



Pediatric Surgery

Q: This 1 year old baby had this lesion since birth:

Q1: What is the most likely Dx?
Hemangioma

Q2: What is the best Mx?
Observation and reassurance



Vascular malformation



Sturge weber syndrome

- port wine stain vascular malformation involving the ophthalmic division.
- Usually not evident at birth.

mnemonic :

- S : seizures / U: unilateral weakness
R: retardation (mental) / G: Glaucoma
E : other eye problems



Capillary hemangioma in the eyelid obstructing the eye , might lead to Amblyopia "lazy eye".



The same patient at different ages (hemangioma)

hemangioma	Vascular malformation
Start as small lesions at the age of 3-4 months	seen at birth but may appear late
Grow to reach their maximum size at the age of 1 year then involution	Grow parallel to the child's growth
Female to male (3:1)	Female to male (1:1)
Rarely to cause any complications	High flow can lead to destructive changes
Spontaneous resolution unless complicated you should treat	Treatment : surgery/laser/ embolization

Bilateral cleft lip and palate

Cleft lip:

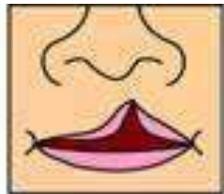
No functional deformity, only cosmetic deformity and **surgery is done at age of 3 months.**

Breast feeding is not contraindicated.

Cleft palate:

baby can't feed, can't speak and may lose his hearing by time (acquired).

surgery is done at age of 1 year as a compromise between not losing his speaking abilities and the normal growth of face.



Unilateral incomplete



Unilateral complete



Bilateral complete



Incomplete cleft palate



Unilateral complete lip and palate



Bilateral complete lip and palate

Pentalogy of Cantrell

1. Omphalocele.
2. Anterior diaphragmatic hernia.
3. Sternal cleft.
4. Ectopia cordis.
5. Intracardiac defect.

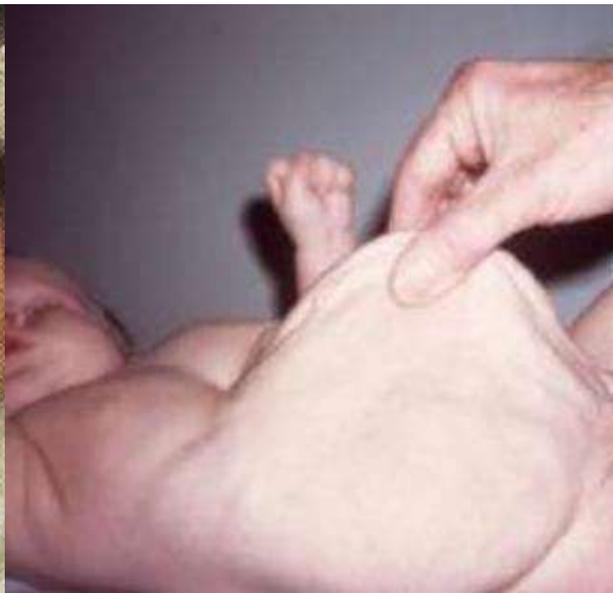


Q1: What is the Dx? Prune belly syndrome

Q2: Mention 2 associated anomalies?

- 1) Undescended testicles
- 2) Urinary tract abnormality such as unusually large ureters, distended bladder, Vesicoureteral reflux, frequent UTI's
- 3) VSD
- 4) Malrotation of the gut
- 5) Club foot

- thin flaccid abdominal wall.
 - AKA eagle Barrett syndrome.
- absent abdominal wall musculature.
- dilation of bladder, ureter and renal collecting system.
 - **95% in Males.**



Bickwith- Wiedman syndrome

1. Macrosomia.
2. Macroglossia.
3. Organomegaly.
4. Abdominal wall defects.
5. Embryonal tumors.



Torticollis

- Tilted neck.

- Causes:

1) congenital (due to abnormal position of the fetus in uterus which leads to fibrosis of sternocleidomastoid muscle >> shortness of this muscle)

2) acquired : due to trauma leads to muscle spasm on one side/ fibrosis of SCM due to any cause.

3) infection: lymphadenitis



- Occurs at any age but most common in the 1st few months of life.
- Palpable hard mass in 1/3 of patients.
- The baby usually sleeps on the same side >> craniofacial deformity.
- Treatment : conservative using physiotherapy for 2-3 months.
- If no improvement, surgery is indicated (SCM myotomy).

Cystic hygroma

- Fluid-filled sacs caused by blockages in the lymphatic system.
- **most hygromas appear by age 2.**
- **soft, non-tender, compressible lump.**
- high recurrence rate.
- usually located in the posterior triangle of the neck.
- **transillumination.**
- DDX: teratoma/hemangioma/
- encephalocele.

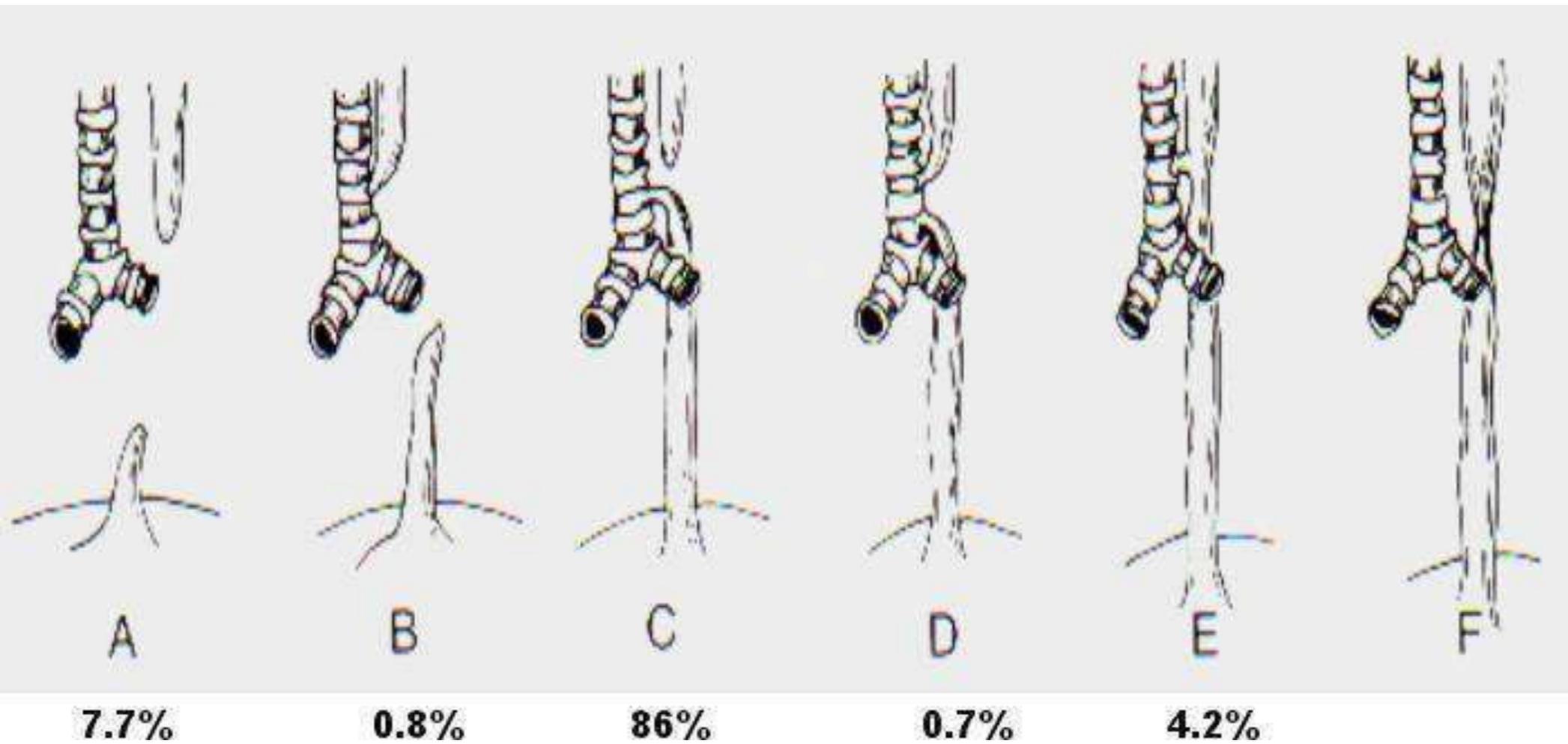


Congenital malformations

Think of Albort Syndrome



Esophageal atresia and tracheoesophageal fistula



Manifestations of esophageal atresia:

- 1) **Upper part:** drooling of saliva/ bubbling of the saliva/ respiratory distress/ choking/ failure to pass nasogastric tube.
- 2) **Lower part:** accumulation of secretions which will lead to regurgitation and vomiting/ ischemia>> physiological death>> biological death (necrosis) >> rupture.

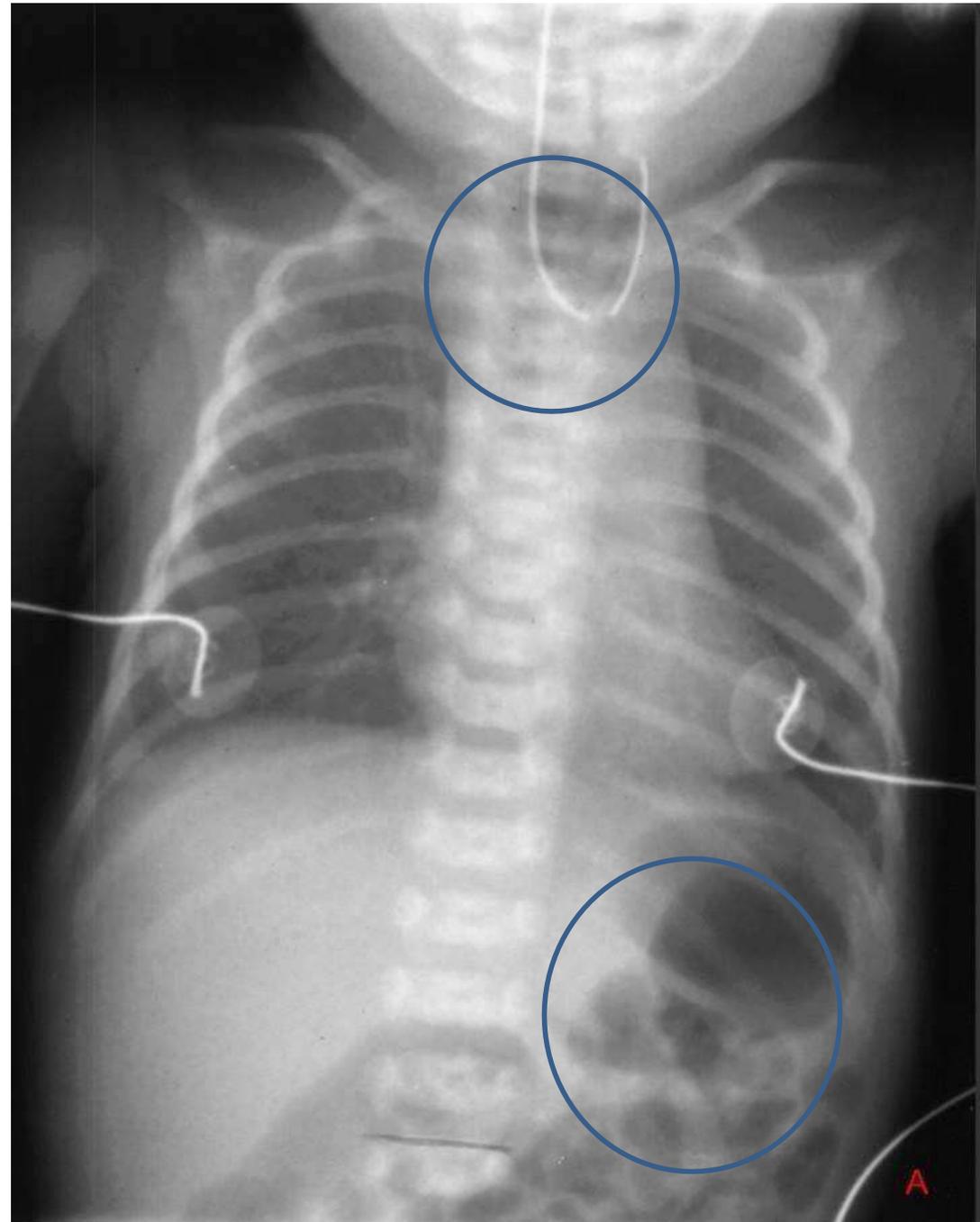
* The more distal the obstruction, the more the distention of the lumen and so the more the possibility of rupture.



Neonates with esophageal atresia usually develop copious, fine white frothy bubbles of mucus in the mouth and nose. Secretions recur despite suctioning.

Esophageal atresia and tracheoesophageal fistula

- Atresia of the upper esophagus evidenced by failure to pass a feeding tube.
- Gas in the abdomen.
- These findings are likely due to a esophageal atresia with a distal tracheoesophageal fistula (Type C TEF).



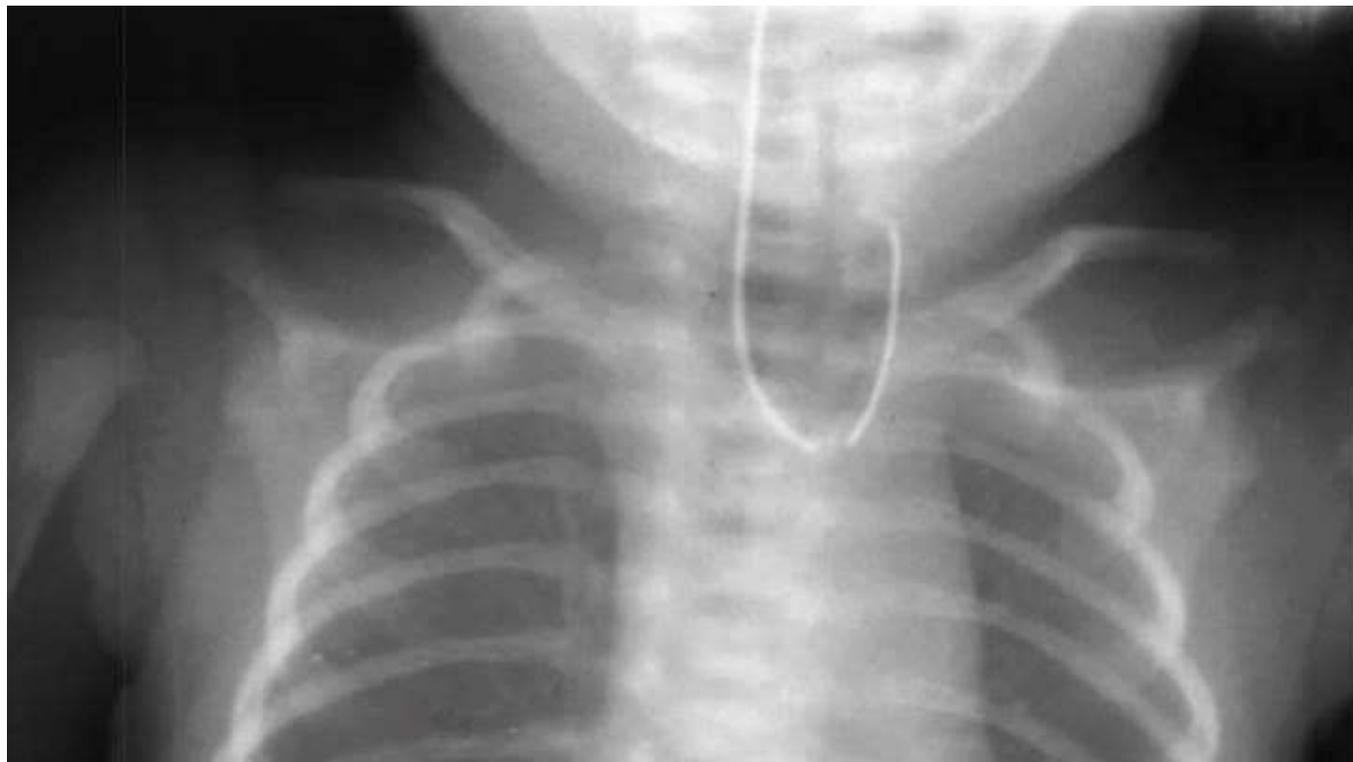
Q: New born x-ray, cyanosis and distressed:

Q1: What is your Dx?

- Tracheoesophageal fistula (because of the cyanosis)

Q2: Characteristic sign?

- Failure to pass the nasogastric tube



Q: A new-born baby had inability to swallow milk and frothy mouth secretions, this is his x-ray.

Q1: Mention two radiological signs?
inability to pass nasogastric tube/air in the stomach.

Q2: What is the diagnosis?
Esophageal atresia with tracheo-esophageal fistula.



ARDS

(bilateral diffuse
pulmonary infiltrates)

Other DDx:

- 1-severe pulmonary edema.
- 2-pulmonary hemorrhage.
- 3-pulmonary fibrosis.

(history differentiates
between these conditions)

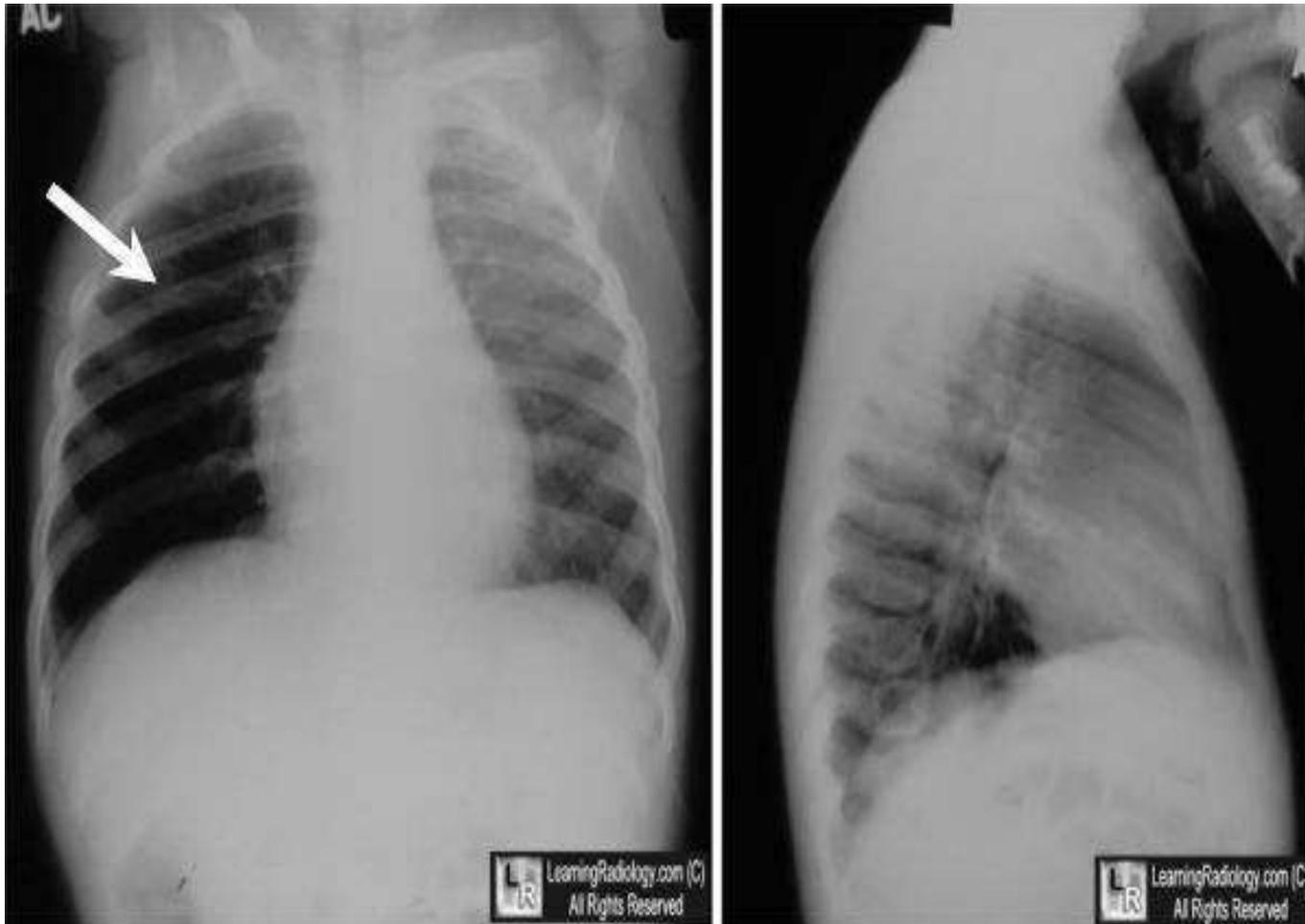
Ground Glass Appearance

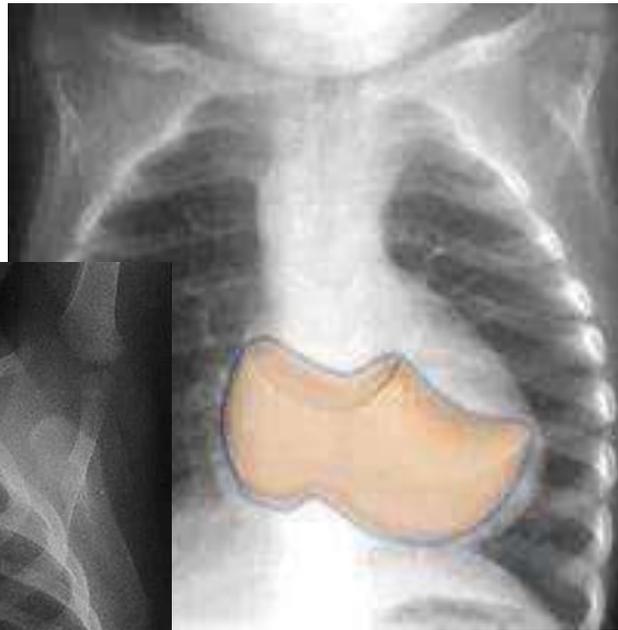
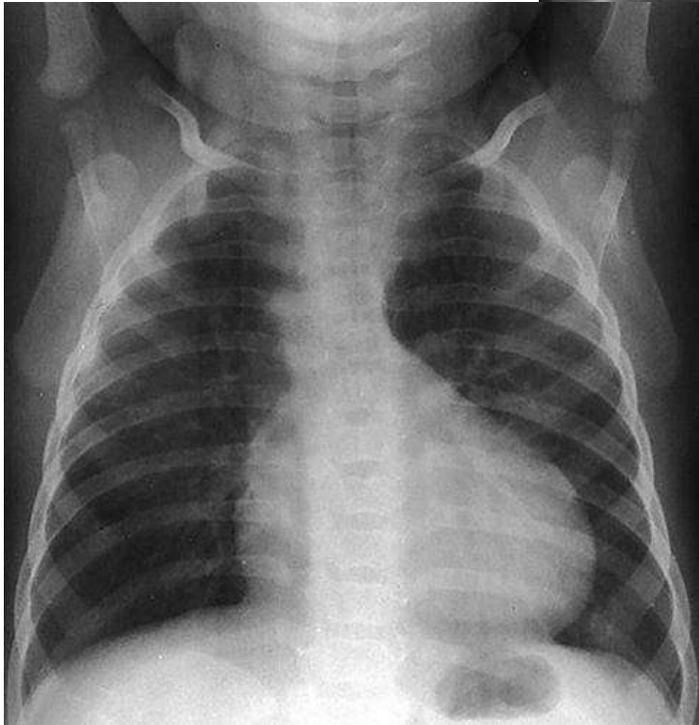


This chest X-ray shows **air trapping** indicating **foreign body aspiration**.

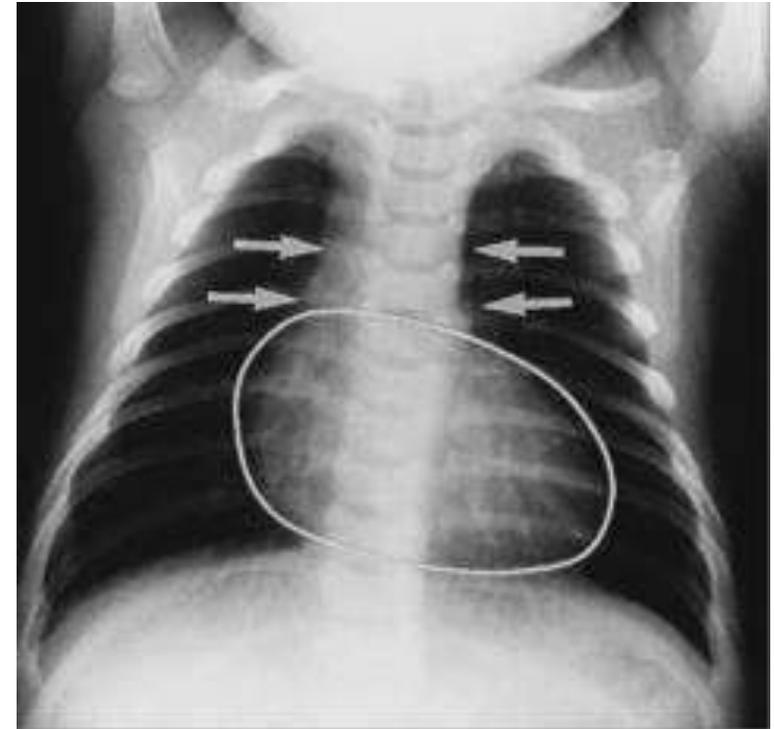
It is the most common radiological sign shown on the X-ray after F.B aspiration.

Whenever you suspect F.B aspiration you have to do **bronchoscopy**.





Tetralogy of Fallot
"boot" shaped heart on
chest X-ray.



**Transposition of great
vessels**
Egg shaped heart

Congenital diaphragmatic hernia

- X-ray of the abdomen and chest.
- features :
 - scaphoid abdomen.
 - **bowel is located in the left side of the chest.**
 - mediastinal shift towards the right.
- mortality is mostly due to **pulmonary hypoplasia.**
- Diagnosis: In prenatal period (ultrasonography)



• Types :

1) Bochdalek hernia

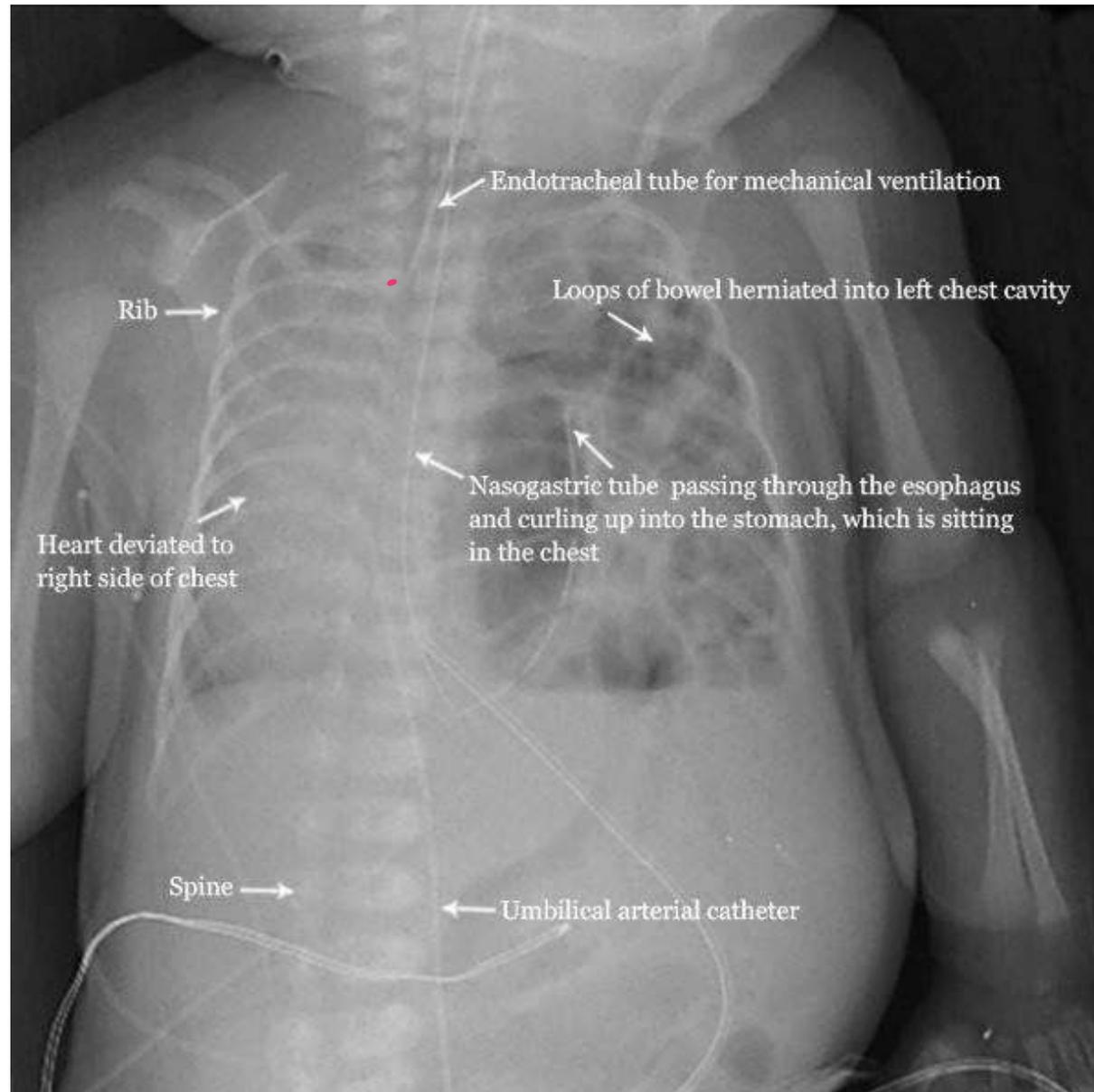
(mostly on left side): posterolateral, mc.

2) Morgagni hernia

(mostly on the right side): retrosternal.

Hiatus hernia.

Neonate with a prenatally diagnosed left congenital diaphragmatic hernia pre surgery.



	Omphalocele	Gastroschisis
Incidence	1:6,000-10,000	1:20,000-30,000
Delivery	Vaginal or CS ✓	CS
Covering Sac	Present	Absent
Size of Defect	Small or large	Small
Cord Location	Onto the sac	On abdominal wall
Bowel	Normal	Edematous, matted

	Omphalocele	Gastroschisis
Other Organs	Liver often out	Rare
Prematurity	10-20%	50-60%
IUGR	Less common	Common
NEC	If sac is ruptured	18%
Associated Anomalies	>50%	10-15%
Treatment	Often primary	Often staged
Prognosis	20%-70%	70-90%

Q1: What is the Dx? Gastroschisis

Q2: Name the procedure? Silo

Q3: The prognosis depends on?

- Bowel status

Q4: The indication of this procedure?

- if the bowel is inflamed and primary closure is not possible

- to prevent dehydration, hypothermia, contamination

- **location : lateral to the umbilicus (to the right).**
 - defect size : 2-4 cm.
 - no sac.
 - cord is normally inserted into umbilicus.
- contents : only bowel (edematous and matted).
 - GIT function : **prolonged ileus.**
 - associated anomalies : infrequent.



Q1: What is the Dx?

- Omphalocele

Q2: How is the GI function?

- Normal



- location : umbilical ring.
- The protrusion is covered by peritoneum.
 - defect size : >10 cm.
- cord : inserted into the sac.
 - GIT function is normal.
 - contents : bowel +/- liver.
 - malrotation : present.
- associated anomalies : common (30-70 %).

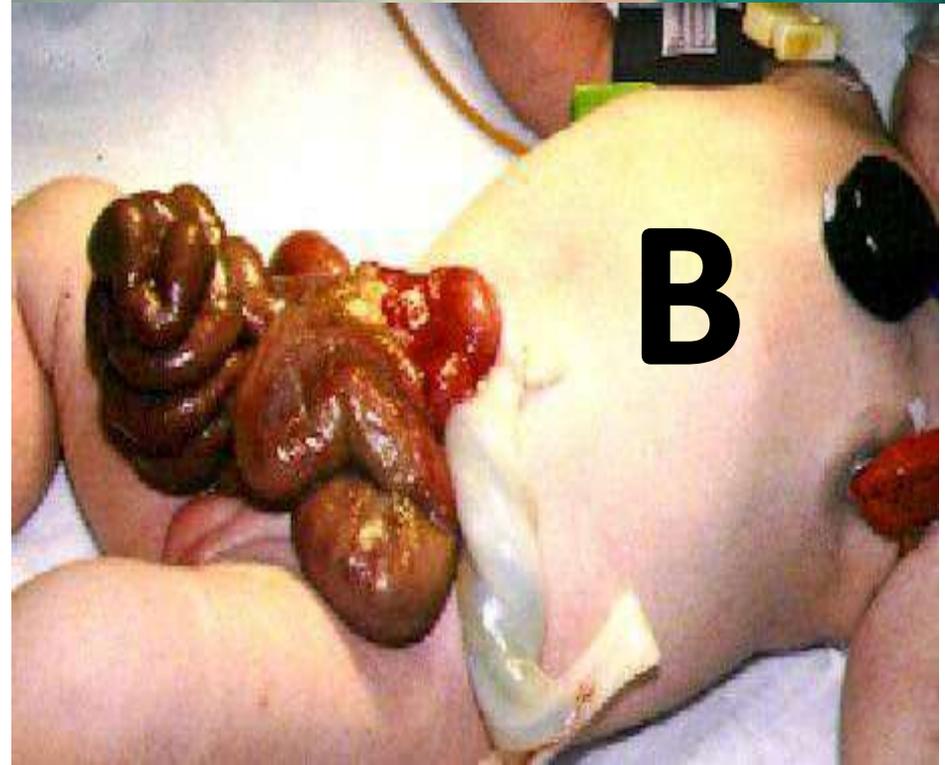
Q1: What is the diagnosis in A,B?

A > Omphalocele

B > Gastroschisis

Q2: Which of these are more associated with congenital anomalies?

- Omphalocele



Q3: What is the 1st aid Mx for both?

- Carefully wrap in saline-soaked pads.
- Support without tension.
 - NG tube.
- Abdominal ultrasound.



Q: Malrotation:

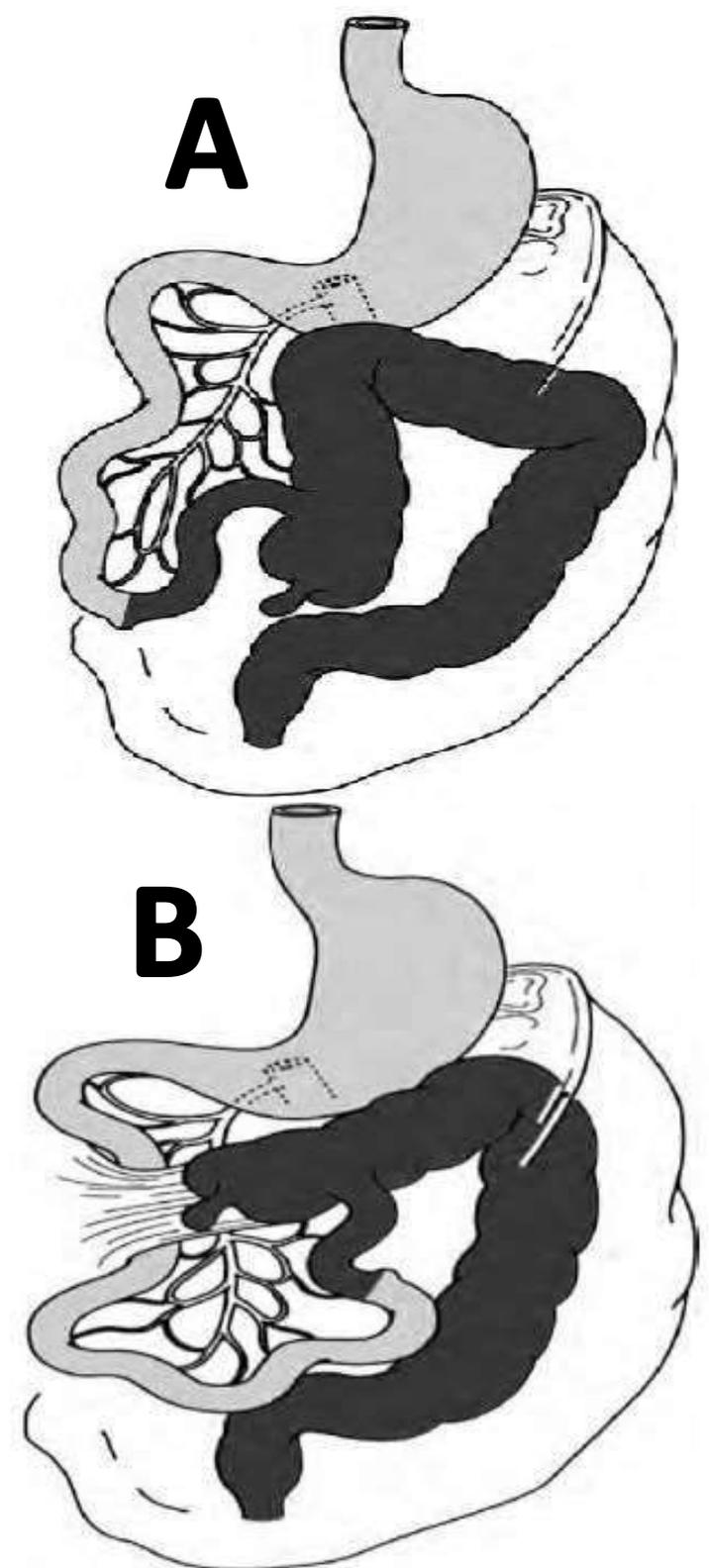
Q1: What's A and B?

A > Non-Rotation

B > Incomplete Rotation

Q2: Which one is the most commonly associated with volvulus?

- B



Q: What is the Dx according to:

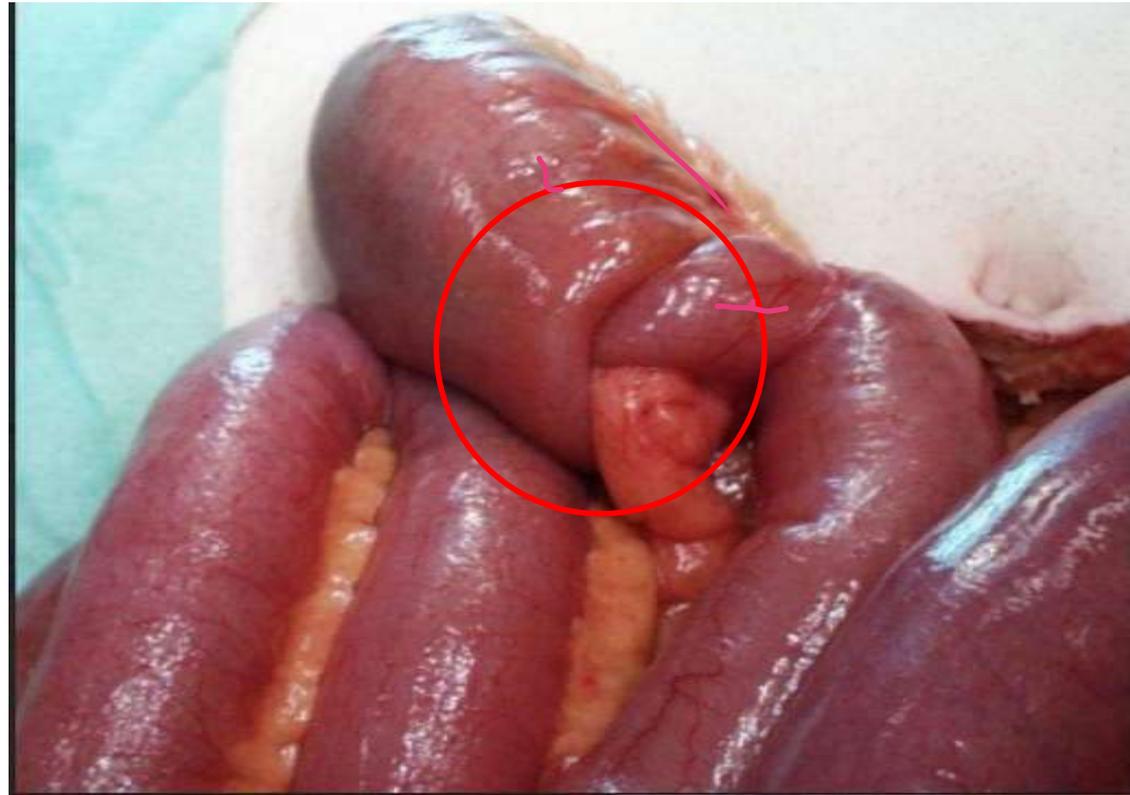
A: Preterm baby > Necrotizing enterocolitis (NEC)

B: Full-term baby > Hirschsprung disease



Intussusception

- It is a cause of intestinal obstruction.
- M : F (3:2)
- In a previously healthy infant.
- (5 months - 3 yrs) idiopathic / (>3yrs) 2ry.
- m.c.c of I.O in the age of (5 months-3 yrs)
- Sudden onset, abdominal colic, vomiting.
- begins proximal to ileo-cecal junction.
- **Ba enema (diagnostic and therapeutic).**
- The part that prolapses into the other is called the intussusceptum, and the part that receives it is called the intussusciptient.



Q1: What is the investigation?

- Abdominal US

Q2: Name of the sign?

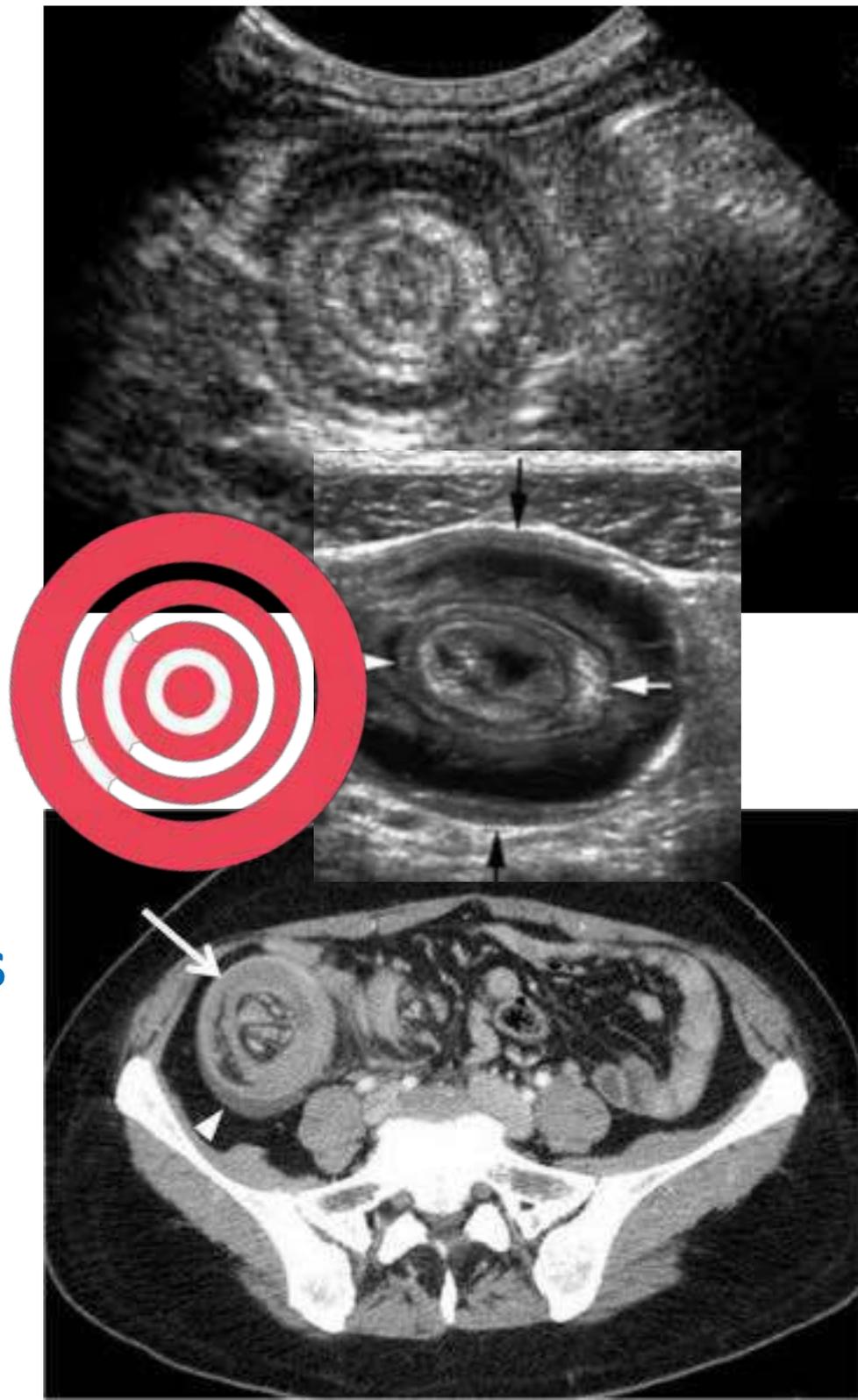
- Target sign

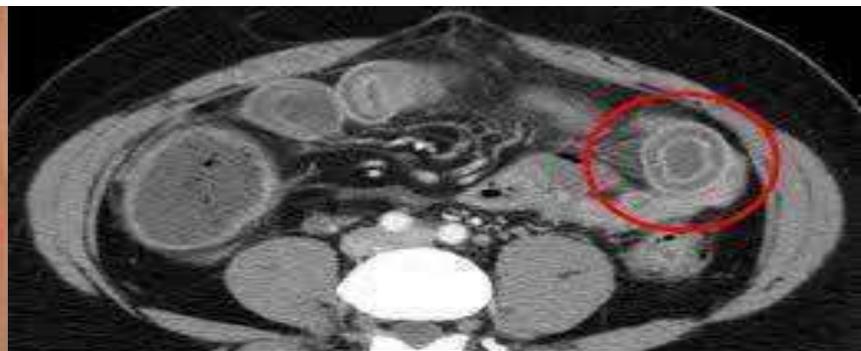
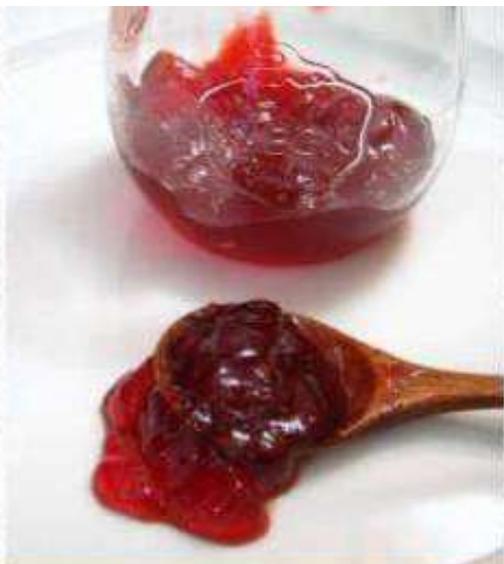
Q3: What is the pathology?

- Intussusception

Q4: How do we treat those patients in uncomplicated cases (stable)?/1st line of Mx?

- Resuscitation, Hydrostatic (pressure) reduction using gas air or barium enema



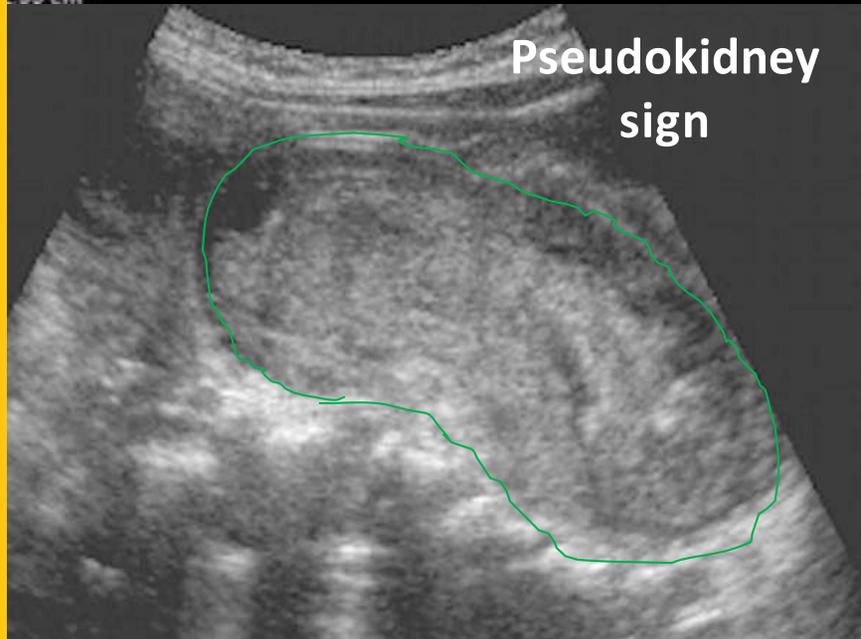


RUQ Target sign (doughnut sign).



2.55 cm

8.0



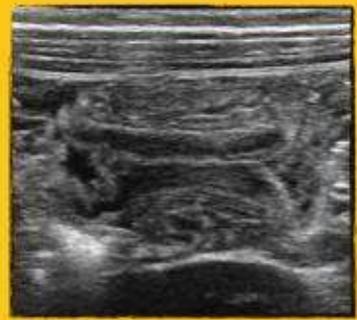
Pseudokidney sign

Red currant jelly

Stool

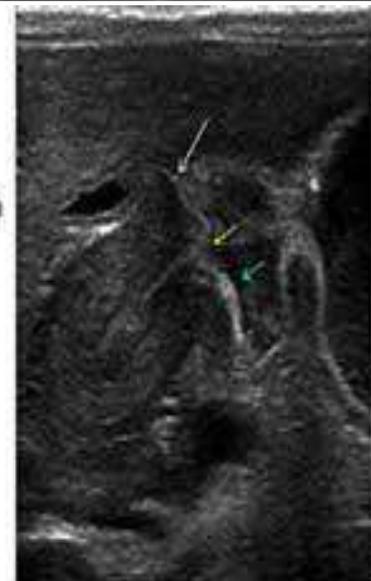
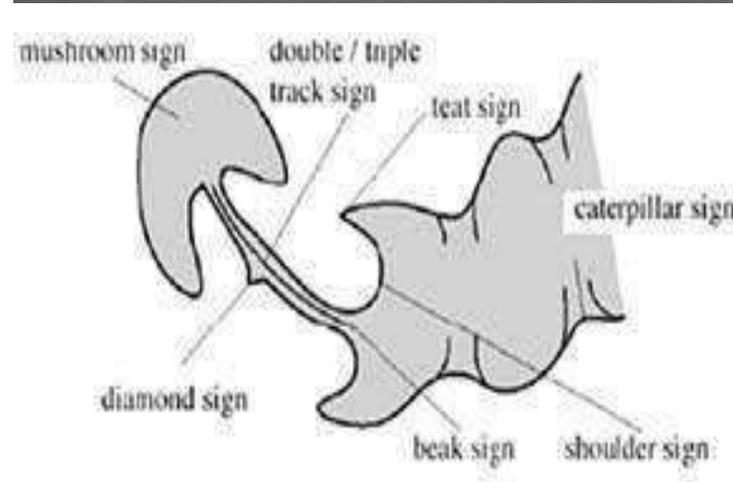
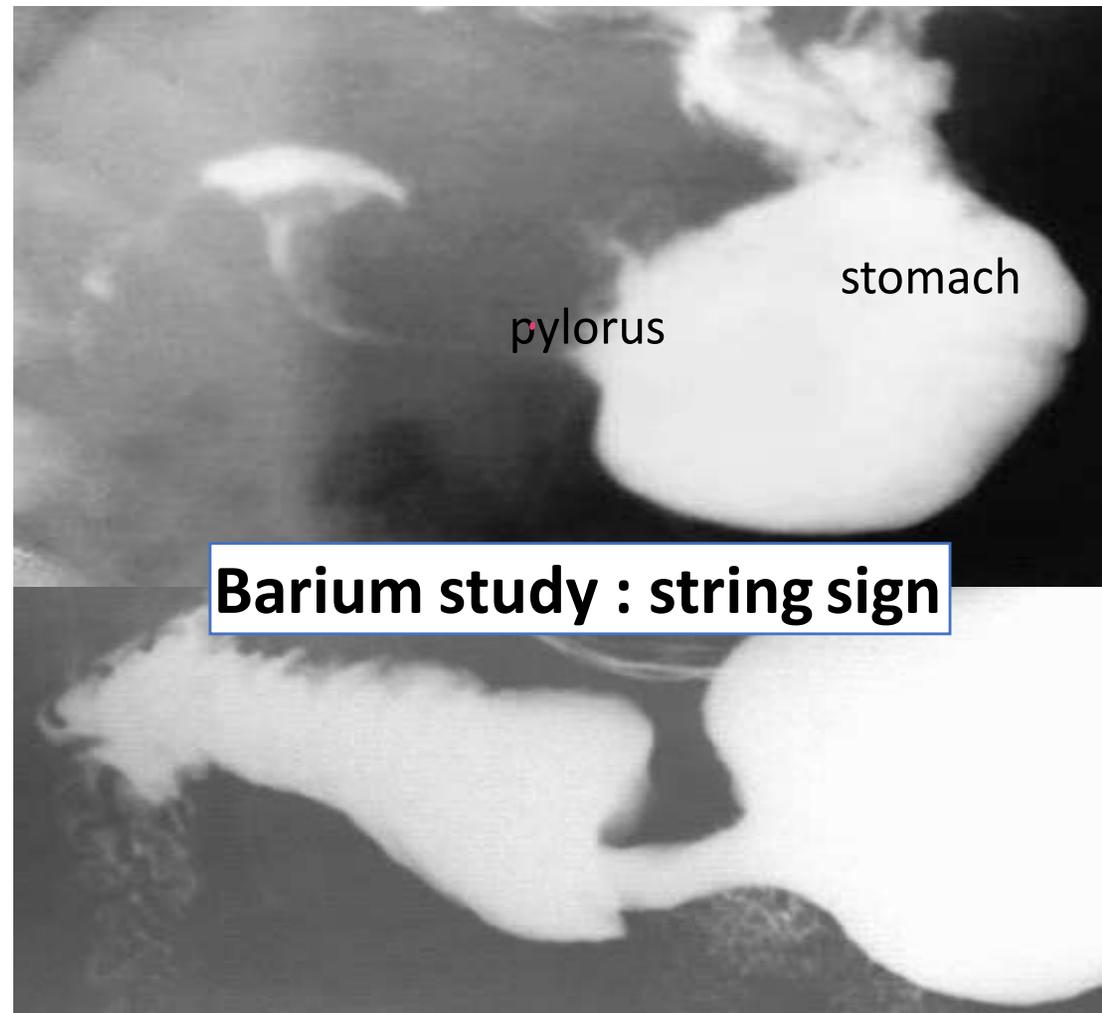


INTUSSUSCEPTION



Pyloric stenosis

- M : F (4:1)
- Age (3-6 wks)
- Progressive, persistent, projectile, non-bilious vomiting.
- Succation splash.
- Olive sign (enlarged pylorus is palpable).
- Hypochloremic^{hypokalemic} alkalosis.
- Dx by abdominal U/S
- Higher risk when mother is affected.
- Surgical ttt: Ramstad's pyloromyotomy.
- No recurrence after surgery.



Q1: What is this?

- Meckel's Diverticulum

Q2: Name 2 complications?

- 1) Intestinal hemorrhage
- 2) Intestinal obstruction
- 3) Diverticulitis

Q3: Mention one common ectopic tissue you can find?

- Gastric and pancreatic tissues



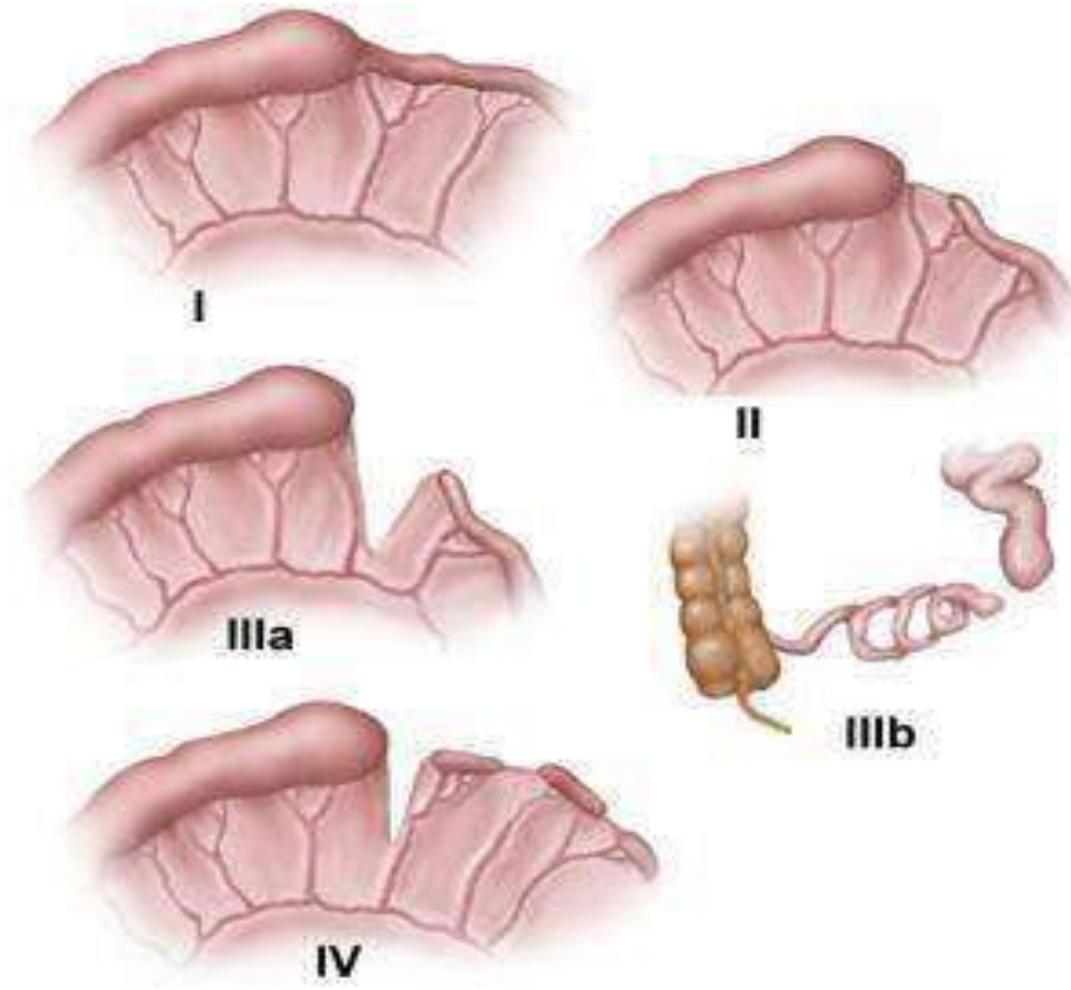
Q4: Is it a true or pseudo-diverticulum?

- True Congenital Diverticulum

-A memory aid is the rule of 2s:
2% (of the population).
2 feet (proximal to the ileocecal valve).
2 inches (in length).
2 types of common ectopic tissue (gastric and pancreatic)
2 years is the most common age at clinical presentation
2:1 male: female ratio



Types of intestinal atresia



Q1: What is the Dx?

Jejunal atresia.

Q2: Age of presentation?

Neonate (till one month)

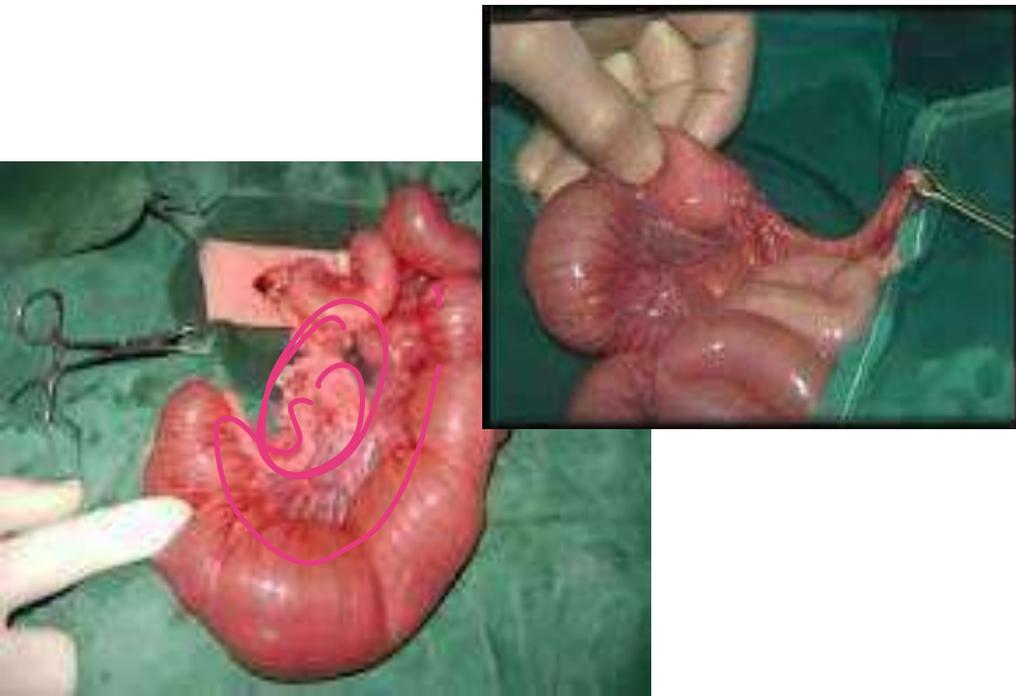
Q3: How would u manage?

Admit to NIC

fluid resuscitation

Antibiotic

NG suction and parental nutrition.



Q: Intra-op image of a baby with symptoms of obstruction.

Q1: Give two findings:

Dilated proximal loop,
collapsed distal loop.

Q2: What is the diagnosis?

Type 1 intestinal atresia.



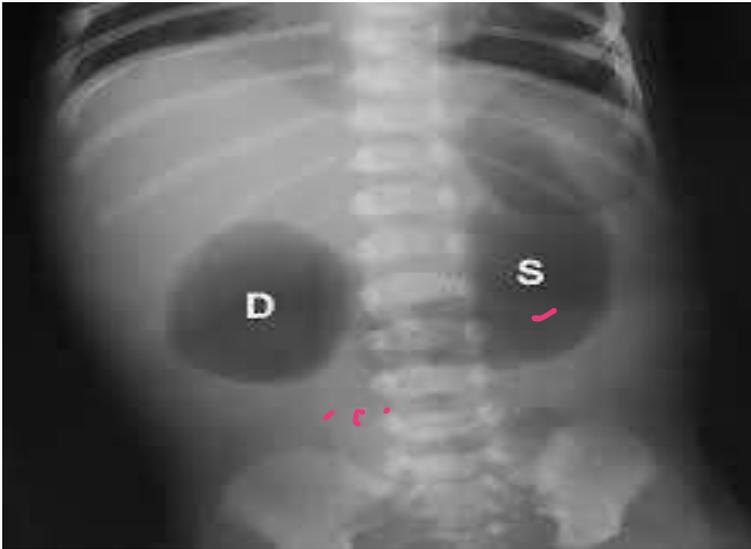
- **Apple peel intestinal atresia**
(also type IIIb or **Christmas tree atresia**).

- Due to vascular accident.

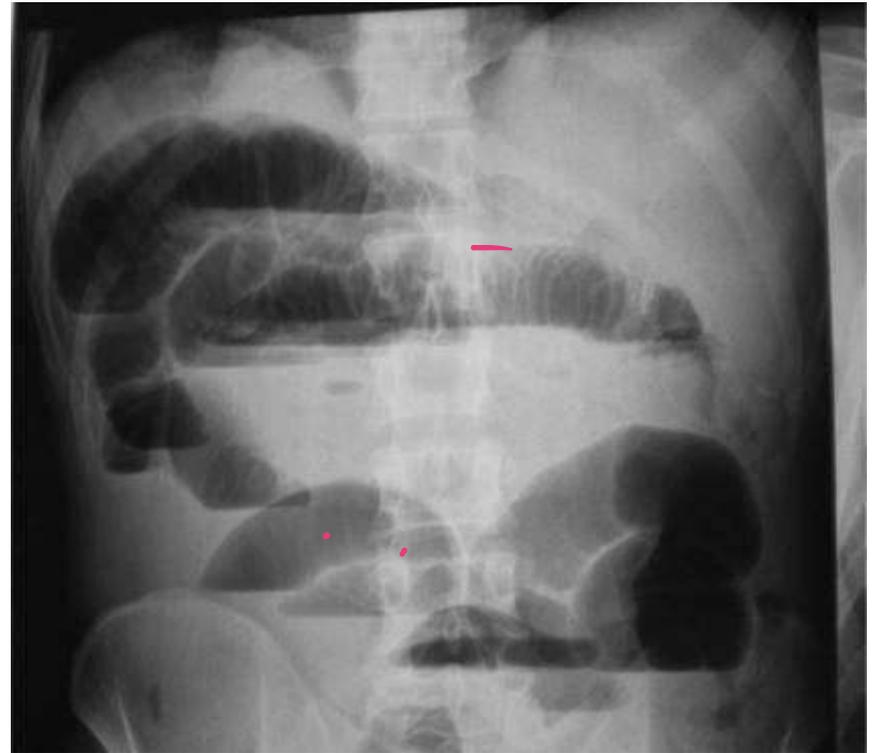
- All the intestine is atretic, and forms a loop around the superior mesenteric artery.



Intestinal obstruction



- Abdominal X-ray.
- Double bubble sign.
- represents dilation of the proximal duodenum & stomach.
- DDx : duodenal stenosis (mostly in the 2nd part of duodenum) / duodenal atresia.



Multiple air fluid levels seen in mechanical intestinal obstruction.

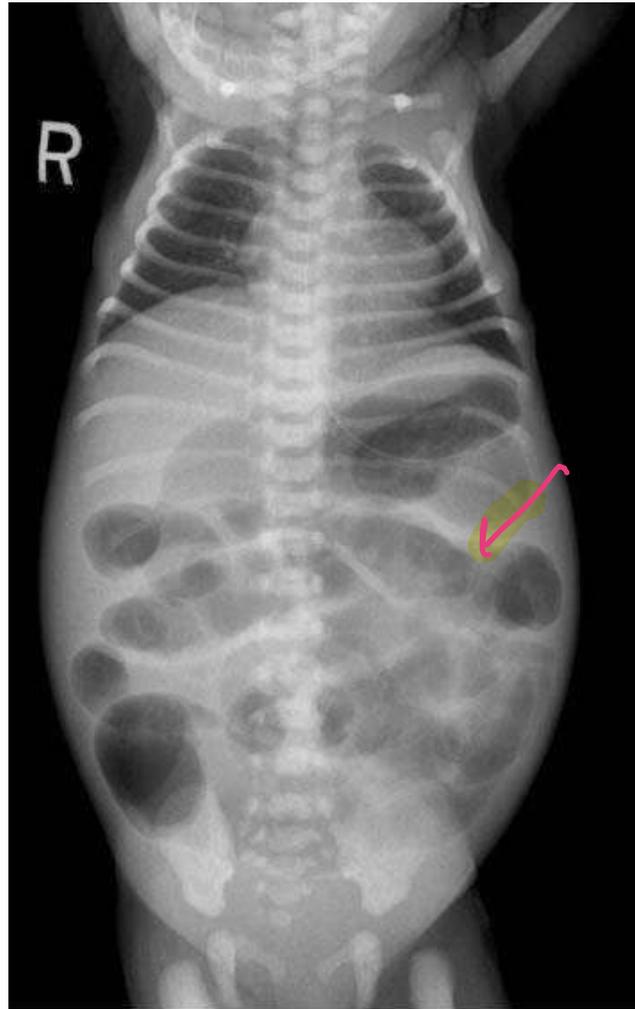
Meconium ileus

- Intestinal obstruction from solid meconium concretions.
- >95% have cystic fibrosis.
- Sx: bilious vomiting/
abdominal distention/
failure to pass meconium.



Hirschsprung's disease

- Congenital megacolon.
- It is an absence of ganglion cells distal in the bowel.
- Contracted non-peristaltic affected segment and a dilated hypertrophied proximal segment.
- M:F (4:1)
- Failure to pass meconium in the 1st 24-48 hrs of life.
- When compared to habitual constipation (no soiling/ no anal fissures).
- DDX : hypothyroidism/ sepsis.



Plain abdominal X-ray : dilated loops of bowel/ air-fluid level.



Barium enema study: funnel shaped appearance of colon (megacolon – transitional zone- the affected narrowed segment).

Q: A neonate failed to pass meconium, so a barium enema was done and shows this:

Q1: What is the Dx?

- Hirschsprung disease

Q2: What does the arrow indicate?

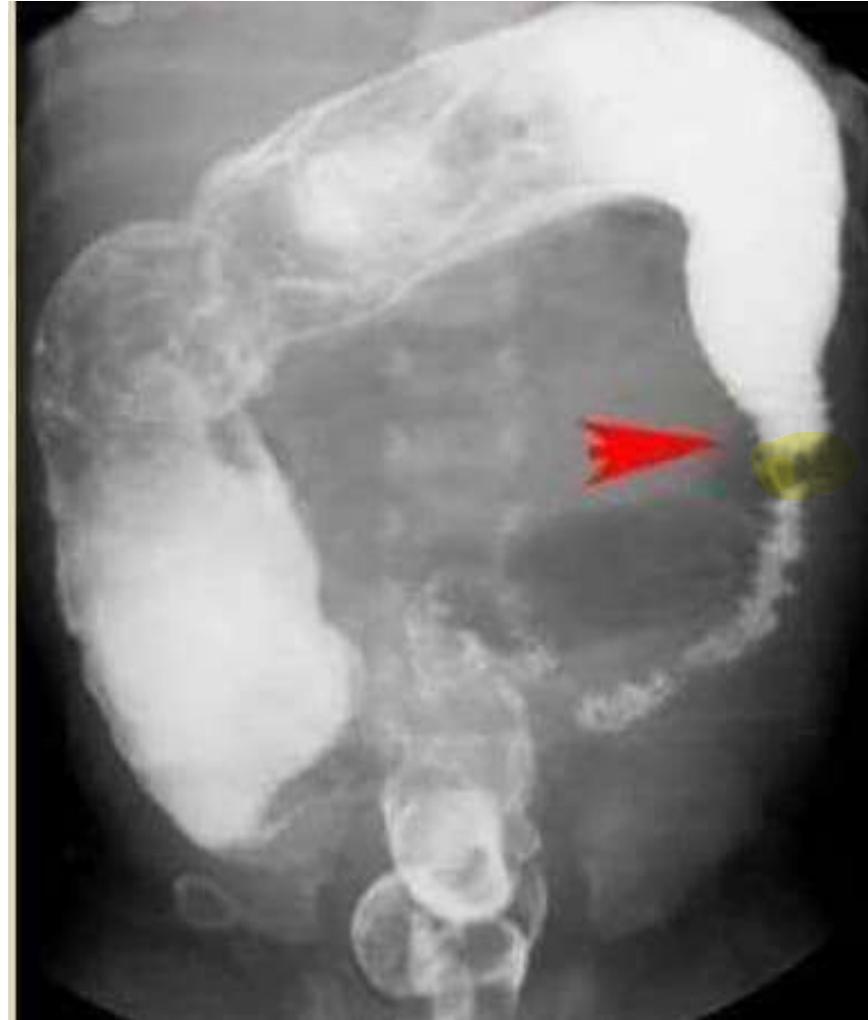
- Transition zone

Q3: What is the diagnostic test?

- Biopsy
- Full thickness or rectal suction

Q4: Name the radiology study?

- Barium enema



Umbilical Hernia

- more common in blacks.
- familial tendency.
- repair is carried out if closure does not occur by the end of 2nd year of life.
- repair performed after the age of 2 and before the age of 10.
- associated anomalies :
 - hypothyroidism.
 - hurler syndrome.
 - beckwith-wiedman syndrome.

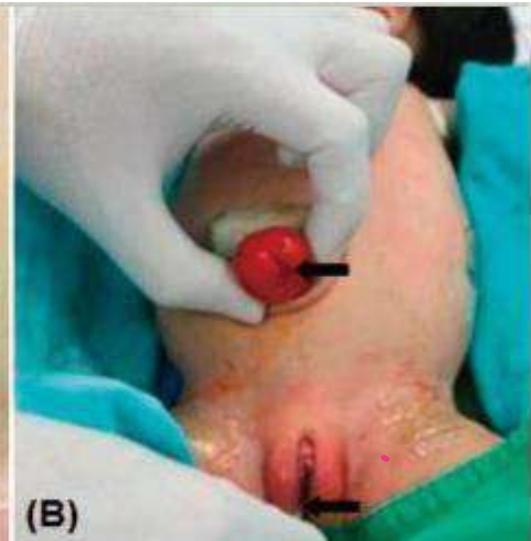
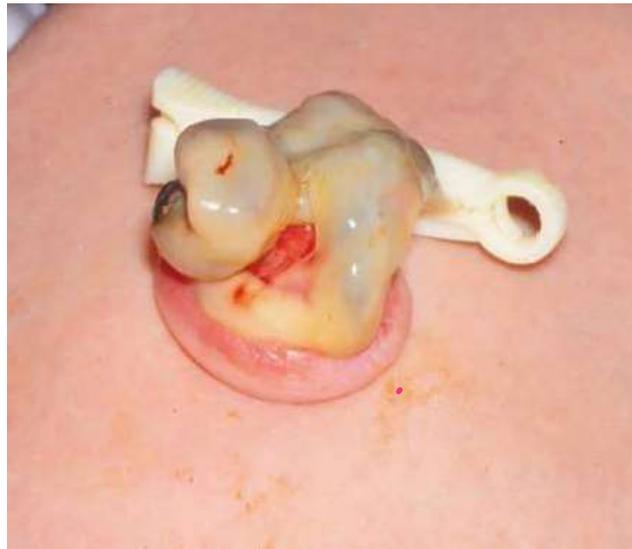


Patent urachus

- It is a remnant presents as **fistula** connecting the umbilicus & urinary bladder.

- Patients with prune belly syndrome have a patent urachus.

- Other forms : blind sinus/ cyst/ abscess.



(A) Prolapsed bladder was shown through the patent urachus. (B) Catheterization through the urethral orifice confirmed the communication between patent urachus and the bladder (black arrow: catheter tip).

Vesicointestinal fissure

The terminal ileum is herniating through the cecum forming the so called **elephant trunk deformity**.

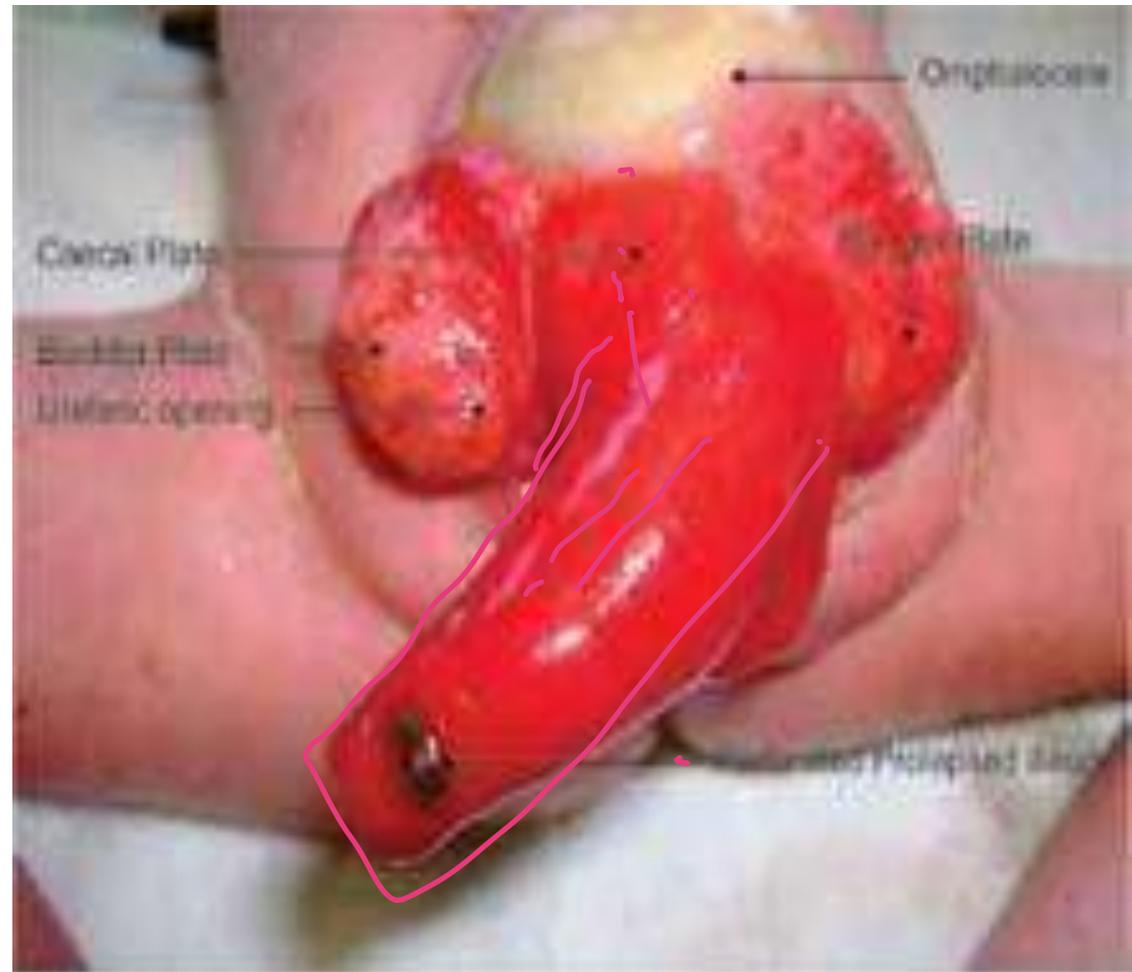


Fig.1: Showing omphalocele, lateral bladder plate, caecal plate and prolapsed ileum.

Omphalitis

- Inflammation of the umbilicus.
- Occurs only in newborns.
- Can be fatal because of portal vein thrombosis.
- Infection can spread to the abdominal wall.
- Antibiotics and intensive care.



Bladder Extrophy

- Defective enfolding of caudal folds.
- Associated with prolapsed vagina or rectum / **epispadias** / bifid clitoris or penis.



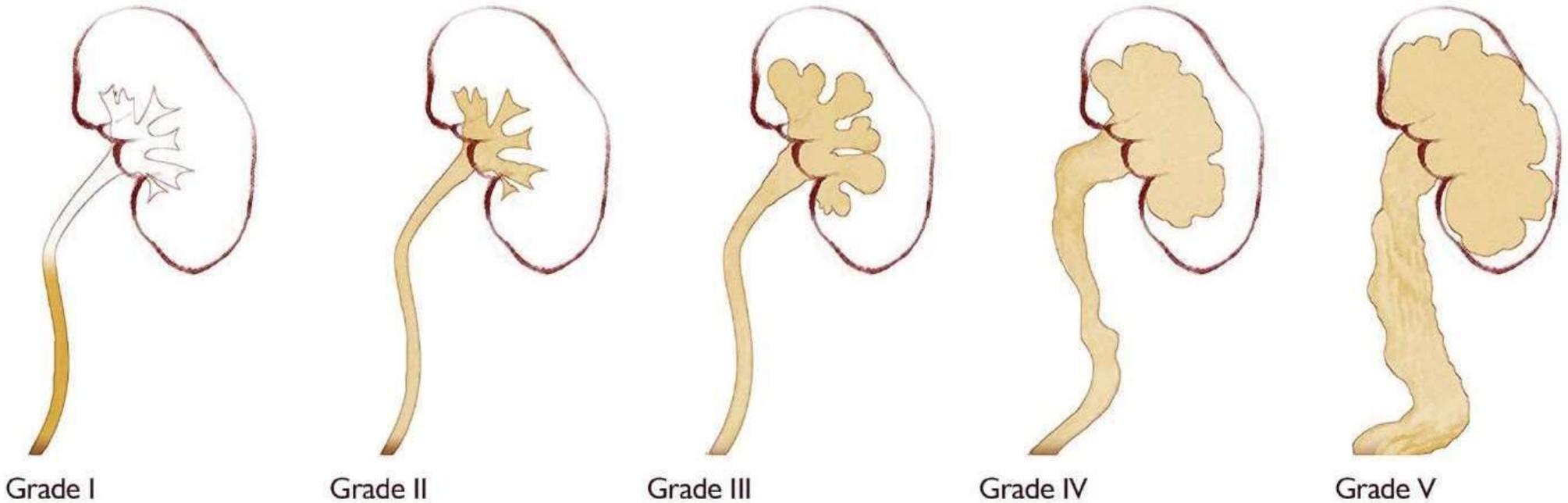
Vesicoureteral reflux

- **Presentation : either antenatal hydronephrosis or clinical UTI.**
- Diagnosis : urine culture/ ultrasound/ **voiding cystourethrogram.**
- Nuclear cystogram for screening.
- DMSA scan to detect kidney scarring.
- Urodynamic study for lower urinary tract abnormalities (neurogenic bladder).



Spot film taken during VCUG shows unilateral grade 4 vesicoureteral reflux

UVR grades



Treatment :

- Spontaneous resolution is common in young children (only antibiotics).
- Indications for surgery: grade 4 and 5/ poor compliance with medications/ breakthrough febrile UTI despite adequate antibiotic prophylaxis/ poor renal growth/ kidney scars/ mild or moderate reflux in females that persist during puberty despite several yrs of observation.

Q1: What is the pathology?

- Right scrotal swelling (Hemi-scrotal swelling)

Q2: Give two benign DDx?

- Inguinal hernia, hydrocele

Q3: What is the name of peritoneal part remain patent?

- Patent processus vaginalis



Inguinal hernia

- Due to patent processus vaginalis.
- More common at the right side.
- Bilateral hernias occur in 5-15% of children with hernia.
- **Uncomplicated hernia** will bulge when the baby cry and reduces when the baby is relaxed , sleeping. Etc.
- Uncomplicated hernia must be operated (herniotomy).
- Herniotomy must be performed ASAP.
- 10-15% of children with on the other side. hernia on one side will develop a hernia



- **Complicated hernia** presents in the ER with pain/ management : resuscitation, reduce hernia, then repair within 24-48 hrs. (as we fear strangulation and testicular atrophy).

Q1: What is the Dx?

- Epispadias and Hypospadias

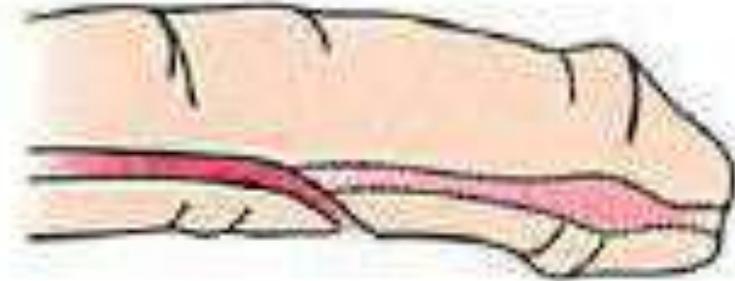
Q2: Mention 2 associated anomalies?

- 1) Bladder extrophy
- 2) Bifid penis
- 3) Rectum prolapse

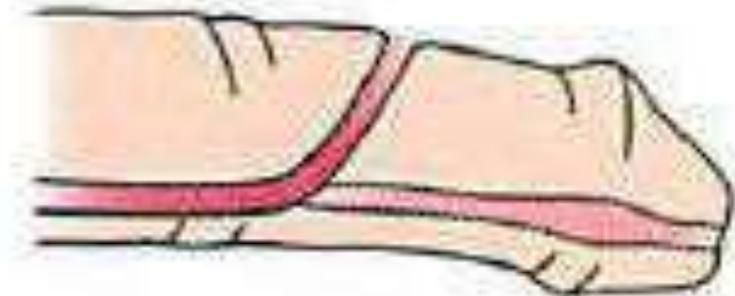
Q3: Name 2 commonly associated features with this pathology other than the abnormally located urethral meatus:

- 1) Chordee
(downward bending of the penis)
- 2) Hooded appearance of the penis

Hypospadias



Epispadias



Q1: What is the Dx?

- Hypospadias

Q2: What is the classification?

- 1) Anterior (50%)
- 2) Bifid Middle (30%)
- 3) Posterior (20%)

Q3: When is the surgery performed?

6 – 18 months of age

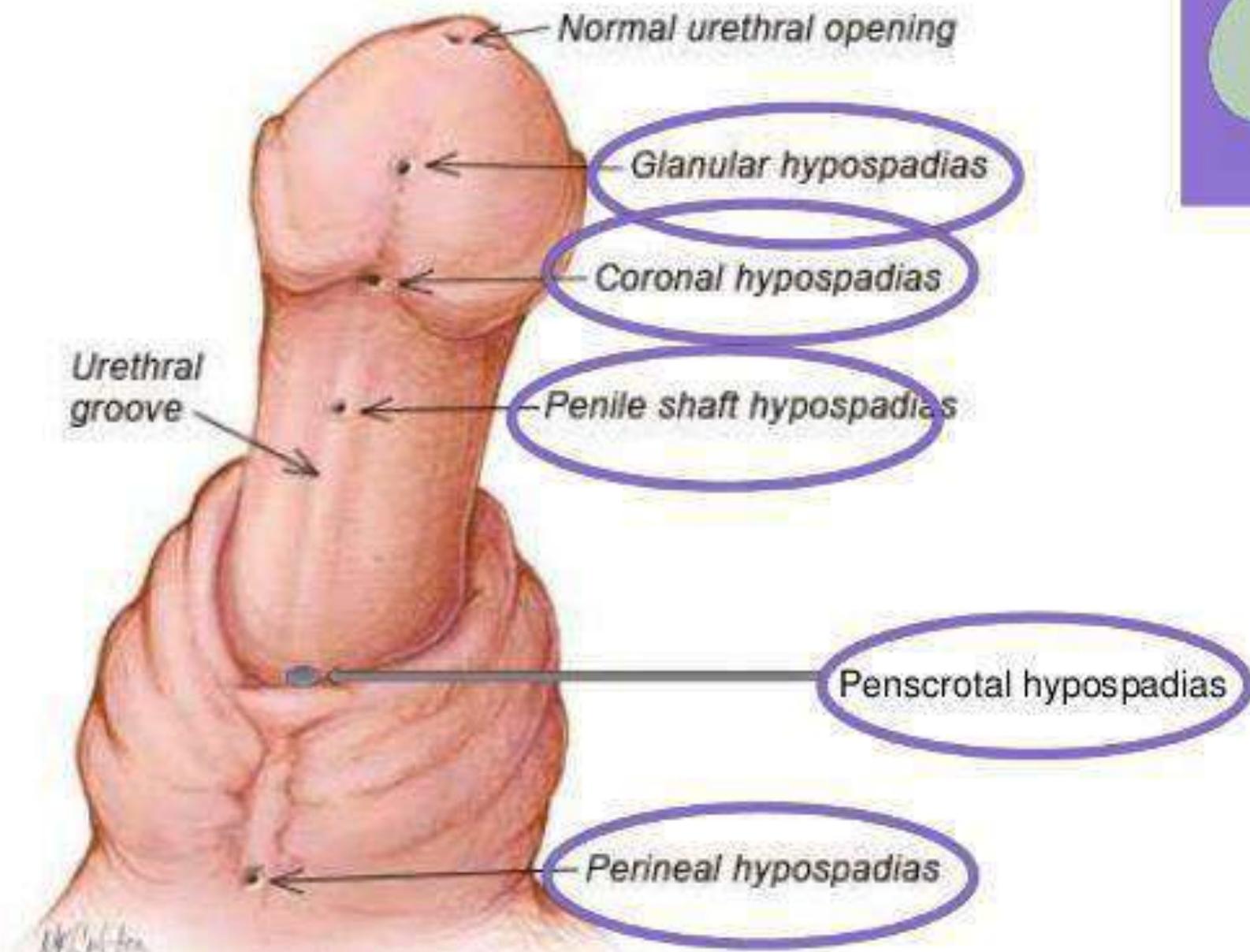
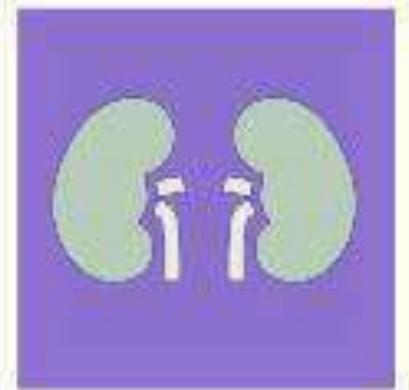


- Glanular (opening on the glans) is the most common.

Epispadias: urethral opening is on the dorsal surface with abnormal penis. It is usually a part of a syndrome includes extrophy of the urinary bladder.

- Extremely rare.





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Q: This is a 5 yo boy.

Q1: Give two clinical findings:

scrotal swelling
transillumination

Q2: What is the Dx?

hydrocele

- Fluid filled sac (fluid in a patent processus vaginalis or in the tunica vaginalis around the testicle).
- Communicating with the peritoneal cavity VS non communicating.
- **In most infants it will resolve in the 1st year.**
- If there is increase in size >> operation
- Any hydrocele appearing after a 1st year must be operated as it will not resolve.



Undescended testicle

- Significant risks: infertility/ trauma/ torsion/ hernia/ cancer.
- Treatment : **orchidopexy** by the age of one year (6-12 months).
- After 2 years the testicle is abnormal and wouldn't be functioning.



Q1: What is the Dx?

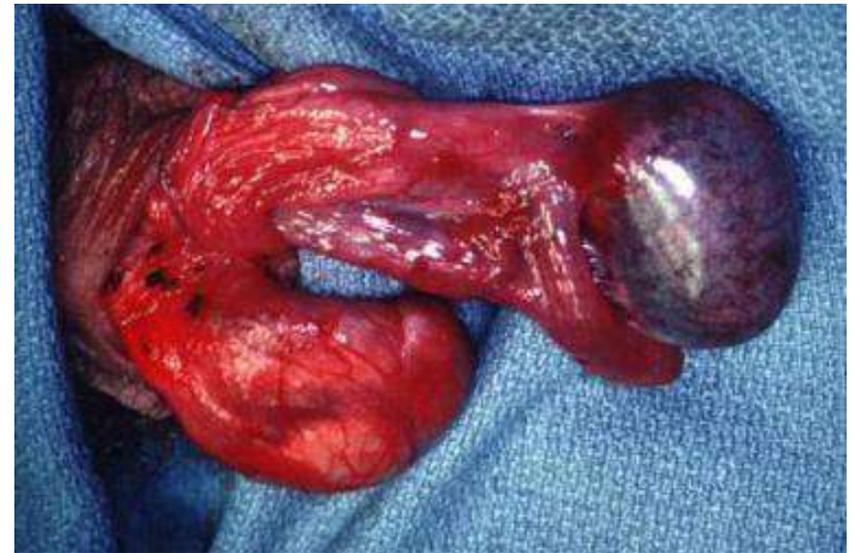
- Testicular torsion

Q2: What is your Mx?

- Orchiectomy

DDx for Acute scrotum:

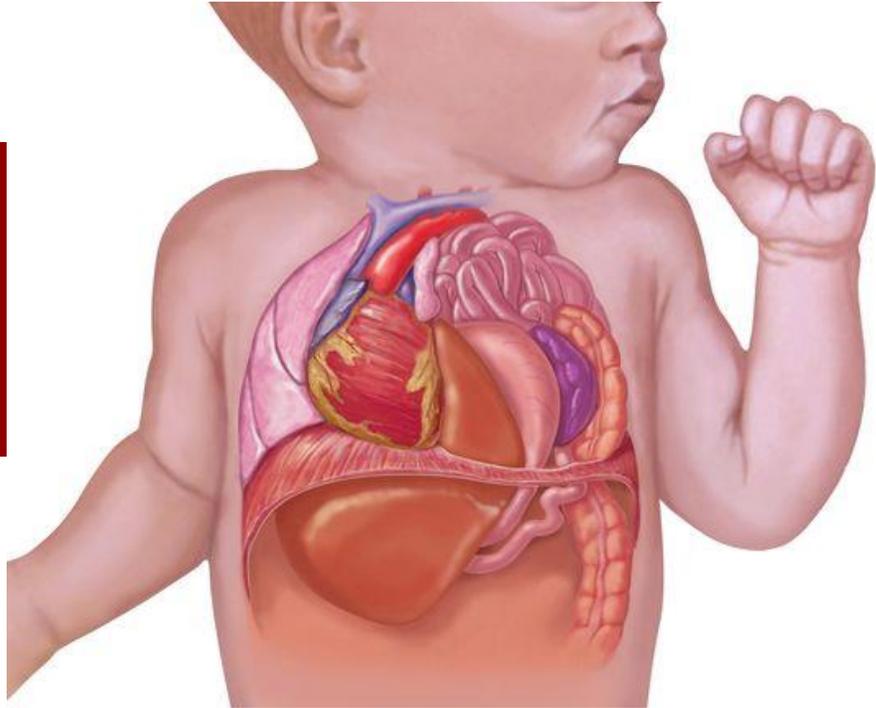
1. Testicular torsion.
2. Torsion of testicular appendages.
3. Epididymorchitis.
4. Scrotal edema.
5. Complicated hernia.



Imperforate anus

- Males > females.
- High lesion vs. low lesion.
- Meconium or air per urethra or vagina.
- One of the common findings that the anal opening anteriorly located.
- Treatment : resuscitation/ the low types managed by a one stage procedure in the neonatal period (**anoplasty**).
- Other types treated by colostomy in the neonatal period followed by a definitive procedure called **pull-through (posterior sagittal anorectoplasty)**.





PEDIATRIC



• QUESTION

Wateen 2023

A 1 month old male baby presented with projectile vomiting . With no previous medical or surgical history

. A. What is the diagnostic modality of choice?

B. What is the initial management of uncomplicated cases ?

(No picture founded)



• ANSWER

A. Ultrasound

B. Fluid and electrolytes and PH correction - pylorotomy

Ram Stadd's Pyloromyotomy



• QUESTION

Wateen 2023

Regarding pediatric hernias and hydroceles;

A. Name one way of differentiating them other than trans illumination test:

B. Name the common congenital anomaly in both.

(No picture found)



• ANSWER

A. Fingers can fit at the neck of mass

B. Epispadias



• QUESTION

Wateen 2023

A) name this disorder :

B) what anomalies can be seen in this pt .



• ANSWER

A) Prune belly syndrome

B)

1) Undescended testes

2) Urinary tract abnormality such as unusually large ureters, distended bladder, Vesicoureteral reflux, frequent UTI's

3) VSD

4) Malrotation of the gut

5) club foot

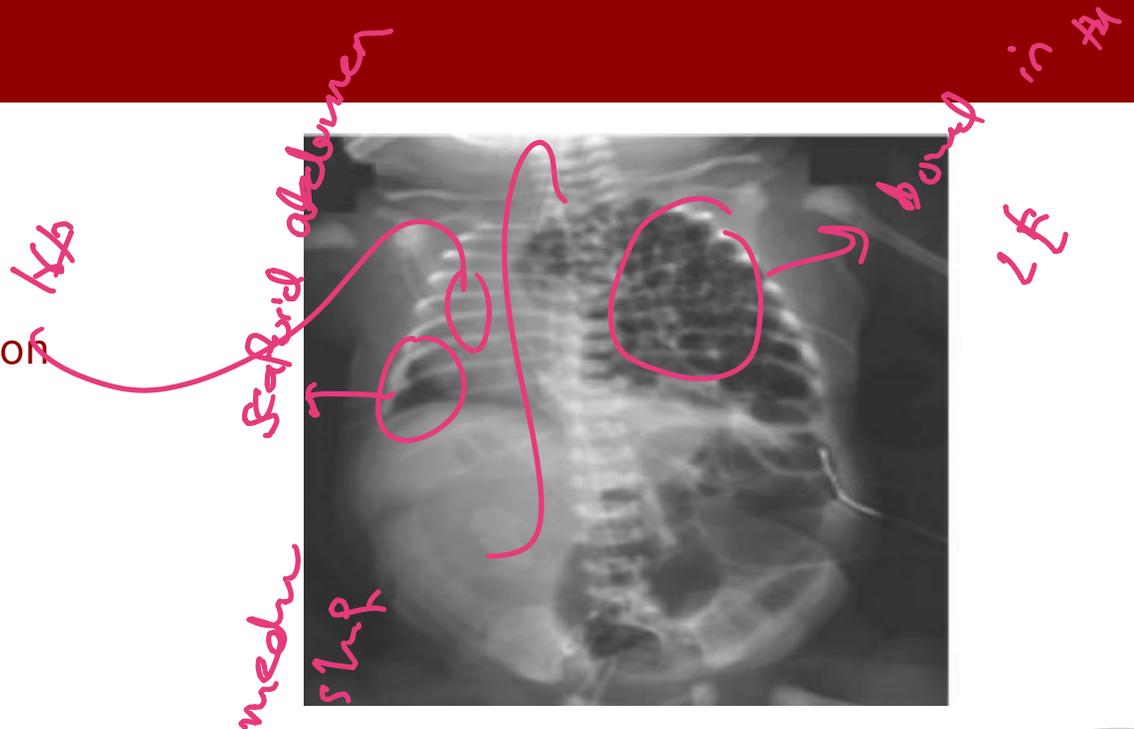


QUESTION

Harmony 2022

10. What is your diagnosis?
- a. Bochdalek Hernia
 - b. Severe intestinal obstruction
 - c. Small Bowel perforation
 - d. Morgagni Hernia

Answer: A



• QUESTION

Harmony 2022

28. The blue arrow points to

- a. Ectopic testes
- b. Polyorchidism
- c. Inguinal hernia
- D. Femoral hernia

Answer: A



• QUESTION

SOUL 2021

1. What is the Dx?
2. Name the procedure?
3. The prognosis depends on?
4. The indication of this procedure is?



• ANSWER

1. Gastroschisis

2. Silo

3. Bowel status

4. To prevent dehydration, hypothermia, contamination

if the bowel get inflammed & try closure covt be done



• QUESTION

SOUL 2021

1 year old male, presents with inconsolable crying:

- A) Name the radiological study:
- B) Name the sign:
- C) What is the first line management:



ANSWER

A) Ultrasound

B) Donut / target sign

C) Resuscitate then barium enema , hydrostatic reduction.

Note: diagnosis is (intussusception)



• QUESTION

SOUL 2021

A) What is the pathology:

B) The treatment used :



• ANSWER

A. Gastroschisis

B. Silo pouch



• QUESTION

SOUL 2021

1 month old presented to the ER, with an acute onset of , vomiting

A) Mention 2 questions that would help you diagnose :

B) Name a study that can help you reach the diagnosis:

(No picture)



• ANSWER

A. Bilious or not , projectile or not, change in weight
diarrheal , constipation

B. U/S ,upper/ lower GI contrast



• QUESTION

IHSAN 2020

A 6-month old with chronic constipation since Birth

1. Name the radiology study in the image
2. Name the most likely surgical condition
3. What does the arrow indicate?
4. What Is the diagnostic tes?



• ANSWER

1. Barium enema

2. Hirschsprung Disease

3. Transition zone

4. Biopsy



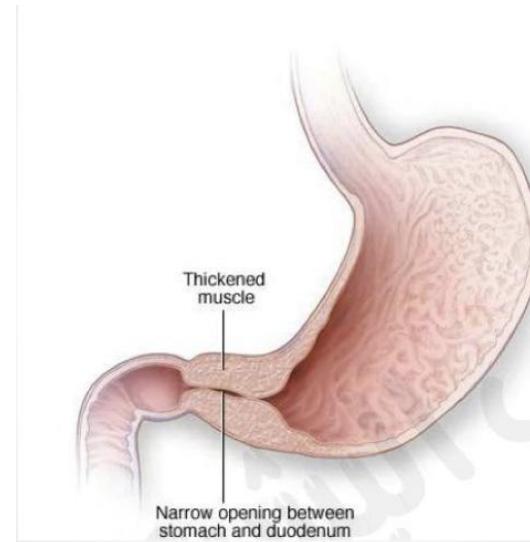
• QUESTION

IHSAN 2020

1-month old with recurrent vomiting. Name the :

1 metabolic and electrolyte derangement associated with this condition

2. Name it's effect on ventilation



• ANSWER

1. Hypochloremic Hypokalemic Metabolic Alkalosis

2. Hypoventilation



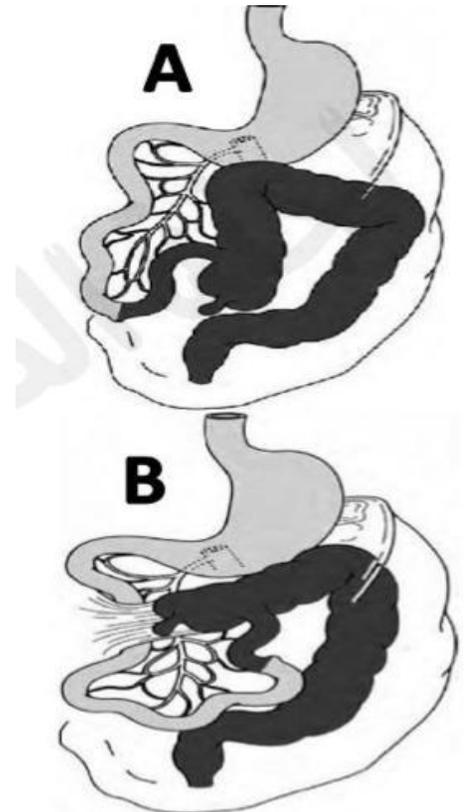
• QUESTION

IHSAN 2020

Malrotation:

I. What's A and B?

II. Which one is the most commonly associated with volvulus



• ANSWER

1. A >: Non-Rotation B >: Incomplete Rotation

2. B



• QUESTION

2019 – Before

Name 4 differential diagnoses for this condition .



• ANSWER

- A. inguinal hernia
- B. hydrocele
- C. testicular tumor
- D. testicular torsion
- E. Idiopathic scrotal edema



QUESTION

2019 – Before

1. What is the pathology?
2. Give two benign differential diagnosis?
3. What is the name of peritoneal part that remains patent?



• ANSWER

1.Right scrotal swelling

2.Inguinal hernia, hydrocele

3.Patent processus vaginalis

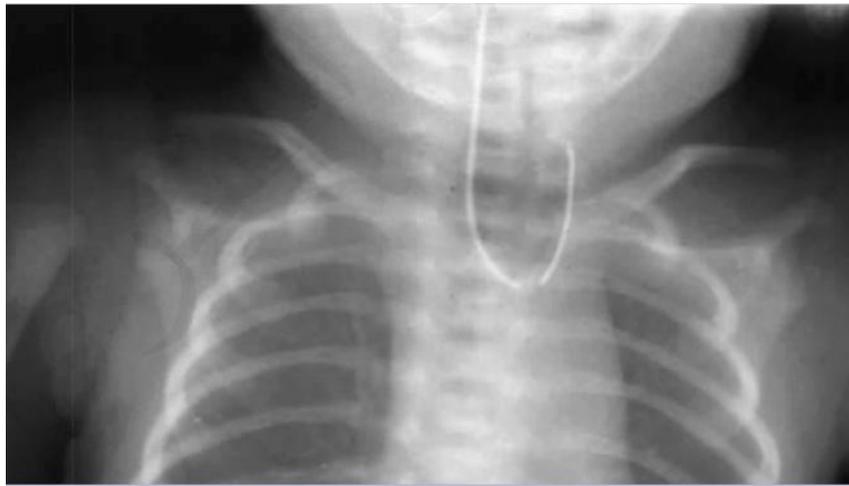


• QUESTION

2019 – Before

Newborn x-ray, cyanosis and distressed:

1. What is your Dx?
2. Characteristic sign?



• ANSWER

1. Tracheoesophageal fistula (because of the cyanosis)
2. Failure to pass the nasogastric tube

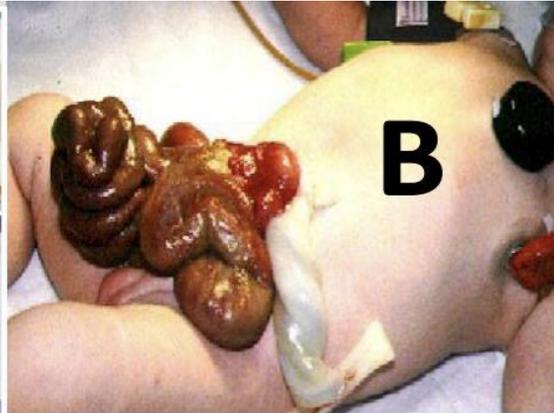


QUESTION

2019 – Before

1. diagnosis in A,B?

2. Which of these are more associated with congenital anomalies?



• ANSWER

1.A.Omphalocele

B > Gastroschisis

2.Omphalocele



• QUESTION

2019 – Before

What is the diagnosis according to:

A. Preterm baby

B. Full-term baby



• ANSWER

A. Necrotizing enterocolitis (NEC)

B. Hirschsprung disease

