Commonly used Drugs with their Doses in Pediatric Gastroenterologist's Practice

Devarapalli Venkata Umesh Reddy[1], Anshu Srivastava[2]

www.ispghan.org

In a busy day to day OPD/practice of a pediatric gastroenterologist, keeping a list of the common drugs with their doses will be handy for easy reference. Below section describes the drugs with their doses for the commonly encountered diseases in our practice.

We would like to highlight that most of the conditions discussed below like inflammatory bowel disease, pediatric intestinal pseudo obstruction, solitary rectal ulcer syndrome, Clostridioides difficile colitis etc. needs specialized care and should be managed by specialists in the subject.

Disease/ Symptom	Medications	Dose
1. Constipation (Functional)	• Laxatives: Polyethylene glycol (PEG); 1st line (Recommended in children above 12 months of age)	• Disimpaction dose (PEG): 1.5–2 gm/kg/day in two divided doses for 5 days (home based) or 25 ml/kg of PEG by NG tube for hospital based Maintenance dose: 0.5–1 gm/kg/day (titrate based on stool consistency/symptoms)
	Lactulose	• Lactulose dose for maintenance: 1 mo–12 mo: 2.5 mL BD; 1–5 yrs: 2.5–10 mL BD; 5–18 yrs: 5–20 mL BD
2. Motility disorders	- Prokinetics in Gastroparesis, pediatric in testinal pseudo obstruction (Domperidone, Erythromycin, Octreotide, Pyridostigmine, Neostigmine)	• Domperidone dose: 0.1–0.3 mg/kg/dose TDS, 30 min before meal • Erythromycin: 3–5 mg/kg/dose TDS, 30 min before food • Octreotide: 0.5–1 mcg/kg sc OD
	For Actue pseudo-obstruction (Neostigmine)	• Pyridostigmine: Start with 0.1–0.3 mg/kg per dose 2–3 times daily and increase as tolerated (upper limit not clear, in myasthenia upto 5 to 7 mg/kg/day have been used) • Neostigmine for acute pseudo obstruction 0.01–0.05 mg/kg per dose i.v (max 1 mg/single dose)
3. Acute gastro-enteritis (AGE)	ORS	• ORS-mix one sachet (22 grams) in one liter of water. Only sachets having the label "WHO recommended Formula" should be used.
	Zinc	• Elemental zinc = 2 - 6 months 10 mg/day > 6 months 20 mg/day
	Role of other drugs in select situations: • Anti-secretory agents like Racecadotril - on a case to case basis when ongoing losses are severe due to high output/ purge rates	• Racecadotril = 1.5 mg/kg/dose TDS

[1]Assistant Professor, Department of Pediatric Gastroenterology, Postgraduate Institute of Child Health Hospital, Noida.
Email: umeshreddyd@gmail.com
[2]Professor, Department of Pediatric Gastroenterology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow.
Email: avanianshu@yahoo.com;

	• Antibiotics - in select situations like dysentery, culture proven or suspected shigella; campylobacter (dysenteric form); Vibrio cholerae; salmonella enteritis in high risk children like less than 3 months of age, underlying immunodeficiency, anatomical/ functional asplenia, corticosteroid or immunosuppressive therapy, IBD, achlorhydria; Enterotoxigenic E. Coli (ETEC); systemic antibiotics should be given in children unable to take oral medications, underlying immuno-deficiency who have AGE with fever, severe toxemia, suspected or confirmed bacteremia, infants <3 months of age with fever	• Cefixime dose = 8 to 10 mg/kg/day BD for 5 days • Azithromycin dose (1st line for cholera and ETEC) = 10 mg/kg/day OD for 3 days
4. Inflammatory Bowel disease (IBD)	5-Amino salicylic acid (5 ASA)	• Oral mesalamine: 60–80 mg/kg/day upto 4.8 g daily; • Oral Sulfasalazine: 40–70 mg/kg/day upto 4 g daily • Rectal mesalamine 25 mg/kg upto 1 g daily (OD; suppositories)
	• Azathioprine	• Azathioprine dose: 2–2.5 mg/kg/day
	• Prednisolone	• Prednisolone dose: Start at 1 mg/kg/day (max 40 mg; in acute severe colitis max upto 60 mg), followed by slow taper
	• Infliximab • Adalimumab	• Infliximab dose: 5–10 mg/kg/dose i.v
	• Supplements	• Adalimumab dose: 2.4 mg/kg 1.2 mg/kg 0.6 mg/kg/doses. c
5. Solitary rectal ulcer syndrome	• Fiber	• Cremadiet- 1–2 tsp in glass of water
	• Steroid enema	• Hydrocortisone acetate 10% enema {BD for 1 month, then OD for 1 month then alternate day (2 to 3 months of Rx)}
6. Cyclical vomiting syndrome	• Ondensetron • Lorazepam during acute attack dextrose fluids-D100.45 normal saline with KCl as appropriate at 1.5 times	• Ondensetron dose = 0.3–0.4 mg/kg/dose i.v every 4 to 6 h (upto 20 mg) • Lorazepam dose = 0.05–0.1 mg/kg/dose i.v every 6 h
	Prophylactically • Cyproheptadine • Amitryptiline	Prophylaxis: • Cyproheptadine (<5 yr) = 0.25–0.5 mg/kg/day BD or TDS • Amitriptyline (>5 yr) = begin at 0.25–0.5 mg/kg HS daily, increase weekly by 5–10 mg, until 1.0–1.5 mg/kg
7. Vascular malformations	• Propranolol • Hematinics (in same doses as mentioned earlier)	Propranolol dose = Start at 0.5–1 mg/kg/day, gradually increase to 2 mg/kg/day
8. GERD	• Proton pump Inhibitors (PPI)	• Omeprazole = 1–4 mg/kg/day (max 40 mg) • Esomeprazole dose = <20 kg 10 mg/day; >20 kg 20 mg/day (max 40 mg) • Lansoprazole-2 mg/kg/day for infants (max dose 30 mg)
9. Helicobacter pylori infection	Dosing based on weight: • PPI (Omeprazole/Esomeprazole as twice daily) and	15–24, 20 mg BD | 25–34 kg, 30 mg BD | >35 kg 40 mg BD
	• Amoxicillin (standard dose regimen) and	500 mg BD | 750 mg BD | 1 gm BD
	• Clarithromycin or	250 mg BD | 500 mg and 250 mg BD | 500 mg BD
	• Metronidazole	250 mg BD | 500 mg and 250 mg BD | 500 mg BD
10. Clestridium difficile (Pseudo-membranous colitis)	• Metronidazole • Vancomycin	• Metronidazole = 30 mg/kg/day QID max 2 gm/day oral (i.v TDS) • Vancomycin = 40 mg/kg/day TDS/QID (max 500 mg/day; for severe disease max 2 gm/day)
11. Worm infestations	• Albendazole	• Dose = 400 mg in >2 yrs, 200 mg in <2 yrs stat; repeat after 2 weeks. • For Hydatid Cyst–Dose = 15 mg/kg/day (max 800 mg/day) as BD and for a duration that's not fixed (1–6 months, monitor response)

12. Pancreatitis- [Acute, chronic, complications]	• Paracetamol • Tramadol	• Paracetamol dose = 10–15 mg/kg/dose • Tramadol dose (>12 years): = 50 mg/dose
	• Antioxidants (Note: Insufficient data for clear recommendation in children, indicated in those with acute recurrent and chronic pancreatitis, on the basis of limited studies showing reduced number of painful days)	Antioxidants dose (for Betamore G) = Betamore G <10 yr 1 cap TDS, 10 to 15 yrs 2 cap BD, >15 yrs 2 cap TDS
	• Pancreatic enzyme replacement therapy (PERT) – indicated in children with exocrine pancreatic insufficiency	PERT dosing = Infants: 1000–2500 lipase units/kg/feed Children: 1–4 yrs: Range: 1000–2500 lipase units/kg/feed >4 yrs: Range: 500–2500 lipase units/kg/feed (Max <10000 lipase units/kg/day)
	• Antibiotics (only when indicated eg: infected pancreatic collection) -Inj. Meropenem -Inj. Imipenem-cilastatin -Inj. Ciprofloxacin -Inj. Metronidazole -Inj. Cefepime (Above antimicrobials have good pancreatic penetration; choice should be guided by sensitivity if available)	• Meropenem dose: 60 mg/kg/day TDS (max 3 gm/day) i.v • Imipenem (with cilastatin) dose: 60–100 mg/kg/day QID max 4 gm/day i.v • Ciprofloxacin dose: 20–30 mg/kg/day TDS (max 1.2 gm/day) i.v • Metronidazole dose: 30 mg/kg/day QID (max 4 gm/day) i.v • Cefepime dose: 150 mg/kg/day TDS (max 6 gm/day) i.v

FURTHER READING:

1. Yachha SK, Srivastava A, Mohan N, Bharadia L, Sarma MS; Indian Society of Pediatric Gastroenterology, Hepatology and Nutrition Committee on Childhood Functional Constipation, and Pediatric Gastroenterology Subspecialty Chapter of Indian Academy of Pediatrics; Indian Society of Pediatric Gastroenterology, Hepatology and Nutrition Committee on Childhood Functional Constipation, and Pediatric Gastroenterology Subspecialty Chapter of Indian Academy of Pediatrics. Management of Childhood Functional Constipation: Consensus Practice Guidelines of Indian Society of Pediatric Gastroenterology, Hepatology and Nutrition and Pediatric Gastroenterology Chapter of Indian Academy of Pediatrics. Indian Pediatr. 2018 Oct 15;55(10):885-892. Epub 2018 Jun 13. PMID: 29941697.
2. Thapar N, Saliakellis E, Benninga MA, Borrelli O, Curry J, Faure C, De Giorgio R, Gupte G, Knowles CH, Staiano A, Vandenplas Y, Di Lorenzo C. Paediatric Intestinal Pseudo-obstruction: Evidence and Consensus-based Recommendations From an ESPGHAN-Led Expert Group. J Pediatr Gastroenterol Nutr. 2018 Jun;66(6):991-1019. doi: 10.1097/MPG.0000000000001982. PMID: 29570554.
3. Guarino A, Ashkenazi S, Gendrel D, Lo Vecchio A, Shamir R, Szajewska H; European Society for Pediatric Gastroenterology, Hepatology, and Nutrition; European Society for Pediatric Infectious Diseases. European Society for Pediatric Gastroenterology, Hepatology, and Nutrition/European Society for Pediatric Infectious Diseases evidence-based guidelines for the management of acute gastroenteritis in children in Europe: update 2014. J Pediatr Gastroenterol Nutr. 2014 Jul;59(1):132-52. doi: 10.1097/MPG.0000000000000375. PMID: 24739189.
4. Jones NL, Koletzko S, Goodman K, Bontems P, Cadranel S, Casswall T, Czinn S, Gold BD, Guarner J, Elitsur Y, Homan M, Kalach N, Kori M, Madrazo A, Megraud F, Papadopoulou A, Rowland M; ESPGHAN, NASPGHAN. Joint ESPGHAN/NASPGHAN Guidelines for the Management of Helicobacter pylori in Children and Adolescents (Update 2016). J Pediatr Gastroenterol Nutr. 2017 Jun;64(6):991-1003. doi: 10.1097/MPG.0000000000001594. PMID: 28541262.
5. Lee CKK, Engorn B, Flerlage J. Drug Dosages. In: Engorn B, Flerlage J, editors. THE HARRIET LANE HANDBOOK. Philadelphia: Elsevier, 2015:714-1072.