Pentamidine 115
- Pentawin 8
- Pentazocine 7, 8
- Peptic ulcer 1
- Permethrin 177
- Pertussis 38
- Pethidine hydrochloride 8
- Pharyngitis 28, 33
- Phenazopyridine 10
- Pheniramine 97
- Phenothiazine induced dystonic  
    reactions 63
- Phenoxybenzamine 103
- Phensedyl 6
- Phentolamine 103
- Phenylephrine 182
- Phenytoin 19, 78, 216
- Pheochromocytoma 103
- Physostigmine 65
- Phytomenadione 66
- Pilocarpine 65
- Pinworms 91-93
- Piperacillin 44, 216  
    component 44
- Piperazine 92
- Pipralin 44
- Piprapen 44
- Piracetam 203
- Piroxicam 5
- Pituitary hormones 173
- Plasma volume expanders 175
- Pneumococcal vaccine 188
- Pneumonia 33, 47
- Pneumonitis 18
- Polymyxin-B  
    eye drops 23  
    sulfate 52
- Ponstan 4
- Postherpetic neuralgia 9
- Potassium 169  
    chloride 158  
    nitrate 168
- Pralidoxime 65
- Praziquantel 92
- Prazosin 104
- Preanesthetic medication 7
- Prednisolone 71, 150
- Premature  
    infants 171  
    neonates 171
- Primaquine 110
- Primary nocturnal enuresis 173
- Primaxin 26
- Primidone 79
- Pro-arrhythmia 18
- Probenecid 27, 28
- Procainamide 20
- Procaine penicillin 43
- Prochlorperazine 69
- Promethazine 70, 97
- Propantheline bromide 129
- Prophylaxis and treatment of  
    chronic asthma 16



- influenza-A virus infection 134  
 malaria 110  
*P. carinii* pneumonia 53  
 Prophylaxis of  
   pneumococcal infections in  
     children 43  
   pneumocystis 54  
   UTI 47  
 Propranolol 20, 104  
 Propylthiouracil 183  
 Protamine 66, 156  
 Protease inhibitors 123  
 Proton pump inhibitor 132  
 Pruritis 97  
 Pseudoephedrine 97, 182  
*Pseudomonas* 21  
 Psoriatic arthritis 1  
 Psychotic disorders 118  
 Pulmicort 12  
 Pulmonary edema 7  
 Pyrantel pamoate 93  
 Pyrazinamide 126  
 Pyridium 10  
 Pyridostigmine 113  
 Pyridoxine 66, 80, 192  
 Pyrimethamine 111
- Q**
- 
- Quinidine sulfate 20  
 Quinine 111  
 Quinolones 46, 127
- R**
- 
- Rabies 188  
 Racecadotril 204  
 Ranitidine 161, 216  
 Rectal fissures 9  
 Reflin 28  
 Refzil-O 33  
 Relief  
   from neuropathic pain 58  
   of pain in postherpetic neuralgia 9  
 Relieves  
   dyspnea 7  
   dyspnea of left ventricular  
     failure 7  
   flatulence 205  
 Resistant HSV 135  
 Respiratory  
   syncytial virus  
     immunoglobulin 164  
     tract 31  
 Respule 12  
 Reversal of nondepolarizing  
   neuromuscular blockade 113  
 Rheumatic fever 1, 43  
   prophylaxis 38  
 Rheumatoid  
   and inflammatory disorders 5  
   arthritis 3, 143  
   disorders 3, 4  
 Ribavirin 138  
 Riboflavin 193  
 Ridaura 2  
 Rifampicin 127  
 Rimantadine 138  
 Ringworm 86  
 Ritonavir 124  
 Robenecid 87  
 Romilast 14  
 Rotacaps 12  
 Rotavirus vaccine 188

Roundworms 92, 93

Roxithromycin 38

## S

---

Saccharomyces boulardi 204

Salbutamol 12, 14, 16

Salmeterol 14

Scabicial agents 177

Schistosomiasis 92

Schizophrenia 118

Seasonal allergic rhinitis 13, 96

Secnidazole 116

Secondary rheumatic fever  
prophylaxis 42

Sedation 6, 61, 70

Selenium sulfide 205

Septic shock 147

Serratia 21

Sertraline 60

Severe

asthma 7

falciparum malaria 107

infection 53

malaria 107, 108

systemic

infections 82

viral or bacterial infection 163

Sildenafil 205

Simethicone 205

Sinus bradycardia 18

Skeletal muscle relaxants 178

Sodium

bicarbonate 66, 159

chloride 160

cromoglycate 15

fluoride 168

stibogluconate 116

Somatropin 174

Sore throat pain 9

Sotagard 20

Sotalol 20

Spasmodic GI tract disorders 129

Spironolactone 154

Status asthmaticus 148, 149

Stavudine 121

Streptococcal pharyngitis 27

Streptomycin 24

Strongyloidosis 91

Subamycin 49

Sucralfate 133

Sucrose solution 206

Sulbactam 29-30, 40

Sulfamethoxazole 53

Sulfonylureas poisoning 65

Sulphadoxine 110

Supraventricular tachycardia 20

Surfactant 206

Susevin 8

Systemic candidiasis 83

## T

---

Tachyarrhythmias 11

Tachycardia 13-15, 18, 61, 65

Tachyra 18

Tacrolimus 206

Tamflox 47

Tapeworm 92

Taxim 29

Tazobactam 44

Teicoplanin 53

Terbinafine 86

Terbutaline 15

Terbutaline sulphate 15

Tetanus antitoxin 131

- Tetracyclines 49, 111  
 Tetralogy spells 104  
 Theophylline 15, 16  
 Theotablin 16  
 Thiamine 193  
 Thiopental 80  
 Thioridazine 118  
 Thrombocytopenia 20  
 Thromboembolic disorders 56  
 Thyroid and antithyroid agents 183  
 Thyrotoxicosis 18, 104  
 Thyroxine 184  
 Ticarcillin 44, 45  
 Tinea infection of skin, hair and  
     nails 84  
 Tinidazole 46-48, 116  
 Tinocardia 207  
 Tizime 31  
 Tobacin 25  
 Tobasafe 25  
 Tobramycin 24  
 Tocopherol 195  
 Tolazoline 190  
 Tolmetin 5  
 Tolnaftate 86  
 Tonsillitis 28, 33  
 Toothache 9  
 Topiramate 80  
 Tramadol 5  
 Tranexamic acid 156  
 Transfusional hemosiderosis 142  
 Treatment of  
     anxiety and panic disorder 197  
     carnitine deficiency 171  
     cerebral spasticity 178  
     CMV 135  
     herpes zoster 139  
     hypocalcemia 170  
     hypomagnesemia 158  
     low cardiac output states 140  
     microcytic hypochromic  
         anemia 168  
     myasthenia gravis 112, 113  
     otitis externa 52  
     *P. falciparum* malaria 107  
     paroxysmal supraventricular  
         tachycardia 17  
     pneumonia 52  
     rheumatic carditis 150  
     rocky mountain spotted fever 49  
     sepsis 29  
     ventricular arrhythmias 19  
 Triamcinolone 150  
 Triamterene 154  
 Trichinosis 89  
 Trichostrongyliasis 93  
 Trichuriasis 91  
 Triclofos 118  
 Trifluoperazine 118  
 Trifluridine 139  
 Trimethoprim 54  
 Trofentyl 7  
 Tropical eosinophilia 90  
 Tropine 18  
 Tryptomer 58  
 Tuberculosis 127  
 Typhoid 189
- U**
- 
- Uncomplicated  
     gonorrhea 33  
     malaria 107, 108

Urinary  
     and genital tract infection 47  
     retention 19  
 Urticaria 94, 97

## V

Vaccines 185  
 Vaginal fungal infection 85  
 Valacyclovir 139  
 Valproate sodium 81  
 Vancomycin 32, 54, 116, 216  
 Varicella zoster 134  
     immunoglobulin 165  
 Vasodilatory shock with  
     hypotension 141  
 Vasopressin 141, 174  
 Ventorlin 14  
 Ventricular  
     arrhythmias 9, 19, 20  
     tachycardia 20  
 Verapamil 105  
 Vernal keratoconjunctivitis 15  
 Vigabatrin 81  
 Visceral  
     larva migrans 89  
     leishmaniasis 115

Vitamin 191

A 194  
 B<sub>1</sub> 193  
 B<sub>12</sub> 191  
 B<sub>2</sub> 193  
 B<sub>3</sub> 192

B<sub>6</sub> 192  
 C 194  
 D 195  
 E 195  
 K 66, 195

Vomiting 6, 11  
 Voriconazole 86  
 Voveran 2  
 Vulvovaginal candidiasis 85  
 Warfarin poisoning 66  
 Whipworms 89, 91, 93  
 Wilson's disease 143  
 Wyflox 47

## X

Xerostomia 13  
 Xylocaine 9  
 Xylocard 9  
 Xylometazoline 182

## Z

Zanocin 48  
 Zemetril 33  
 Zenflox 48  
 Zidime 31  
 Zidovudine 121  
 Zinc 169  
     oxide 9  
 Zithrocin 36  
 Zupar 2, 3  
 Zuvair 16  
 Zyban 58