تبييض محاضرة

gastrointestinal bleeding in children

((Meckel's diverticulum and Intussusception))

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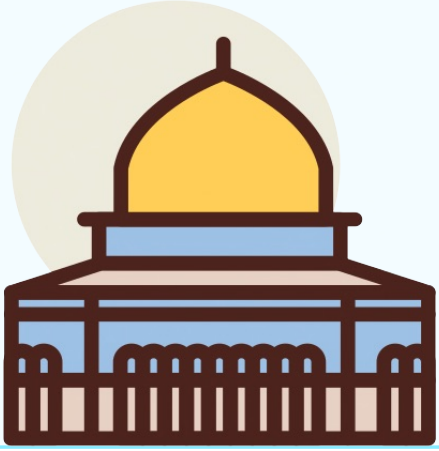
Done by :

لجنة الطب والجراحة



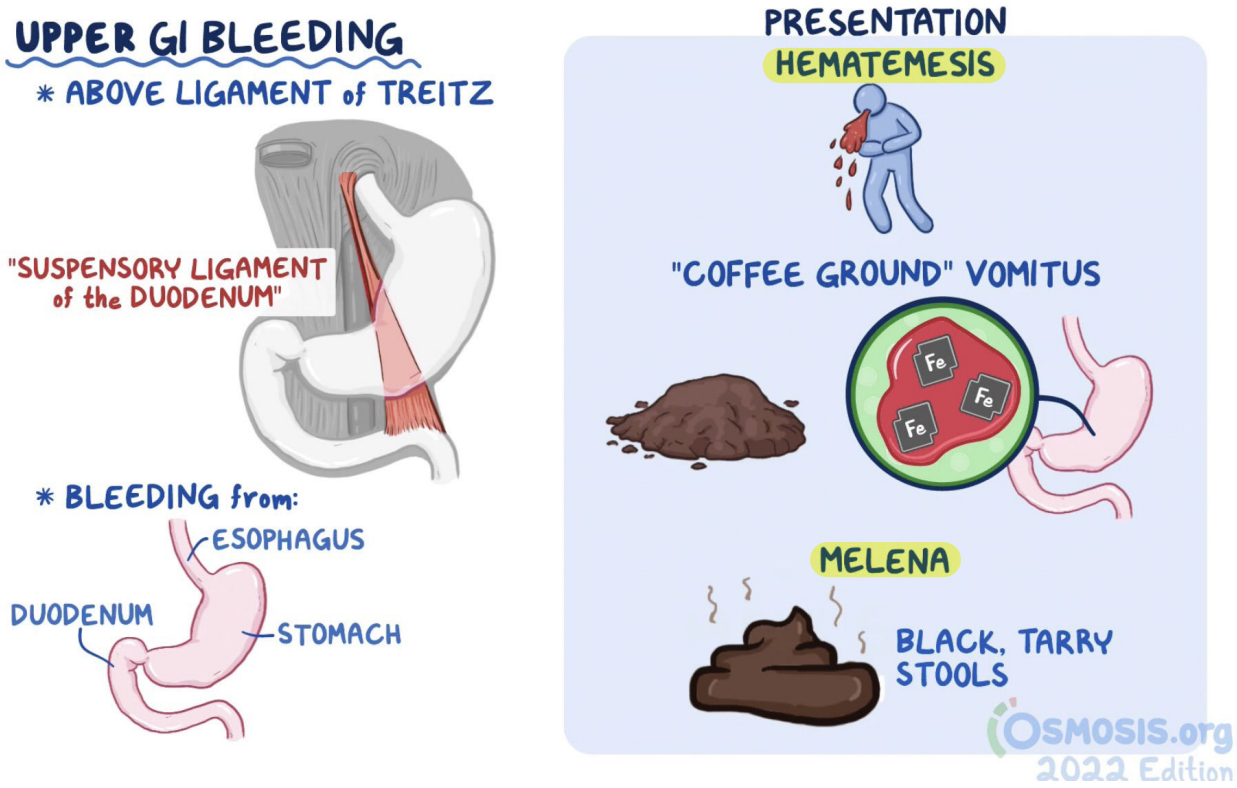
Approach to gastrointestinal bleeding in children

- Upper gastrointestinal (UGI) bleeding
  - Arising proximal to the ligament of Treitz
  - Presents with hematemesis (vomiting of red blood or coffee ground-like material) and/or melena (black, tarry stools)

- Lower gastrointestinal (LGI) bleeding
  - Arising distal to the ligament of Treitz
  - Presents with hematochezia (bright red or maroon-colored blood or fresh clots per rectum)

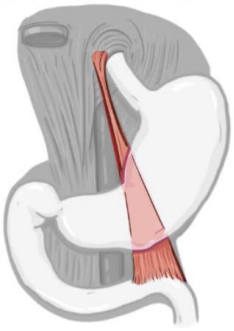
↳ If the bleeding was from the distal small bowel Such as ; meckle's

STEPS
STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY



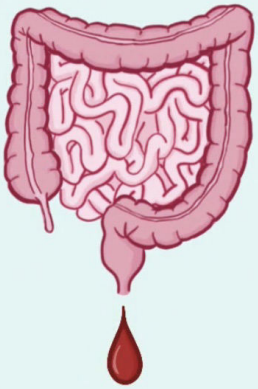
LOWER GI BLEEDING

* BELOW LIGAMENT of TREITZ



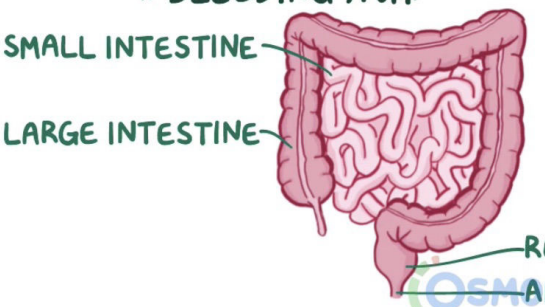
PRESENTATION

HEMATOCHEZIA



BLOOD MAY or MAY NOT MIX w/ STOOL

* BLEEDING from:



The blood volume is approximately 80 ml/kg

When it's narrow , that's indicate bleeding

هون بتبلش تظهر

TABLE 3-1 SIGNS AND SYMPTOMS OF HEMORRHAGE BY CLASS

أعراض ال shock

PARAMETER	CLASS I	CLASS II (MILD)	CLASS III (MODERATE)	CLASS IV (SEVERE)
Approximate blood loss	<15%	15–30%	31–40%	>40%
Heart rate	↔	↔/↑	↑	↑/↑↑
Blood pressure	↔	↔ Due to compensation	↔/↓	↓
* Pulse pressure = Systolic BP - diastolic BP	↔	↓	↓	↓
Respiratory rate	↔	↔	↔/↑	↑
Urine output	↔	↔	↓	↓↓
Glasgow Coma Scale score	↔	↔	↓	↓
Base deficit[a]	0 to −2 mEq/L	−2 to −6 mEq/L	−6 to −10 mEq/L	−10 mEq/L or less
Need for blood products	Monitor	Possible	Yes	Massive Transfusion Protocol

[a] Base excess is the quantity of base (HCO_3^-, in mEq/L) that is above or below the normal range in the body. A negative number is called a base deficit and indicates metabolic acidosis.

Data from: Mutschler A, Nienaber U, Brockamp T, et al. A critical reappraisal of the ATLS classification of hypovolaemic shock: does it really reflect clinical reality? *Resuscitation* 2013,84:309–313.

The blood volume is approximately 80 ml/kg

Normal child birth weight (2.5 - 4.2) kg
So, if the infant's weight was 3 kg → his normal blood volume = 80x3 = 240 ml

In stage III → patient become in tachycardia
In stage III & stage IV → become tachypnea

* the most or earliest (first) sign of developing the patient to third degree is → hemorrhagic shock or narrowing of pulse pressure

Case Q :

Child, his weight = 10 kg , he leaks 500 ml (5 Gauze) << 1 Gauze = 100 ml >>

1- what is normal blood volume (المفروض) ?? 80x10 = 800
2- which stage?? Stage IV

haemophilia A, lack or total absence of coagulation factor VIII.
In haemophilia B, lack or total absence of coagulation factor IX.
Their management is → تعطيهم ال factor الناقص

	Newborn (1-30) days Premature	1MO-1YR	1-2YR	> 2YR
Upper GIB It's usually medical cause	Hemorrhagic disease Factors deficiency Swallowed maternal blood	Esophagitis Gastritis	PUD Peptic ulcer disease	Varices (Esophageal, gastric)
Lower GIB usually surgical cause	Anal fissure M.C → posterior NEC → Necrotizing enterocolitis Abdominal distention & vomiting	Anal fissure Intussusception	Polyps Meckle's Diverticulum	Polyps IBD Intussusception

vichow circle → tight sphincter → constipation → hard stool → fissure بصير يجرح المنطقة

Management in children → treat the cause of constitution
By laxatives & fibers

STEPS
STANDARDIZED TOOLS FOR EDUCATION FOR PEDIATRIC SURGERY

- Older infants and young children present with painless lower GI bleeding
- Older children presented as inflammation diverticulitis like appendicitis

* Most common cause of bleeding per rectum in childhood is Meckel's diverticulum

antimesentry

Meckel's diverticulum

Distally is obliterated
Proximal is patent

Meckel's diverticulum is a remnant of the embryonic vitelline or omphalomesenteric duct, caused by failure of normal regression of the duct.

It is a true diverticulum that occurs in the ileum
↳ Contain all Intestinal layers (mucosa, submucosa, muscularis, serousa)

↳ Connect yolk sac with the midgut

Other anomalies arise from failed regression of the omphalomesenteric duct
Umbilical polyp, omphalomesenteric fistula, umbilical sinus, umbilical cyst, and persistent fibrous band.

If not obliterated (patent)

Proximally is obliterated
Distally is patent
Near the umbilicus

Obliterated from the 2 distal sides

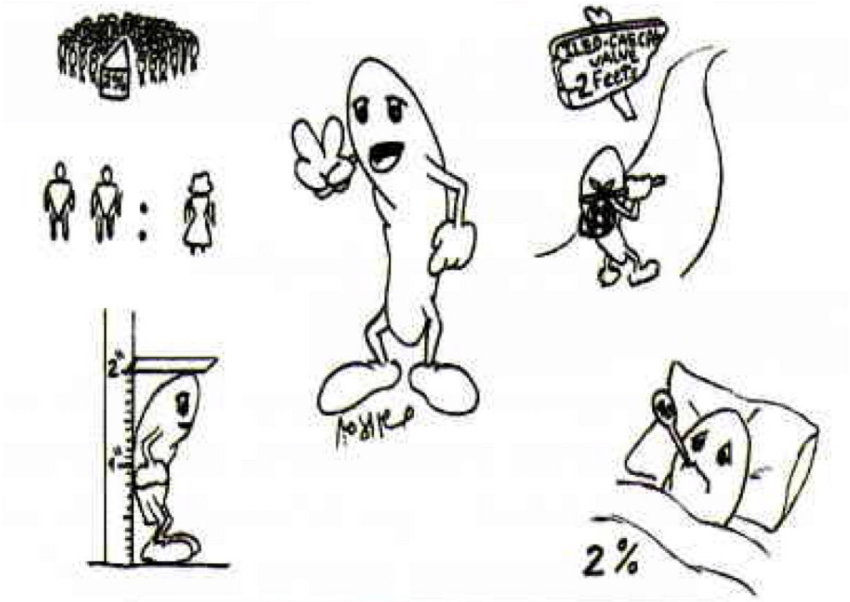
"Rule of 2's"
Occurs in 2% of the population, usually is located within 2 feet of the ileocecal valve, is 2 inches in length and 2 centimeters in diameter, becomes symptomatic before age 2, contains 2 types of heterotopic tissue (gastric and pancreatic), and is 2 times more common in males.

↳ Means not mucosa of small bowel

* False → contain just mucosa & submucosa → such as diverticulum disease in adults

STEPS
STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

Small bowel contents → succus entericus



Rule of 2 in Meckel's

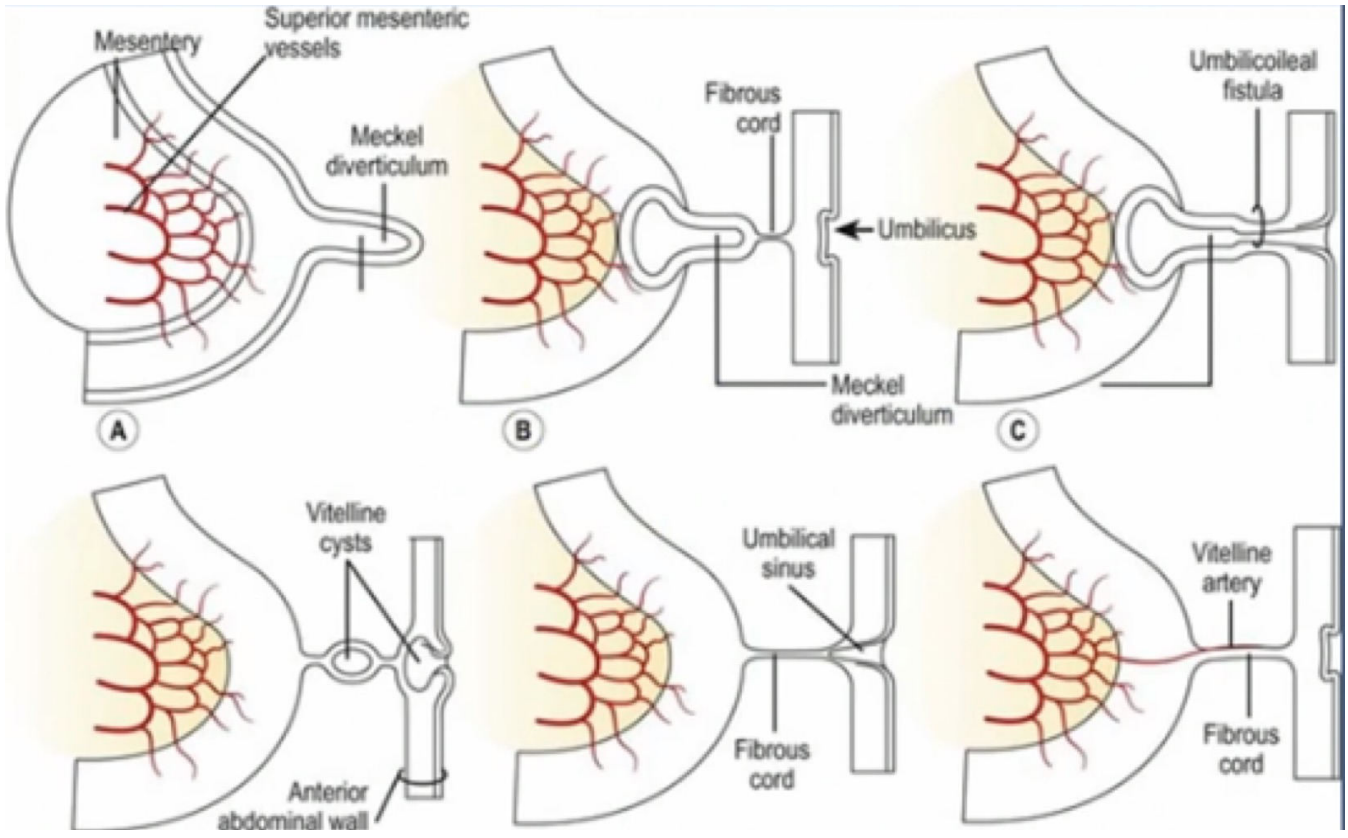
* Anomalies :

1 - patency of the proximal part of the duct & obliteration of the distal (near the umbilicus)
→ diverticulum

2 - patency of the entire duct
→ fistula

3 - patency of the distal part (near the ambulicus) → sinus

4 - obliteration of the lumen of the duct & patency of the duct
→ fibrous cord



If there is lower GI bleeding → meckle's diverticulum most commonly the mucosa was (gastric) mucosa

- **3 common presentations**
  - **Bleeding (40-60%)**
    - Painless, episodic, bright → Maroon Color
      (Periodic) → not continuous
      Cause ?? gastric mucosa
  - **Obstruction (25%)**
    - Episodic, crampy pain, bilious vomiting, currant jelly stools
      Bleeding وصف ال
      Sign of late presentation
    - Due to volvulus or intussusception → (diverticulum act As a leading point)
      → By the fibrous band
  - **Diverticulitis +/- perforation (10-20%)**
    - Similar to appendicitis Right lower quadrant pain

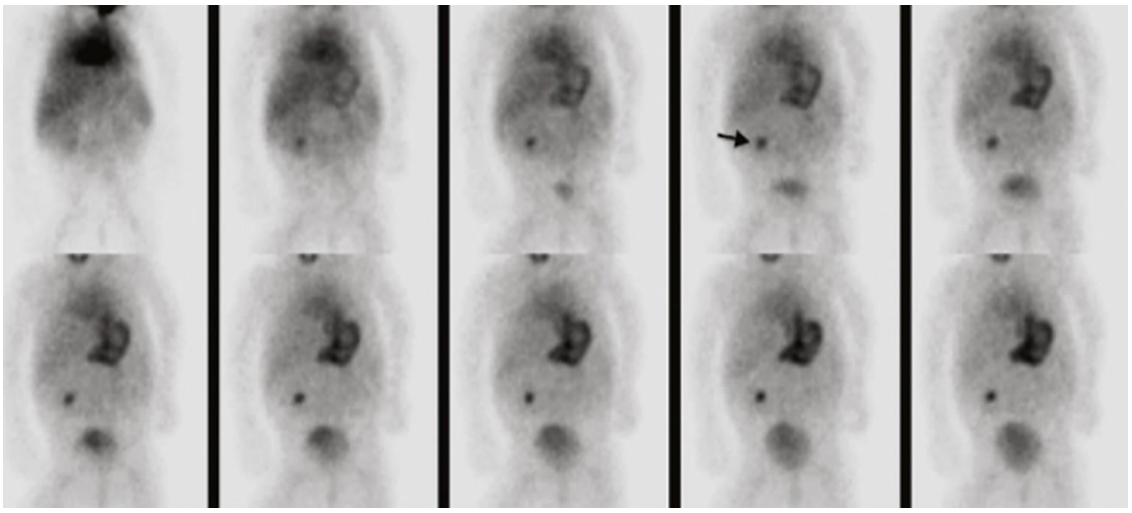
STEPS STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

Fissure bleeding → painful
Meckle's → painless

Radiology
In bleeding : t99c
In obstruction (intussesception): US
Pain : ct

- **What labs are needed?**
  - CBC - Low HCT with bleeding (but high in dehydration)
  - Electrolytes
- **What imaging is needed?**
  - Meckel scan for bleeding (technetium-99m pertechnetate isotope scan)
    sensitivity of 85% and a specificity of 95%
    gastric تلوّن ال Mucosa
  - Ultrasound for intussusception → Target sign
  - CT Abd/Pelvis for obstruction → Dilatation of bowel
    + diverticulitis
    or Pain

STEPS STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY



STEPS
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- **Management** Surgical
  - **Pre-op:** Stabilization
    - Hydration/transfusion (NPO)
    - NG decompression
    - Antibiotics → if there is inflammation, most common G- in small bowel
  - **Operative:**
    - Laparoscopy/laparotomy
    - Bowel resection vs. diverticulectomy

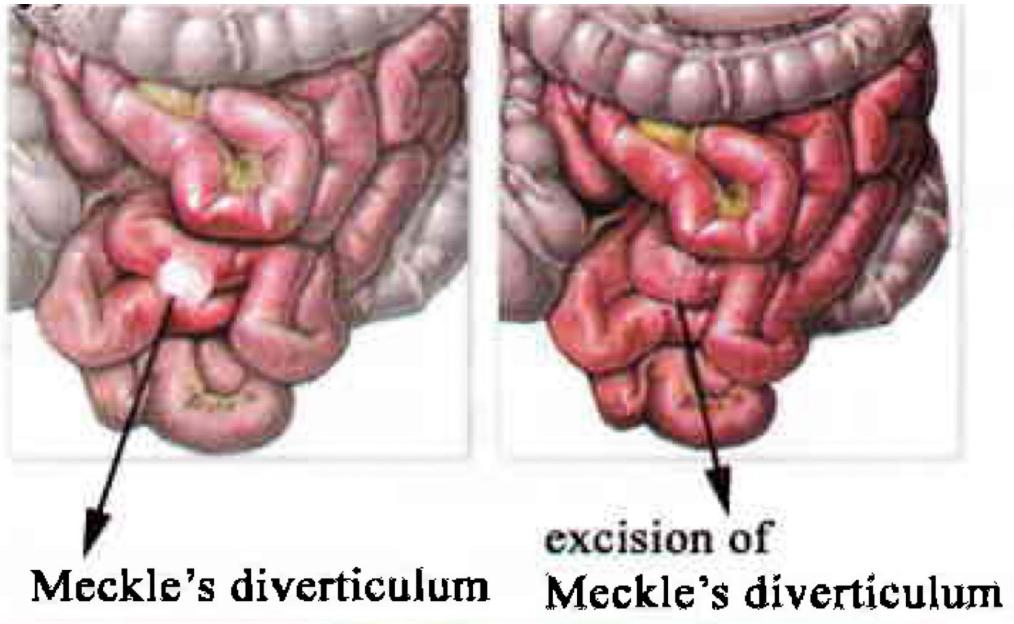
If the base of the diverticulum is wide

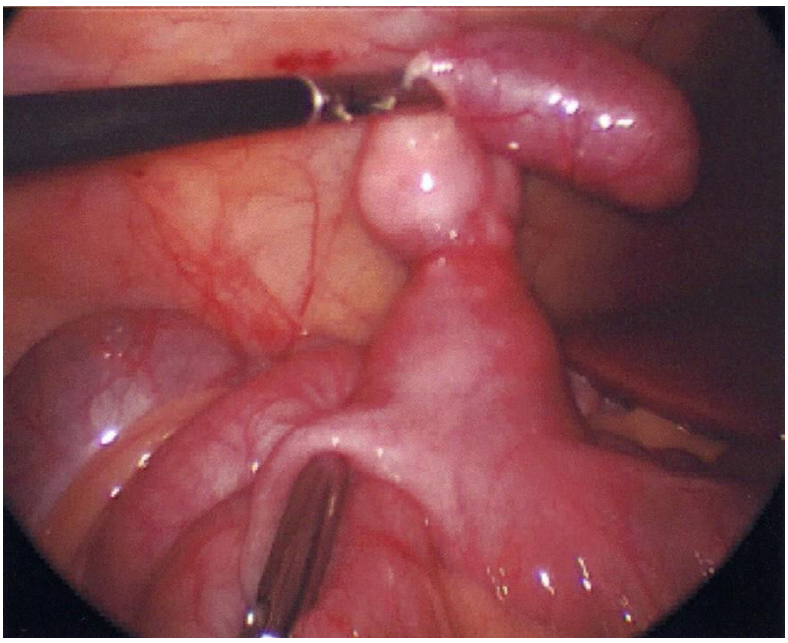
If narrow

STEPS
STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

Mesentric onstruction causes :

Adhesion . Mesentric and omental cyst





STEPS
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Typically seen in infants; rare in adults.

INTUSSUSCEPTION → main presentation is obstruction

Full-thickness invagination (telescoping) of the proximal bowel into the distal contiguous intestine

80-90% of intussusceptions occur in children between 3 months and 2 years of age

RUQ mass → advanced case

→Recurrent jelly stool

Crampy intermittent abdominal pain, vomiting, rectal bleeding, and abdominal mass (Classic presentation) , Constipation, obstipation

- Pulls legs up with pain episodes, comfortable in between episodes

intermittent sudden crying and legs being drawn up during the crying episodes

lethargy, dehydration, and abdominal distention are also frequent findings

Causes small bowel obstruction and vascular compromise intermittent abdominal pain, vomiting, bloody "currant jelly" stools.

STEPS STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

The most common intussusception is ileocolic—the ileum invaginates into the cecum or right colon.

Ileoileal or colocolic intussusceptions are less frequent and associated more often with a "pathologic lead point." (Meckle's, LN, Tumor, lymphoma, Polyp)

Secondary

hypertrophied in case of Previons infection

mainly out side the typical age

STEPS STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

What is the usual cause of intussusception?

The best answer is that the cause is unknown.

However, an unproven theory suggests that, because intussusception frequently follow s a viral illness (gastroenteritis, respiratory infection), the resultant hyperplasia o f distal ileal lymphoid tissue is to blame. Hyperplastic tissues, called Peyer's patches, involve the entire circumference of the distal ileum, thus causing luminal narrowing and tethering that encourages intussusception.

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In intussusception → upper GI infection لازم نسألهم اذا تعرضو ل

Or gastroenteritis within one week cuz it's thought that the cause on intussusception is idiopathic (unknown) → there is no definite pathology

* viral → L.N hypertrophy in ileum mesentry cause intussusception

Idiopathic form is associated with recent viral infections (eg, adenovirus), rotavirus vaccine Peyer patch hypertrophy may act as a lead point.

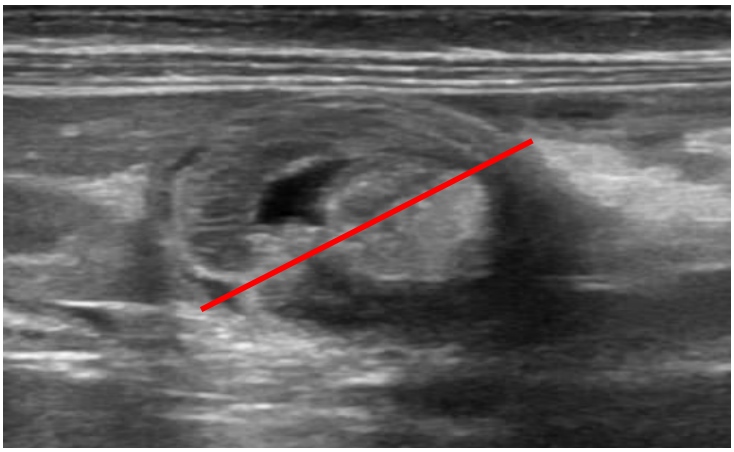
Contraindicated

Diagnosis

If transverse

Ultrasonography (target sign) , (Pseudo kidney sign if U/S is longitudinal)

Contrast enema (coiled-spring sign).



STEPS
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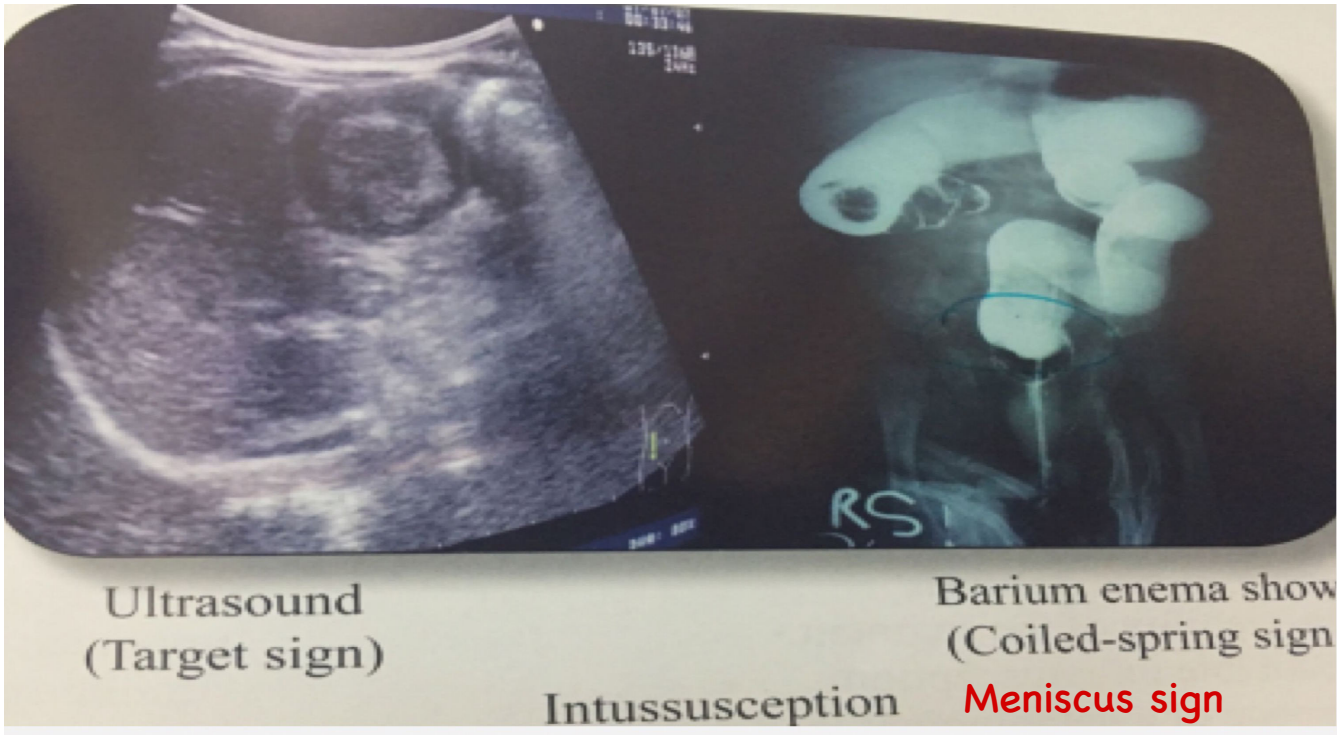

first line
(Pre-surgery)

Management

NPO (fluids)

IV access, rehydration, and surgical consultation are essential.

NG

Insertion o f a nasogastric tube and intestinal decompression are recommended before reduction is attempted.

Non invasive maneuver

Either hydrostatic or pneumatic reduction Under fluoroscopic guidance. → Live - X-ray

(air) (fluids)

→ if failed twice , don't try third time

بجرب بس مرتين

- **Successful reduction**
  - Free flow of contrast into distal small bowel
  - Resolution of symptoms

If recurrent: برضو بمشي non operative >> if failed للمرة الثالثة >> surgery

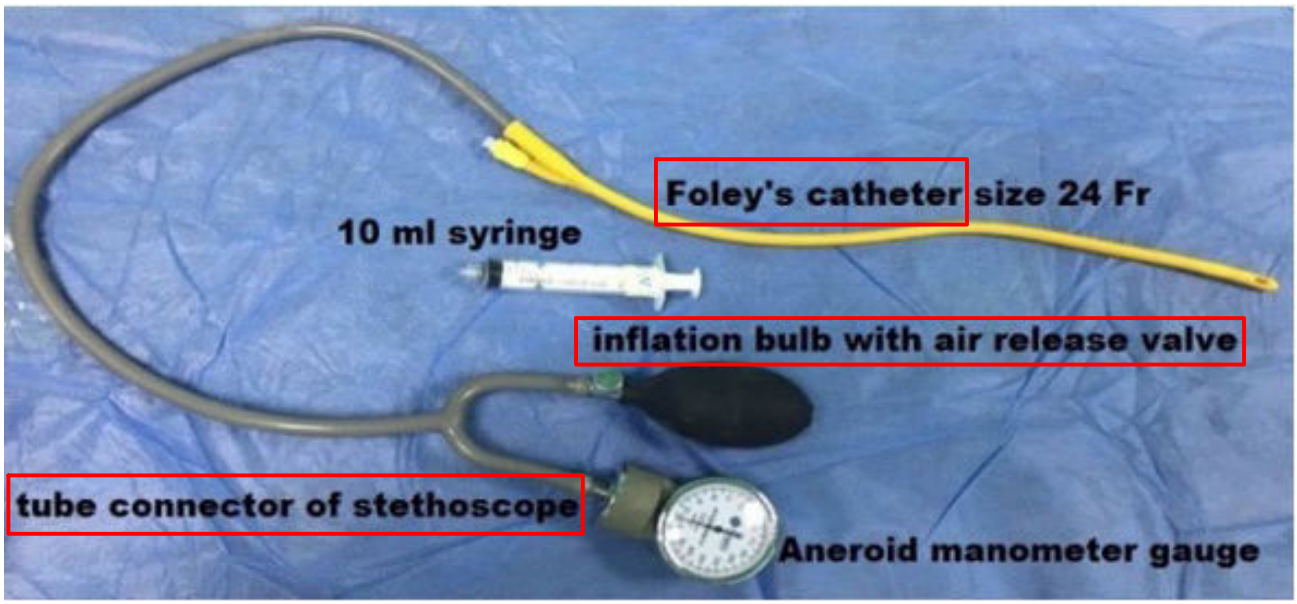

Figure 1. Modified Air Insufflation Device.

Operative treatment

When is indicated?

- Irreducibility by pneumatic or hydrostatic means (Failure)
- Peritonitis (perforation), shock, and hemodynamic instability
- Age > 6 years → With leading point لأنها
- Duration of symptoms > 24 hours. - late sign as current jelly stool (Milking)

- Gentle manipulation by pushing the intussusceptum out of the intussuscipiens (rather than by pulling with traction).

- If attempts at reduction cause undue injury to the bowel wall, if bowel necrosis or perforation is present, or if a pathologic lead point is identified or suspected, resection and primary anastomosis are indicated.

STEPS
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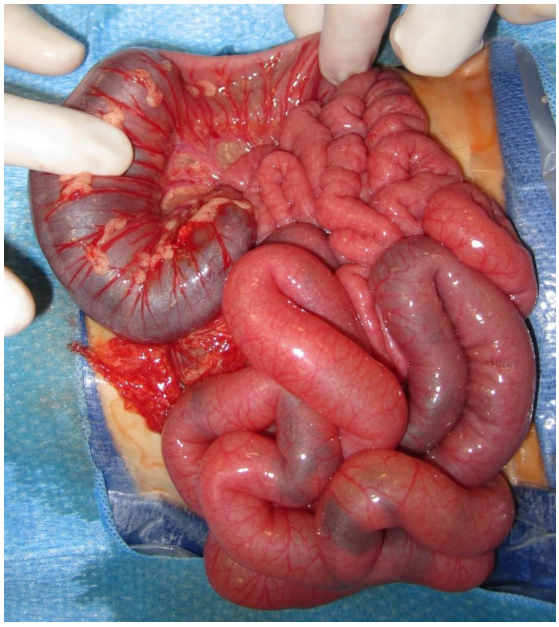
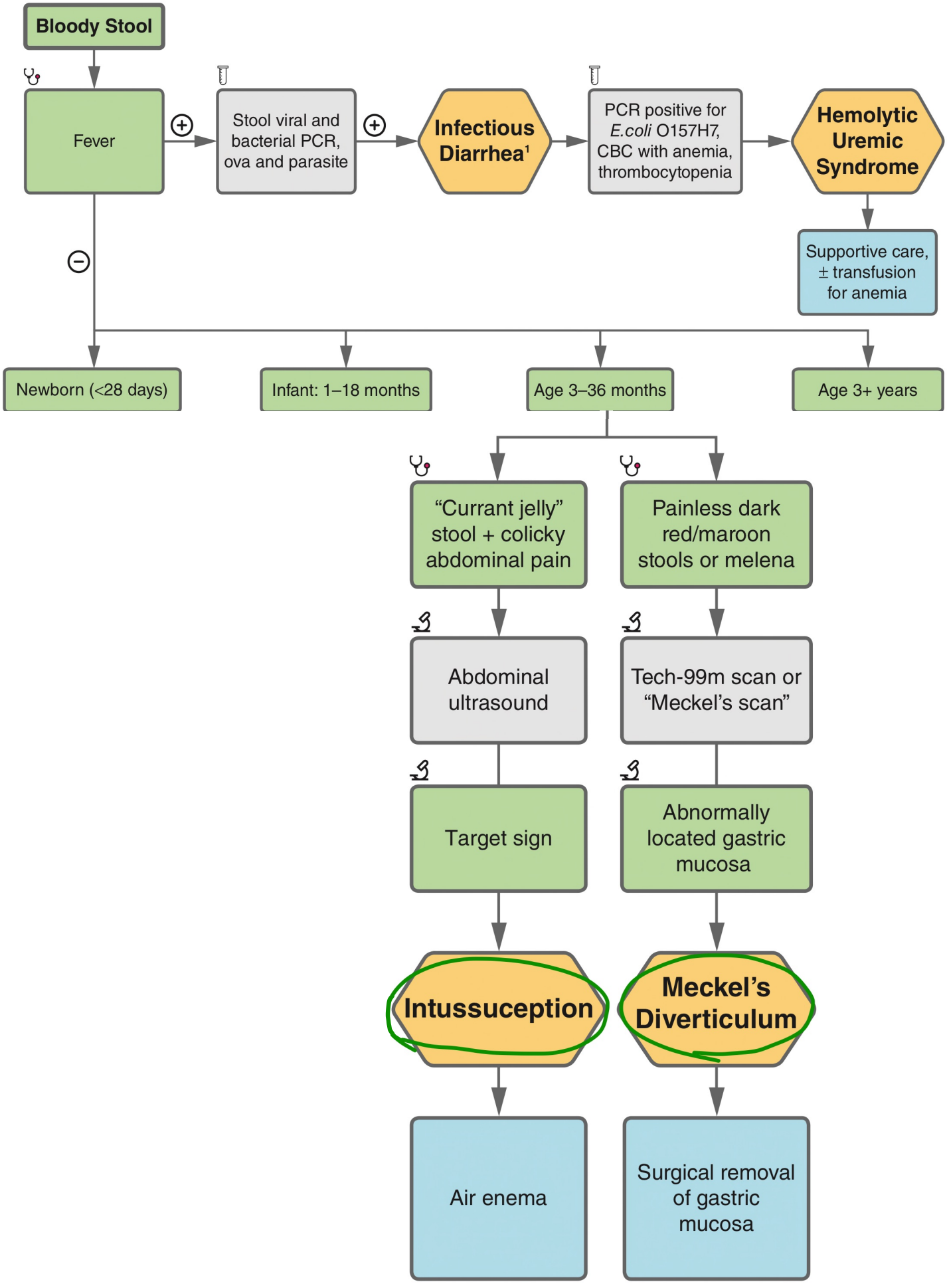
Better to do surgery :

1. Recurrent jelly stool (late sign) associated with high faliure rate with hydrostatic and pnematic reduction
2. Prolapse intussesception in rectum
3. symptoms > 36h



STEPS
STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY


Bloody Stool
Fever
Stool viral and bacterial PCR, ova and parasite
Infectious Diarrhea[1]
PCR positive for E.coli O157H7, CBC with anemia, thrombocytopenia
Hemolytic Uremic Syndrome
Supportive care, ± transfusion for anemia
Newborn (<28 days)
Infant: 1–18 months
Age 3–36 months
Age 3+ years
"Currant jelly" stool + colicky abdominal pain
Painless dark red/maroon stools or melena
Abdominal ultrasound
Tech-99m scan or "Meckel's scan"
Target sign
Abnormally located gastric mucosa
Intussuception
Meckel's Diverticulum
Air enema
Surgical removal of gastric mucosa

Archive

*** All are causes of melena, EXCEPT:**

A. Esophageal varices
B. Bleeding duodenal ulcer
C. Aorto-duodenal fistula
D. Hematobilia
E. Hemorrhoids

*** Which of the following is considered as a poor prognostic indicator in upper gastrointestinal bleeding:**

A. A presentation of melena rather than hematemesis
B. Young age
C. Chronic rather than acute ulcer
D. Duodenal rather than gastric ulcer
E. Female sex

*** Regarding Meckel's diverticulum, which of the following statement is true:-**

A-It is a false diverticulum.
B-Resection of the incidental meckel's is indicated in all children.
C-Bleeding Meckel's can be diagnosed by Tc99, scan.
D-The diverticulum arises from the mesenteric side of the small bowel.
E-All Heterotopic tissue in the diverticulum is usually associated with massive bleeding

*** The massive rectal bleeding in children is due to:-**

a. Anal fissure.
b. Juvenile polyps.
c. Rectal prolapse.
d. Meckel's diverticulum.
e. Intussusception

*** Which of the following statements about gastrointestinal bleeding in children is TRUE?**

a. Lesions proximal to the ligament of Treitz are the usual cause of gastrointestinal bleeding in children older than 1 year.
b. Upper gastrointestinal bleeding is ruled out by normal naso-gastric aspirate.
c. Meckel's diverticulum hill most frequent cause of massive lower gastrointestinal bleeding.
d. Bleeding is common with midgut volvulus but is rarely seen with intussusception.
e. Anal fissures are a rare cause of rectal bleeding in an infant.

*** The segment of bowel is most frequently associated with intussusception; Select one:**

a. Ileoileal

b. Colocolic

c. Ileocolic

d. Caecocolic

e. Jejunoileal

*** Which of the following is not a typical cause of neonatal intestinal obstruction?**

a. Intussusception.

b. Meconium ileus.

c. Hirschsprung's disease.

d. Jejunoileal atresia.

e. Incarcerated inguinal hernia.

*** Regarding intussusception all the statements are true Except:-**

a. Palpable sausage shaped mass in the abdomen.

b. May be the presenting feature of intestinal lymphoma.

c. Urgent surgery is the best choice of treatment.

d. The red currant jelly stools are a frequent finding.

e. The diagnosis is confirmed by ultrasonography

*** Intussusception is a cause of all of the following, EXCEPT:**

A. A mass in the abdomen

B. Abdominal colic

C. Frequency of micturition

D. Passage of blood per rectum

E. Intestinal obstruction

*** A previously healthy 8 months old boy started to suffer from repeated abdominal pain, vomiting and red currant jelly stool; he should be regarded to have:**

A. Volvulus neonatorum

B. Intussusception

C. Gastroenteritis

D. Meconium ileus

E. Meckel's diverticulitis

*** An 8 months male baby presented with sudden crying with flexion of his legs to abdomen and vomiting. Few hours later he passed bloody diarrhea with mucus. The pathological diagnosis is:**

A. Gastroenteritis

B. Food poisoning

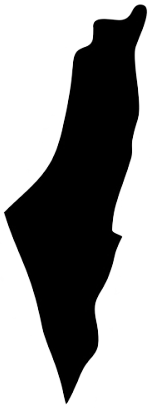
C. Intussusception

D. Meckel's diverticulum

E. Acute appendicitis

*** Intussuception not diagnosed by**

technicium-99



اللهُمَّ انصُر أهل غَزَّة وثبِّت أقدامهم.

اللهُمَّ احرُس أهل غَزَّة بِعينك التي لاتَنام.

اللهُمَّ كُن لأهل غَزَّة عوناً و نصيراً، وبدِّل خوفهم أمناً وأماناً.

اللهُمَّ اجبُر كَسرهم، واشفِ مَرضاهم، وتقبَّل شُهداءَهم بِرحمتكَ.

اللهم سخر لهُم ملائكة السماءِ وجُنودَ الأرض...

اللهم انصرهم على من عاداهم وافتح لهم فتحًا قريبًا.