PEDIATRIC VOMITING

PYLORIC STENOSIS • OBSTRUCTION • ATRESIA **KMU FINAL YEAR PAEDS**

1. THE GOLDEN RULE

Color Matters:
• **Non-Bilious (White/Milk):** Obstruction is *above* Ampulla of Vater. (e.g., Pyloric Stenosis, GERD).
• **Bilious (Green):** Obstruction is *below* Ampulla of Vater. (e.g., Volvulus, Atresia).
Rule: Green vomit in a newborn is a Surgical Emergency until proven otherwise.

2. HYPERTROPHIC PYLORIC STENOSIS (HPS)

Patient: First born male, 2-6 weeks old.
Symptoms:
• **Projectile Vomiting** (Non-bilious).
• Hungry "vomiter" (wants to feed immediately after).
• Weight loss / Dehydration.

Physical Sign: Palpable **"Olive-like mass"** in RUQ (during test feed).
Metabolic Derangement (Must Memorize):
• **Hypochloremic** (Low Cl).
• **Hypokalemic** (Low K).
• **Metabolic Alkalosis**.
(Vomiting out Stomach Acid = HCl).

3. HPS MANAGEMENT

Investigation: Ultrasound (Muscle thickness > 4mm, Length > 14mm). "Target Sign".
Treatment:
1. **Resuscitate First:** Correct Alkalosis and Electrolytes with Normal Saline + KCl. (Do not operate on alkalotic baby!).
2. **Surgery:** Ramstedt's Pyloromyotomy (Split the muscle, leave mucosa intact).

4. INTUSSUSCEPTION

Definition: Telescoping of bowel (Ileum into Caecum).
Age: 3 months - 2 years.
Triad:
1. Colicky Pain (Baby draws legs up, screams).
2. Red Currant Jelly Stool (Late sign - Ischemia).
3. Sausage-shaped mass (RUQ).

Diagnosis: Ultrasound ("Target Sign" or "Donut Sign").
Rx: Air/Contrast Enema (Reduction). Surgery if failed.

5. NEONATAL OBSTRUCTION (THE BIG 3)

Condition	Key Feature	X-Ray Sign
Duodenal Atresia	Down Syndrome (Trisomy 21). Bilious vomiting on Day 0.	**Double Bubble Sign** (Stomach + Duodenum).
Malrotation with Volvulus	**Surgical Emergency.** Twisting of midgut. Bilious vomit + Shock.	"Corkscrew" sign on Contrast study.
Meconium Ileus	**Cystic Fibrosis.** Failure to pass meconium.	Ground glass appearance.

6. CLINICAL SCENARIOS

Q: 4 week old boy, projectile milk vomit. pH 7.50, Cl 85. Next step?
IV Fluids (NS). Correct the alkalosis *before* surgery (Pyloromyotomy).

Q: 8 month old, intermittent crying, pulling legs to chest. Stool looks like bloody mucus.
Intussusception. Prepare for Air Enema reduction.

Q: Newborn with Down Syndrome. Vomiting green bile. X-ray shows two air bubbles.
Duodenal Atresia. "Double Bubble".

NEONATAL JAUNDICE

PHYSIOLOGICAL vs PATHOLOGICAL • KERNICTERUS • PHOTOTHERAPY **KMU FINAL YEAR PAEDS**

7. THE 24-HOUR RULE

🚨 **DAY 1 IS DANGEROUS**
< 24 Hours: ALWAYS Pathological. (Hemolysis, Sepsis, TORCH).
24h - 2 Weeks: Physiological or Breast Milk.
> 2 Weeks: Prolonged Jaundice. (Biliary Atresia, Hypothyroid).

8. CAUSES BREAKDOWN

A. Unconjugated (Indirect) - Yellow baby, Normal Stool:
- **Hemolysis:** ABO Incompatibility (Mother O, Baby A/B), Rh Incompatibility (Coombs +ve), G6PD Deficiency.
- **Physiological:** Immature liver enzyme (Glucuronyl Transferase). Peaks Day 3-5.
- **Breast Milk Jaundice:** Factor in milk inhibits enzyme. Persists weeks. (Don't stop feeding!).
- **Breastfeeding Jaundice:** "Starvation". Not enough milk intake -> Dehydration.

B. Conjugated (Direct) - Green baby, Pale Stool:
- **Biliary Atresia:** Blocked ducts.
- **Neonatal Hepatitis:** TORCH infections, Sepsis.

9. BILIARY ATRESIA (DO NOT MISS)

Signs: Jaundice > 2 weeks, **Pale/Clay Stools**, Dark Urine.
Investigation: HIDA Scan (No excretion into bowel). Liver Biopsy.
Treatment: Kasai Portoenterostomy.
Crucial: Surgery must be done before 8 weeks (60 days) to prevent cirrhosis!

10. KERNICTERUS (BILIRUBIN ENCEPHALOPATHY)

Mechanism: Unconjugated Bilirubin is fat soluble -> crosses Blood Brain Barrier -> Deposits in **Basal Ganglia**.
Risk: Usually when Bilirubin > 20-25 mg/dl.
Signs: Lethargy, Hypotonia -> Hypertonia (Opisthotonos/Arching back), High pitched cry.
Sequelae: Cerebral Palsy, Deafness, Gaze palsy.

11. MANAGEMENT PROTOCOL

Modality	Mechanism & Indication
Phototherapy	**Blue Light (460nm).** Converts Bilirubin to Lumirubin (Water soluble isomer) -> excreted in urine/bile. *SE: Dehydration, Rash, Bronze Baby.*
Exchange Transfusion	Removes antibodies and bilirubin. Indicated if: Cord Bili > 5, Rising > 0.5/hr, or Bili > 20-25 (Risk of Kernicterus).
IVIG	Blocks hemolysis in Rh/ABO incompatibility.

12. CLINICAL SCENARIOS

Q: Baby born 12 hours ago appears yellow. Mother O+ve, Baby A+ve. Direct Coombs Positive.
ABO Incompatibility (Pathological). Start Phototherapy immediately. Monitor closely.

Q: 4 week old baby. Jaundiced. Mother says poop is "chalk white". Urine stains diaper dark yellow.
Biliary Atresia. Conjugated Hyperbilirubinemia. Refer to Pediatric Surgery for Kasai.

Q: 5 day old, healthy, jaundiced. Bilirubin 12. Mother breastfeeding well.
Physiological Jaundice. Reassure. Continue feeds. (Peaks day 3-5, resolves by day 14).

ACUTE DIARRHEA & DYSENTERY

WHO GUIDELINES • DEHYDRATION • ETIOLOGY **KMU FINAL YEAR MEDICINE**

1. ETIOLOGY (THE USUAL SUSPECTS)

Type	Organism & Clue
Rotavirus	Most common in children < 2 yrs. Winter. Watery, acidic stool (Red butt).
ETEC	"Traveler's Diarrhea". Watery. Uncooked food.
V. Cholerae	"Rice Water" stool. Fishy odor. Massive dehydration. Shock.
Shigella	**Dysentery** (Blood + Mucus). High fever, seizures in kids.
Giardia	Camping history. **Foul-smelling**, greasy stool (Steatorrhea). Bloating.

2. CLASSIFYING DEHYDRATION (WHO)

1. No Dehydration (Plan A):
• Alert, eyes normal, drinks normally, skin pinch goes back immediate.
• **Rx:** Home fluids + Zinc.

2. Some Dehydration (Plan B):
• Restless/Irritable. Sunken eyes. Drinks eagerly (thirsty). Skin pinch slow (<2s).
• **Rx:** ORS in center (75ml/kg over 4 hours).

3. Severe Dehydration (Plan C):
• Lethargic/Unconscious. Unable to drink. Skin pinch very slow (>2s).
• **Rx:** IV Fluids (Ringer's Lactate) IMMEDIATELY.

3. MANAGEMENT PROTOCOLS

1. ORS (Low Osmolarity):
• Contains NaCl, KCl, Citrate, Glucose.
• Glucose helps Na+ absorption (Co-transport).

2. Zinc Supplementation:
• Give for 10-14 days.
• Reduces duration and severity of episode.
• Dose: 10mg (<6mo), 20mg (>6mo).

3. Antibiotics (WHEN TO USE?):
• **Dysentery (Blood):** Ciprofloxacin or Ceftriaxone (for Shigella).
• **Cholera:** Doxycycline or Azithromycin (reduces volume).
• **Giardia/Amoeba:** Metronidazole.
• *Routine watery diarrhea (Rotavirus) needs NO antibiotics!*

4. DYSENTERY VS AMOEBIASIS

Bacillary (Shigella):
• High Fever.
• Stool: Blood + Pus + Mucus.
• Microscopy: Numerous Neutrophils (Pus cells).

Amoebic (E. Histolytica):
• Mild/No fever.
• Stool: "Anchovy Sauce" or Bloody mucus.
• Microscopy: **Trophozoites** with ingested RBCs.

5. HEMOLYTIC UREMIC SYNDROME (HUS)

🚨 **RED FLAG**
Cause: E. Coli O157:H7 (Shiga Toxin).
Triad: 1. Hemolytic Anemia 2. Thrombocytopenia 3. Renal Failure.
Trigger: Giving antibiotics for E. Coli diarrhea releases toxin!
Avoid antibiotics in bloody diarrhea unless septic/Shigella proven.

MALABSORPTION & CELIAC

CHRONIC DIARRHEA • CELIAC DISEASE • STEATORRHEA KMU FINAL YEAR MEDICINE

6. CHRONIC DIARRHEA (> 14 DAYS)

Common Causes by Age:

1. Toddler's Diarrhea:
• "Peas and Carrots" stool (undigested food).
• Child is growing well, happy. Cause: Fruit juice/High sugar.
• Rx: Reassurance + Fat/Fiber in diet.

2. Post-Enteritis Syndrome:
• Temporary lactose intolerance after Rotavirus.
• Villi are stripped off (loss of Lactase enzyme).
• Rx: Lactose-free formula for 2-4 weeks.

3. Celiac Disease:
• Failure to thrive, muscle wasting, abdominal distension.

7. CELIAC DISEASE (GLUTEN ENTEROPATHY)

Pathophysiology: Autoimmune reaction to **Gliadin** (Gluten) in Wheat, Barley, Rye.
Genetics: HLA-DQ2 and HLA-DQ8.
Clinical Features:
• Chronic diarrhea, bloating, weight loss.
• Iron Deficiency Anemia (resistant to oral iron).
• **Dermatitis Herpetiformis:** Itchy blistery rash on elbows/knees.

8. CELIAC DIAGNOSIS

Screening: Tissue Transglutaminase IgA (tTG-IgA).
• *Must be on Gluten diet during test!*
• If IgA deficient, check IgG-tTG.

Confirmatory (Gold Standard): Duodenal Biopsy.
• Findings:
1. Villous Atrophy (Flat mucosa).
2. Crypt Hyperplasia.
3. Intraepithelial Lymphocytes.

9. STOOL CHARACTERISTICS (CHEAT SHEET)

Appearance	Think of...
Greasy / Difficult to flush	Steatorrhea (Celiac, Cystic Fibrosis, Chronic Pancreatitis).
Watery / Explosive	Carbohydrate Malabsorption (Lactose Intolerance).
Bloody + Mucus	Colitis (Ulcerative Colitis, Shigella, Amoebiasis).
Peas & Carrots	Toddler's Diarrhea (Rapid transit).

10. OTHER MALABSORPTION SYNDROMES

Cystic Fibrosis: Pancreatic insufficiency + Chest infections. Positive Sweat Chloride.
Tropical Sprue: Traveler. B12/Folate deficiency. Rx: Tetracycline.
Whipple's Disease: "Foamy Macrophages" (PAS+). Joint pain + Neuro symptoms.

11. CLINICAL SCENARIOS

Q: 14 month old, loose stools with undigested vegetable matter. Weight gain normal. Mom worried.
Toddler's Diarrhea. Reassurance. Reduce juice intake.

Q: 40F, chronic diarrhea, Iron deficiency anemia despite supplements. Itchy rash on elbows.
Celiac Disease. (Anemia + Rash + GI symptoms). Biopsy will show villous atrophy.

12. THE STEATORRHEA TEST

Sign: Stool floats, difficult to flush, foul smelling.
Sudan Stain: Qualitative test for fat.
72h Fecal Fat: Quantitative gold standard (>7g/day = Malabsorption).