Project: Ghana Emergency Medicine Collaborative

Document Title: Non-Traumatic Abdominal Pain/Abdominal Emergencies

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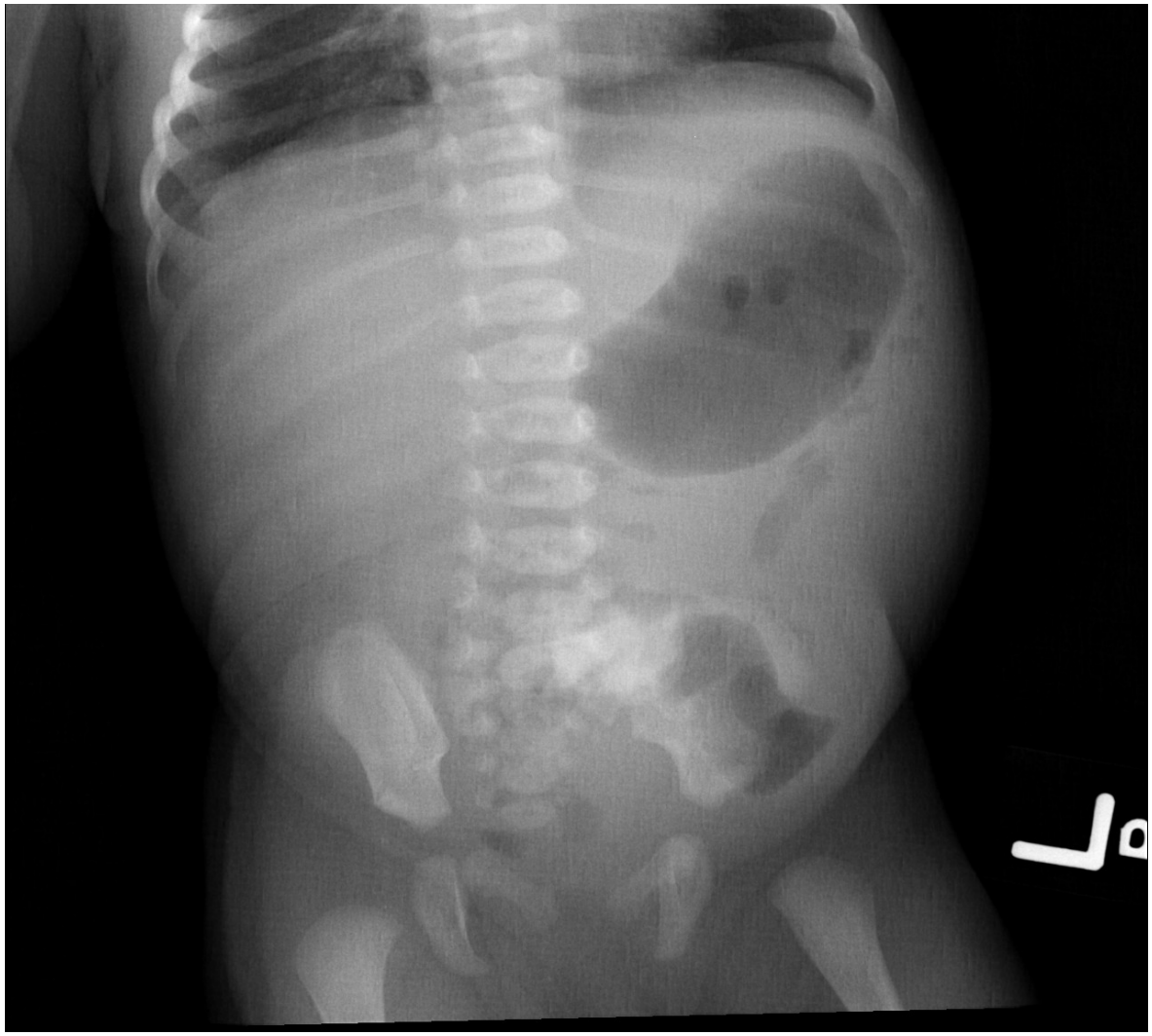
Case 1

- CC: vomiting
- HPI: 2 day old female, discharged home yesterday from outside facility

Case 1

- Vitals: Temp 36.9 rectally, HR 135, RR 36, pulse-ox 98%, wt is 3.2 kg
- PE: awake, alert, well hydrated, normal exam
- Abd: soft, non-distended hyperactive BS

Case 1



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Case 1

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Case 1

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	ingestion	Pneumonia	infection
	Sickle cell syndrome vasoocclusive crisis	Intussusception	Diabetic ketoacidosis
	Dietary protein allergy	Foreign body ingestion	Sickle cell syndrome vasoocclusive crisis
	Tumor	Sickle cell syndrome vasoocclusive crisis	Henoch Schönlein purpura
	Hirschsprung disease	Henoch Schönlein purpura	Ovarian torsion
	Adhesions	Ovarian torsion	Testicular torsion
	Hemolytic uremic syndrome	Intraabdominal abscess	Inflammatory bowel disease
	Toxin	Tumor	Intraabdominal abscess
	Meckel's diverticulum	Adhesions	Ruptured ovarian cyst
	Hepatitis	Hemolytic uremic syndrome	Cholecystitis
		Hepatitis	Pancreatitis
		Meckel's diverticulum	Urolithiasis
		Toxin	Hepatitis

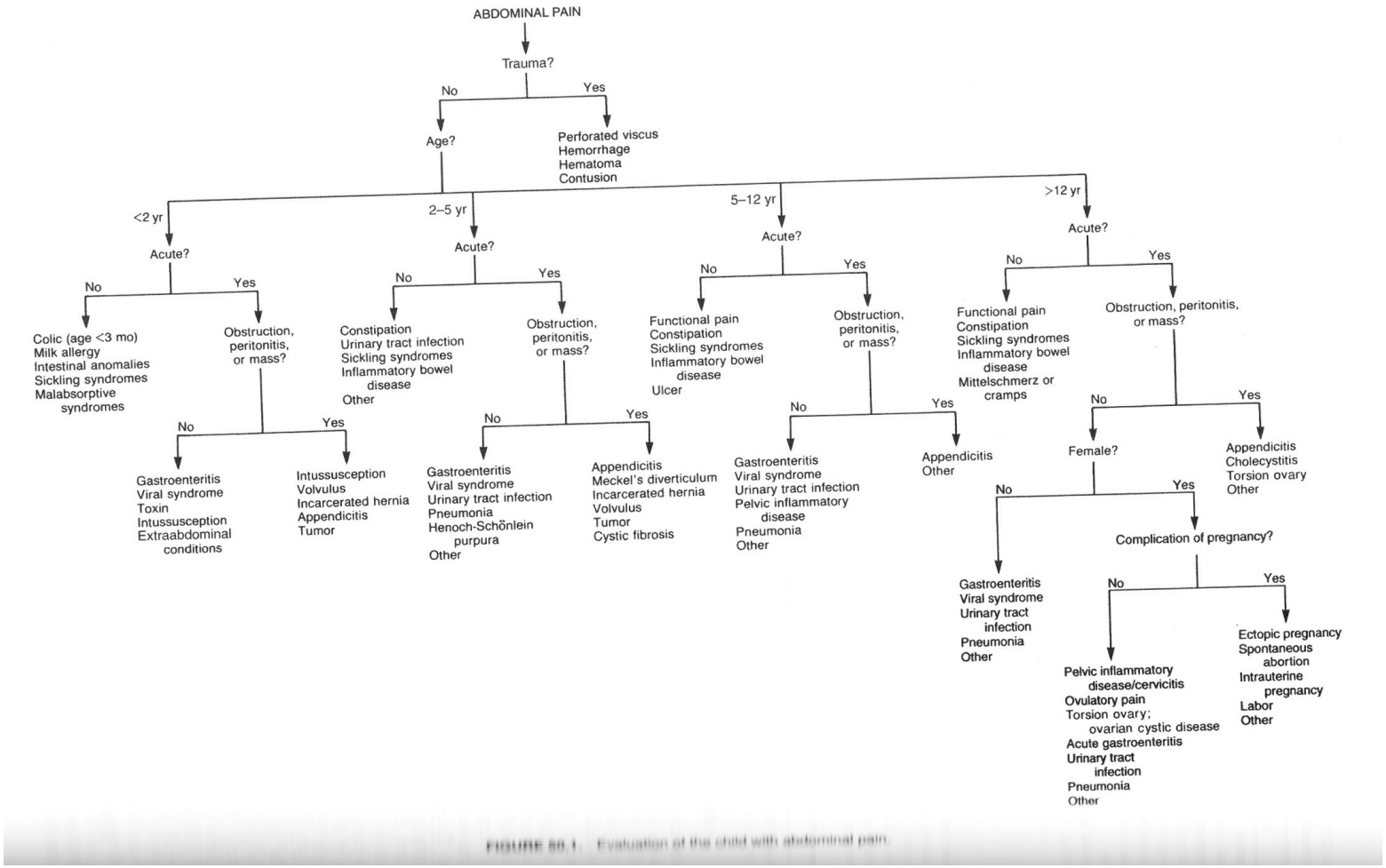

FIGURE 88.1 Evaluation of the child with abdominal pain.

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Vomit DDx

Table 78.1.
Vomiting and Regurgitation: Principal Causes by Usual Age of Onset and Etiology

Newborn (Birth to 2 wk)
- Normal variations
- Gastroesophageal reflux (± hiatal hernia)
- Esophageal stenosis, atresia
- Infantile achalasia
- Obstructive intestinal anomalies
  - Intestinal stenosis, atresia
  - Malrotation of bowel (± midgut volvulus)
  - Meconium ileus (cystic fibrosis)
  - Meconium plug
  - Hirschsprung's disease
  - Imperforate anus
  - Enteric duplications
- Other gastrointestinal causes
  - Necrotizing enterocolitis
  - Cow's milk allergy
  - Lactobezoar
  - Gastrointestinal perforation with secondary peritonitis
- Neurologic
  - Subdural hematoma
  - Hydrocephalus
  - Cerebral edema
  - Kernicterus
- Renal
  - Obstructive uropathy
  - Renal insufficiency
- Infectious
  - Meningitis
  - Sepsis
- Metabolic
  - Inborn errors of urea cycle; amino acid, organic acid, and carbohydrate metabolism (phenylketonuria, galactosemia)
  - Congenital adrenal hyperplasia

Older Infant (2 wk to 12 mo)
- Normal variations
- Gastroesophageal reflux
- Acquired esophageal disorders (corrosive esophagitis ± stricture, foreign bodies, retroesophageal abscess)
- Rumination
- Gastrointestinal obstruction
  - Bezoars, foreign bodies
  - Pyloric stenosis
  - Malrotation (with or without volvulus)
  - Enteric duplications
  - Meckel's diverticulum (complications of)
  - Intussusception
  - Ascariasis
  - Incarcerated hernia
  - Hirschsprung's disease
- Other gastrointestinal causes
  - Gastroenteritis
  - Celiac disease
  - Peritonitis
  - Paralytic ileus
- Neurologic
  - Brain tumors
  - Other intracranial mass lesions
  - Cerebral edema
  - Hydrocephalus
- Renal
  - Obstructive uropathy
  - Renal insufficiency
- Infectious
  - Meningitis
  - Sepsis
  - Urinary tract infection
  - Otitis media
  - Pertussis
  - Hepatitis
- Metabolic
  - Metabolic acidosis (inborn errors of amino acid and organic acid metabolism, renal tubular acidosis)
  - Galactosemia
  - Fructose intolerance
  - Adrenal insufficiency
- Drug overdose
  - Aspirin
  - Theophylline
  - Digoxin
- Respiratory (posttussive)
  - Reactive airways disease
  - Respiratory infection
  - Foreign body (FB)

Older Child (Older than 12 mo)
- Gastrointestinal obstruction
  - Acquired esophageal strictures
  - Foreign bodies, bezoars
  - Peptic ulcer disease
  - Posttraumatic intramural hematoma
  - Malrotation (with or without volvulus)
  - Meckel's diverticulum (complications of)
  - Meconium ileus equivalent (cystic fibrosis)
  - Ascariasis
  - Incarcerated hernia
  - Adhesions (postsurgical, peritonitis)
  - Intussusception
  - Hirschsprung's disease
  - Superior mesenteric artery syndrome
- Other gastrointestinal causes
  - Gastroenteritis, gastritis, duodenitis
  - Gastroesophageal reflux
  - Appendicitis
  - Peptic ulcer disease
  - Pancreatitis
  - Peritonitis
  - Paralytic ileus
  - Crohn's disease
- Neurologic
  - Brain tumors
  - Other intracranial mass lesions
  - Cerebral edema
  - Migraine
  - Motion sickness
  - Postconcussion syndrome
  - Seizures
- Renal
  - Obstructive uropathy
  - Renal insufficiency/renal tubular acidosis
- Infectious
  - Meningitis
  - Urinary tract infection
  - Hepatitis
  - Upper respiratory infection (postnasal
- Metabolic
  - Diabetic ketoacidosis
  - Reye's syndrome
  - Adrenal insufficiency
  - Inborn error of metabolism (urea cycle
    - oxidation defect; acute, intermittent
- Toxins and drugs
  - Aspirin
  - Ipecac
  - Theophylline
  - Digoxin
  - Iron
  - Lead (chronic)
- Respiratory (posttussive)
  - Asthma exacerbation
  - Infectious respiratory disease
  - FB
- Other
  - Pregnancy
  - Psychogenic
  - Cyclic vomiting

Source unknown

Most Common Cause Vomiting

- Newborn (birth to 2wks)
  - Nml “spitting up”
  - GERD
  - Obstruction
  - NEC
  - Infection
- Infant (2wks to 1yr)
  - Nml “spitting up”
  - GERD
  - Obstruction
  - Gastroenteritis
  - Infection
  - Post-tussive
  - Drug OD

Most Common Cause

- Children (>1yr)
  - GI Obstruction
  - Other GI cause
  - Infection
  - Post-tussive
  - Metabolic
  - Toxins/Drugs
  - Pregnancy

Life Threatening

- Anatomic abn
- NEC
- Neurologic
- Renal
- Infections
- Metabolic
- Drugs

Work-Up

- Based on H&P
- First few days of life: delayed passage of meconium?
- Bilious? Suspect obstruction
- Febrile? Sepsis, meningitis
- Signs of increased ICP?

Malrotation

St Bartholomew's Hospital Archives & Museum, London, UK, Wellcome Images

Malrotation with Volvulus

- Bilious vomiting
- Can occur in utero
- Distention depends on site of volvulus
- May develop ischemia within hour
- May have h/o intermittent abd pain, failure to thrive
- Can have malrotation w/o volvulus

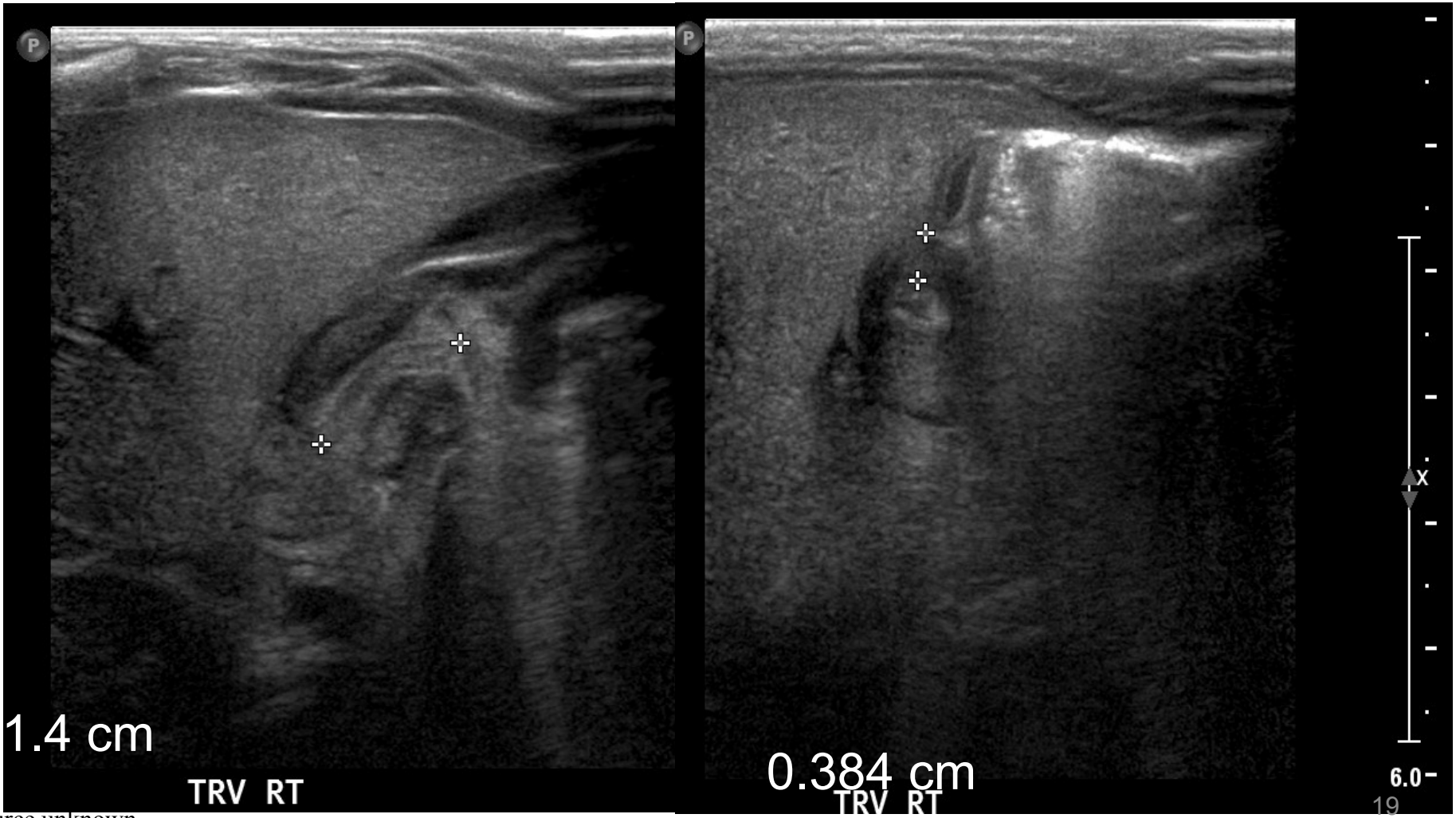
Treatment

- OR
- Fluids
- Electrolytes

Case 2

- CC: vomiting
- 2wk old
- Was feeding normally 4 days ago, but then started having increasing frequency and quantity of vomiting
- Non-bilious

Case 2



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Pyloric Stenosis

- Hypertrophy of pylorus
- 1 in 250 births
- Male : female of 4:1
- First born males highest risk
- Onset 2 to 5 wks
- Infant is hungry and will eat, but vomit w/in 30 min

Pyloric Stenosis

- Electrolytes
  - Na:139 K:3.4, Cl:84, BiCarb>40, BUN:21, Cr:0.3
- Measurements: >1.4cm length, >0.3cm thickness
- Other studies
  - Upper GI

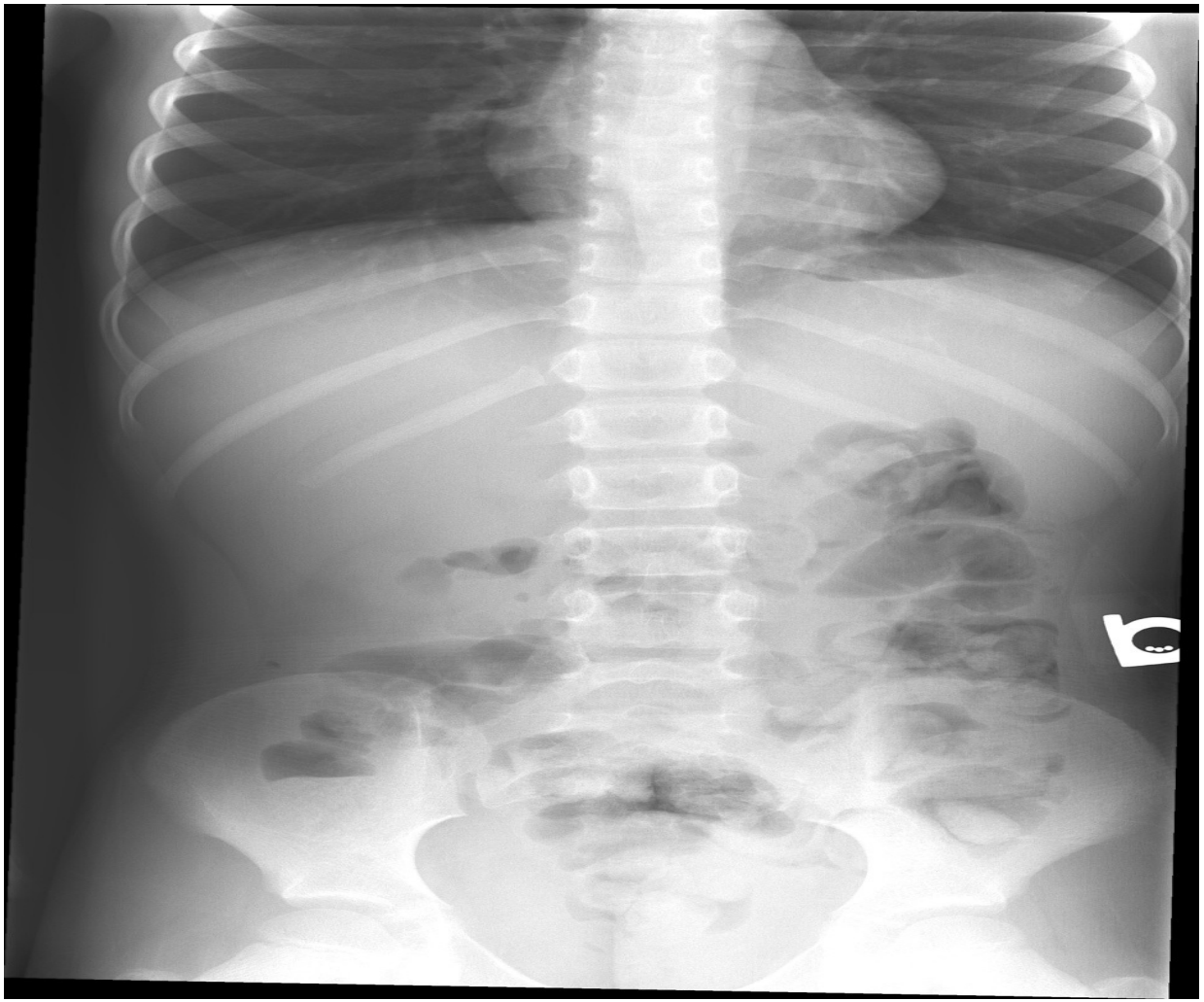
Pyloric Stenosis

- Treatment
  - Atropine
    - Reversible disorder of muscarinic receptors
    - Start treatment 0.2mg/kg/day divided 5min prior to feeds
    - When tolerated po transitioned to 2x dose orally
    - Average length of treatment 52 days
  - OR

Case 3

- CC: abdominal pain
- 9yo male
- History of abdominal migraines

Case 3



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2yo same diagnosis

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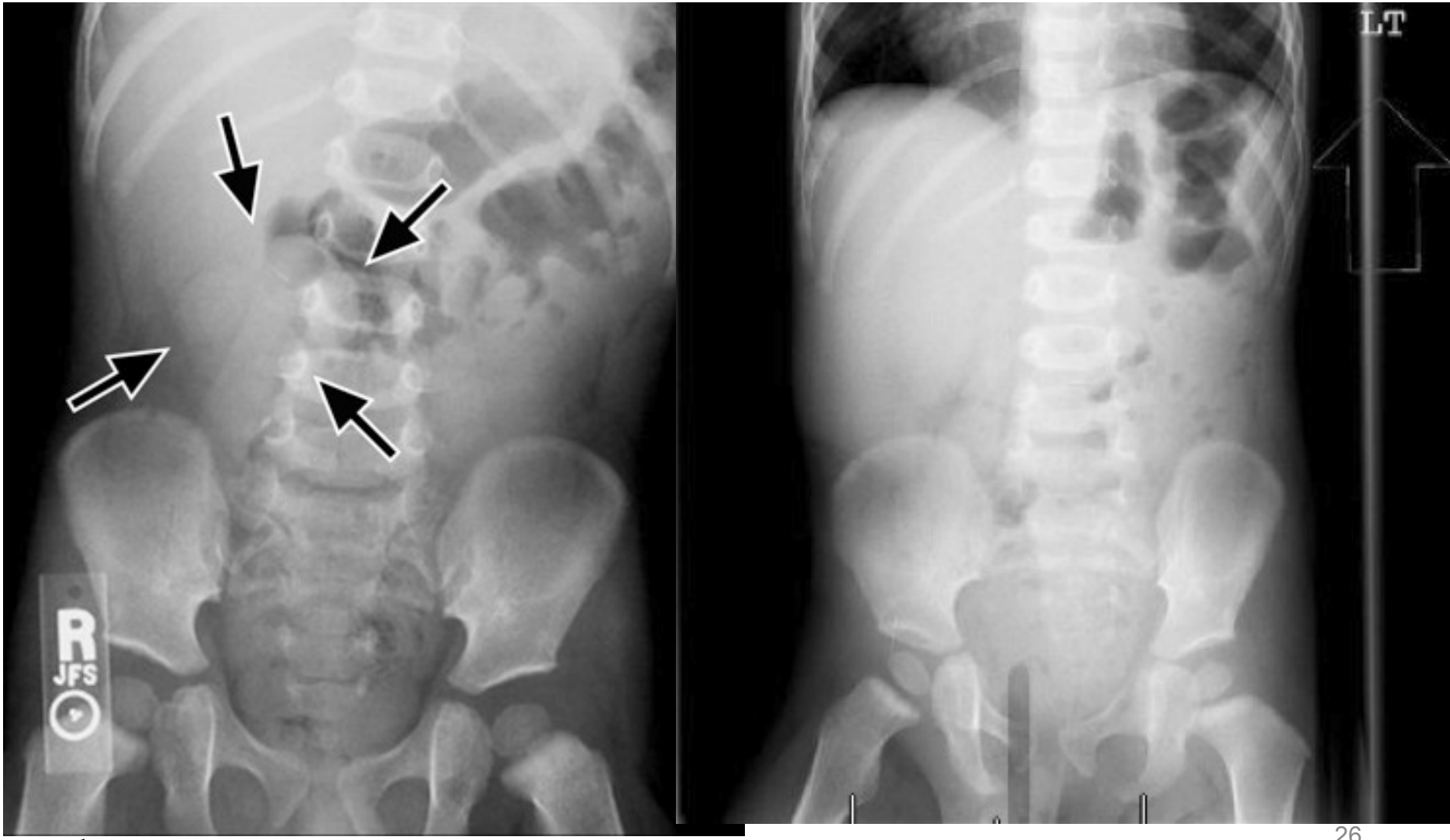
2yo same diagnosis



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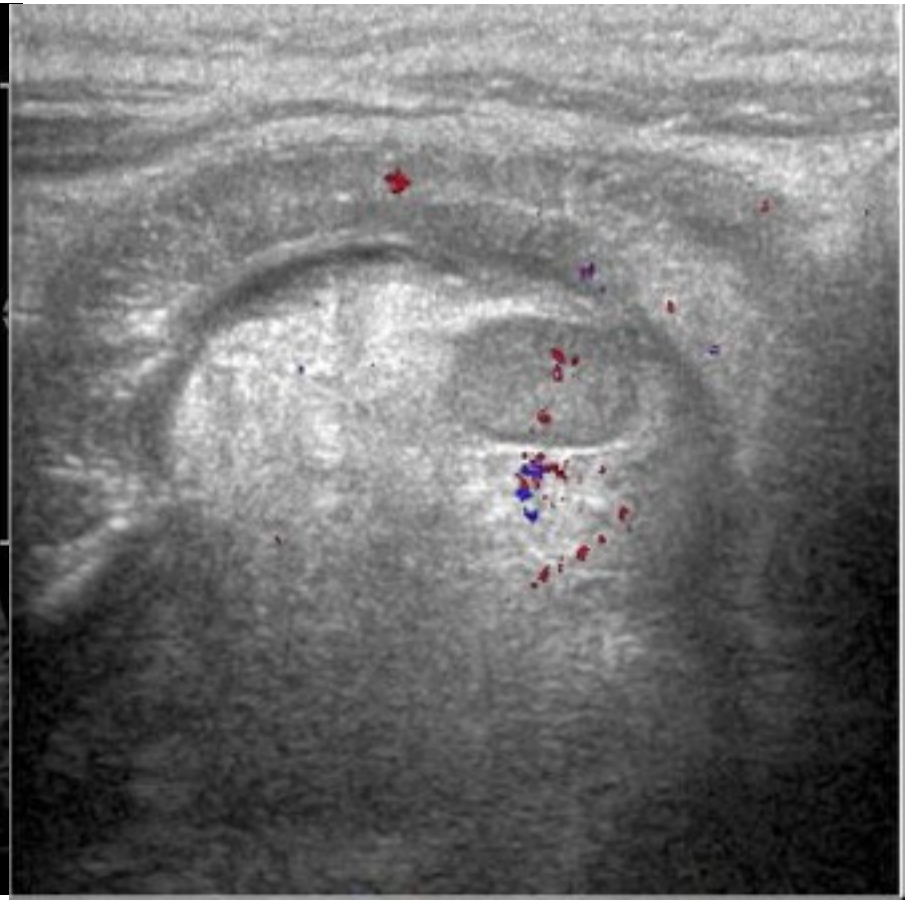
2yo same diagnosis



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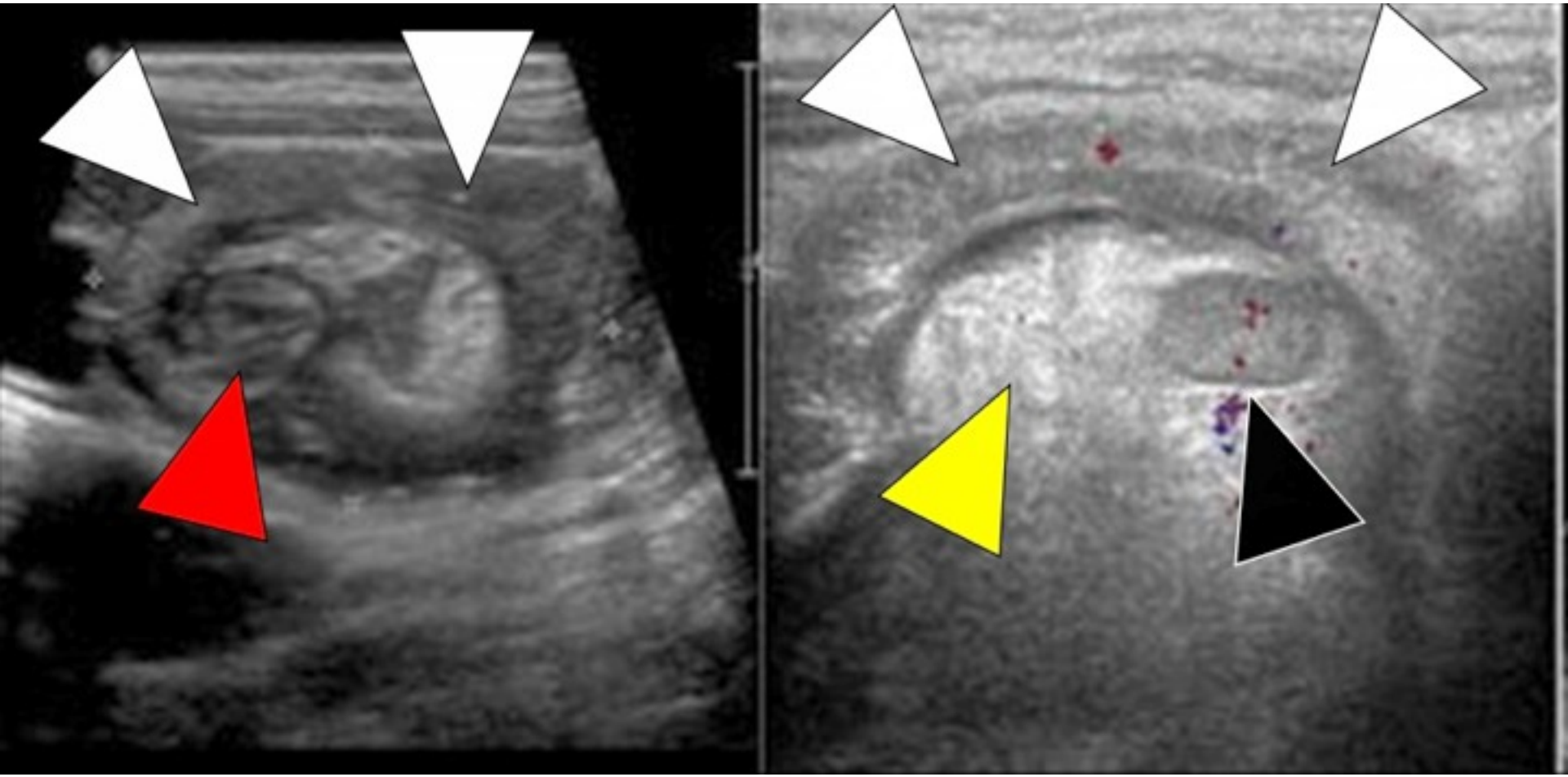
2yo same diagnosis



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Intussusception

- Leading cause of obstruction in infants
- Most commonly between 3 and 12 months
- Can have ileo-colic, ileo-ileo, or colo-colic
- Small bowel prolapses through ileo-cecal valve
- May have lead point

Intussusception

- COLICKY pain
- May have currant jelly stool 50-75% have heme + stool

Intussusception

- Work-up
  - X-ray
    - Early may be normal
    - After 6 to 8hrs, may show obstructive pattern
  - U/S 98-100% sensitivity

Intussusception

- Treatment
  - Air enema
    - Perf rate up to 3%
    - Lower success rate and higher perf rate: <3 months or >5yrs, >48hrs of symptoms, hematochezia, dehydration, SBO
  - OR

Intussusception

- Antibiotics prior to reduction?
  - Have heard prior peds surgeon requested it
  - Only reference can find is use if suspect peritonitis
- Surgeon needs to evaluate prior to reduction?

- Recurrence
  - 1 to 3%
  - Can retry air enema
  - More common in older
  - May have lead point

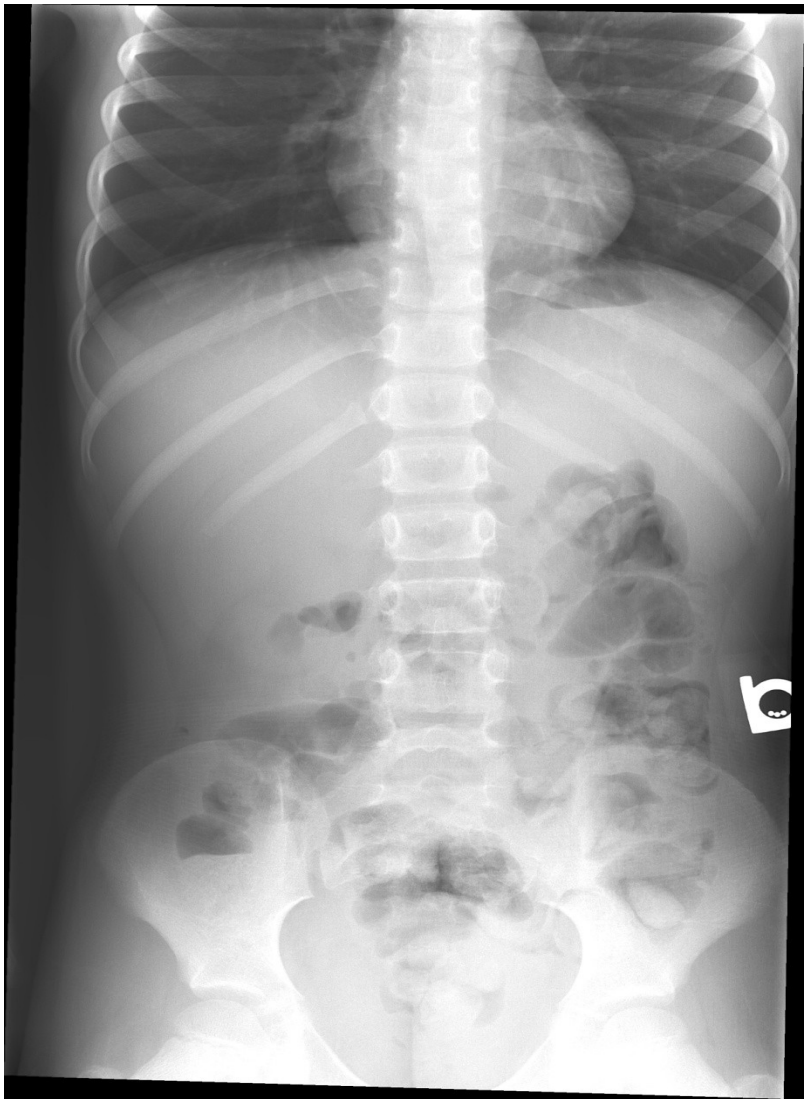
Case 4

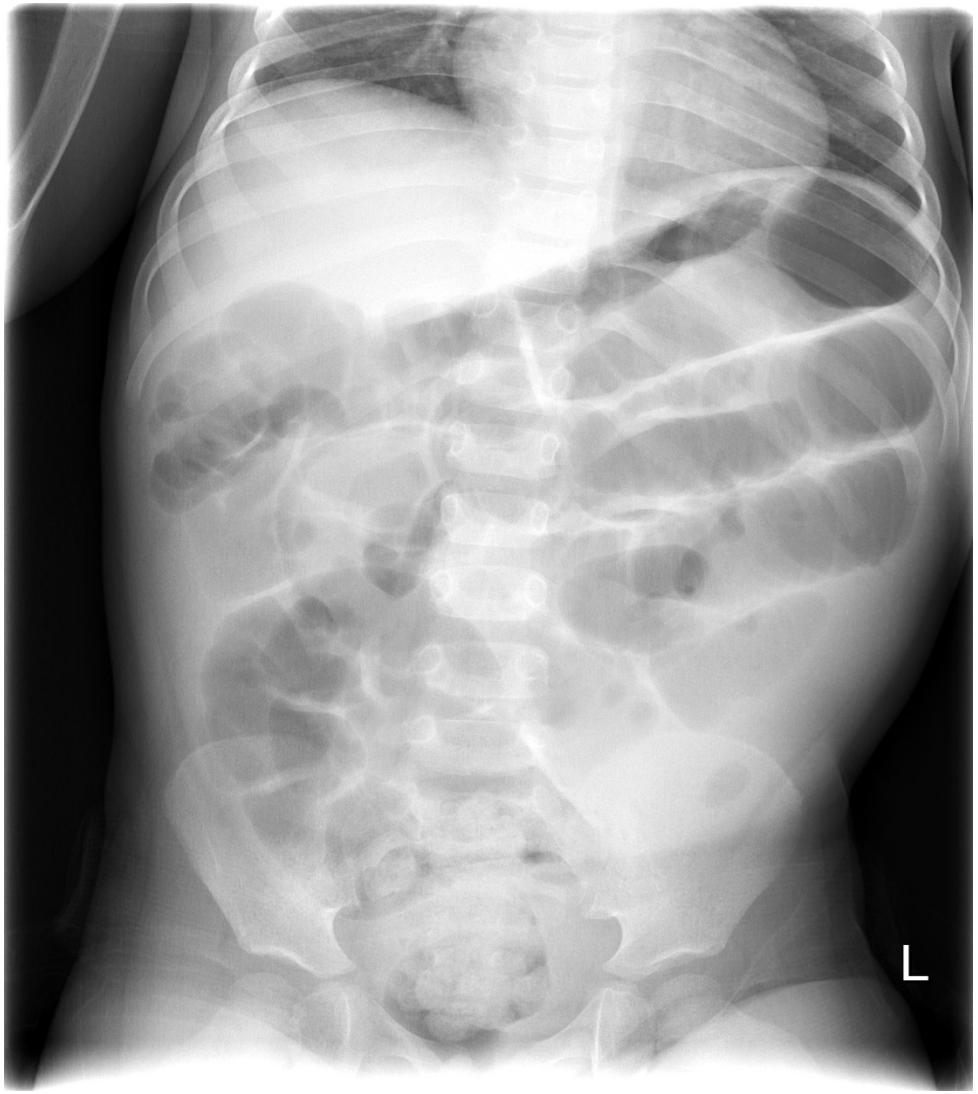
- CC: Abdominal pain
- 3yo male
- Pain, vomiting, constipation x3d

Case 4

- VS: HR 148, RR 22, T 36.7, wt 16.1kg
- Gen: mildly ill appearing
- HEENT, Neck, CV, Resp: neg
- Abd: tense, distended, tympanitic

Case 4





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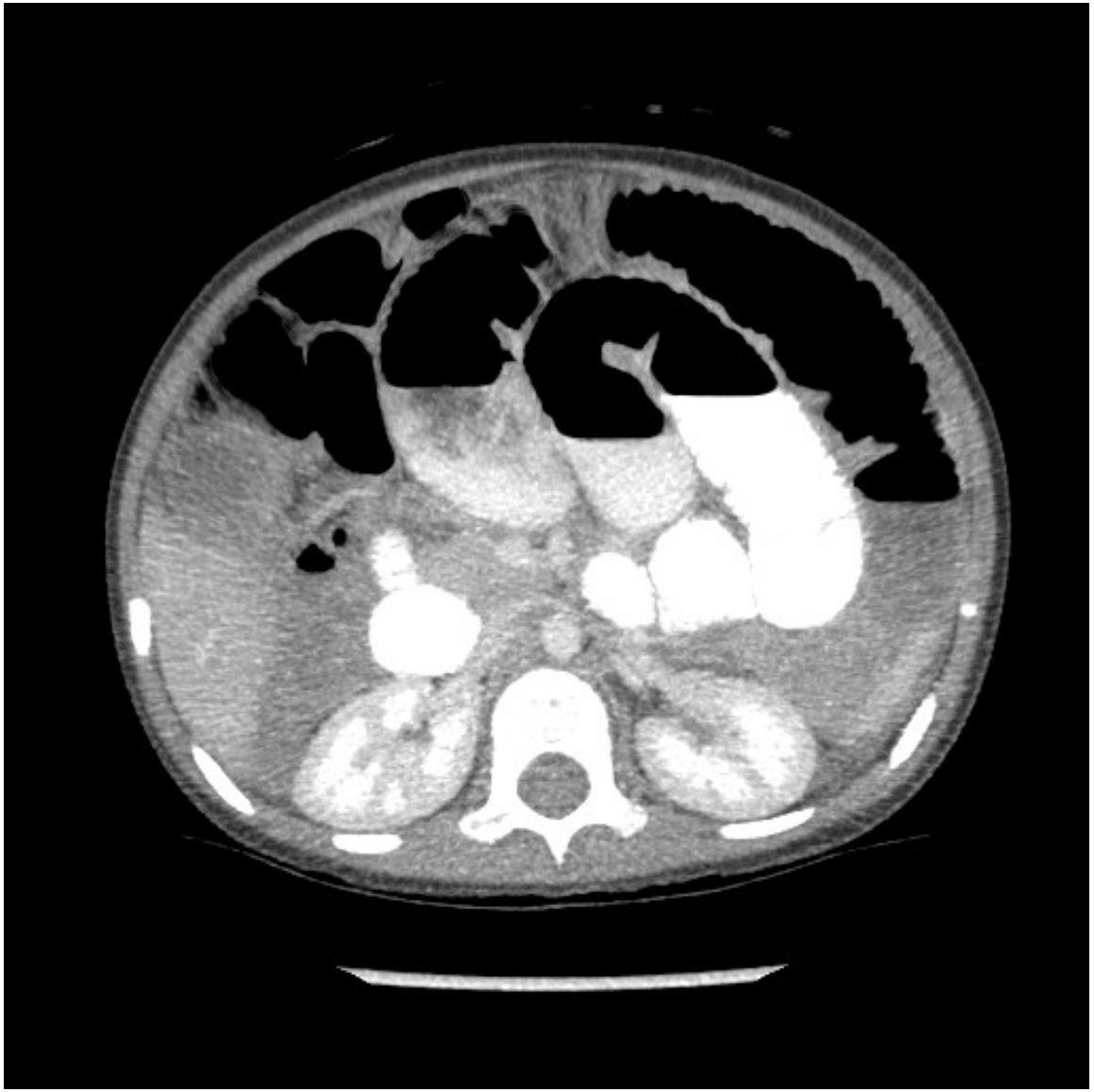
Case 4



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Case 4

- Peds surg consulted
- Going to take to OR
- Delayed decided to do conservative treatment
- Became CV unstable to OR
- Final diagnosis: perforated Meckel's Diverticulum

Meckel's Diverticulum

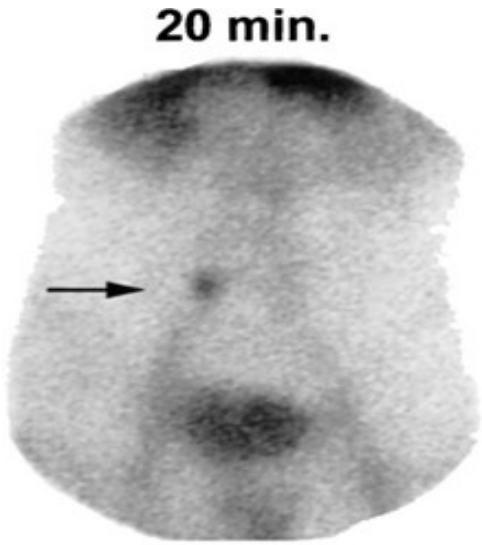
- Remnant of embryonic yolk sac
- Omphalo-mesenteric duct connects yolk sac to the gut and provides nutrition until the placenta is established
- Between the 5th and 7th wk of gestation, separates from the intestine
- Epithelium of the yolk sac develops a lining similar to stomach

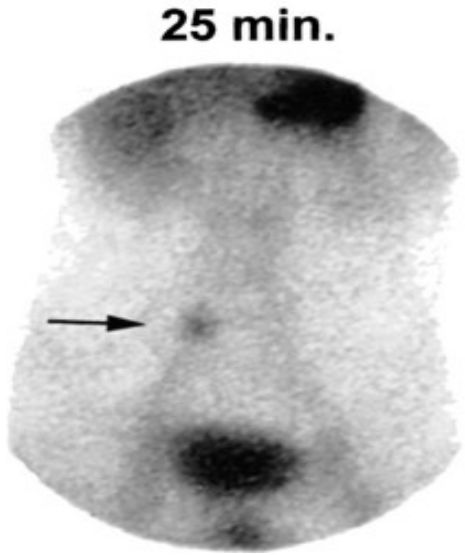
- 2% of population
- Male to female: 2 to 1
- Within 2 feet of ileo-cecal valve
- 2 inches long
- 2% develop problems

- Painless rectal bleeding
- Ulceration within gastric mucosa
- 50% do not have gastric mucosa

How do you find it?

- Accidentally
- Meckel's Scan
  - 99m technetium scan





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Appendicitis

- Still most common requiring emergent surgery
- Peak incidents 12-18yrs, uncommon <5yrs, rare <3yrs
- Perforation rates as high as 20%

Pediatric Appendicitis Score

Diagnostic Indicator	Score
Cough/percussion/heel tapping tenderness in RLQ	2
Anorexia	1
Low-grade fever (99°F-101°F)	1
Nausea/emesis	1
RLQ tenderness upon light palpation	2
Leukocytosis	1
Left Shift	1
Migration of pain to RLQ	1

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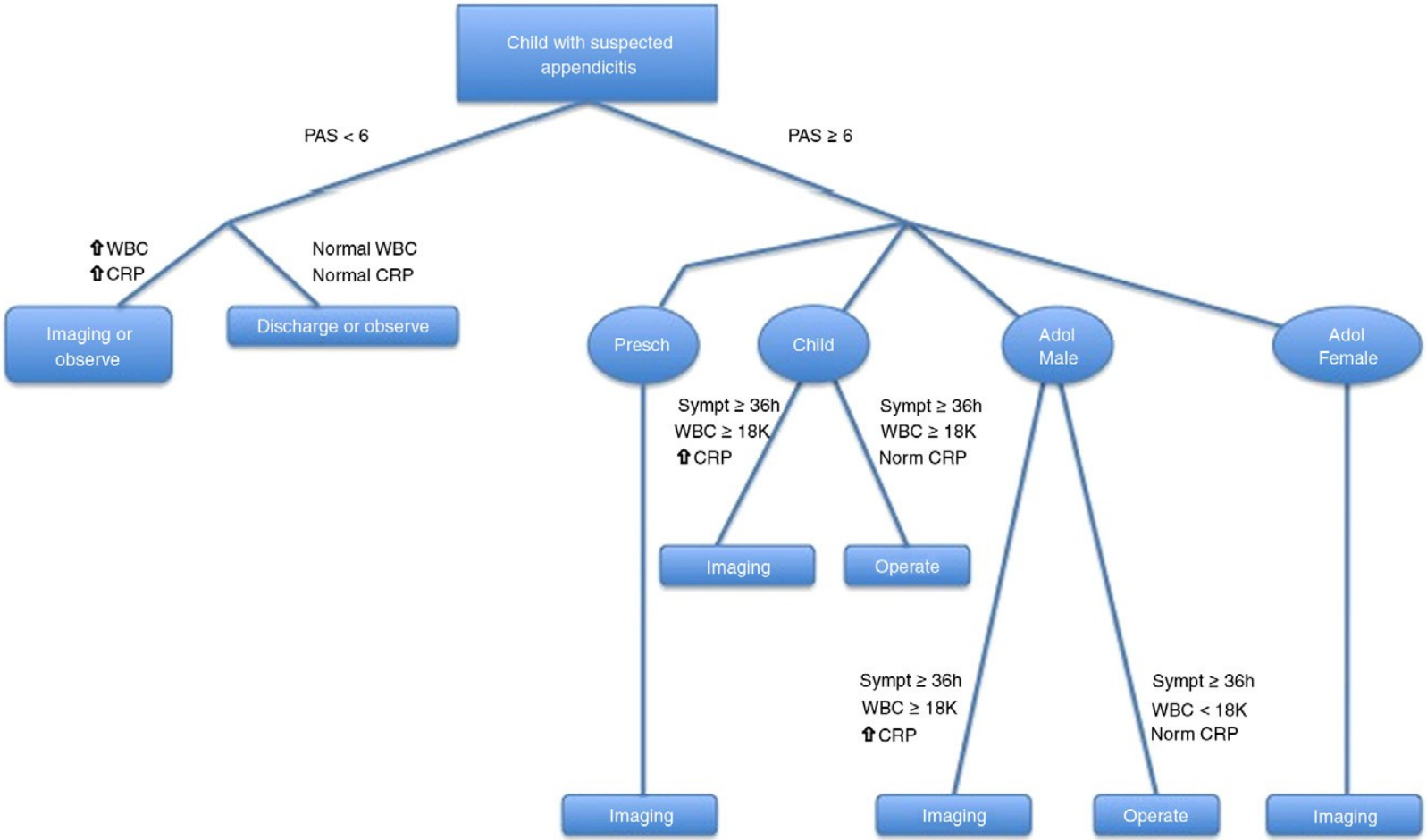

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Results

	2007; n (%)	2009; n (%)	P value
Age	11 +/- 3.8	10.9 +/- 4.1	0.9
Male	76 (59.6)	64 (64)	0.49
Pre-op CT	118 (80.8)	60 (60)	0.01
In-house CT	84 (71.2)	31 (51.7)	0.01
Outside CT	34(28.8)	29 (48.3)	0.01
US use	4 (2.7)	21 (21)	<0.001
No Imaging	26 (17.1)	22 (22)	0.34
Complex appy	27 (18.5)	25 (25)	0.16
Neg appy	10 (6.8)	11 (11)	0.25

Ultrasound

- Operator dependent: sensitivity and specificity as high as 90%
- Limited by
  - extreme tenderness and guarding
  - weight?
  - Excess of fatty tissue/bowel gas
  - Lack of cooperation

Weight limited

	Group 1: Underweight	Group 2: Normal Weight	Group 3: Overweight	Total
Not seen	2 (9.5)	24 (29.6)	7 (35)	33 (27)
Normal	0	3 (3.7)	1 (5)	4 (3.2)
Inflamed	19 (90.5)	54 (66.7)	12 (60)	85 (69.7)
Total	21 (17.2)	81 (66.4)	20 (16.4)	122

Source unknown

Weight limited

	Group 1: Underweight	Group 2: Normal Weight	Group 3: Overweight
True pos	19	66	14
False pos	0	0	0
True neg	0	3	1
False neg	2	12	5
Accuracy (%)	90.4	85.1	80
Total	21	81	20

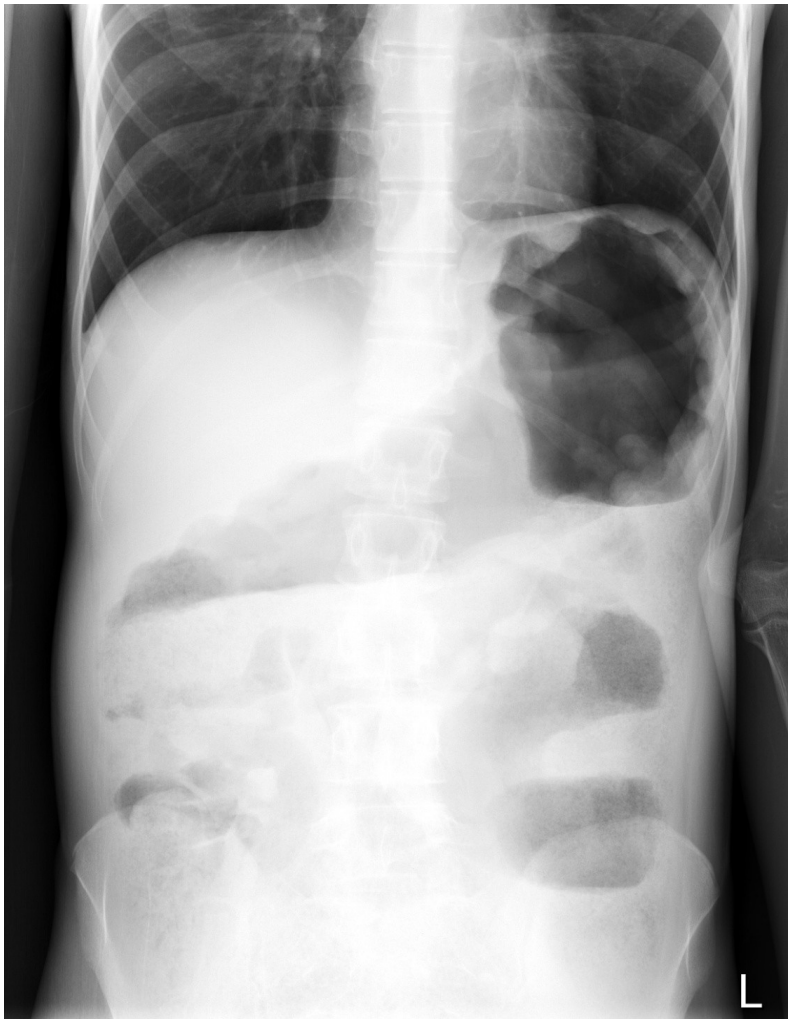
Source unknown

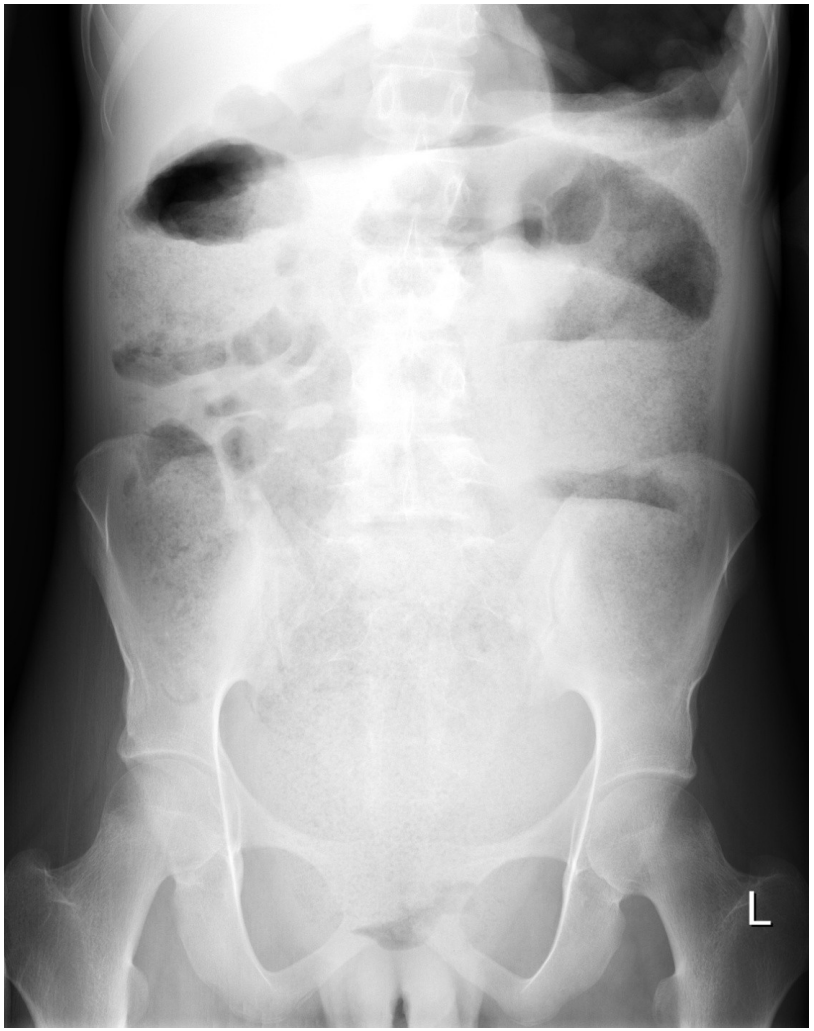
Don’t Forget

- Genital Exam
  - Hernias
  - Scrotal pain often radiates to the abdomen
  - Ovarian Torsion

Case 5

- CC: Abdominal pain, fullness, and vomiting
- 17 yo male
- H/O constipation
- + weight loss





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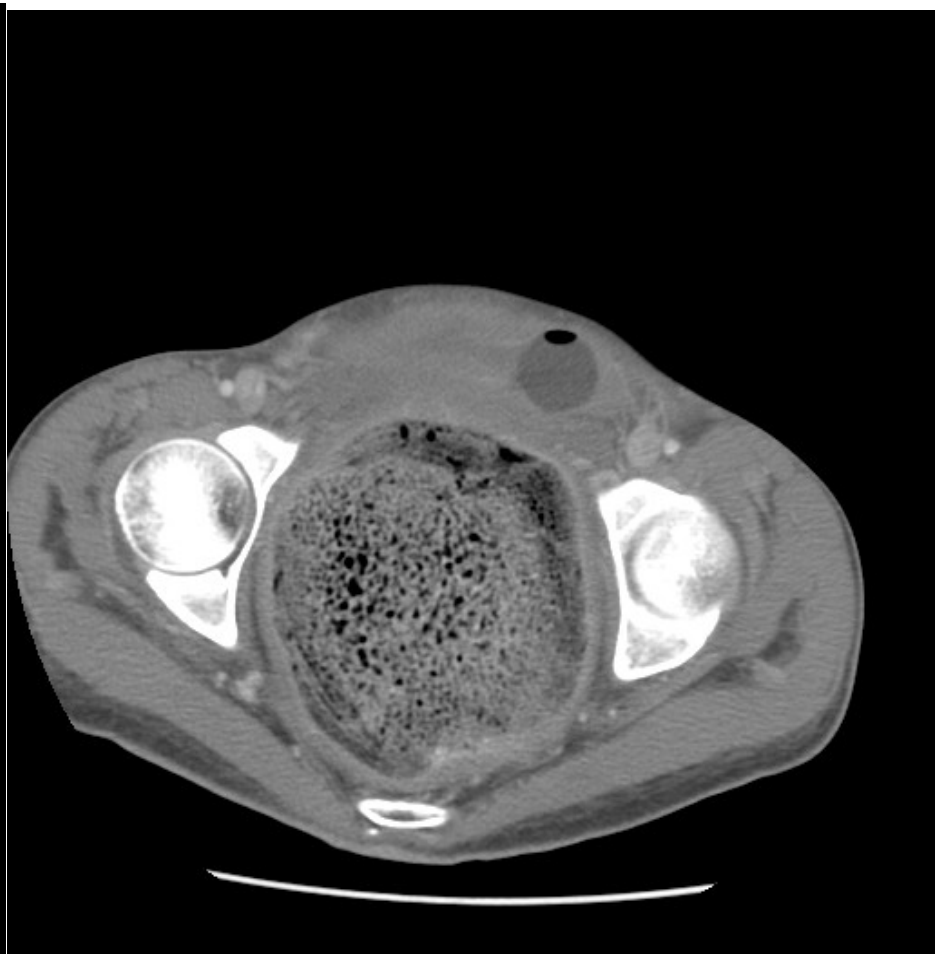

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Constipation

- Defined as delayed or difficulty passing stool for >2wks
- Functional
- Organic

Treatment

- Enema vs. no enema
  - Single site
  - 121 enrolled
  - X-rays 69.4%
  - Did not receive rectal 75.2%
  - 33% had enema

- 27.3% had follow-up visit (42.4% to ED)
- 70.2% found visit helpful
  - No difference if had enema, x-ray, or laxatives
- 63.4% reported child upset or very upset if they received an enema

Hirschsprung's Disease

- Parasympathetic ganglion cells of Auerbach's plexus are absent
- History of chronic constipation
- May not be stool without assistance
- Work-up
  - Biopsy
  - Barium enema
  - Anorectal manometry