Congenital intestinal obstruction

Lection

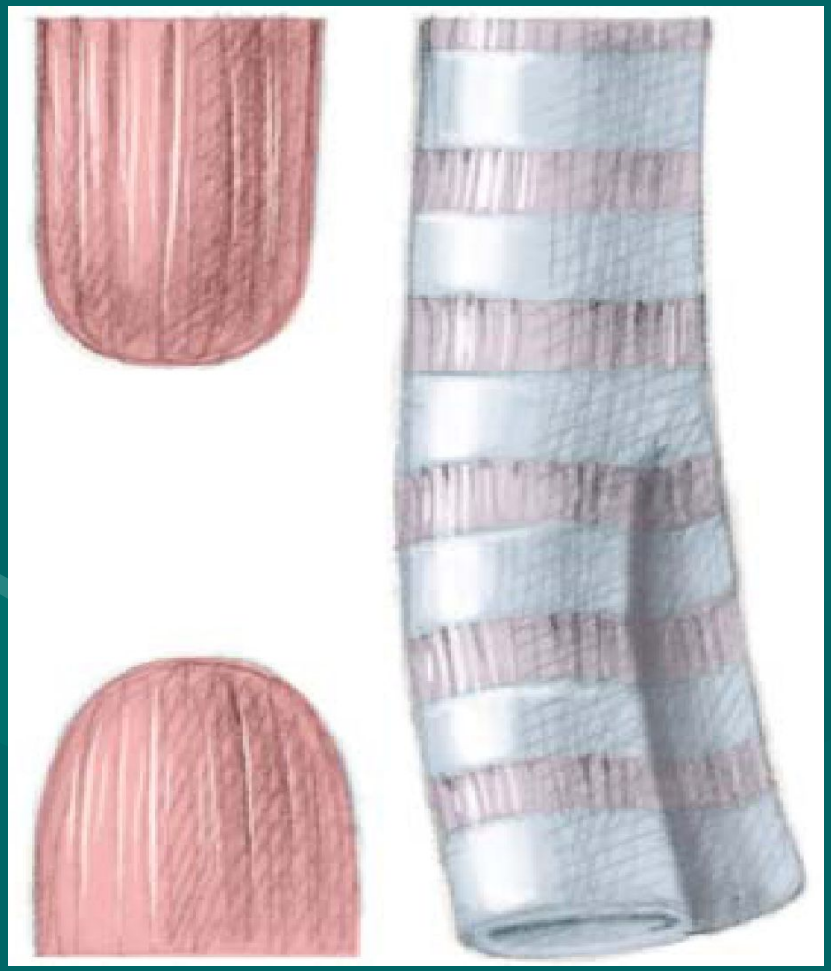
Oesophageal atresia

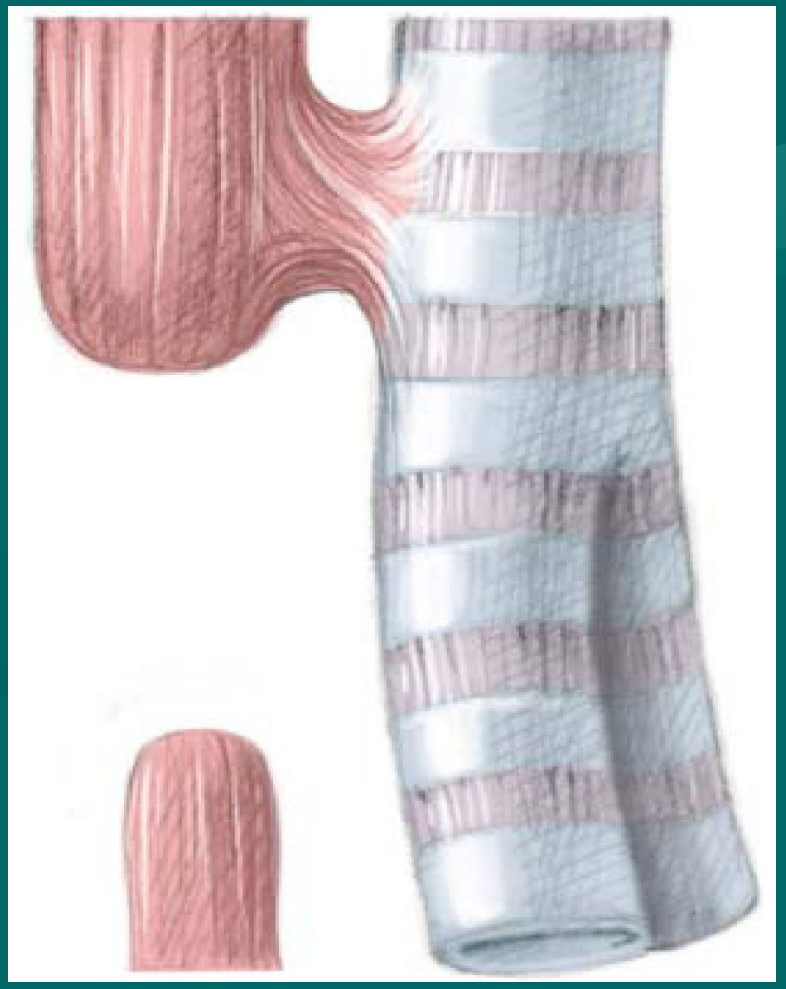
- Oesophageal atresia is defined as an interruption in the continuity of the oesophagus with or without fistula to the trachea.

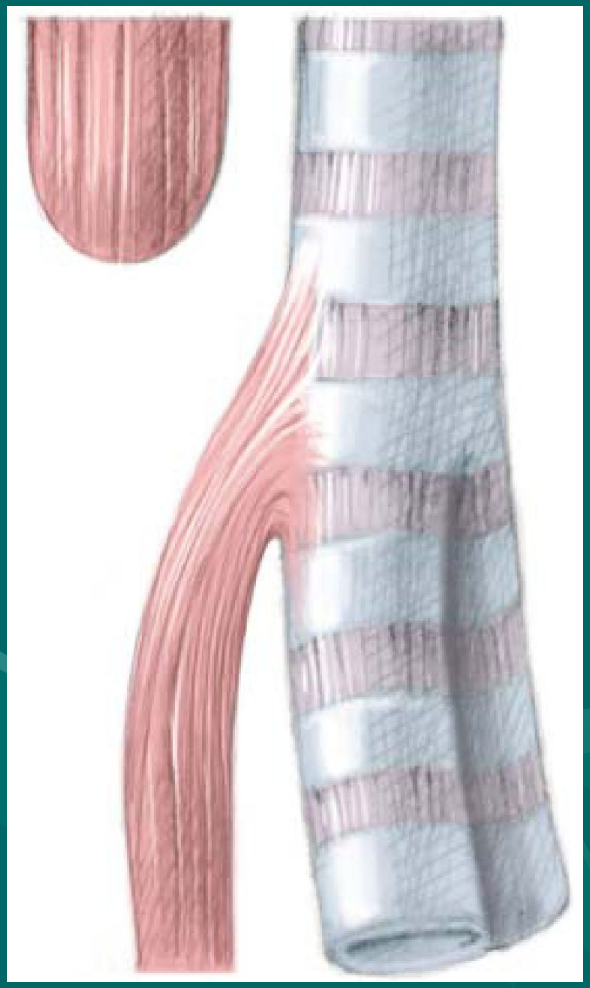
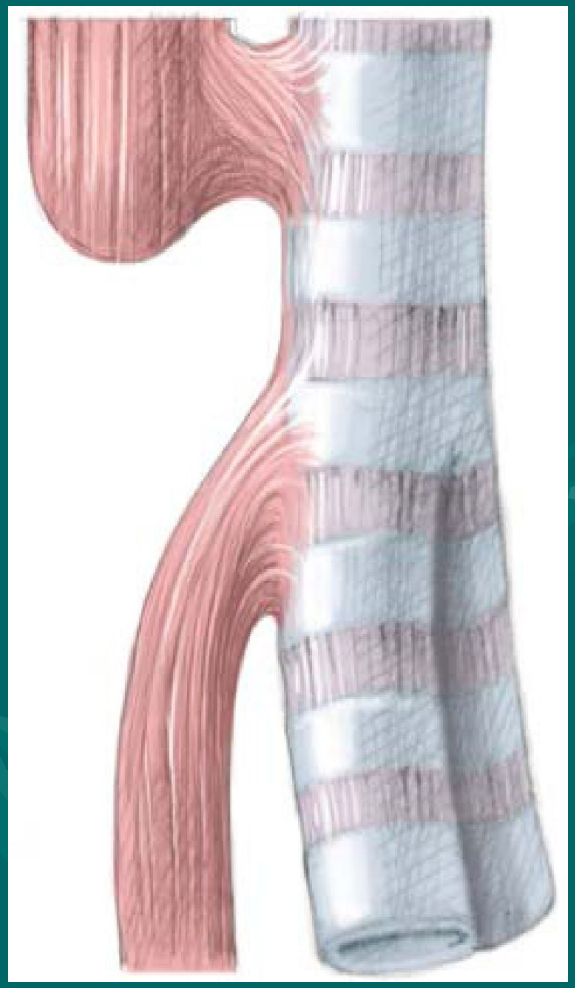
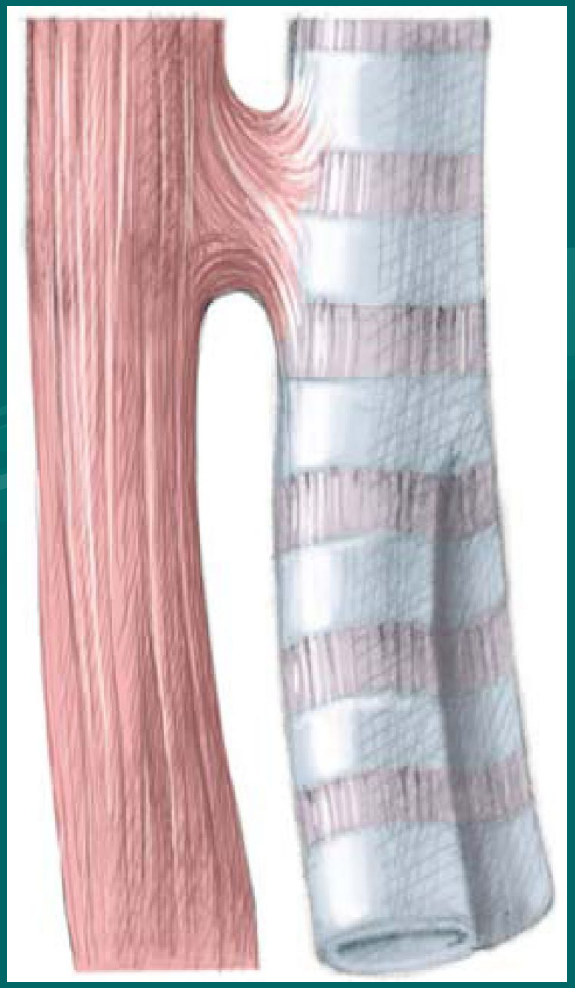
- The anomaly results from an insult occurring within the fourth week of gestation, during which separation of trachea and oesophagus by folding of the primitive foregut normally takes place.

- At least 18 different syndromes have been reported in association with oesophageal atresia.
- The best known is probably the VATER or VACTERL association of anomalies (**V**ertebral-**A**nal-**C**ardiac-**T**racheal-**E**sophageal-**R**enal-**L**imb).

Types of tracheo-oesophageal fistula





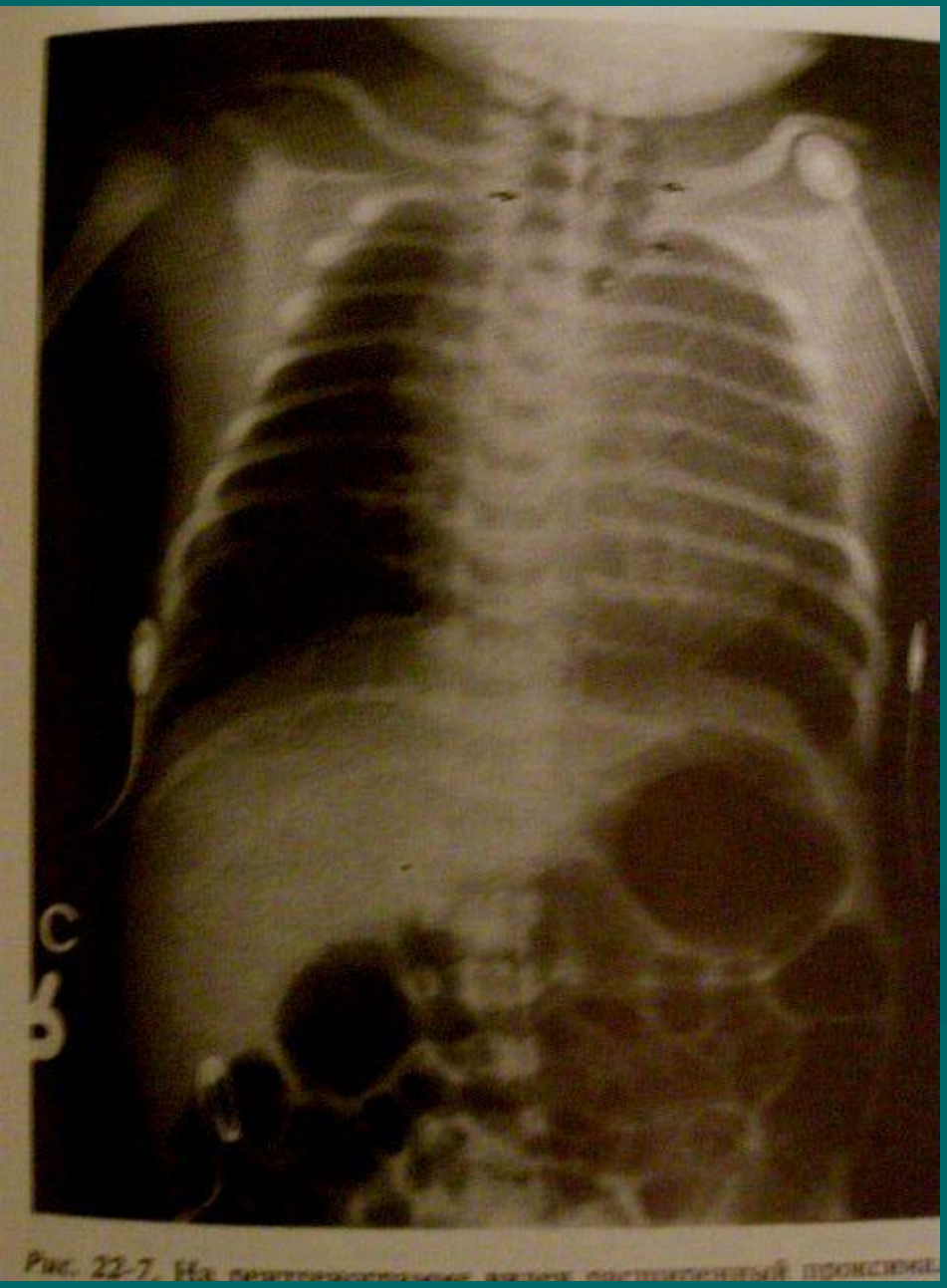




Clinic

- The earliest symptom of oesophageal atresia is a polyhydramnios in the second half of pregnancy.
- A newborn infant has excessive salivation, choking, and regurgitation with feeding.
- 25-40% of neonates are premature, low bith weight.
- 50% of neonates with TEF have an associated anomaly (cardiovascular most common).

Prenatal diagnosis - polyhydramnios

- Inability to pass nasogastric tube.
- Abdominal Xray with air in the stomach excludes esophageal atresia
- A Replogle tube maximally advanced into the upper pouch helps to estimate its approximate length.



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Differential diagnosis

- Intranatal asphyxia of newborn
- Birth injury of brain
- Aspiration pneumonia
- Congenital diaphragmatic hernia with camp

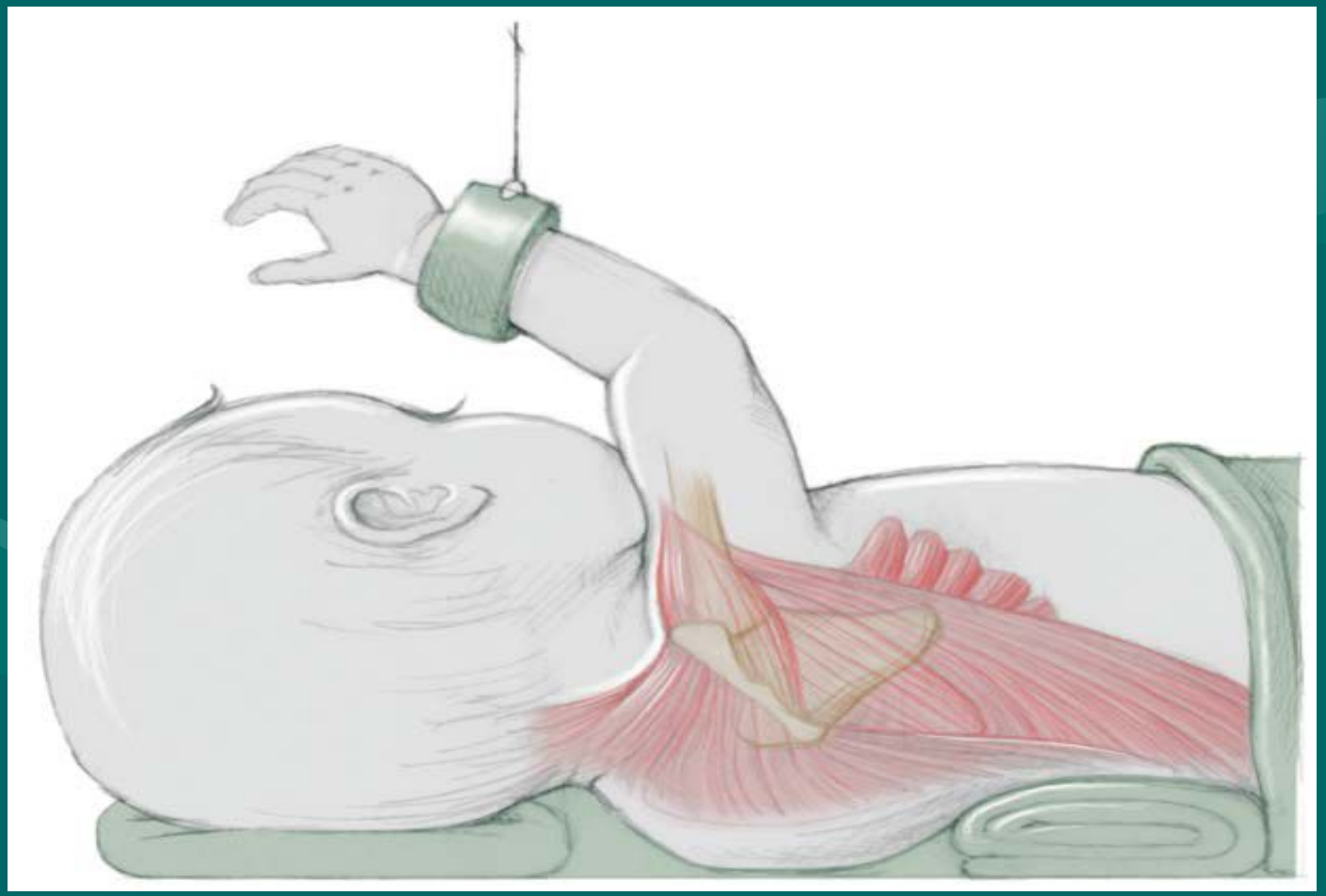
Complications

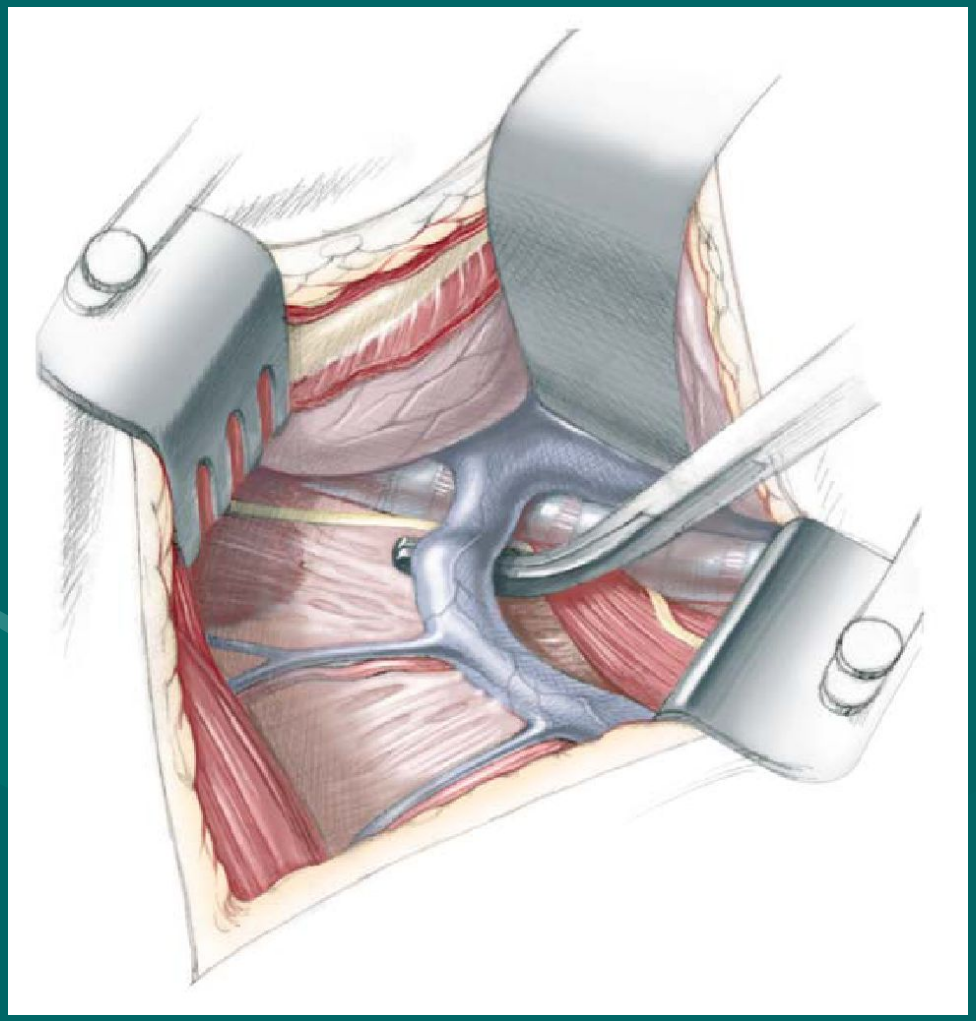
- **Early complications include**: Anastamotic leak, recurrent TEF, tracheomalacia.

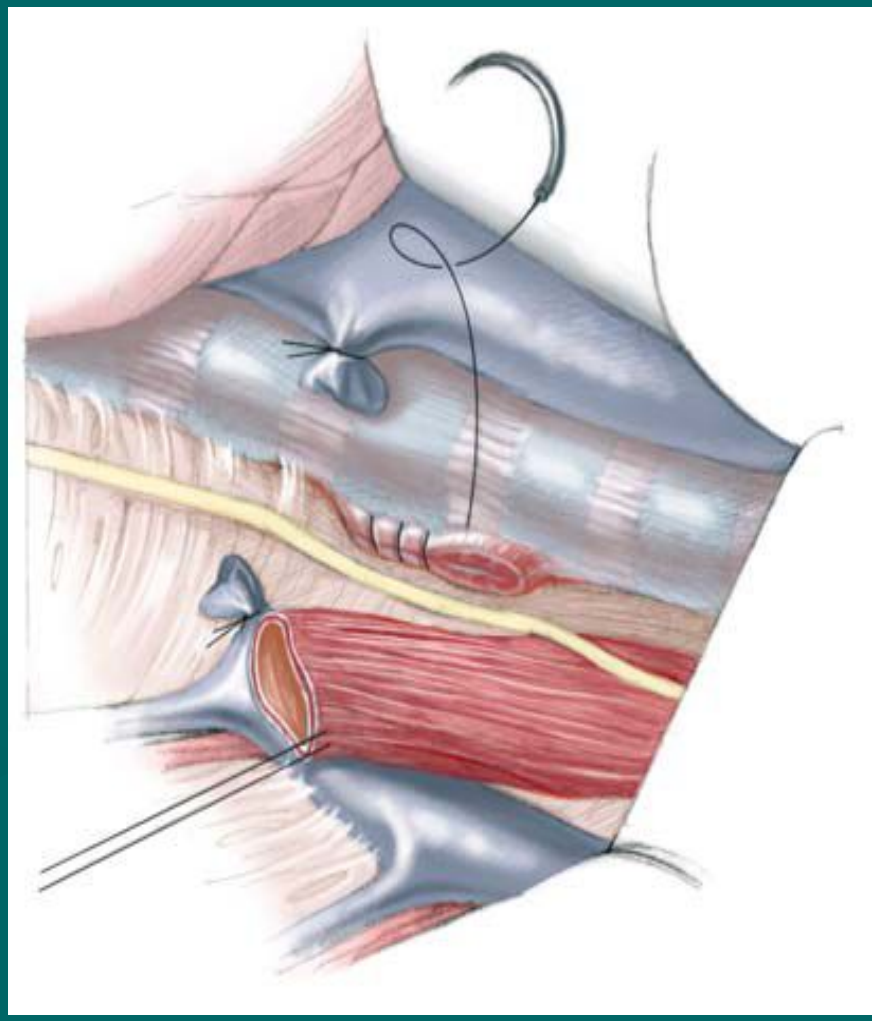
- **Late Complications** include: Anastamotic stricture (25%), reflux (50%), dysmotility (100%).

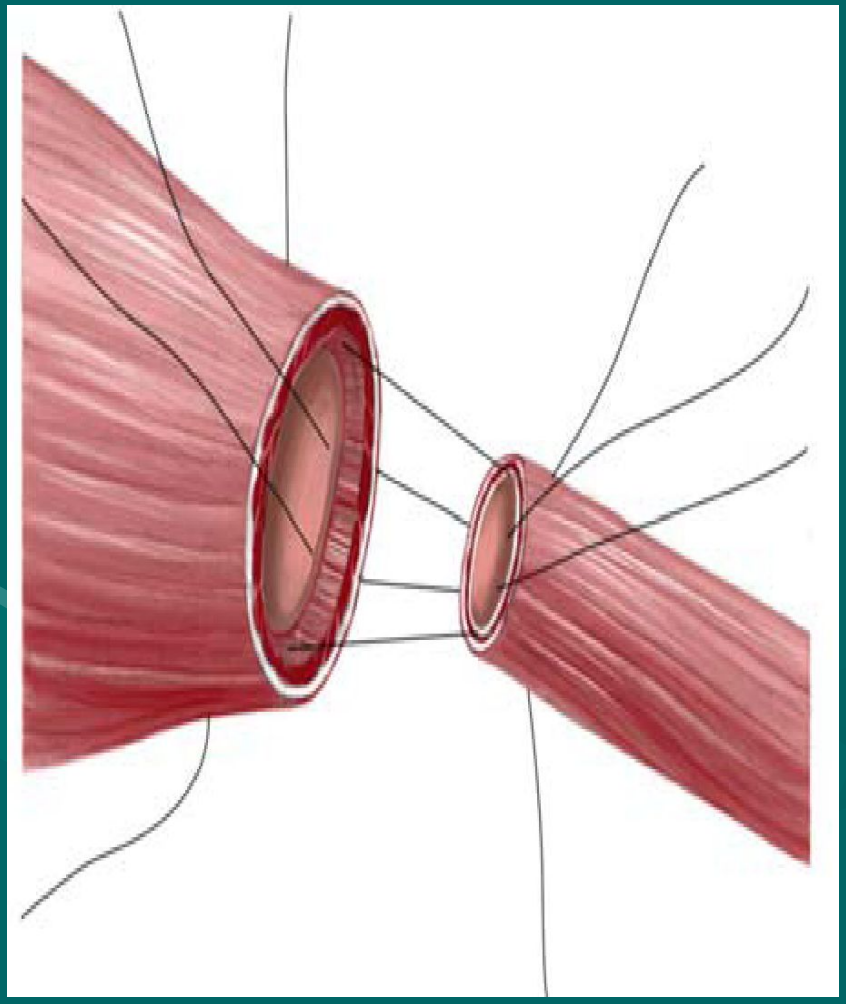
Treatment

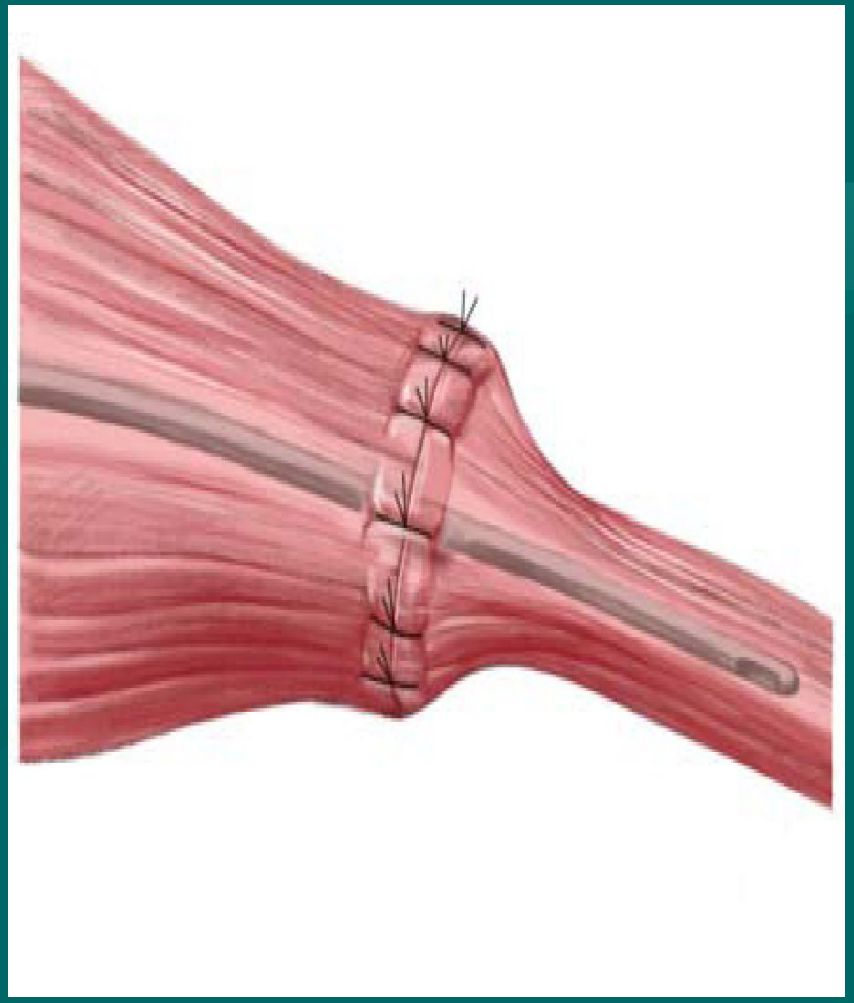
- Operation includes TEF ligation, transection, and restoration with end-to-end anastamosis.



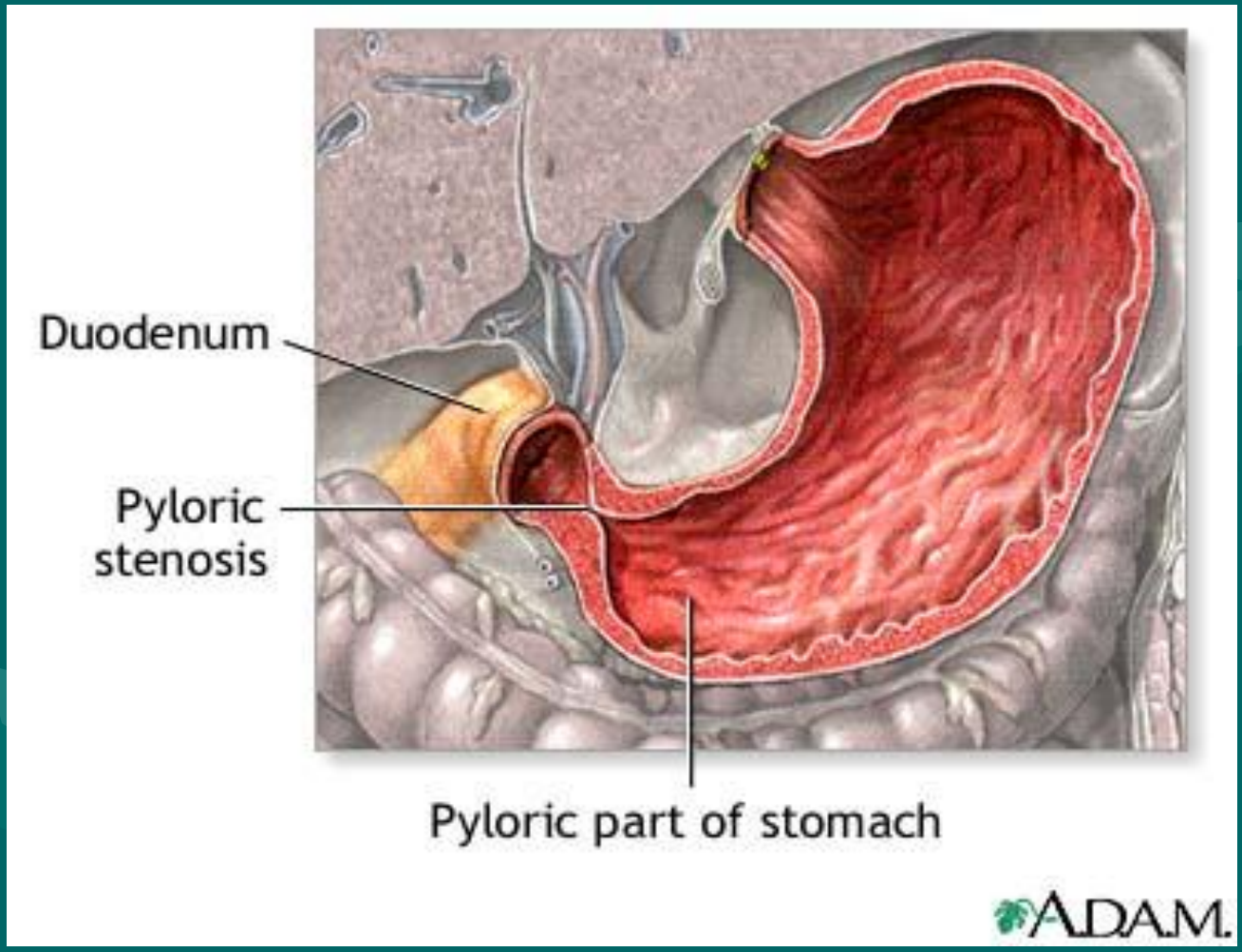








Hypertrophic Pyloric Stenosis



- Infantile hypertrophic pyloric stenosis (IHPS) is a common surgical condition encountered in early infancy, occurring in 2~3 per 1,000 live births. It is characterized by hypertrophy of the circular muscle, causing pyloric narrowing and elongation. Boys are affected four times more than girls.

Cause of hypertrophic circular muscle

- abnormal peptidergic innervation,
- abnormality of nitrergic innervation,
- abnormalities of extracellular matrix proteins,
- abnormalities of smooth-muscle cells
- abnormalities of intestinal hormones.

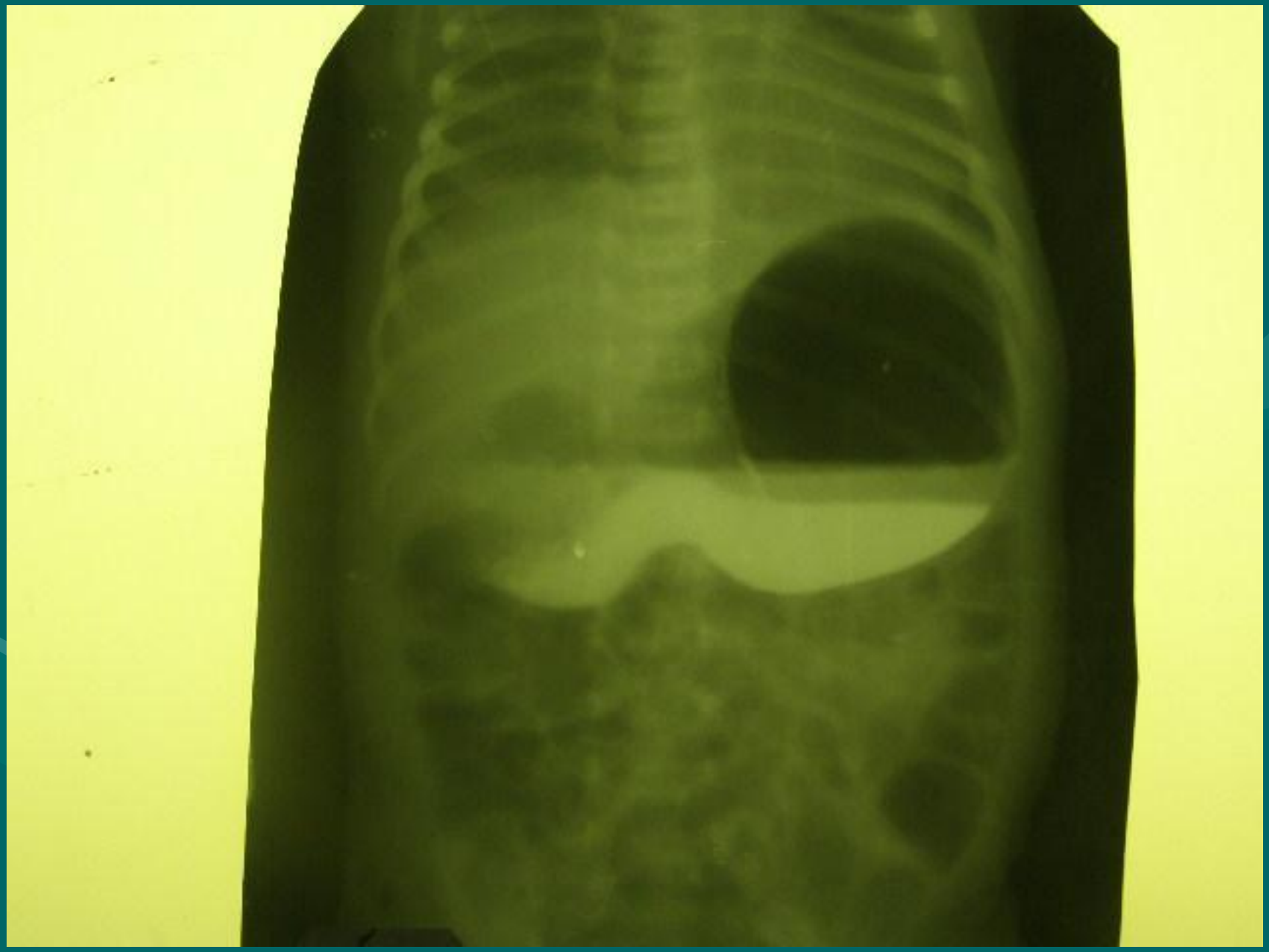
Clinic

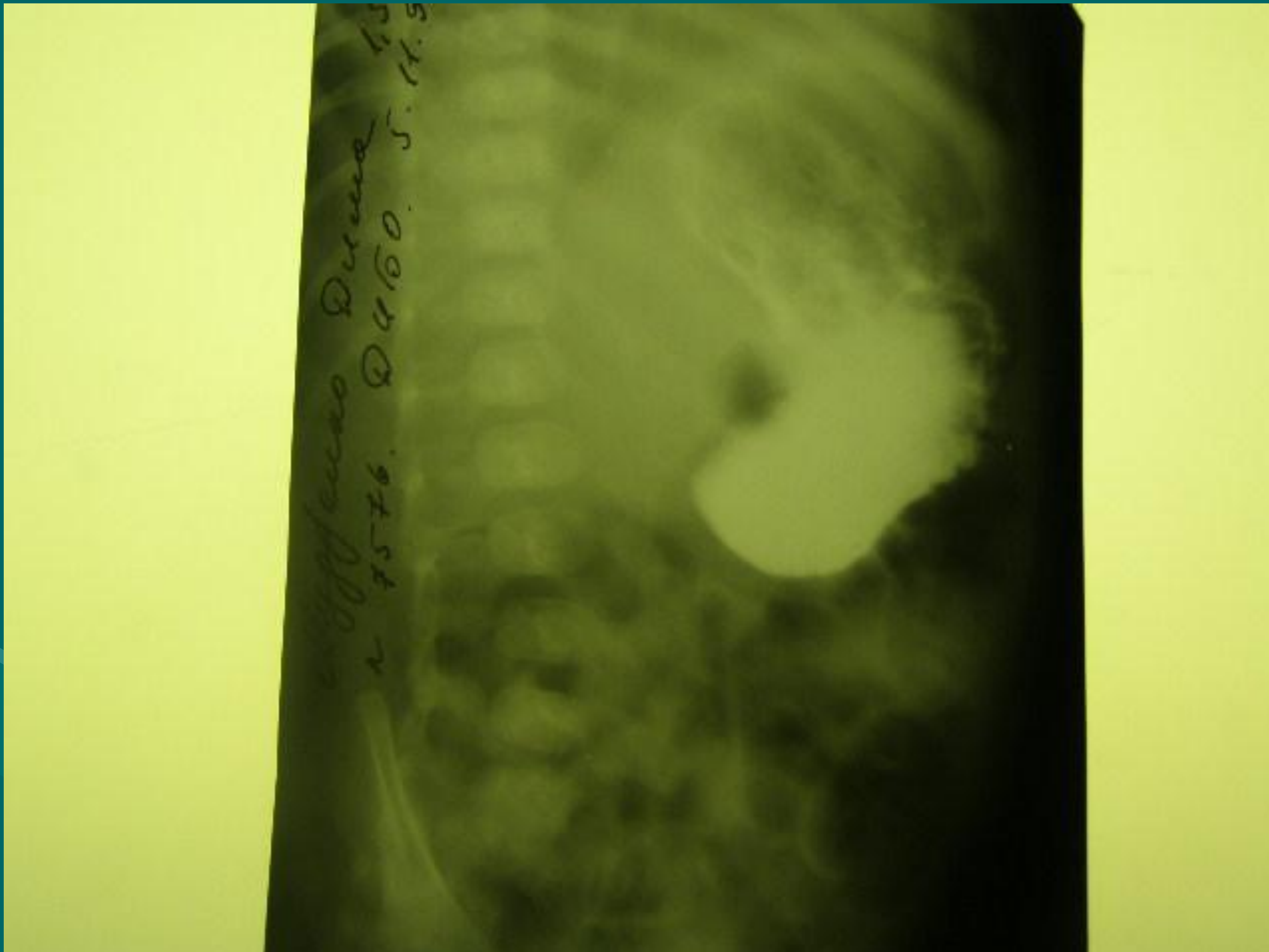
- Age is 3-6 weeks (1 month of age)
- A 4 week old infant presents with non-bilious vomiting and hypochloremic, hypokalemic, metabolic alkalosis.
- Projectile vomiting
- Dehydration
- “Hour-glass deformity sign”

- Initially there is only regurgitation of feeds,but over several days vomiting progresses to be characteristically projectile. It occasionally contains altered blood in emesis appearing as brownish discolouration or coffee-grounds as a result of gastritis and/or oesophagitis.

X-ray symptom

- Increas of stomach
- Gastric peristalsis
- “Beak symptom” or pylorus narrowing
- Deceleration evacuation of contrast (2 – 5 h.)
- Aerated intestinal canal



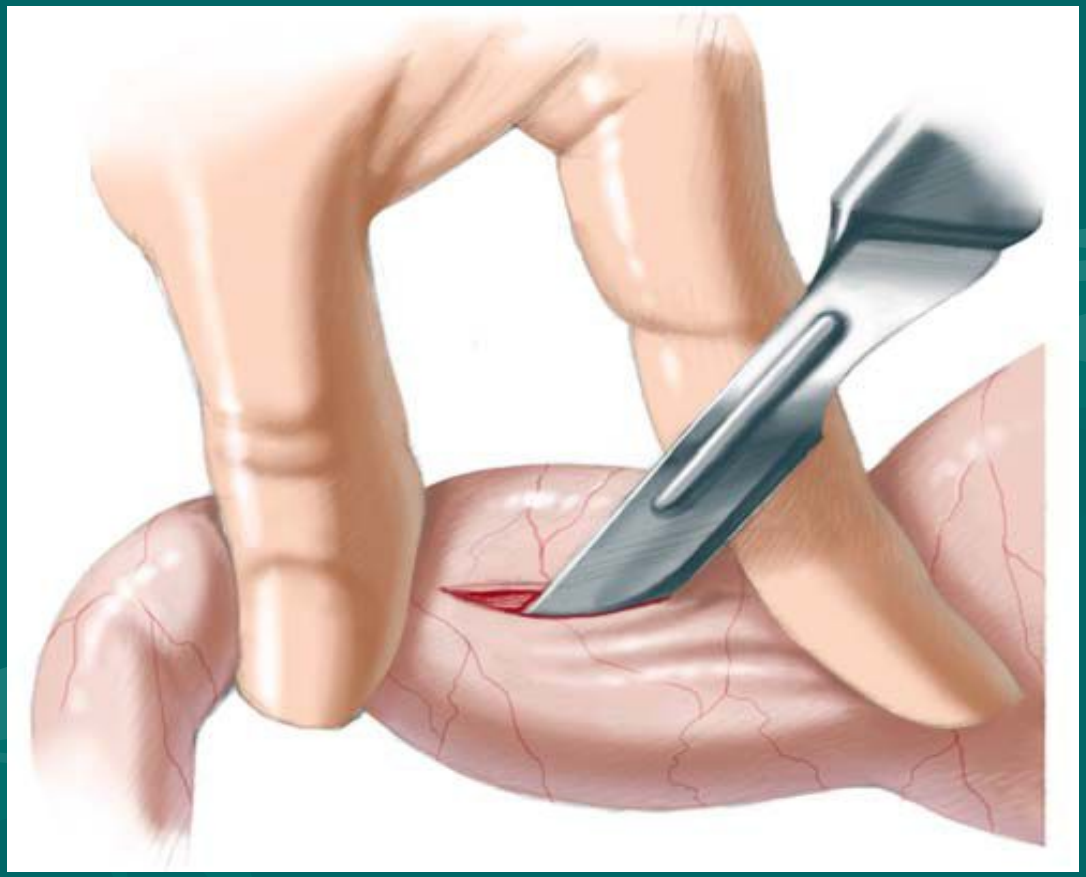


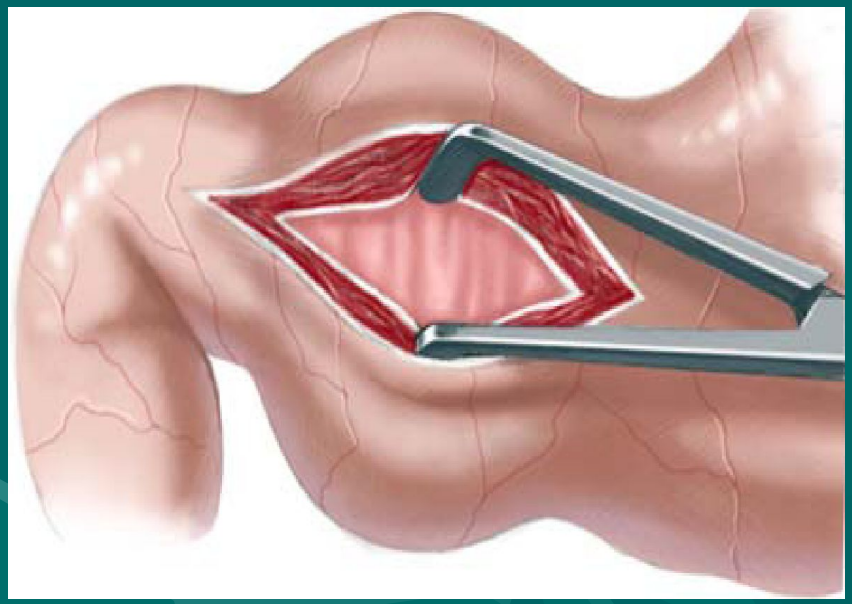
Differential diagnosis

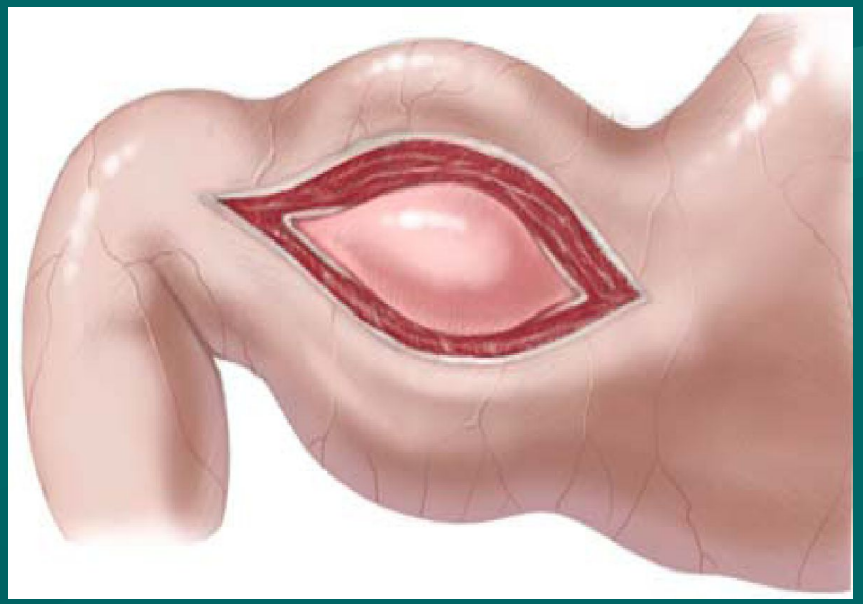
- Congenital pyloric stenosis
- Stomach impassability
- Duodenal obstruction
- Vomiting syndrome

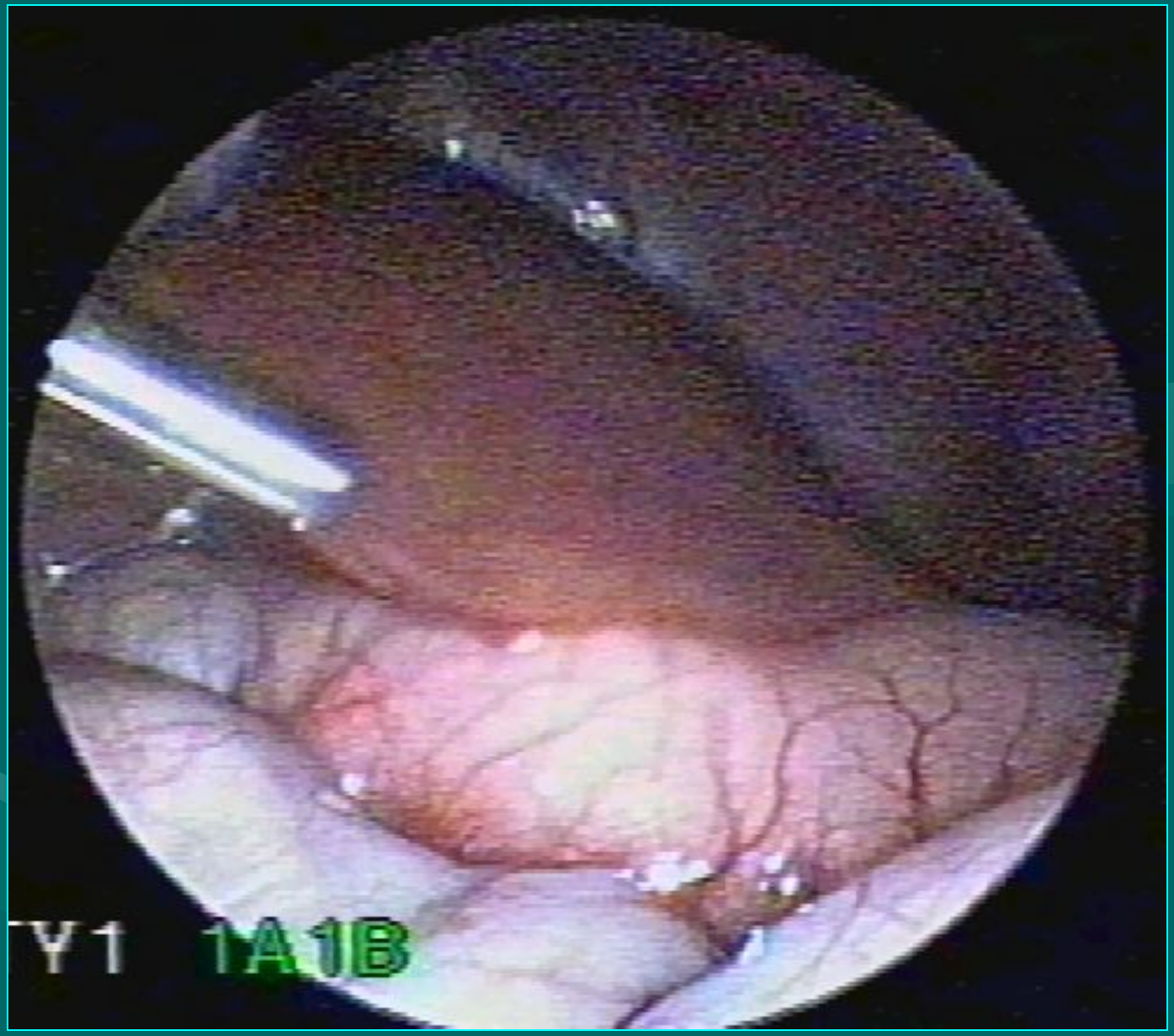
Treatment

- The operation for pyloric stenosis is not an emergency and should never be undertaken until serum electrolytes have returned to normal. Ramstedt's pyloromyotomy is the universally accepted operation for pyloric stenosis.
- Recently, laparoscopic pyloromyotomy has been advocated. The main advantage of the laparoscopic pyloromyotomy is the superior cosmetic result.





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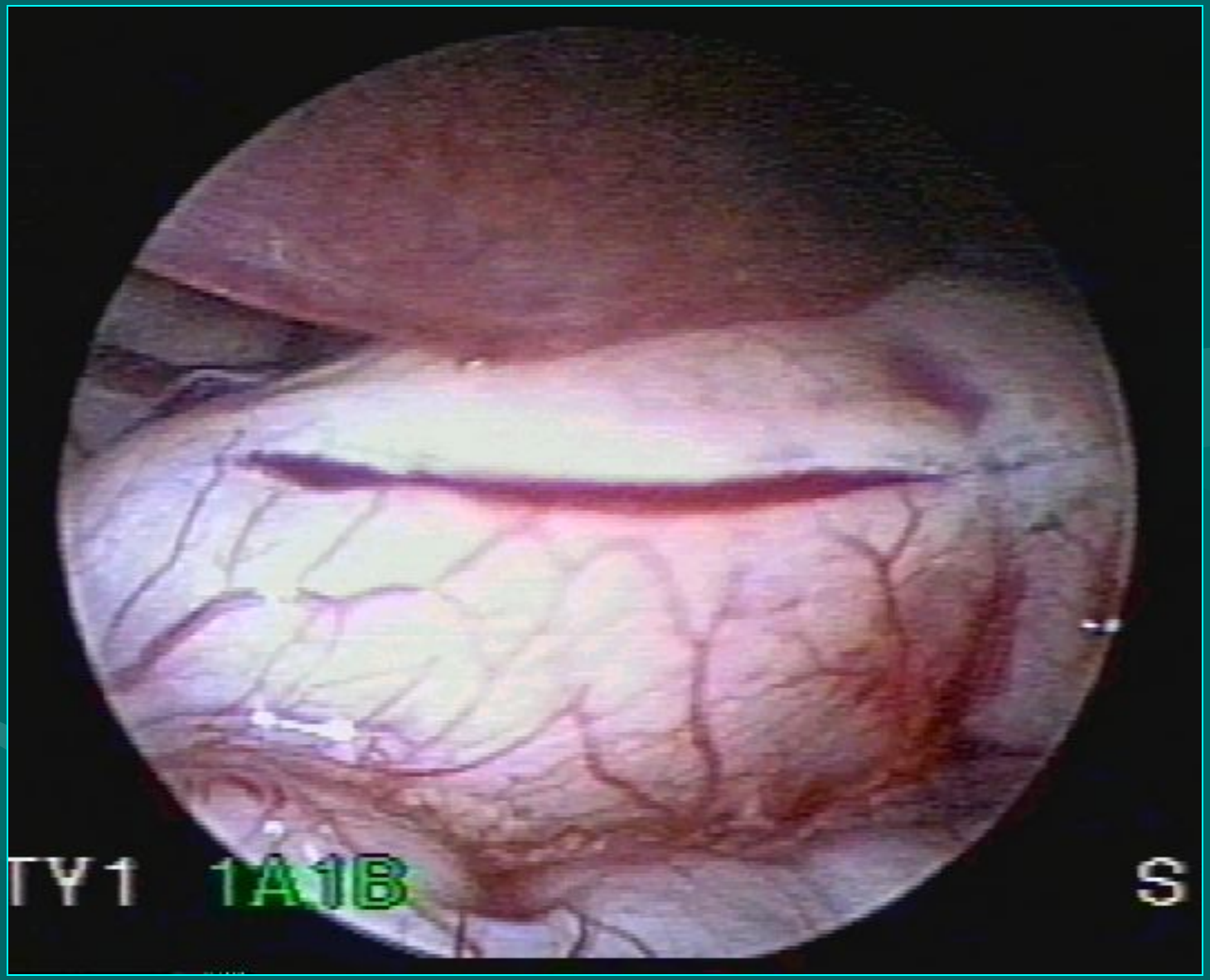
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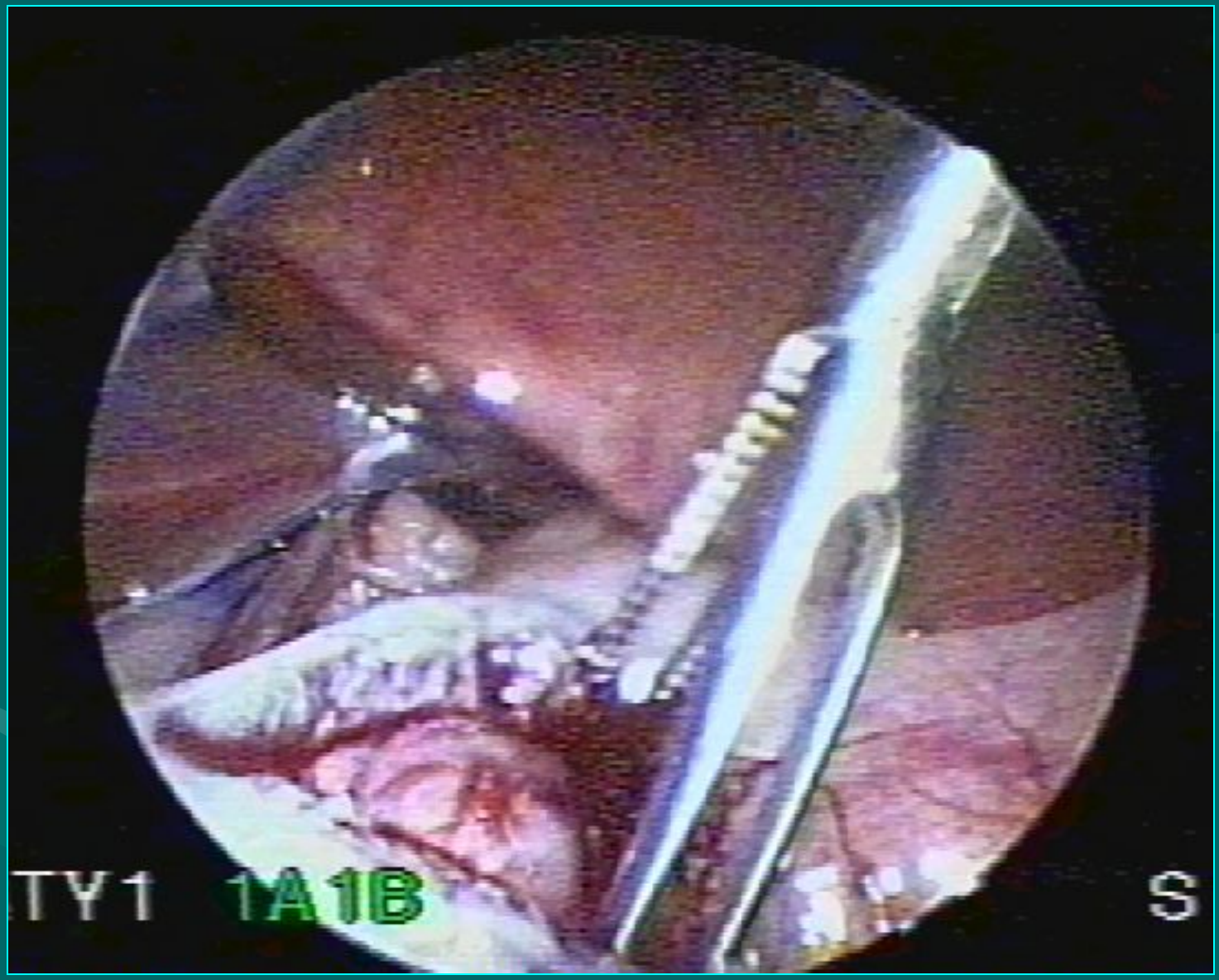
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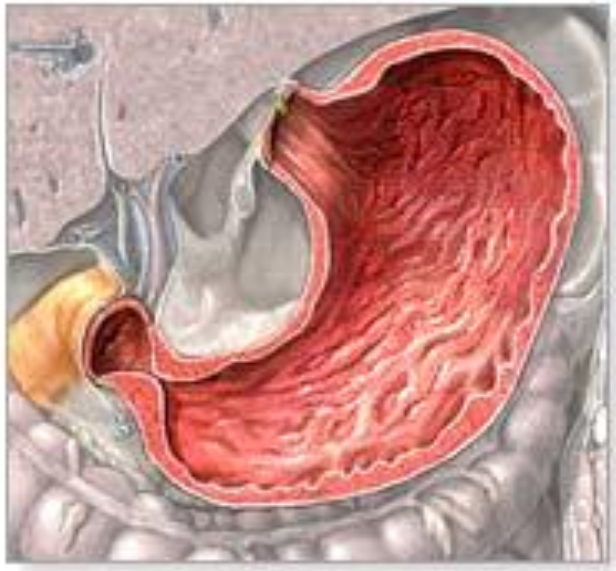

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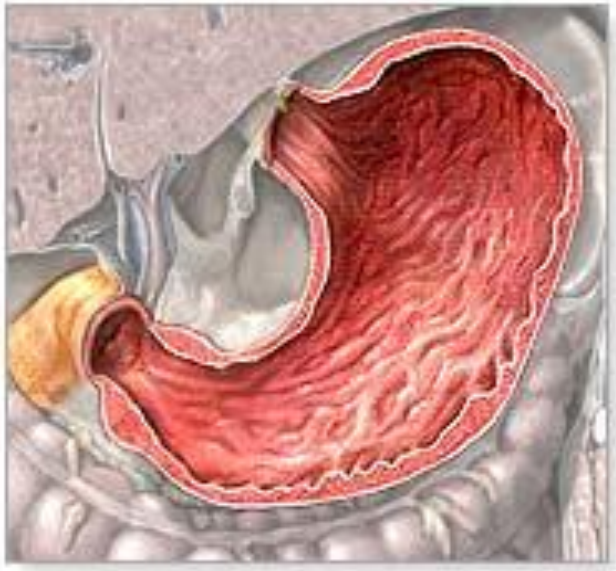

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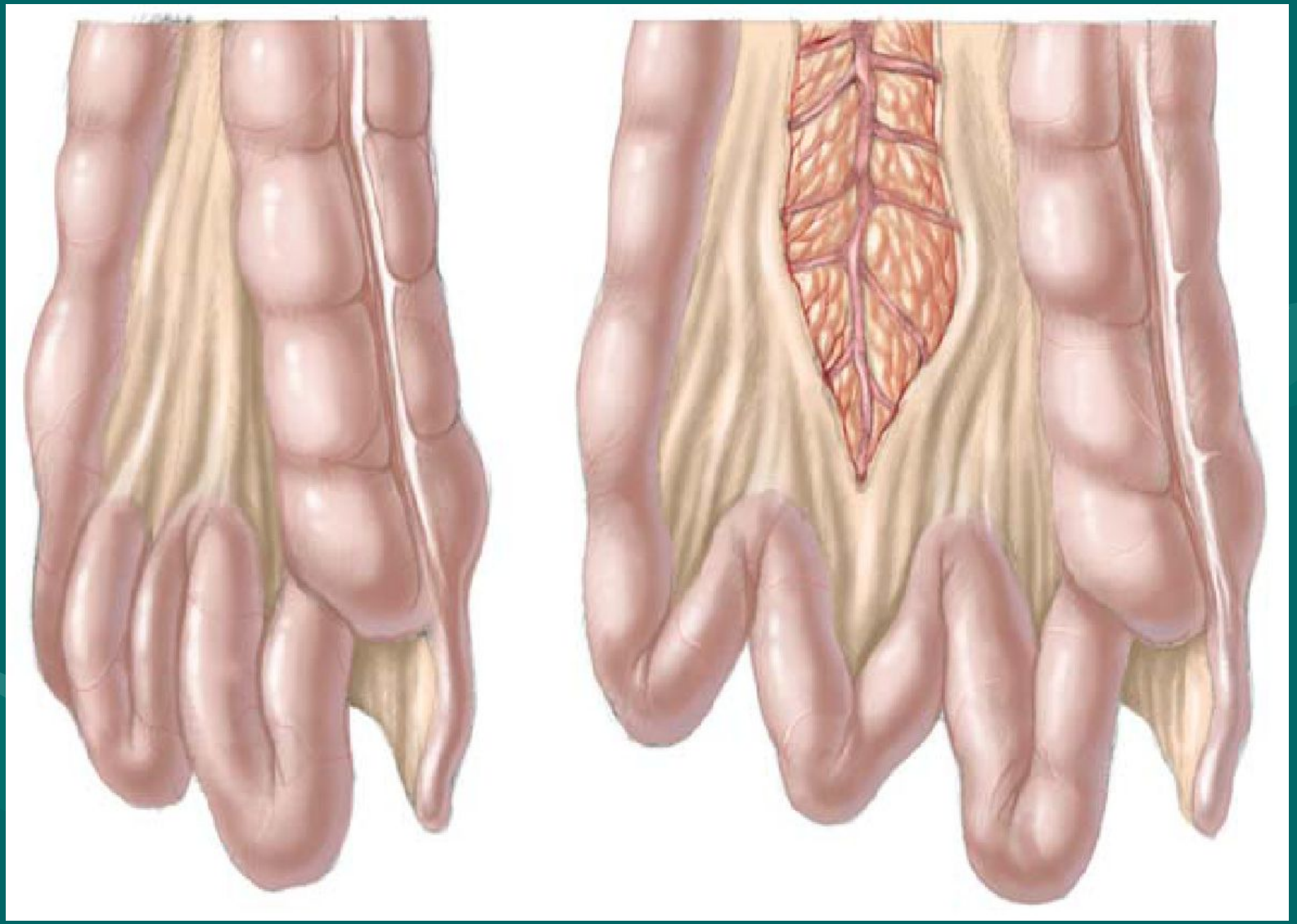
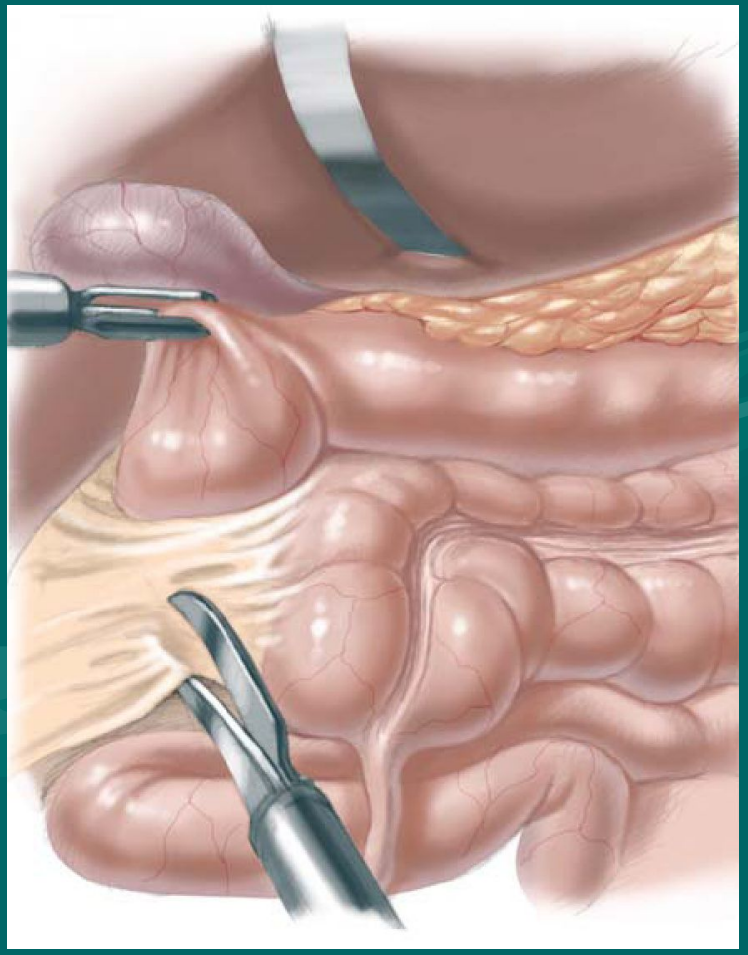
Duodenal obstruction

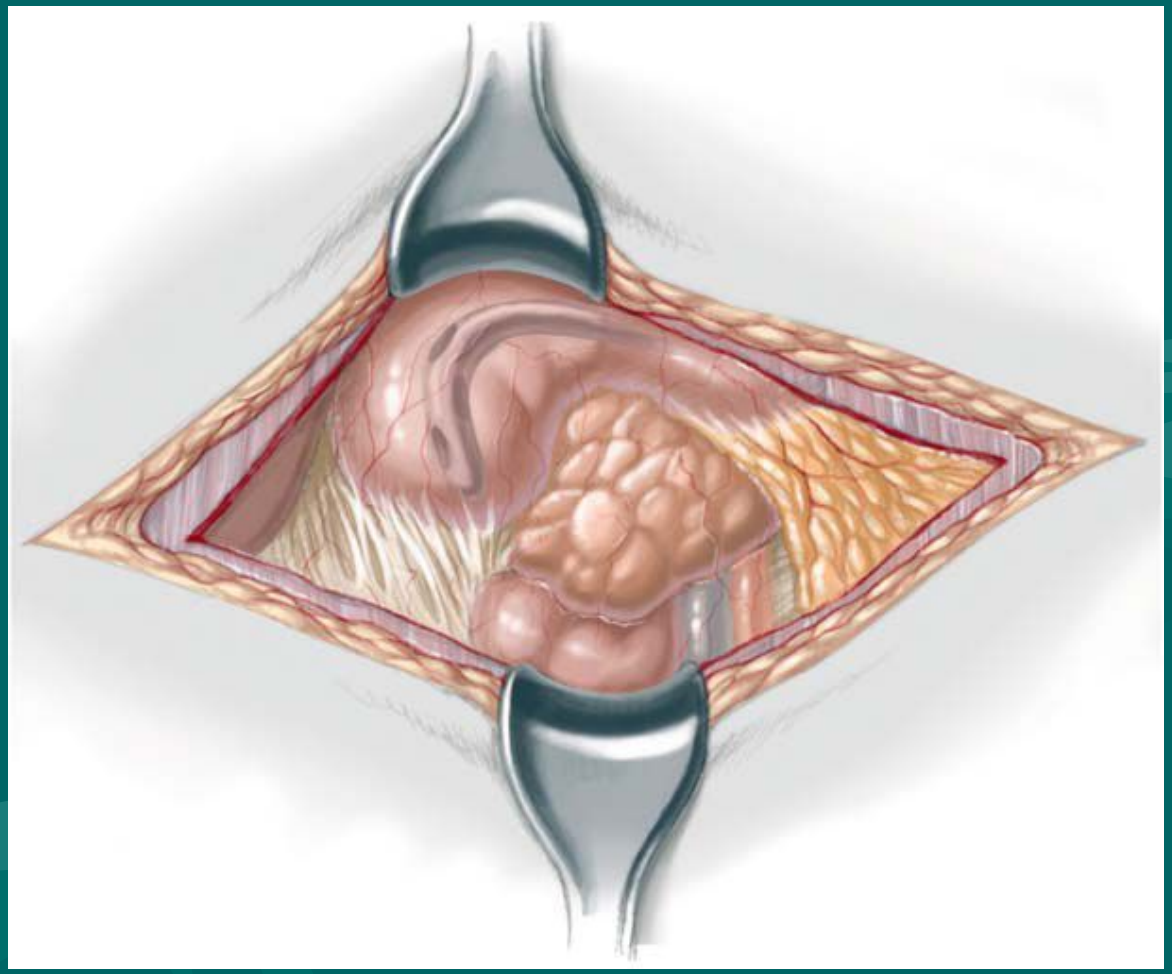
- During the embryonic period the duodenojejunal loop rotates 270° around the superior mesenteric artery axis in an anticlockwise direction. The caecocolic loop, which initially lies inferiorly to the superior mesenteric artery, also rotates 270° in an anticlockwise direction. Finally the caecum and ascending colon become fixed to the posterior peritoneum. If this process is interrupted at any point then malrotation or non-rotation results.



- Duoenal obstruction, with the possibility of vascular compromise, is due to either an associated volvulus or extrinsic compression from peritoneal Ladd's bands.

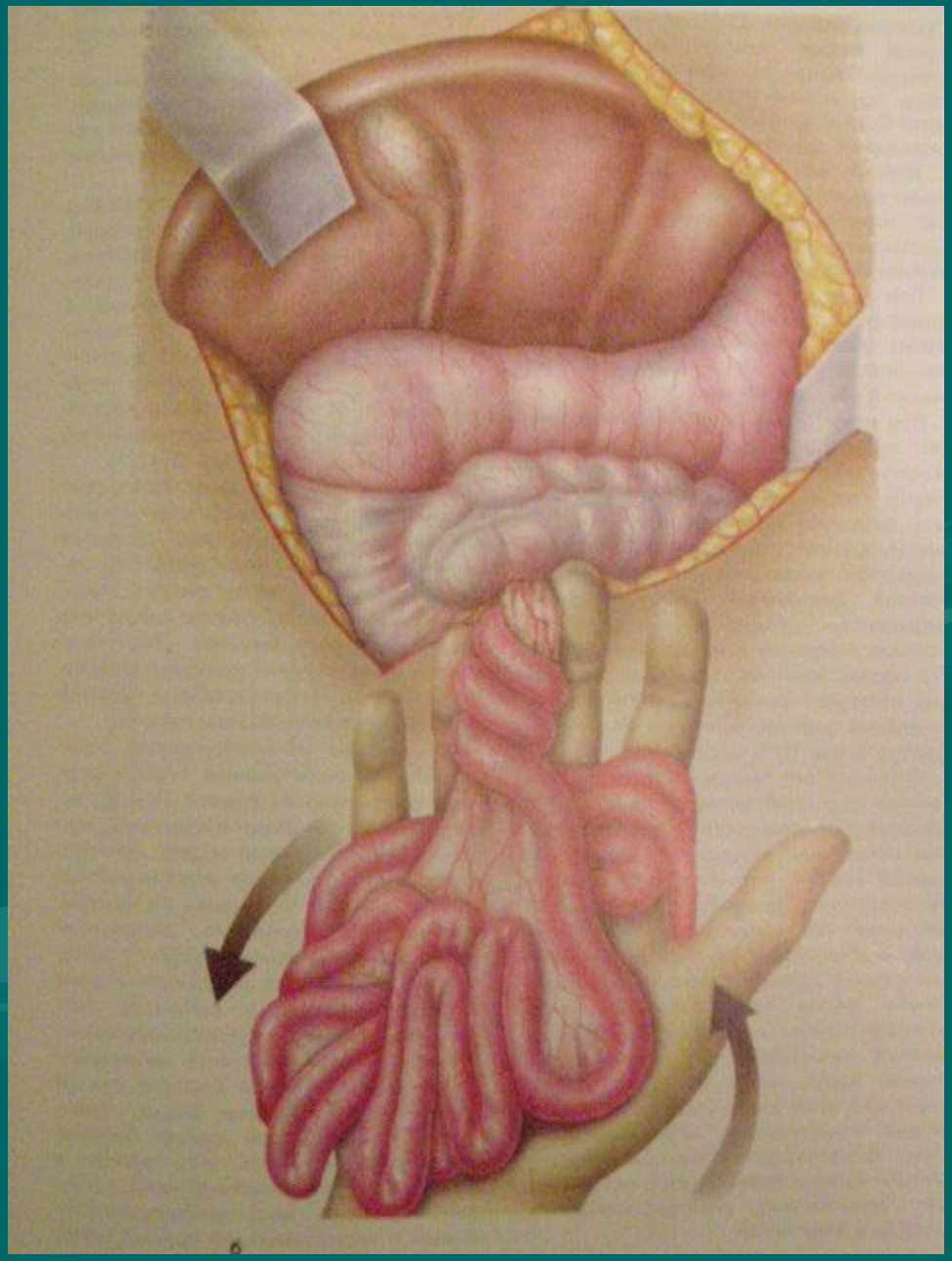
- Acute bowel obstruction due to Ladd’s bands or intermittent midgut volvulus can present with vomiting, typically bilious, as the commonest presenting feature accompanied by colicky abdominal pain and abdominal distention.





- An infant with abdominal tenderness and blood per rectum is suggestive of bowel ischaemia due to midgut volvulus.

- All symptomatic patients with positive investigative findings should undergo urgent laparotomy. Management of the asymptomatic patient is more controversial.

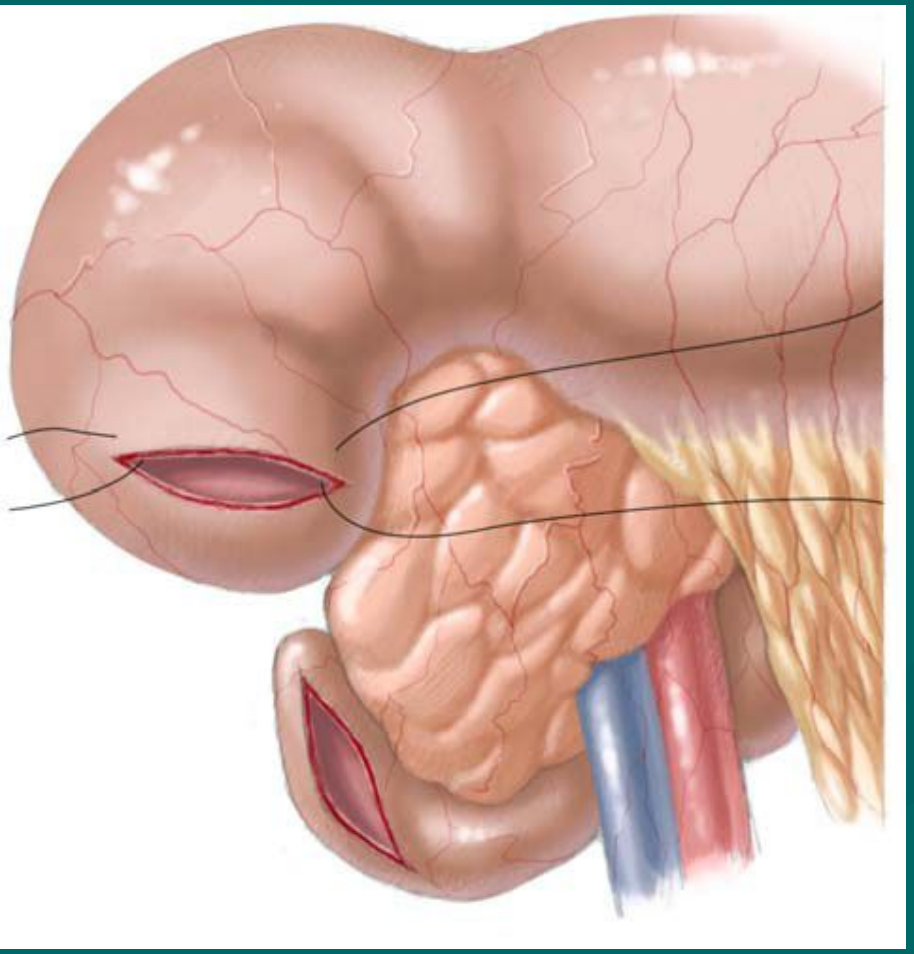


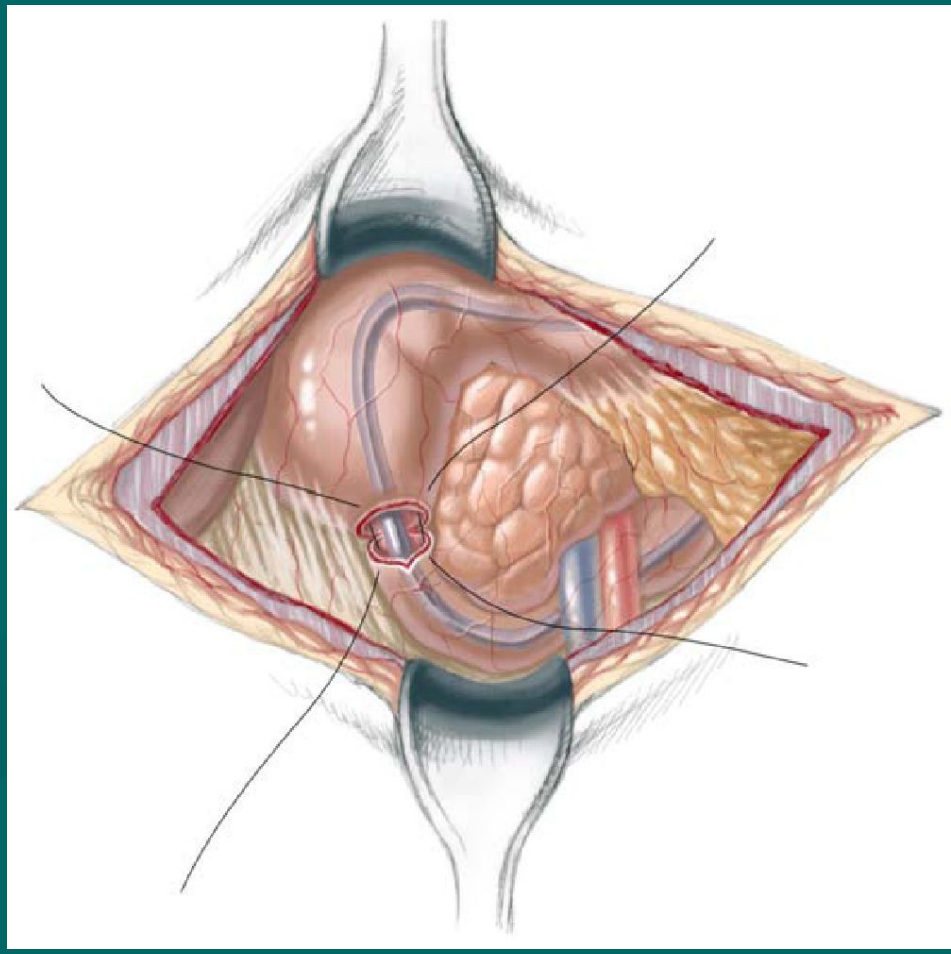
Differential diagnosis

- Pylorospasm
- Pyloric stenosis
- Congenital diaphragmatic hernia
- Helminthic invasion
- Helminthic cholecystitis

Treatment

- Duodenoduodenostomy is the procedure of choice for patients with duodenal atresia, stenosis and annular pancreas. The two surgical techniques, either side-to-side duodenoduodenostomy or proximal transverse to distal longitudinal – "diamond-shape" anastomosis – may be performed. Diamond-shaped duodenoduodenostomy has been reported to allow earlier feeding, earlier discharge and good long-term results.





Hirschprung's disease

- Hirschsprung's disease (HD) is characterised by an absence of ganglion cells in the distal bowel and extending proximally for varying distances. The absence of ganglion cells has been attributed to failure of migration of neural crest cells. The earlier the arrest of migration, the longer the aganglionic segment.
- The pathophysiology of Hirschsprung's disease is not fully understood. There is no clear explanation for the occurrence of spastic or tonically contracted aganglionic segment of bowel.

Classification (Lenushkin, 1989)

- Anatomic forms:

1. *Rectal*
2. *Rectosigmoid*
3. *Segmental*
4. *Subtotal*
5. *Total form*

- Clinic forms

1. *Compensated*
2. *Subcompensated*
3. *Decompensated*

Clinic

- Of all cases of HD, 80–90% produce clinical symptoms and are diagnosed during the neonatal period.
- The usual presentation of HD in the neonatal period is with constipation, abdominal distension and vomiting during the first few days of life.
- The diagnosis of HD is usually based on clinical history, radiological studies, anorectal manometry and in particular on histological examination of the rectal wall biopsy specimens.

- A full-term neonate has bilious emesis during first and second days of life. The abdomen is distended. X-rays show dilated loops of small bowel. A contrast enema reveals a narrow rectum, compared to the sigmoid. The baby failed to evacuate the contrast the following day.
- A bedside suction rectal biopsy at least 2cm above dentate line is the gold standard test.

Diagnostic work-up includes:

- Contrast enema showing a contracted rectum with dilated bowel above.
- Failure to evacuate contrast 24h later can be diagnostic.
- Rectal biopsy is required to confirm absence of ganglion cells and nerve hypertrophy.

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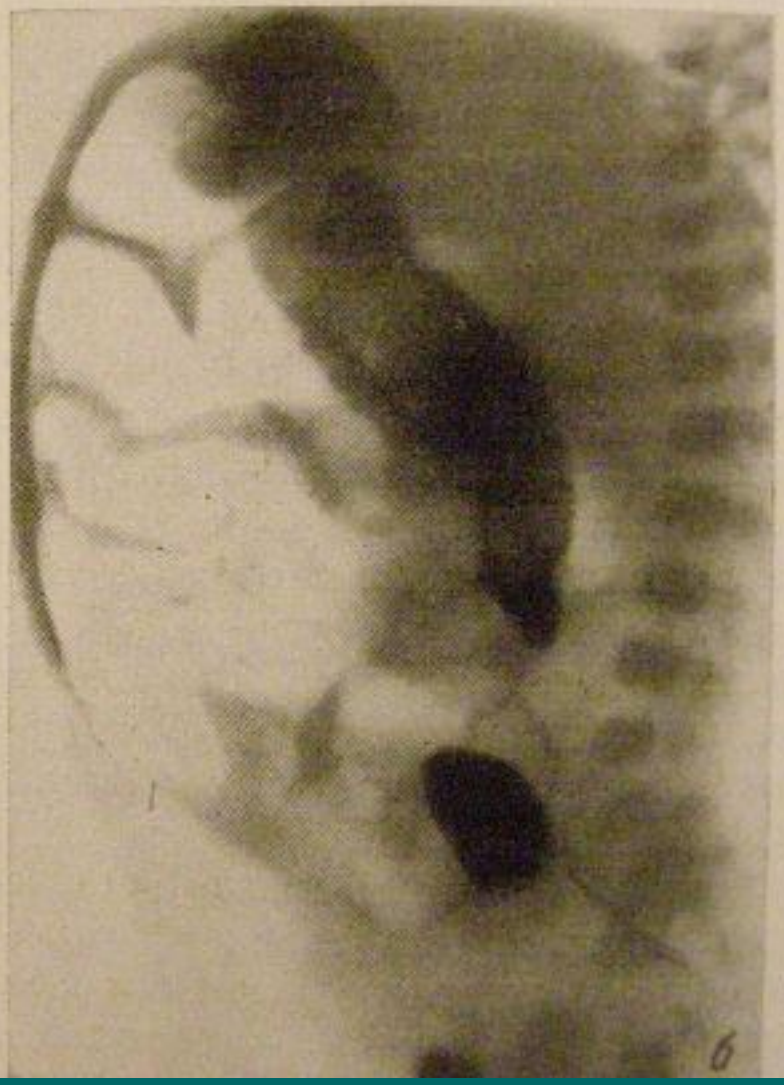

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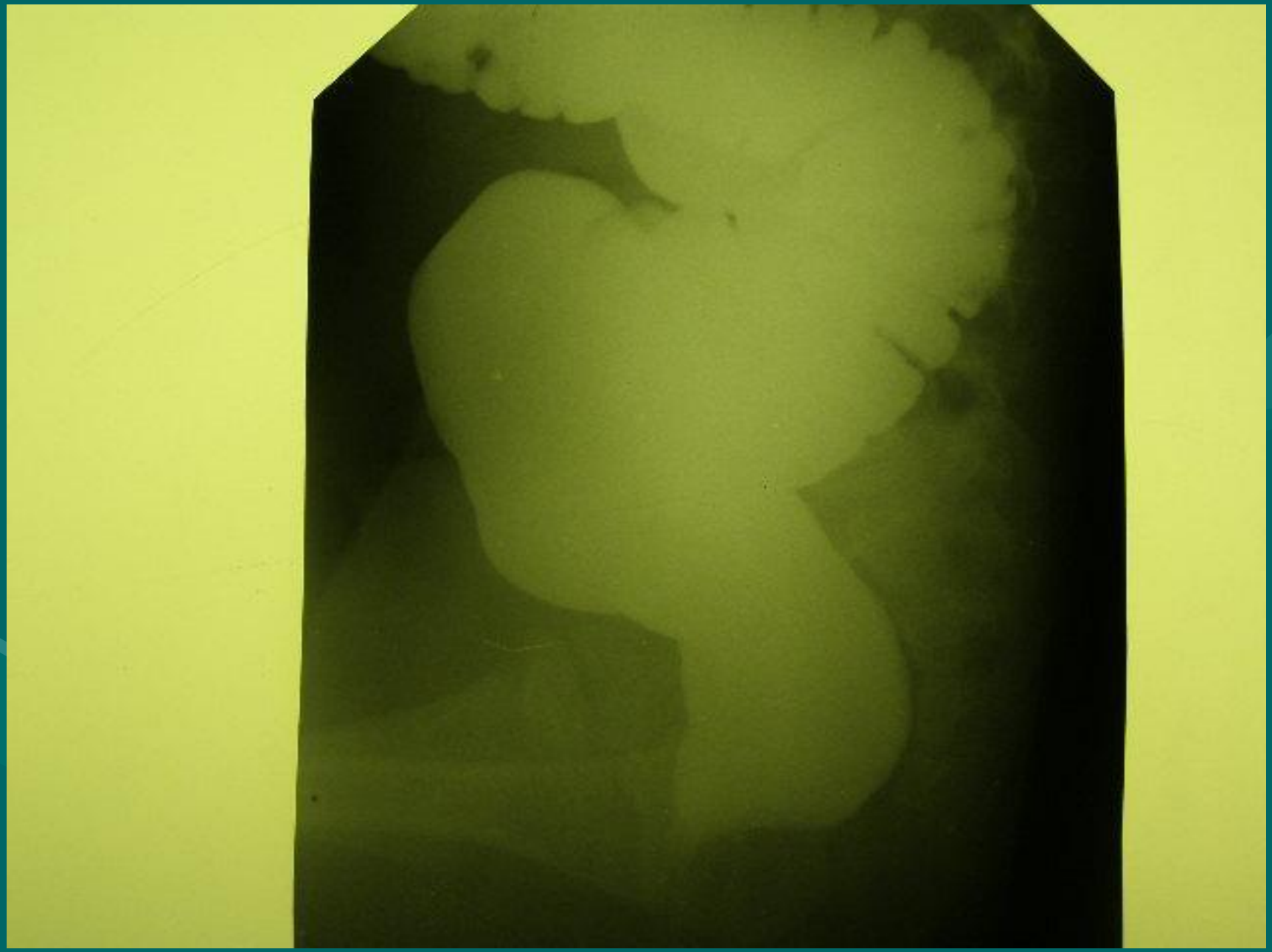
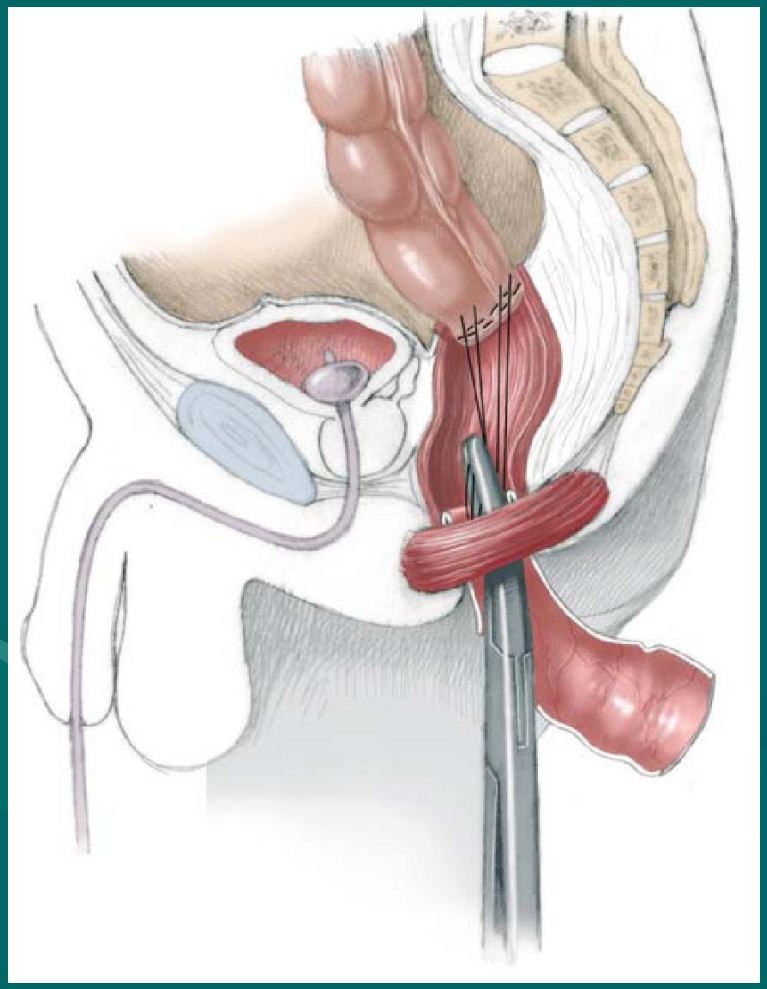
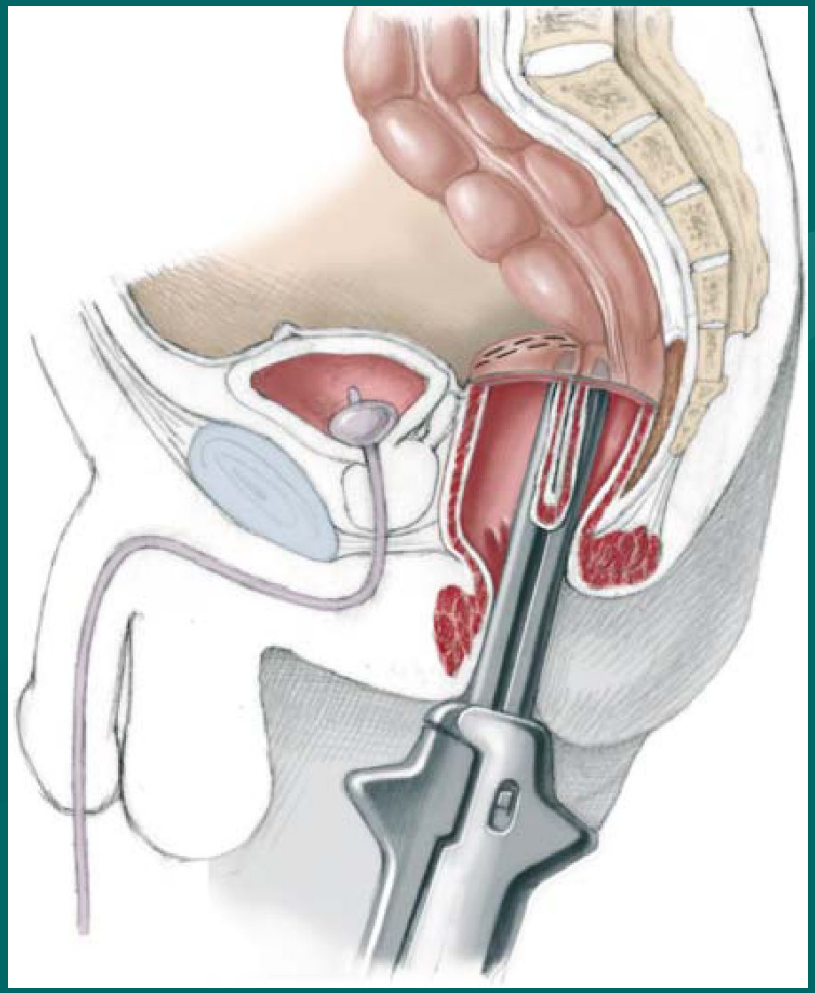
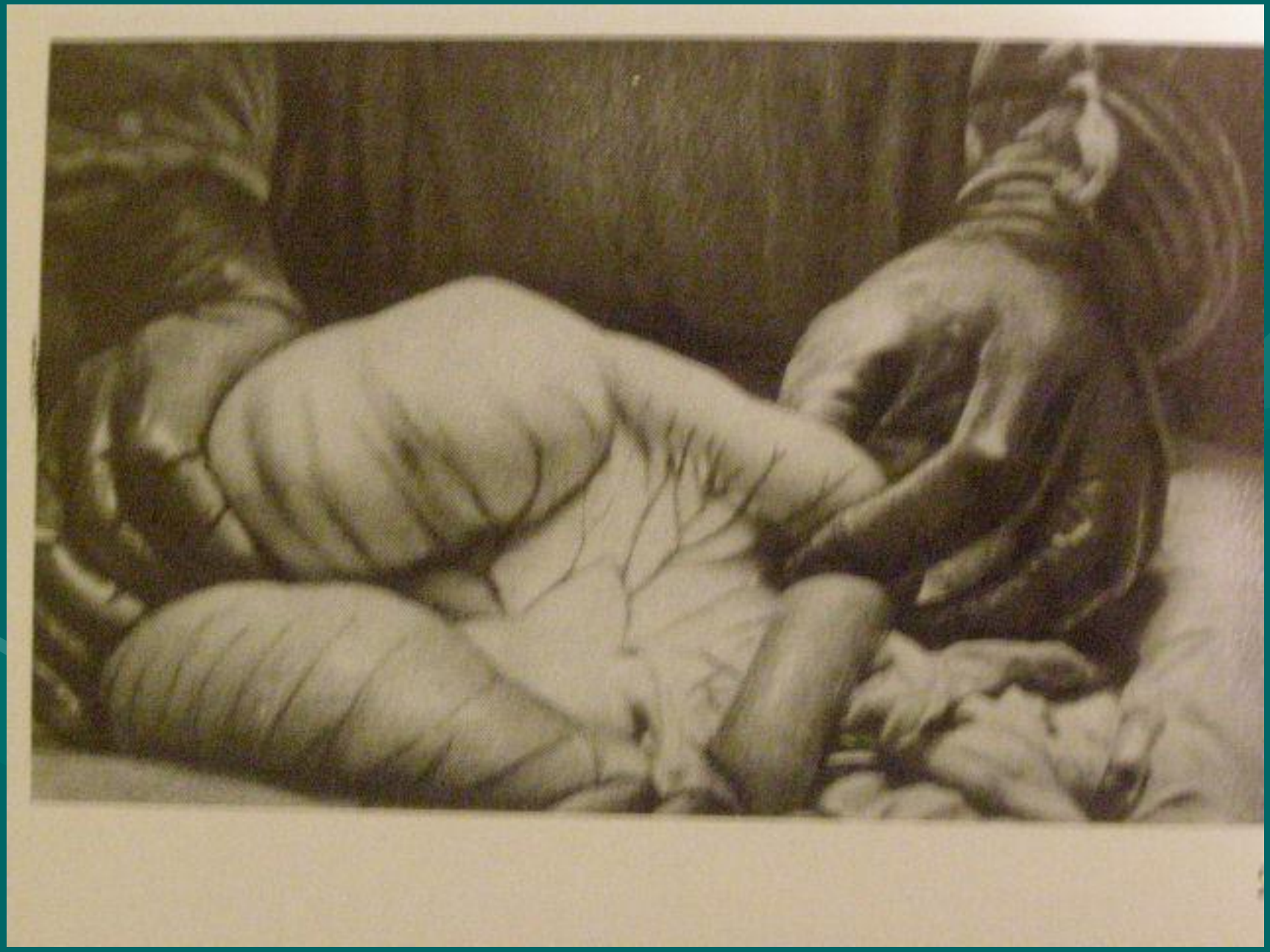


Surgical treatment

- Soave endo-rectal pull through with removal of the diseased distal bowel with coloanal anastamosis
- Children who present acutely ill may need staged procedure with colostomy.
- Need to do intraoperative frozen section to help determine the anatomic location of transition zone.







Anorectal anomalies

- Anorectal malformations, represent a wide spectrum of defects. Surgical techniques useful to repair the most common types of anorectal malformations seen by a general pediatric surgeon are presented following an order of complexity from the simplest to the most complex.

Classification

Full atresia

Inferior

High

Atresia with fistula

External fistula

Internal fistula

- External fistula:

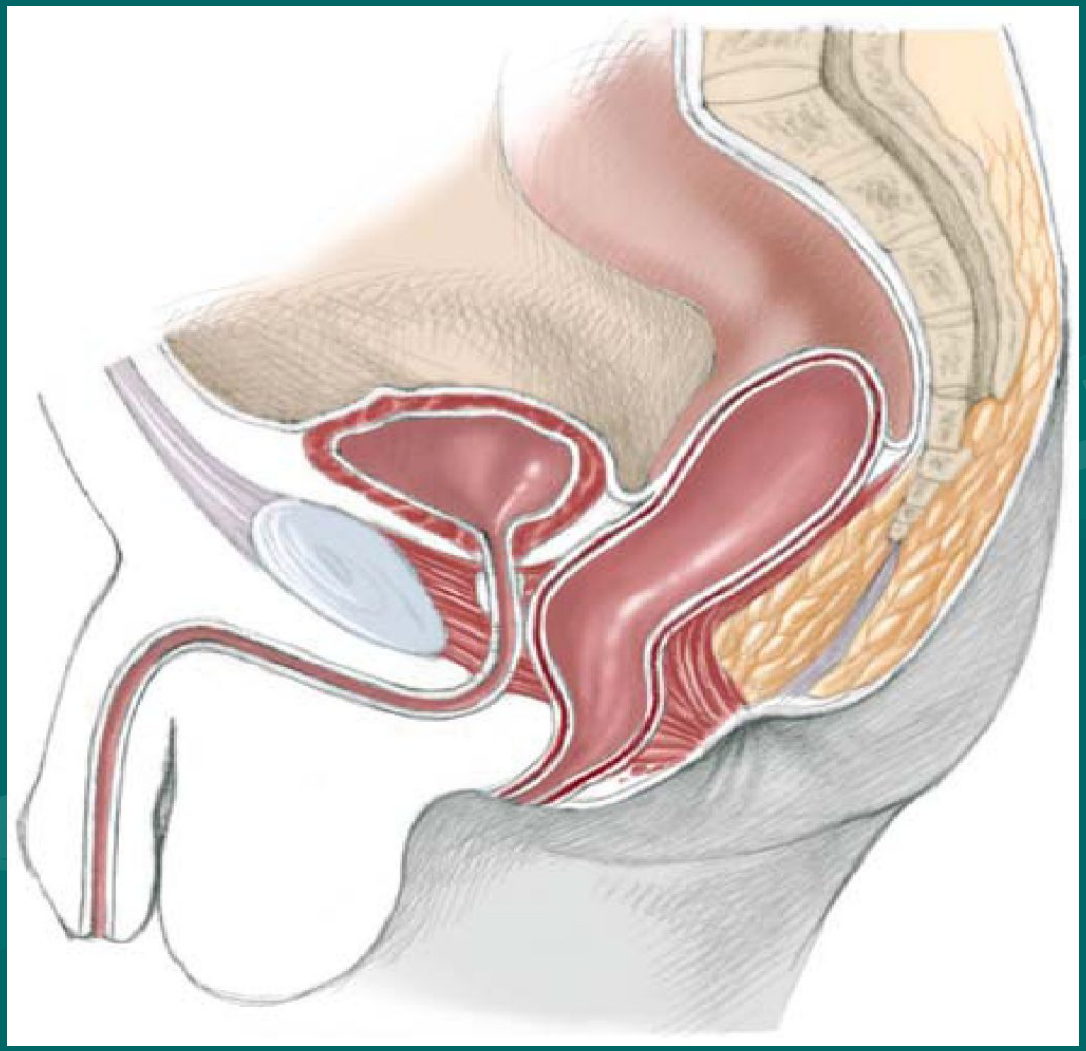
1. Vaginal fistula
2. Perineal fistula
3. Scrotal fistula

- Internal fistula:

1. Vaginal fistula
2. Fistula in the urinary blader
3. Fistula in the urethra
4. Fistula in the uterus
5. Cloaca

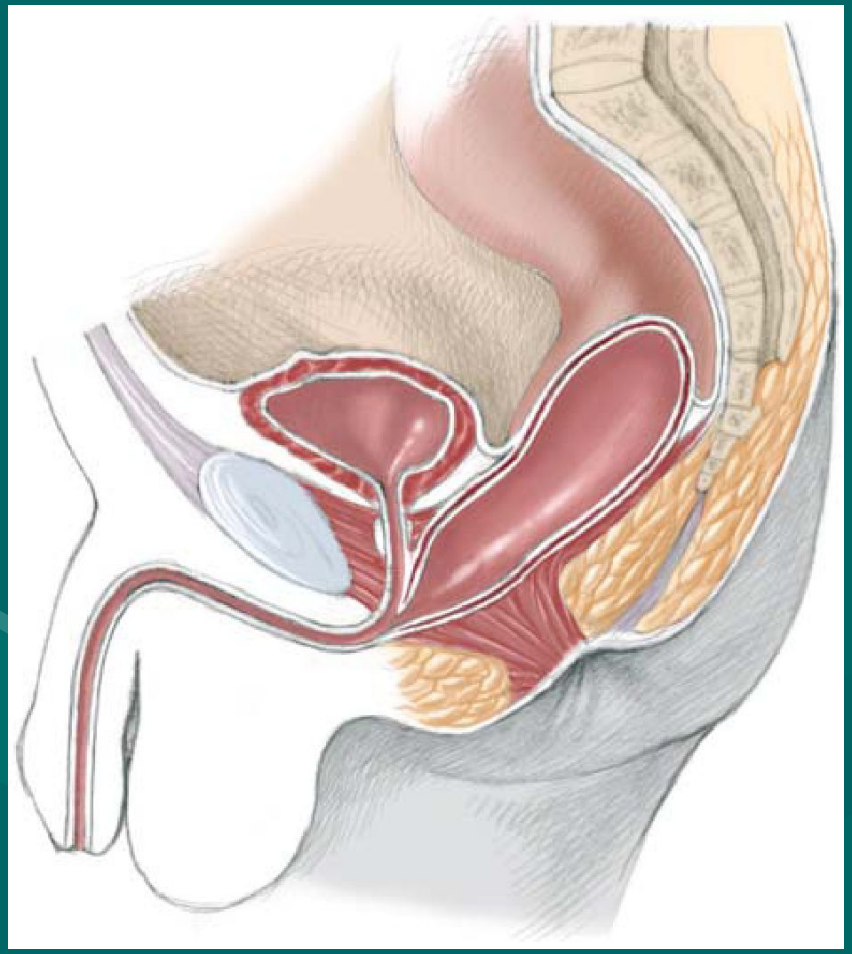
Perineal Fistula

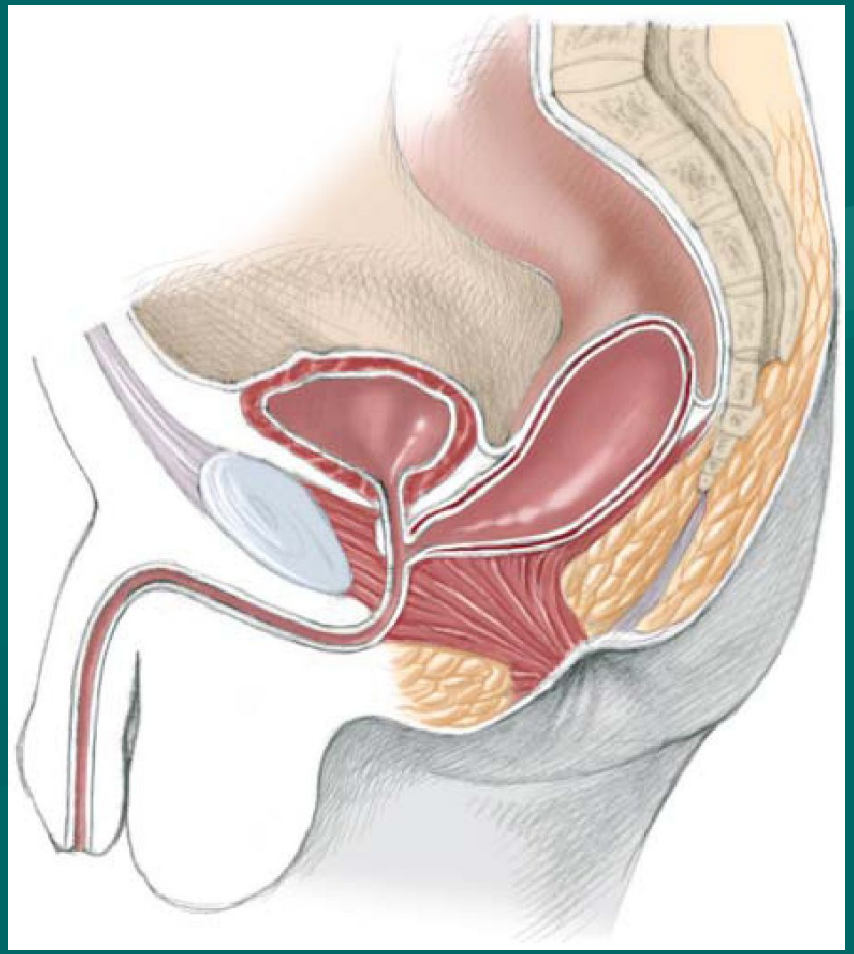
- This malformation represents the simplest of the spectrum. In this defect, the rectum opens immediately anterior to the centre of the sphincter, yet, the anterior rectal wall is intimately attached to the posterior urethra. The anal orifice is frequently strictured. These patients will have bowel control with and without an operation.



Rectourethral Fistula.

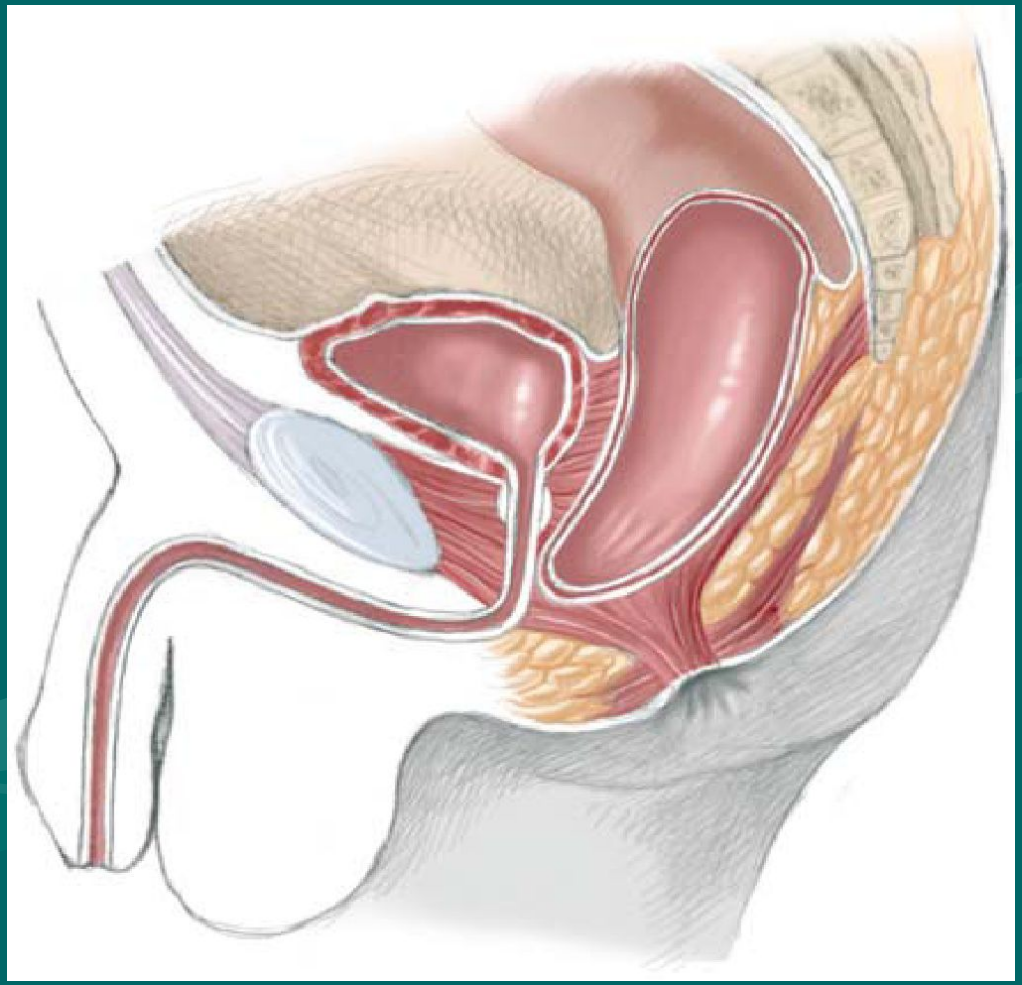
- This group of patients include two specific categories: (a) rectourethral bulbar fistula (Fig 3), and (b) rectoprostatic fistula (Fig 4). These two variants represent the majority of male patients with anorectal malformations. Rectourethral bulbar fistula patients, in our experience have an 80% chance of having bowel control by the age of 3,whereas the rectoprostatic fistula patients only have a 60% chance.

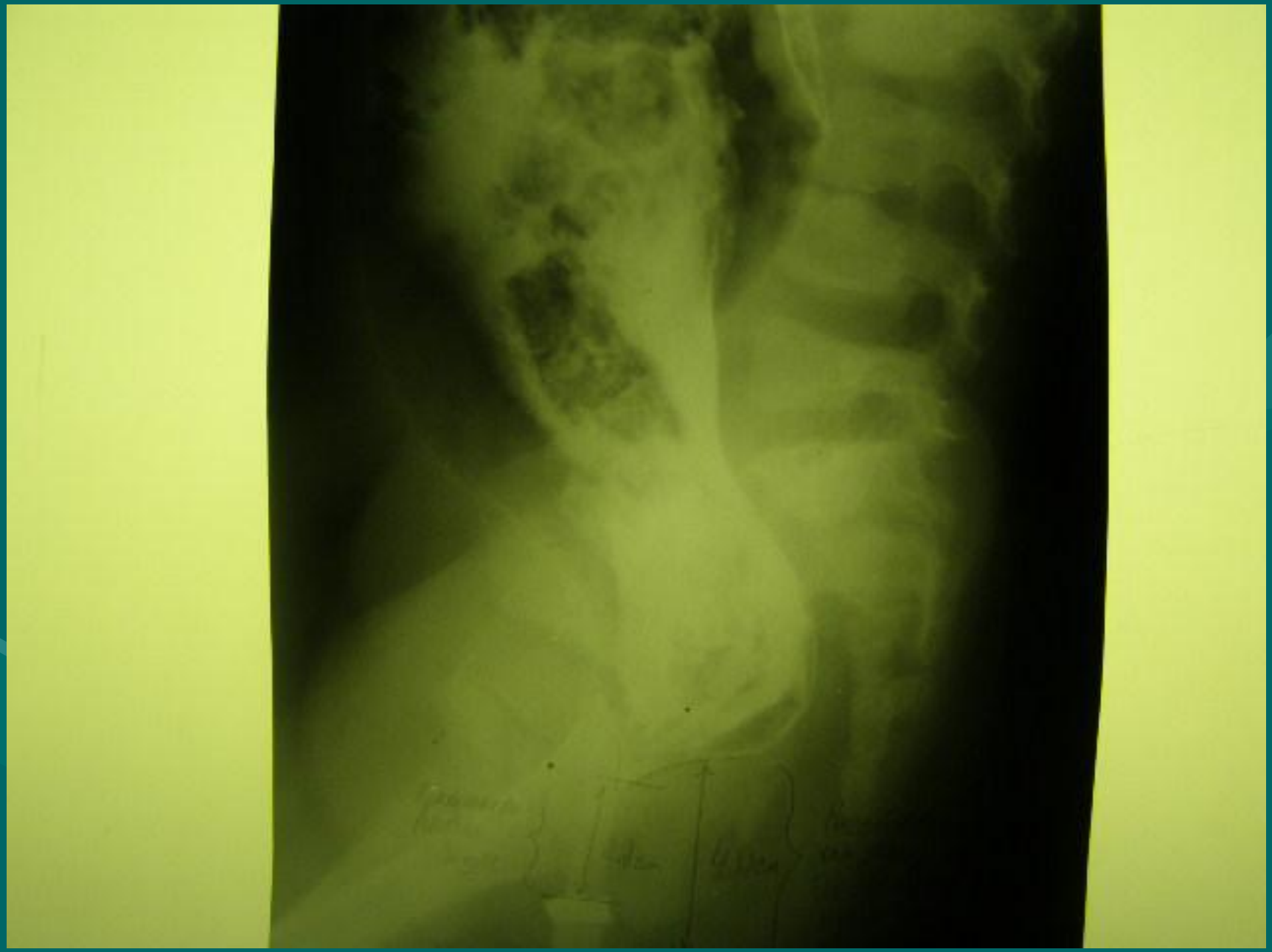


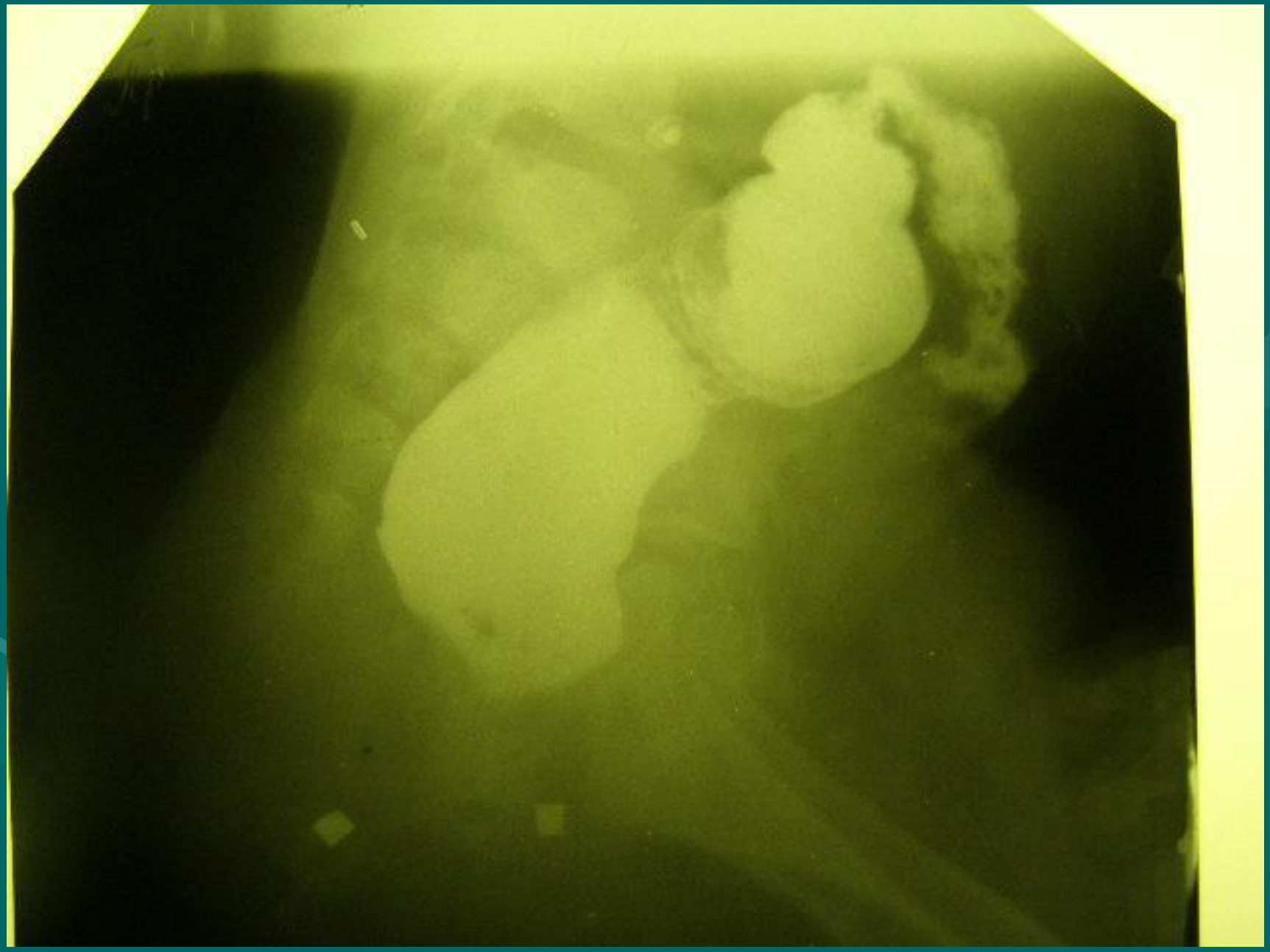


Imperforate Anus Without Fistula

- This particular malformation is unique.When we say imperforated anus without fistula, we do not have to refer to the height of the defect because in all cases the rectum is located approximately 1–2 cm above the perineal skin, at the level of bulbar urethra. This malformation only happens in 5% of all cases and half of these have Down's syndrome.

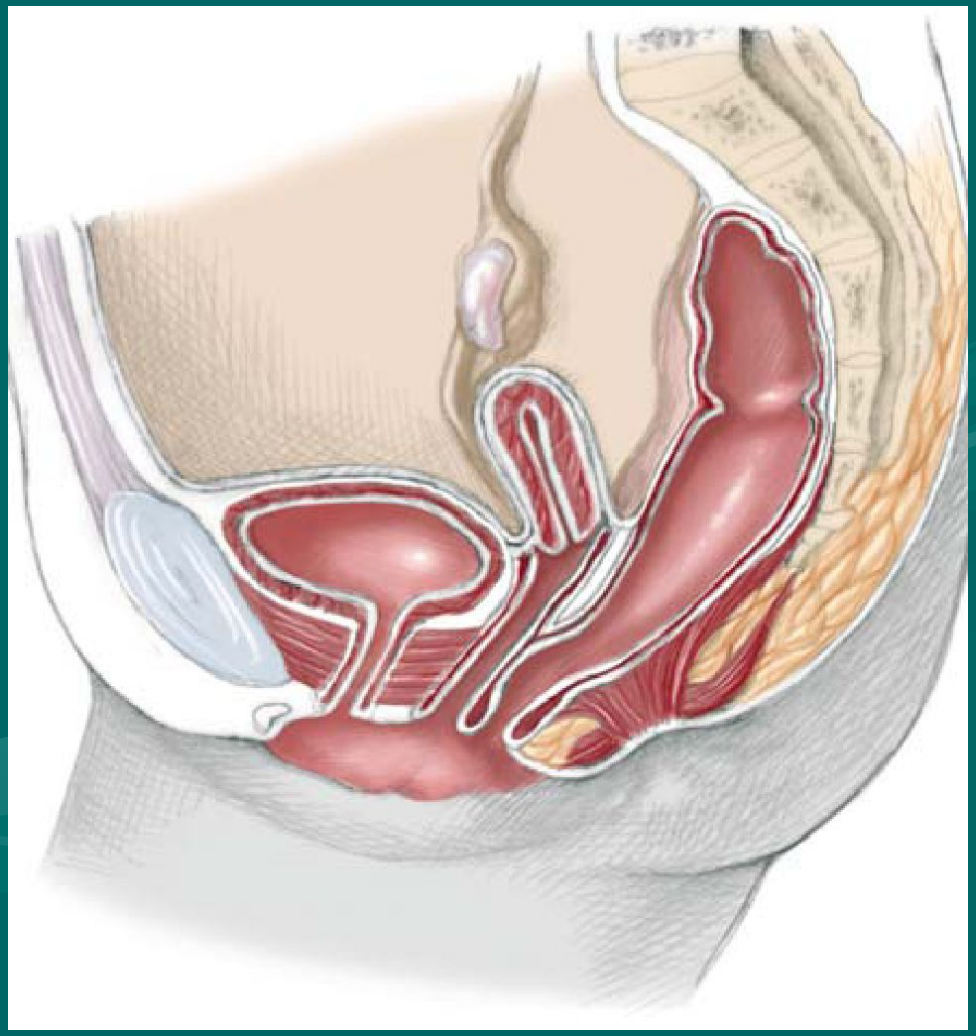






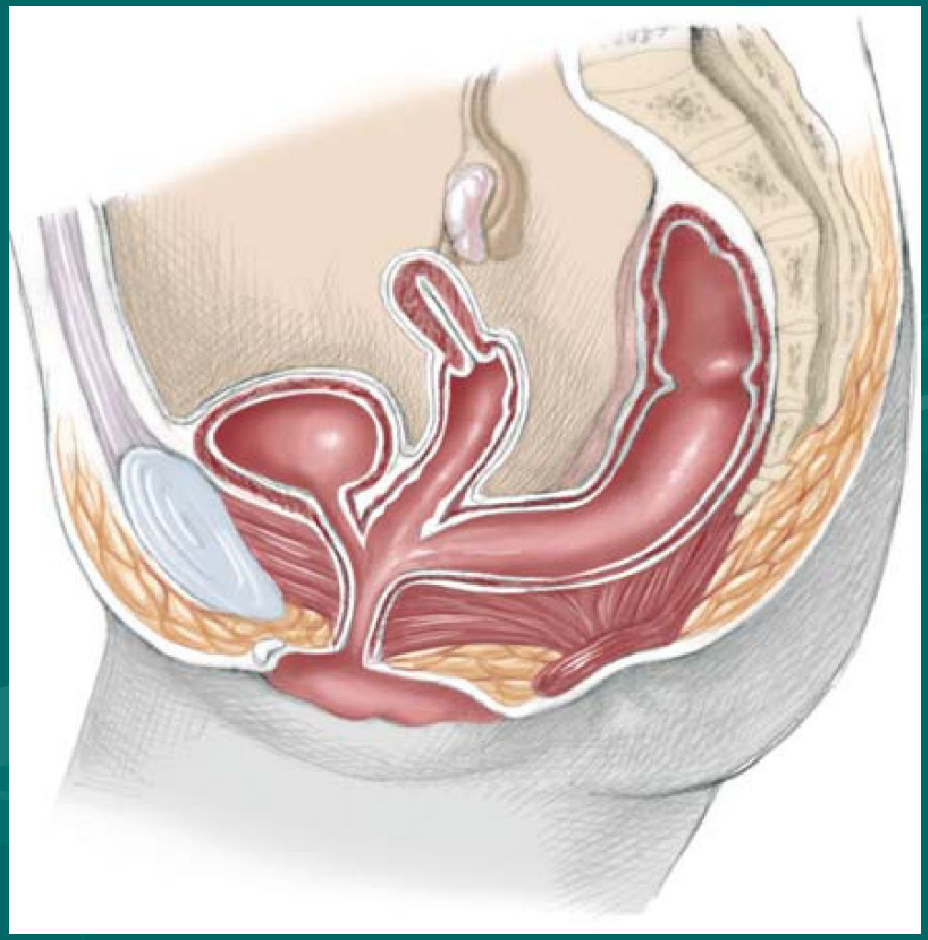
Rectoperineal Fistula.

- This defect is equivalent to the recto-perineal fistula in males already described. Bowel control exists in 100% of our patients and less than 10% of them have associated defects. The patients are faecally continent with and without an operation.
- Constipation is a constant sequela and should be treated energetically.



Cloaca.

- A cloaca is defined as a malformation in which the rectum, vagina and urethra are congenitally fused, forming a common channel and opening in a single perineal orifice at the same location where the normal female urethra is located. These three structures share common walls that are very difficult to separate.

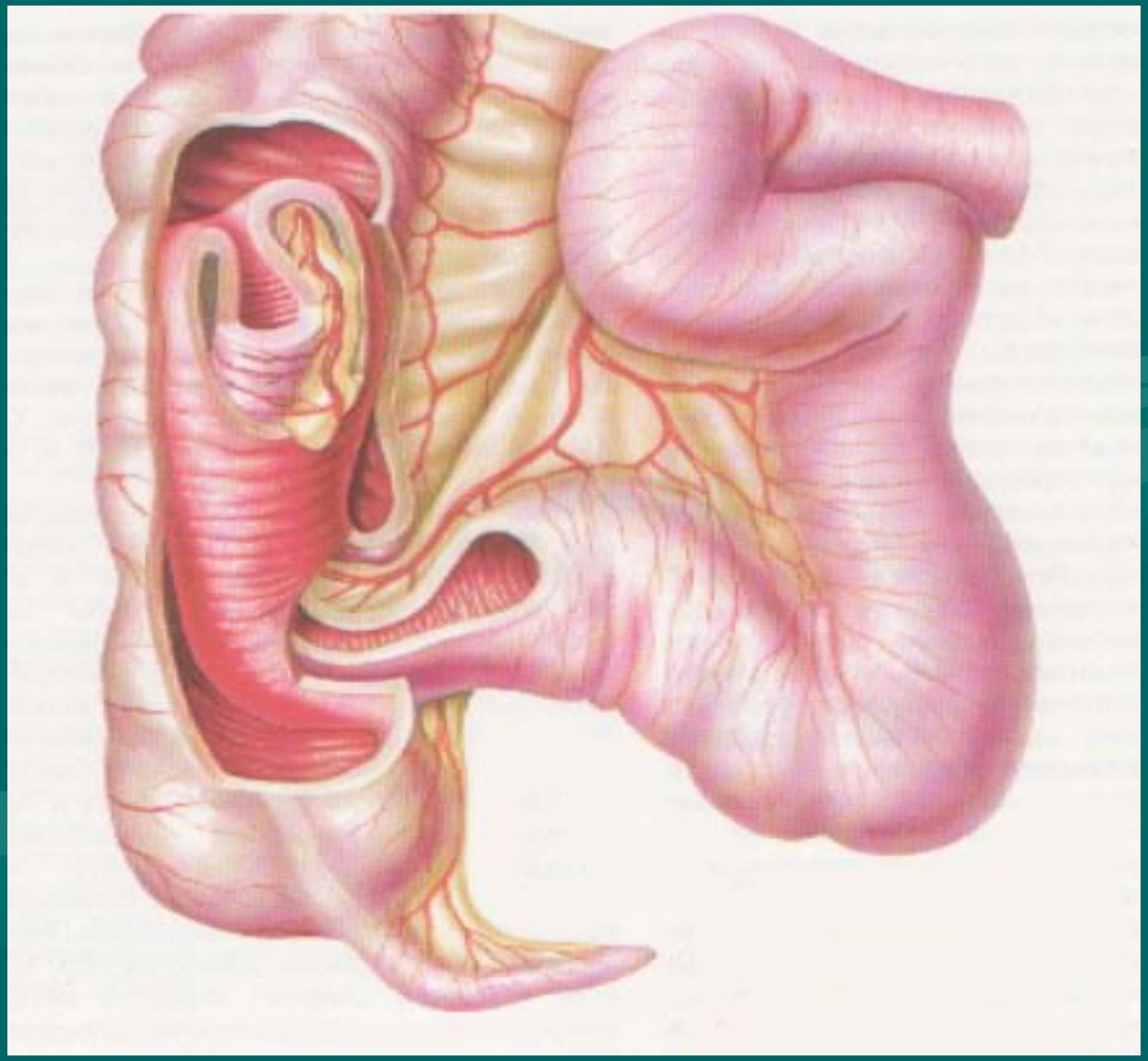


INTUSSUSCEPTION

INTUSSUSCEPTION

DEFINITION

- Telescoping of a proximal segment of the intestine (intussusceptum) into a distal segment (intussuscipiens)



INTUSSUSCEPTION

ANATOMIC LOCATIONS

- ILEOCOLIC
  - MOST COMMON IN CHILDREN
- ILEO-ILEOCOLIC
  - SECOND MOST COMMON
- ENTEROENTERIC
  - ILEO-ILEAL, JEJUNO-JEJUNAL
  - MORE COMMON IN ADULTS
  - MAY NOT BE SEEN ON BARIUM ENEMA
- CAECOCOLIC, COLOCOLIC
  - MORE COMMON IN ASIAN CHILDREN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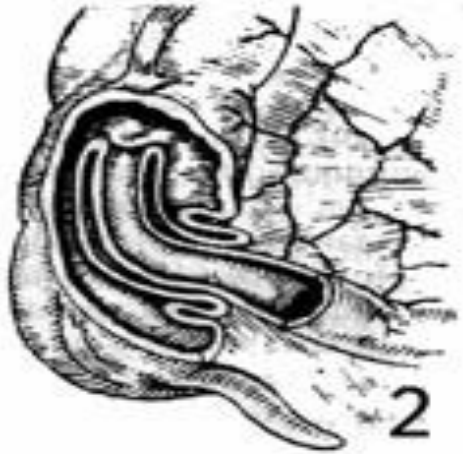
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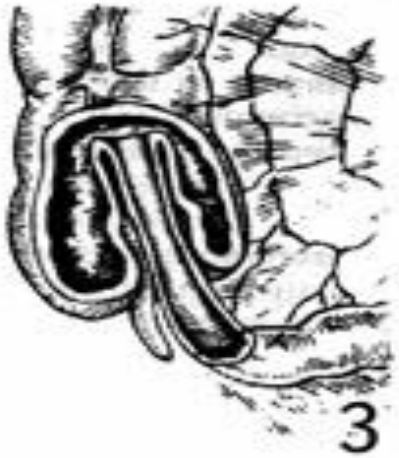
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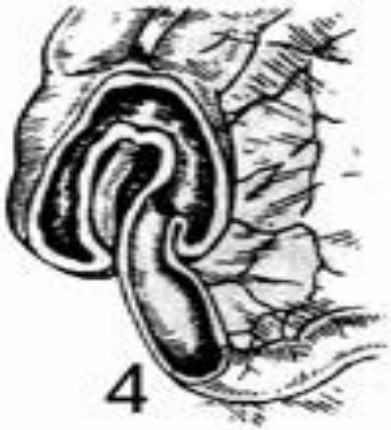
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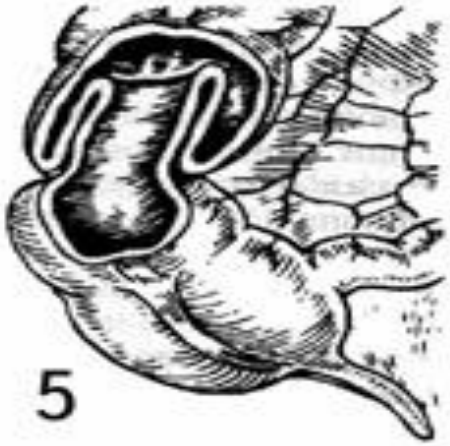
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PATHOPHYSIOLOGY

- Precipitating mechanism unknown
- Obstruction of intussusceptum mesentery
- Venous and lymphatic obstruction
- Ischemic necrosis occurs in both intussusceptum and intussuscipiens
- Pathologic bacterial translocation

ETIOLOGIES

- Majority of pediatric intussusceptions idiopathic (85-90%)
  - LYMPHOID HYPERPLASIA POSSIBLE ETIOLOGY
- Mechanical abnormalities may act as "lead points"
  - CONGENITAL MALFORMATIONS (MECKEL'S DIVERTICULUM, DUPLICATIONS)
  - NEOPLASMS (LYMPHOMA, LYMPHOSARCOMA)
  - POLYPOSIS
  - TRAUMA (POST-SURGICAL, HEMATOMA)
  - MISCELLANEOUS (APPENDICITIS, PARASITES)

EPIDEMIOLOGY

- Incidence 2 - 4 / 1000 live births
- Usual age group 3 months - 3 years
- Greatest incidence 6-12 months
- No clear hereditary association
- No seasonal distribution
- Frequently preceded by viral infection
  - ADENOVIRUS

INTUSSUSCEPTION

CLINICAL CHARACTERISTICS

- Early Symptoms
  - PAROXYSMAL ABDOMINAL PAIN
  - SEPARATED BY PERIODS OF APATHY
  - POOR FEEDING AND VOMITING
- Late Symptoms
  - WORSENING VOMITING, BECOMING BILIOUS
  - ABDOMINAL DISTENTION
  - HEME POSITIVE STOOLS
  - FOLLOWED BY "RASPBERRY JELLY" STOOL
  - DEHYDRATION (PROGRESSIVE)
- Unusual Symptoms
  - DIARRHEA

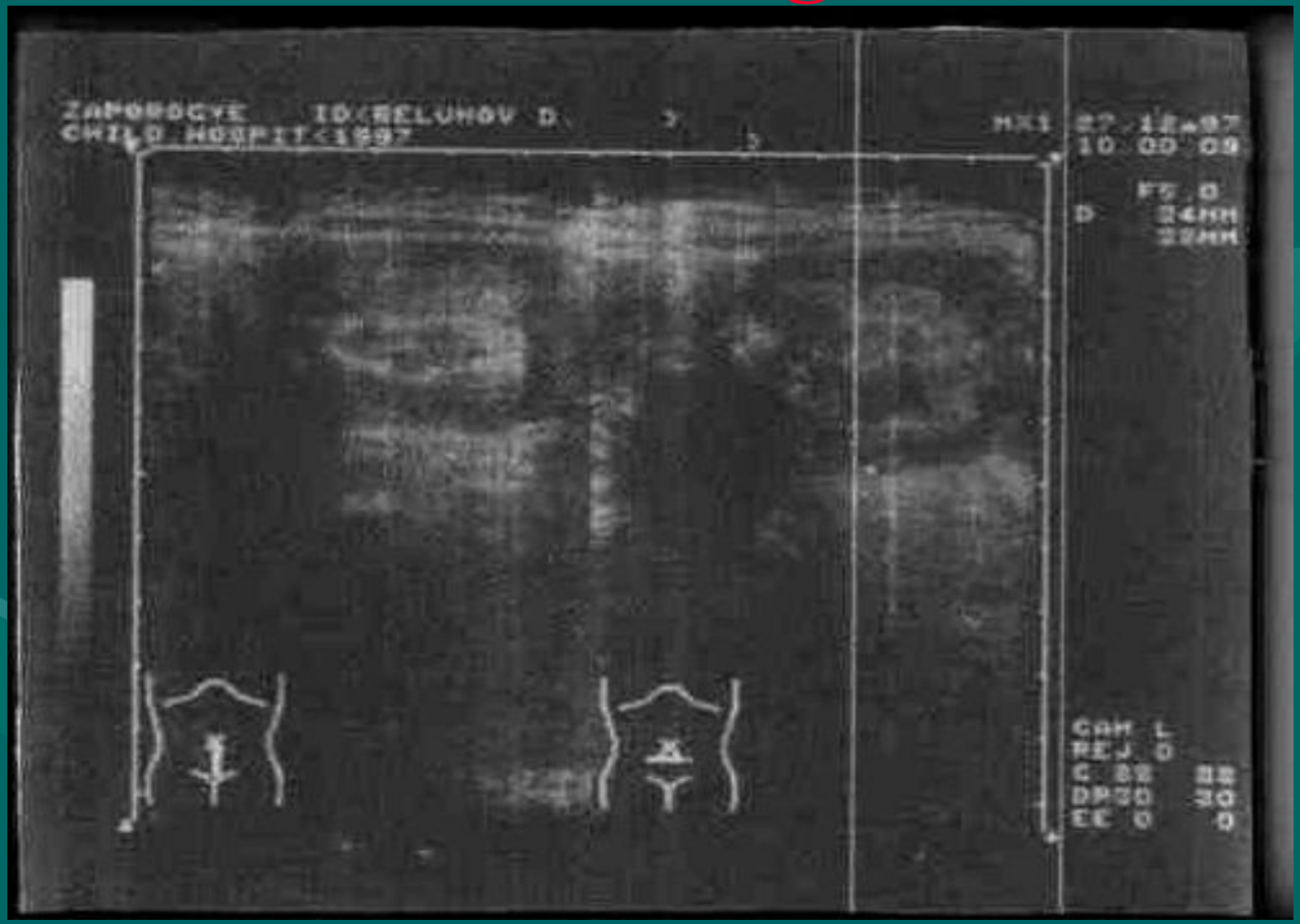
PHYSICAL EVALUATION

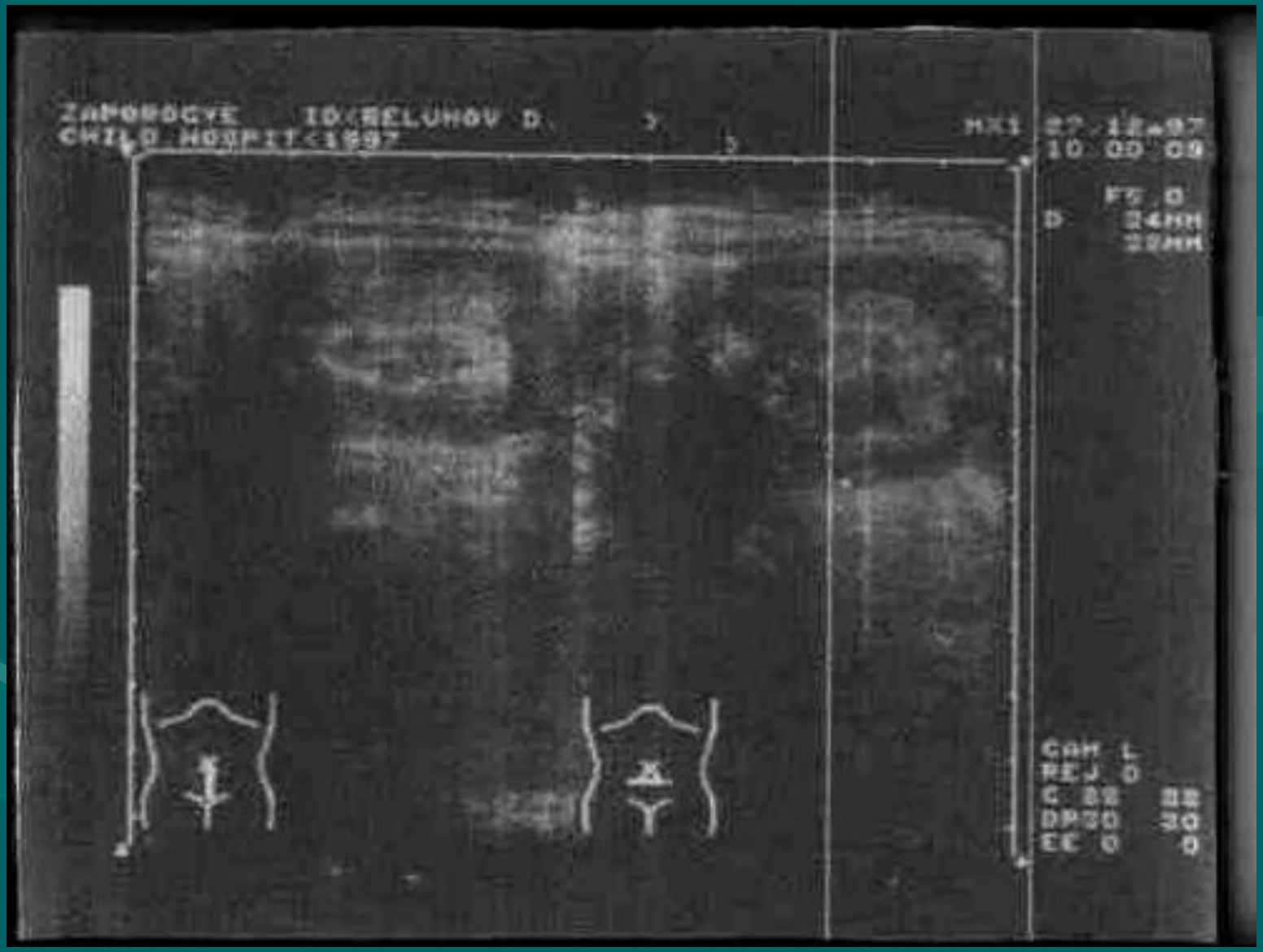
- Moderately to severely ill
- Irritable, limited movement
- Most are at least 5-10% dehydrated
- 80% have palpable abdominal masses
- Paucity of bowel sounds
- Rectal examination (blood, mass)
- Abdominal rigidity
- “Knocked Out” syndrome

INTUSSUSCEPTION STAGES

- I. Bright clinical manifestation
- II. Pseudodysenteric stage
- III. Peritonitis

Ultrasonic diagnostics

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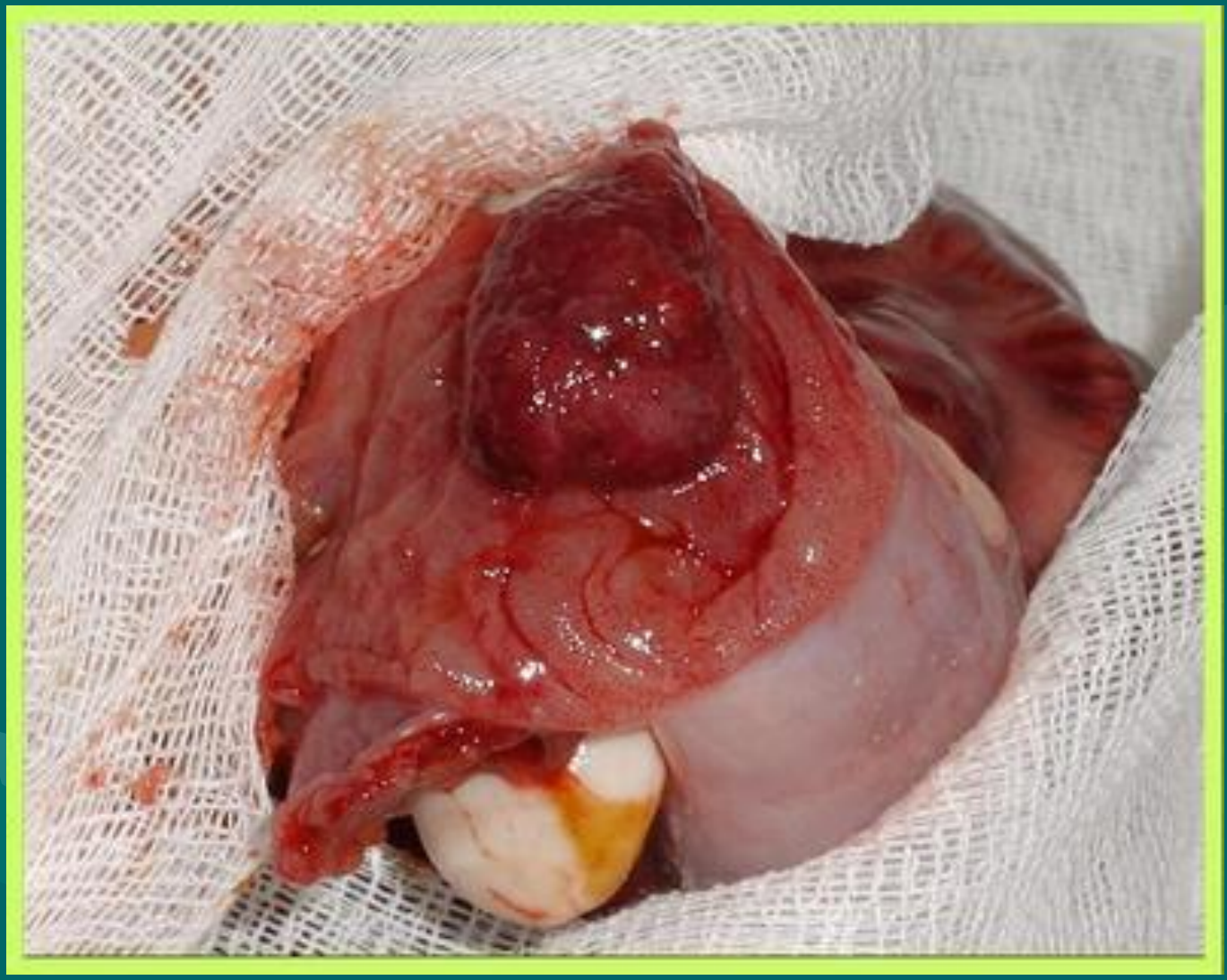
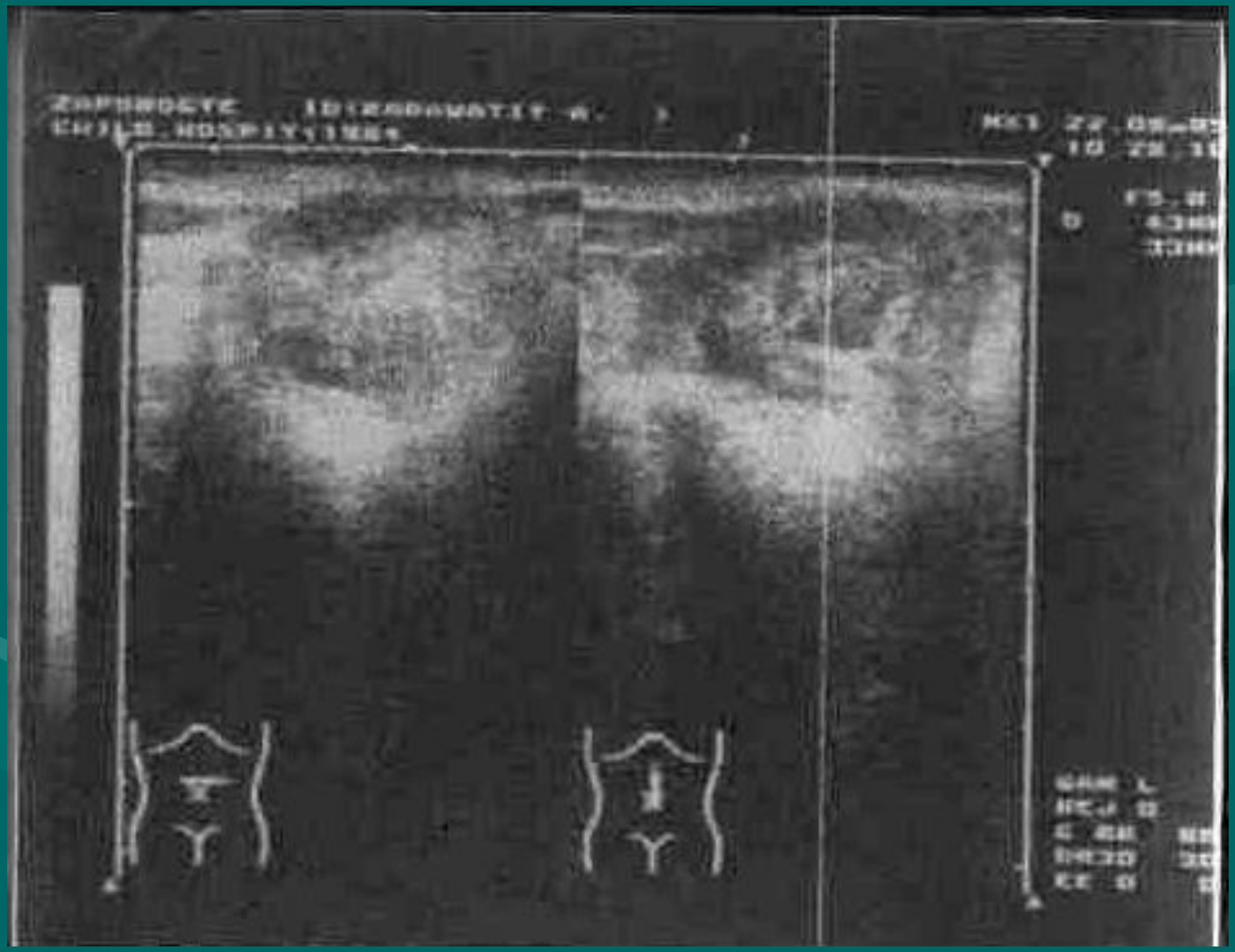
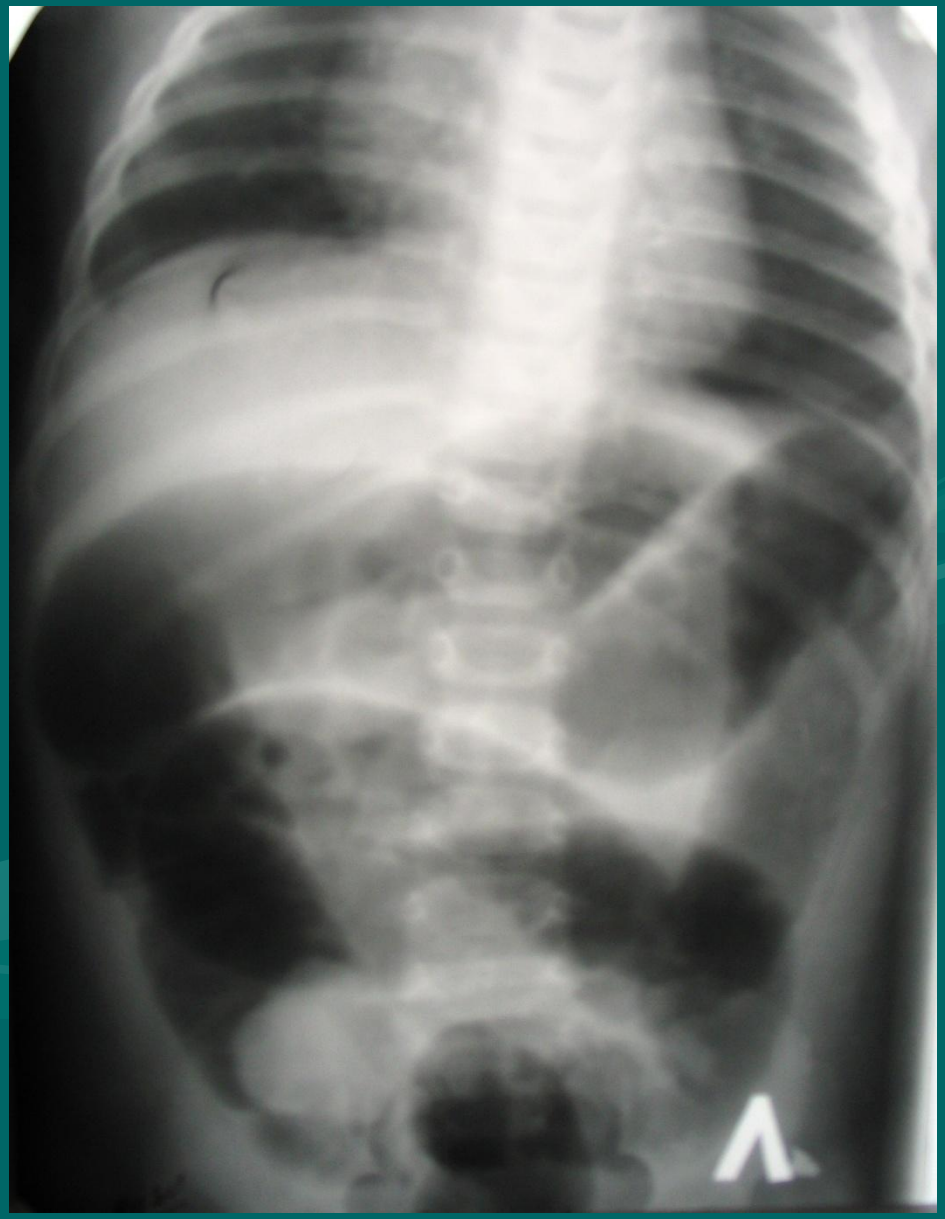
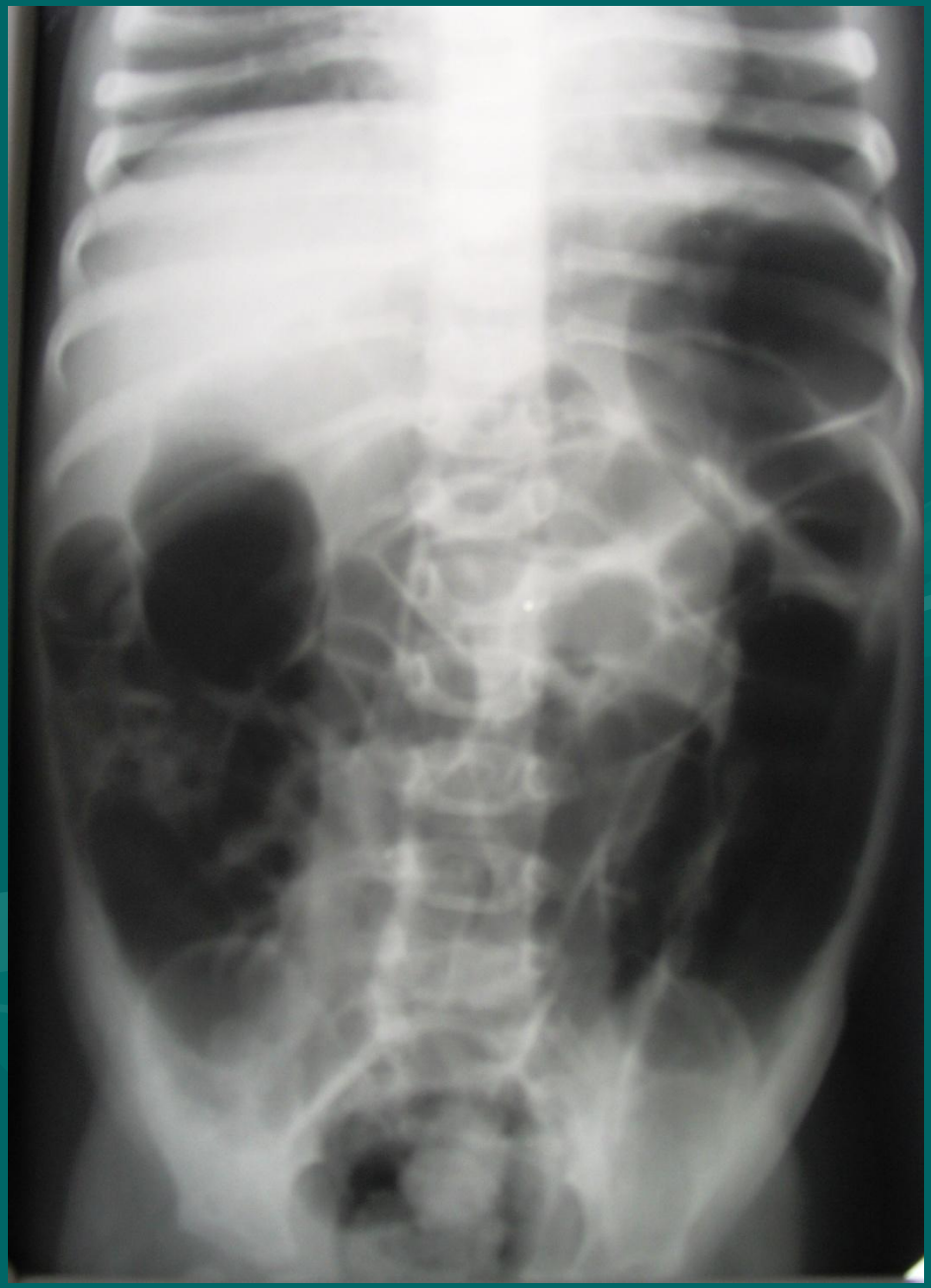




RADIOGRAPHIC EVALUATION

- Plain radiographs (acute abdominal series)
- Plain films suggestive in majority, but cannot rule out diagnosis
  - PAUCITY OF LUMINAL AIR IN INTESTINAL
  - SMALL BOWEL DISTENTION, AIR FLUID LEVELS
  - LUMINAL AIR CUTOFFS (CECUM, TRANSVERSE COLON)





TREATMENT

- Obstructive surgical emergency
- Pediatric surgeon notified immediately
- Supportive Therapy
  - AGGRESSIVE FLUID RESUSCITATION
  - ELECTROLYTES
  - NASOGASTRIC TUBE PLACEMENT AND DRAINAGE
  - ANTIBIOTICS IF ISCHEMIC BOWEL SUSPECTED
- Arrange radiographic evaluation

INTUSSUSCEPTION
PNEUMATIC REDUCTION

- Theoretical Advantages
  - LESS INFLAMMATION IF PERFORATION OCCURS
- Method
  - AIR INSUFFLATION LIMITED TO MAXIMUM "RESTING " PRESSURE OF 120 mmHg
  - MAXIMUM PRESSURE MAINTAINED FOR 3 MIN
  - USUALLY 3 ATTEMPTS AT REDUCTION
- Success Rate (75-90%)
  - MUST OBSERVE AIR IN THE TERMINAL ILEUM
  - LESS RECURRENCES (5-10%)
  - LOW PERFORATION RATE (1%)

INTUSSUSCEPTION

NON-OPERATIVE REDUCTION CONTRAINDICATIONS

- Absolute Contraindications
  - PERITONEAL SIGNS
  - SUSPECTED PERFORATION
- Relative Contraindications
  - SYMPTOMS > 24-48 HRS
  - RECTAL BLEEDING
  - POOR PROGNOSTIC INDICATORS

INTUSSUSCEPTION FAILURE OF NON-OPERATIVE REDUCTION

- Factors associated with failure
  - SYMPTOMS > 48 HRS
  - RECTAL BLEEDING
  - SMALL BOWEL OBSTRUCTION RADIOGRAPHICALLY
  - ILEOILEOCOLIC OR SMALL BOWEL TYPES
  - PRESENCE OF MECHANICAL LEAD POINT
  - AGE < 3 MONTHS
- Operative Reduction

Acquired intestinal obstruction

Acquired intestinal obstructions are a partial or complete blockage of the small or large intestine, resulting in failure of the contents of the intestine to pass through the bowel normally.

- Intestinal obstructions can be mechanical or nonmechanical.
- Mechanical obstruction is caused by the bowel twisting on itself (volvulus) or telescoping into itself (intussusception). Mechanical obstruction can also result from hernias, fecal impaction, abnormal tissue growth, the presence of foreign bodies in the intestines, or inflammatory bowel disease (Crohn's disease).

Clinic

- 1. Abdominal pain
- 2. Vomiting
- 3. Constipation
- 4. Intoxication syndrome

Diagnosis

1. X-ray examination
2. Ultrasonic diagnostics
3. Computed tomography
4. Diagnostic testing will include a complete blood count (CBC), electrolytes (sodium, potassium, chloride) and other blood chemistries, blood urea nitrogen (BUN), and urinalysis. Coagulation tests may be performed if the child requires surgery.

Treatment

1. Preoperative preparation:

   a. inserting a nasogastric tube to suction out the contents of the stomach and intestines

   b. Intravenous fluids will be infused to prevent dehydration and to correct electrolyte imbalances that may have already occurre

Thank you for attention!