

FUNDAMENTAL ABDOMENAL CASES IN PEDIATRIC IMAGING 2022-2023

~~DR. HANA QUDSIH~~

د. سلطان النوايسة

MUTAH UNIVERSITY .

(Done By :- د. هائل البعوش)

بيان دفعة آتش - مجموعة (D) .

CASE # 1

→ mainly due to upper GI-obstruction

- ONE MONTH OLD BABY WITH PROJECTILE VOMITING AND POOR WEIGHT GAIN

A. WHAT IS THE INVESTIGATION YOU WANT TO REQUEST ???

• If this case occurred at the 1st week after Birth,
Highly suggested (Volvulus) !!

• 'PROJECTILE VOMITING'!!!!!!! MMMMMM

⑤ Annular pancreas
(Compressed on 2nd part of duodenum,
that makes pressure on the pylorus
of the stomach).

YOU HAVE TO THINK ABOUT HYPERTROPHIC PYLORIC STENOSIS

OTHER DIFFERENTIAL INCLUDES INTESTINAL ATRESIA, GASTRO ESOPHAGEAL
REFLUX AND GASTROENTERITIS.

ULTRASOUND OF THE PYLORUS SHOULD BE THE NEXT IMAGING STUDY.

LOGIQ
E9

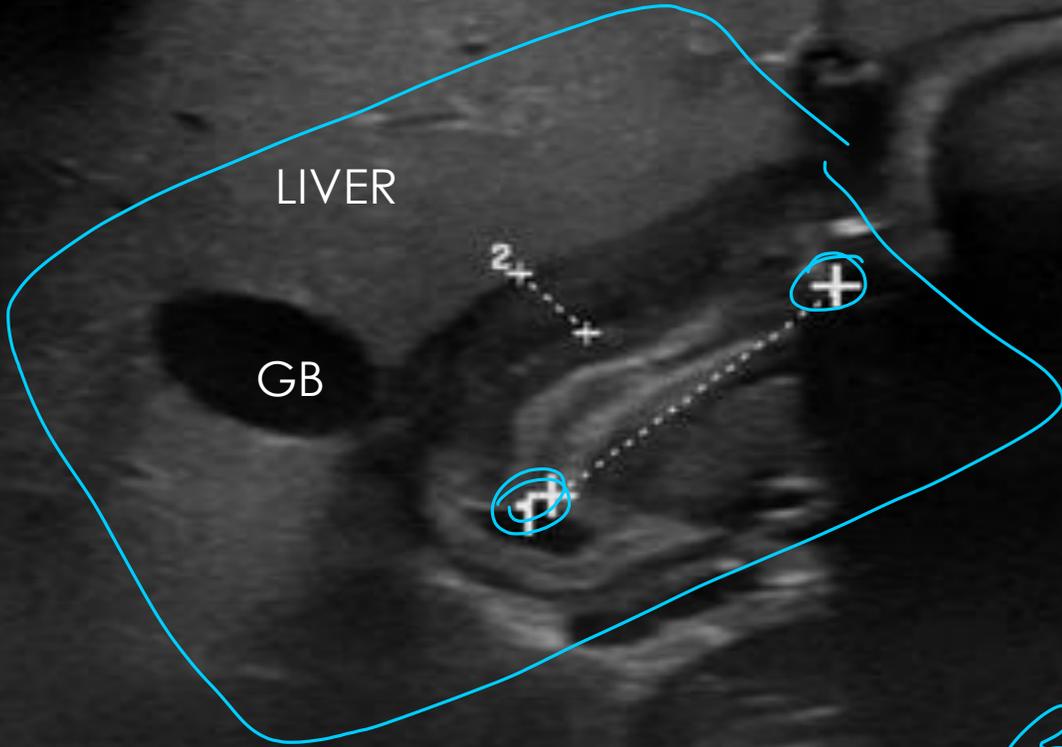
LIVER

GB

• at the RT. upper quadrant

PYLORUS (without annotations)

6"



(US) may be useless in case of Babies abdomen
 Irritable Baby

●	1 L	1.61 cm
●	2 L	0.42 cm

So we use (Barium meal) → دُبُونَا
 الطفل على جنبه اليمنى وبين اقبى الوقت كما يوصل (Barium) الى (Dundenum).
 دُبُونَا يعني الـ (Signs) الذي تبين في الـ (Barium)

PYLORUS
SUP
TRANS

LOGIQ
E9

Normal

LIVER

2+
1
+

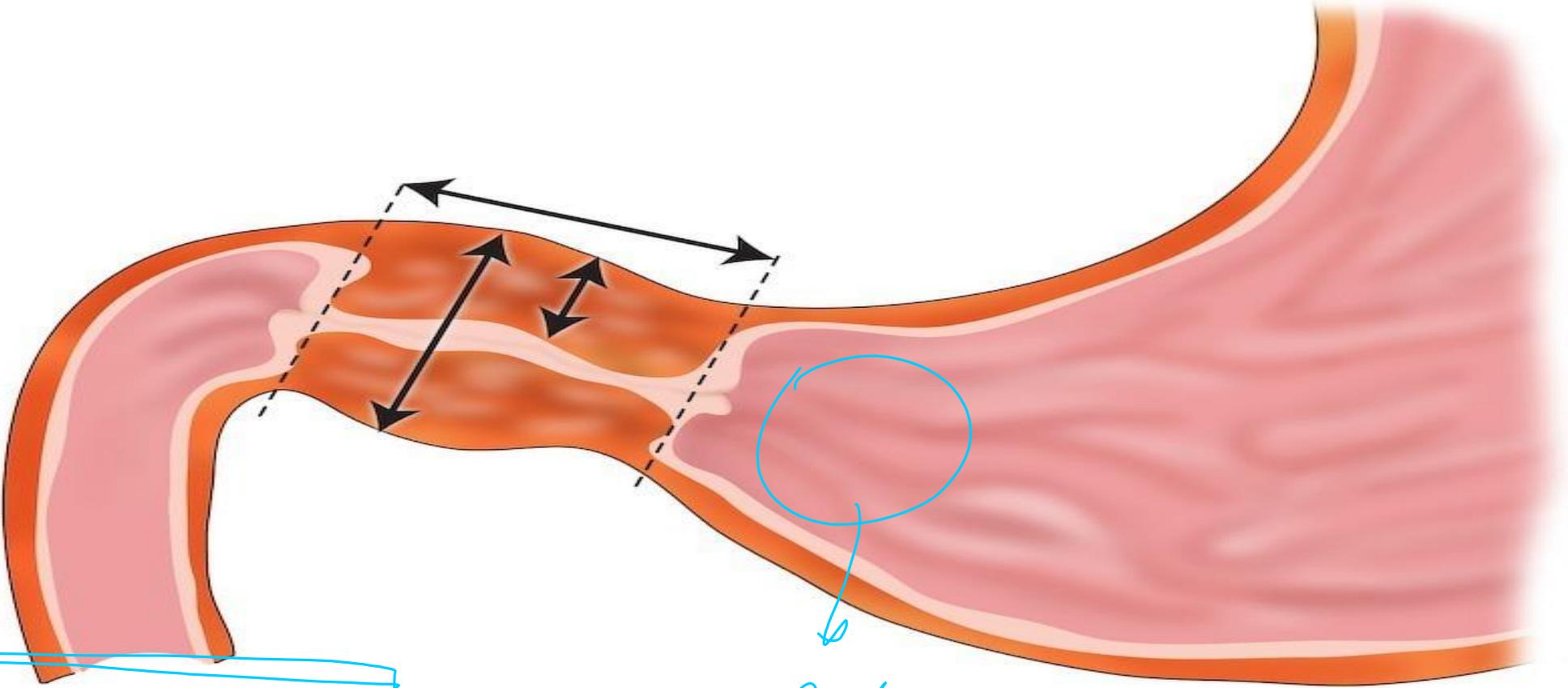


2-
4-
6-

1 L 1.13cm
2 L 0.16cm

NORMAL STUDY ON SEPARATE PATIENT FOR COMPARISON

Pyloric stenosis



Normal values *

- Length: <15mm 1.5cm
- Single muscle thickness: <3mm 0.3cm
- Pyloric width: <7mm 0.7cm

* values vary somewhat from publication to publication

Antrum

F Gaillard
2010

Hypertrophic pyloric stenosis (HPS)

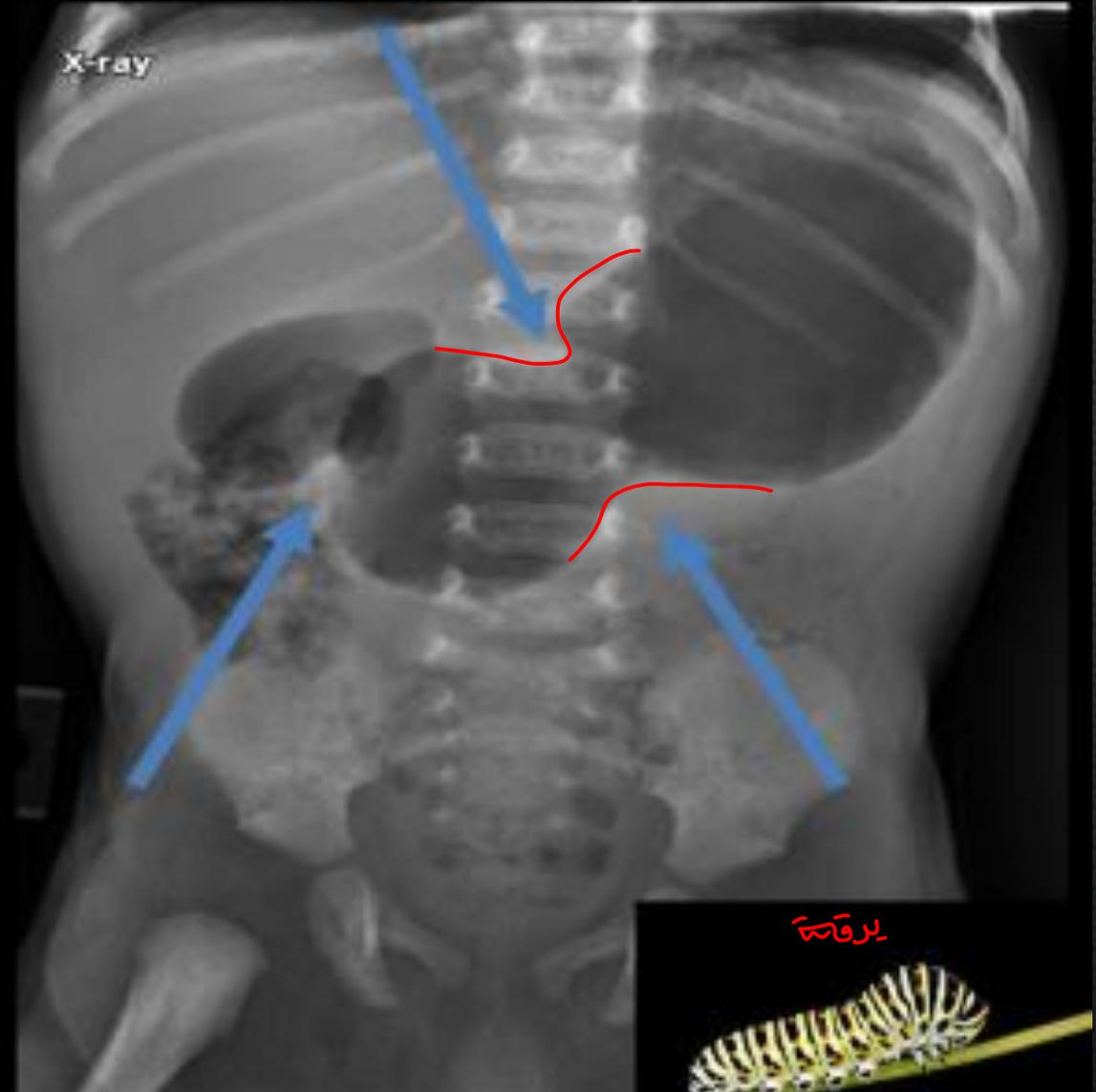
- Infants 2 – 12 weeks most common
 - More common in males ✓
- Present with NONbilious projectile vomiting
 - If bilious (green) vomiting, obstruction is past ampulla of Vater (beyond pylorus)
- Can lead to dehydration, hypochloremic metabolic alkalosis
- Unknown cause
- Thickening of muscle, unable to relax → Main Cause
- Lumen obstructed by thick redundant mucosa

or from (6 weeks → 3 months)

That's mean the obstruction occurred before Ampulla of Vater

Hypertrophic pyloric stenosis (HPS)

Radiographs may show “caterpillar” sign (gastric distention with large contractions or peristaltic waves as stomach **contracts** against obstructed pylorus)



Hypertrophic pyloric stenosis (HPS)

Upper GI may show "string sign" of contrast obstruction at pylorus

لما أُنشئ الـ (Barium) سوبلاني :-



① Delayed emptying

② Shouldering

③ Different signs → String
→ Peak
→ Umbrella

Hypertrophic pyloric stenosis (HPS)

- Treatment is surgical laparoscopic pyloromyotomy

↳ Resections to the pylorus muscle,

Could be a recurrent obstruction due to

Surgical complications - scarring
↳ fibrosis

CASE #2

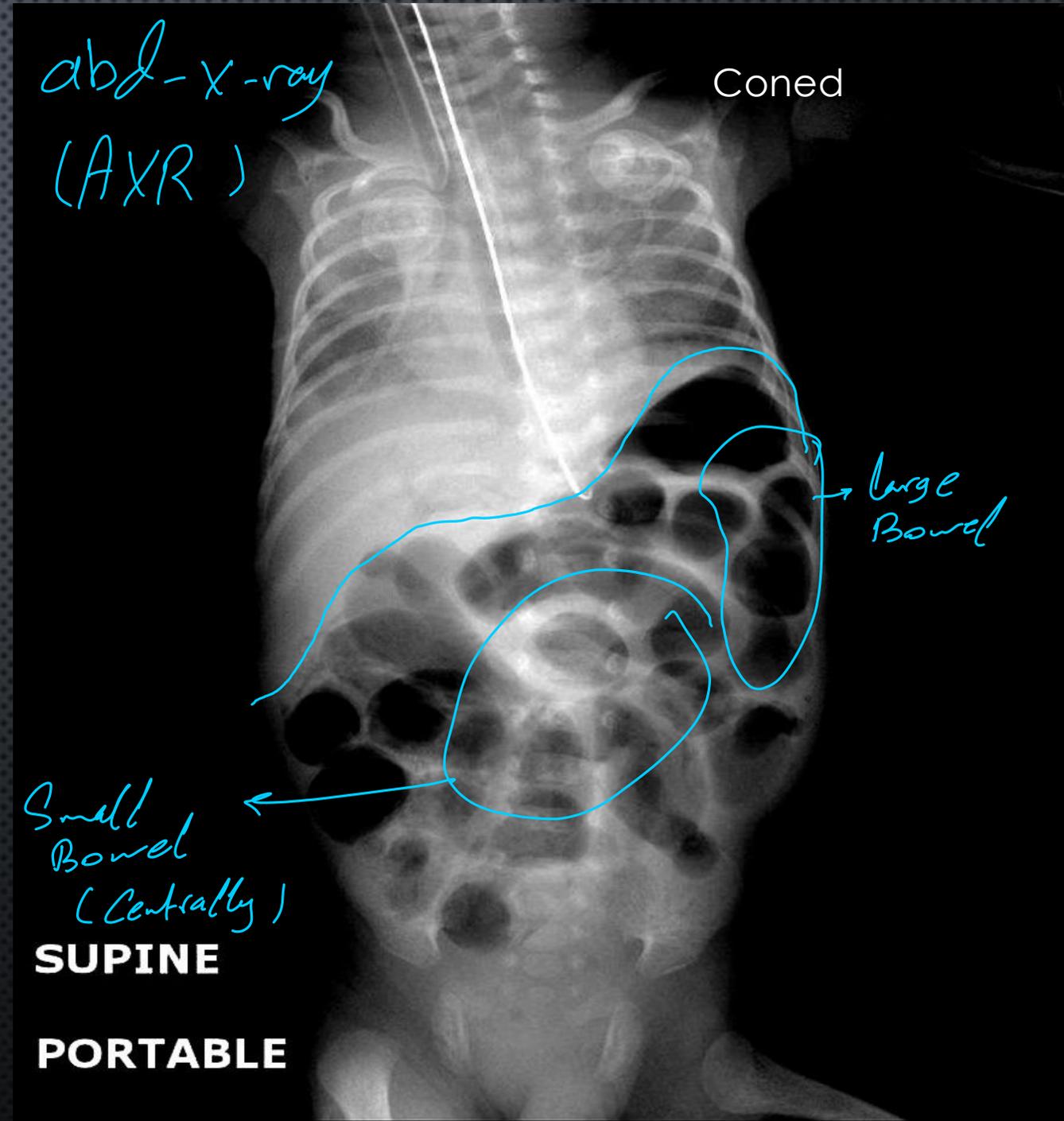
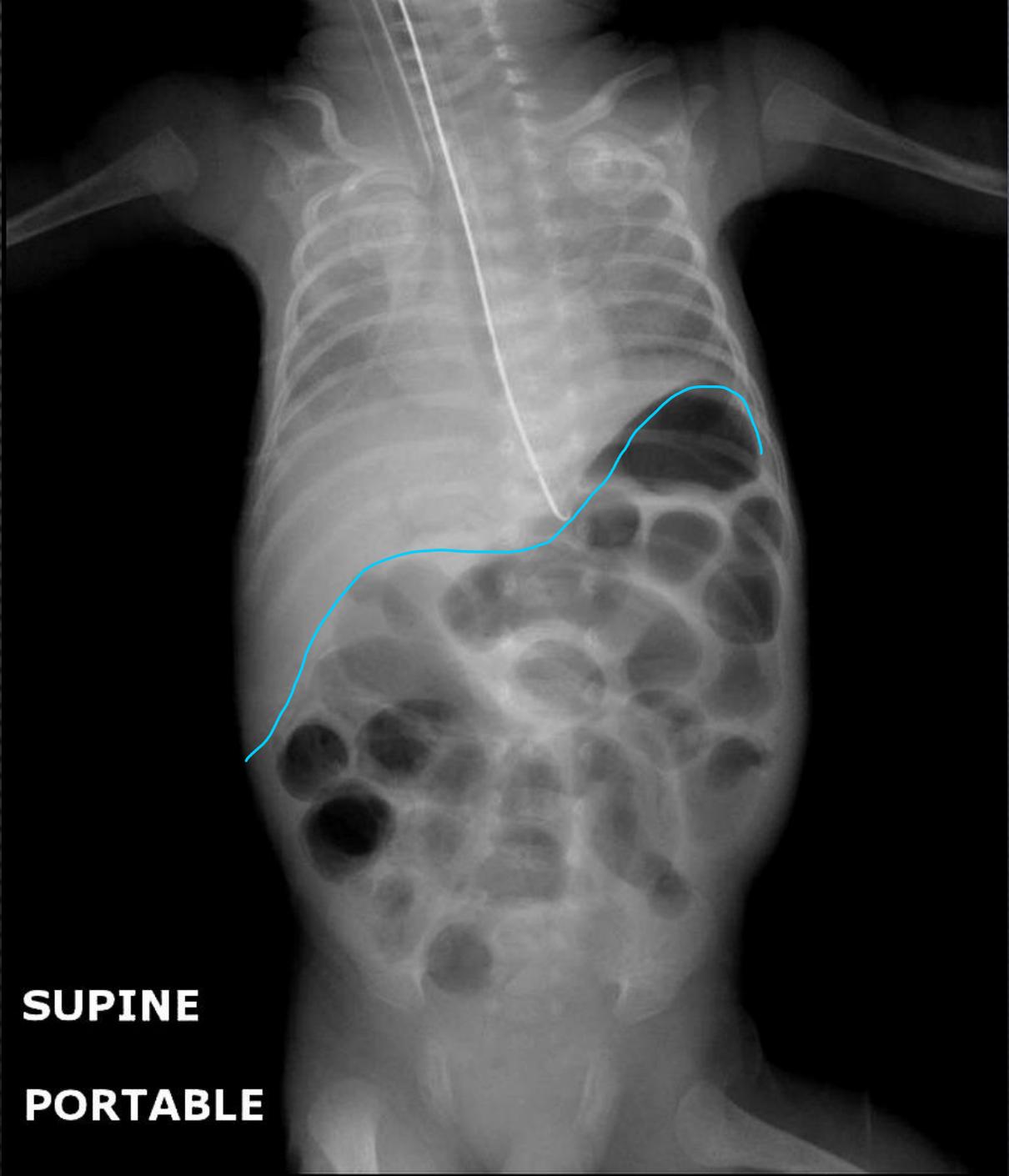
④ Commonly due to NEC that cause perino-peritonium
(necrotizing - Enterocolitis)

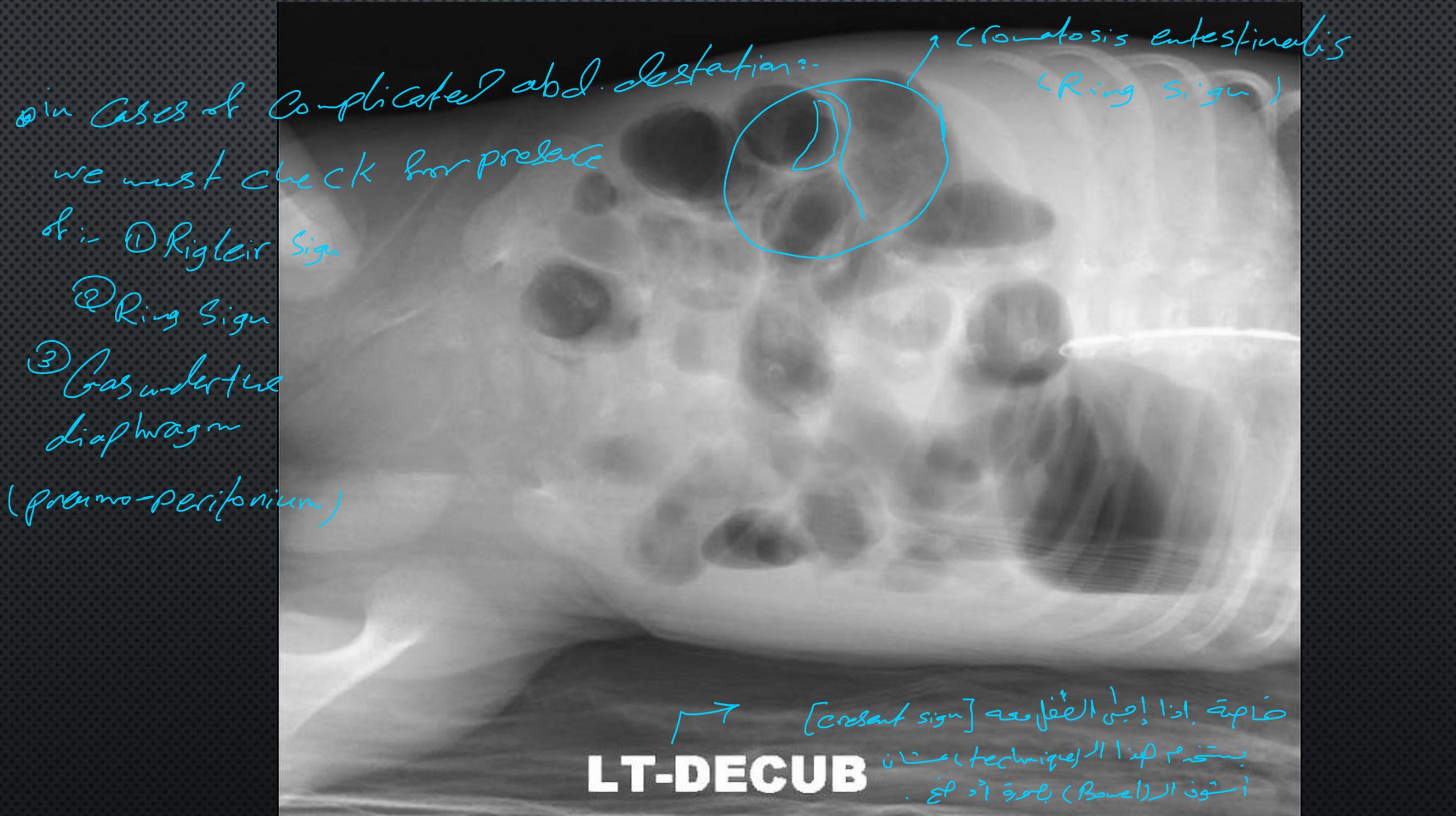
multiple Dilated Bowel Lobe

- PREMATURE GIRL BABY WAS ADMITTED TO THE NICU FOR SUPPORTIVE CARE. AFTER 2 DAYS SHE WAS NOTED TO HAVE INCREASING ABDOMINAL DISTENTION. DIFFERENT ABDOMINAL RADIOGRAPHS WERE ORDERED.

(with vomiting)

- NAME THE MAJOR FINDINGS ON THESE RADIOGRAPHS. ARE THERE ANY "CAN'T MISS" FINDINGS?





Cocytosis entestinalis
(Ring Sign)



in cases of complicated abd. distention:-

we must check for presence

of:- ① Rigleir Sign

② Ring Sign

③ Gas under the diaphragm

(pneumo-peritonium)



ضامة اذا اجس القلعه [crescent sign]

LT-DECUB

يستخدم هذا التقنيه (technique) عند ان
استون ال (Bowel) بامرة اذ ليع .

RT

1F

Diffuse illu

R7

1E

Branching
lucency
of the
portal veins
due to
pneumo-
(peritonium)

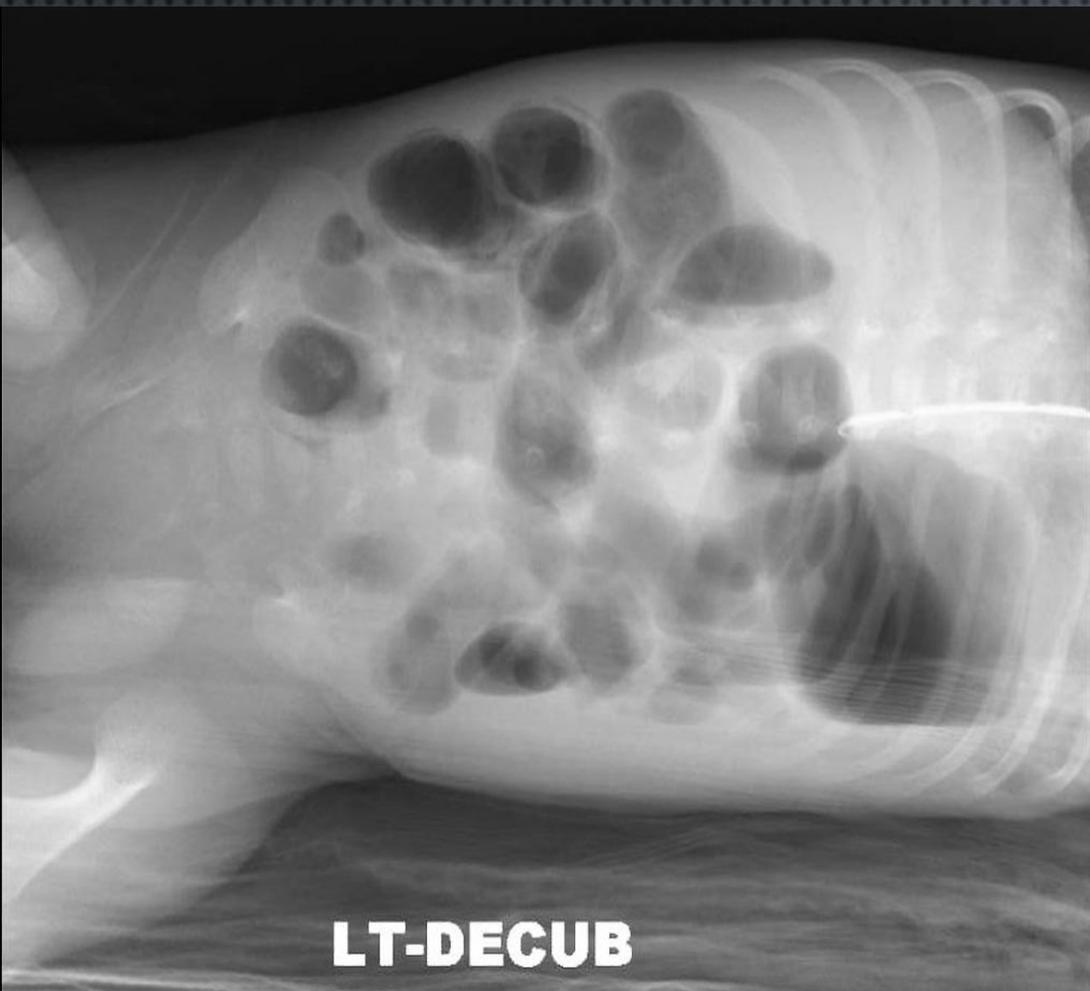


Gas in the
fundus of
the stomach

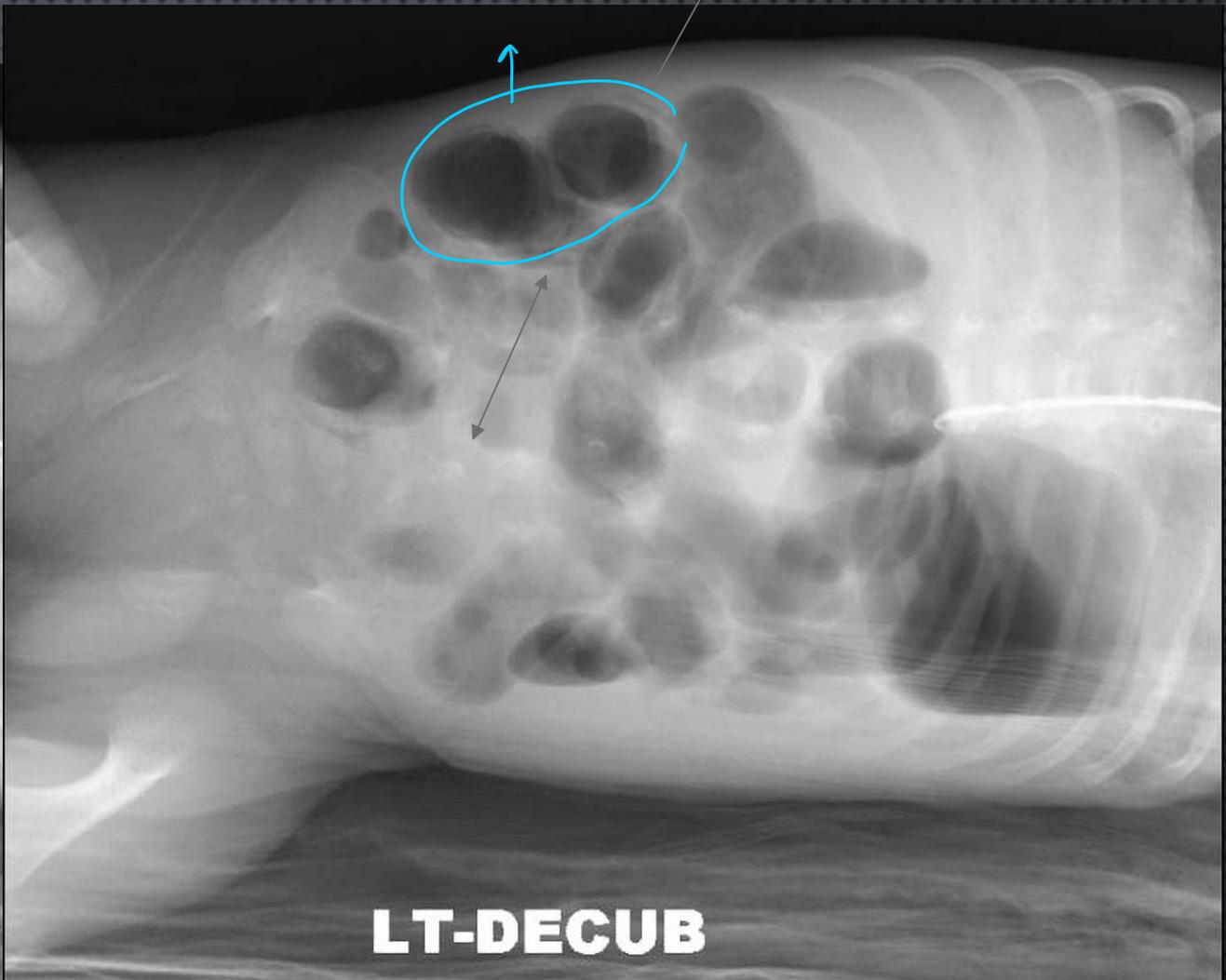
Bowel
loops

SUPINE
PORTABLE

SUPINE
PORTABLE



Gas in the wall of the Bowel

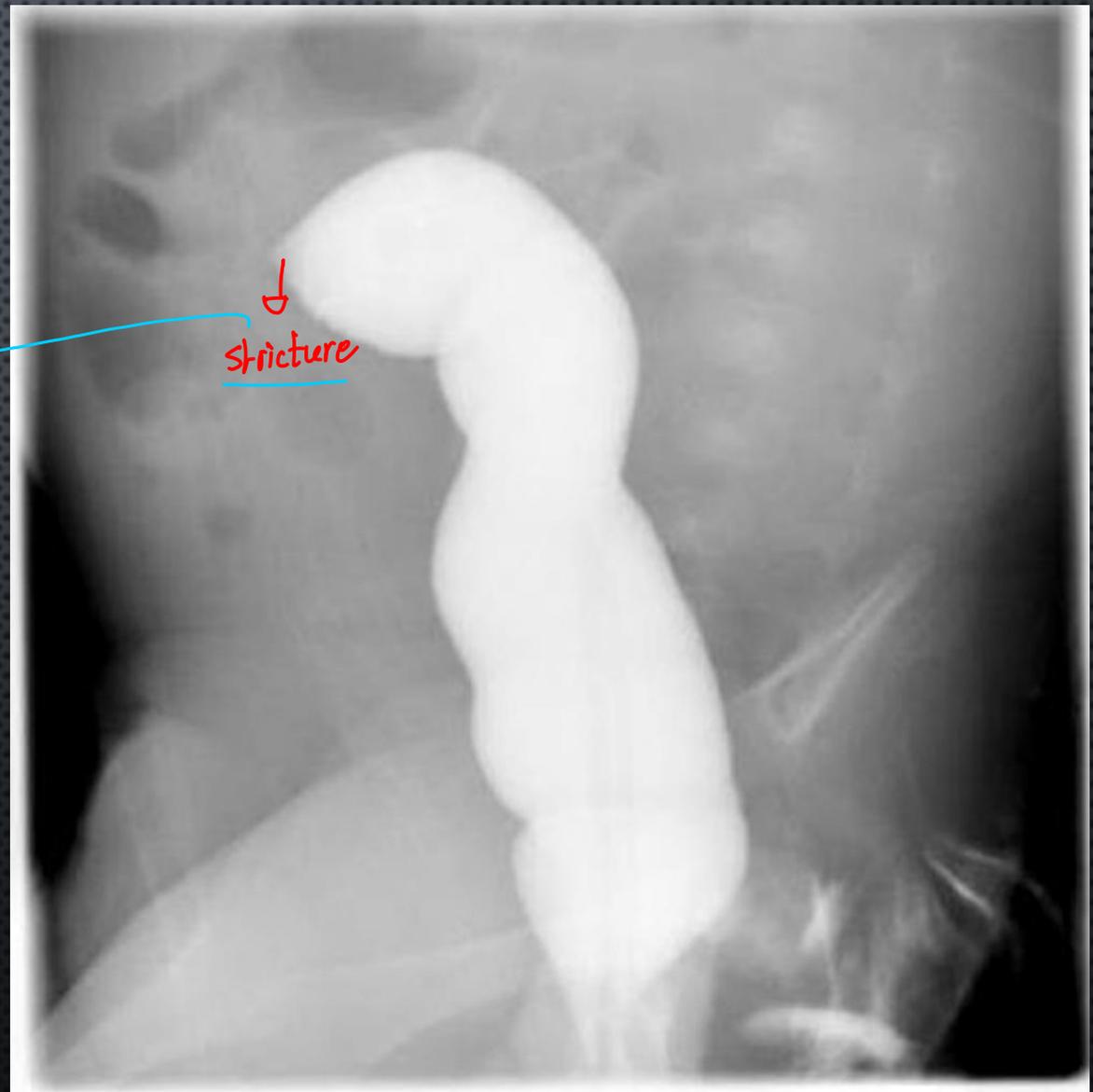


- THE PATIENT WAS MANAGED CONSERVATIVELY AND IS EVENTUALLY TRANSFERRED OUT THE ICU. WHILE ON THE GENERAL PEDIATRICS FLOOR, THE PATIENT BECOMES DISTENDED ONCE AGAIN AND IS INCONSOLABLE. REPEAT ABDOMINAL X-RAY SHOWS MULTIPLE DISTENDED LOOPS OF LARGE AND SMALL BOWEL.

chronic NEC



late stage
of
(NEC)



- NEC : NECROTISING ENTEROCOLITIS WITH PORTAL PNEUMATOSIS AND INTESTINAL PNEUMATOSIS BUT NO PERFORATION OR FREE GAS , HOWEVER SHE DEVELOPED STRICTURE LATER ON.

LET US REVIEW THE RADIOLOGICAL FINDINGS THAT WE COULD ILLUSTRATE IN

NEC

- 1 DILATED BOWEL LOOPS.
- 2 PNEUMATOSIS INTESTINALIS.
- 3 PORTAL PNEUMATOSIS.

4 COMPLICATED NEC

(A) PERFORATION (ACUTE) FREE GAS : 1. CRESENT SHAPE

2. FALCIFORM LIGAMENT SIGN

3. RIGLERS SIGN → True (Gas in the walls of the Bowel)

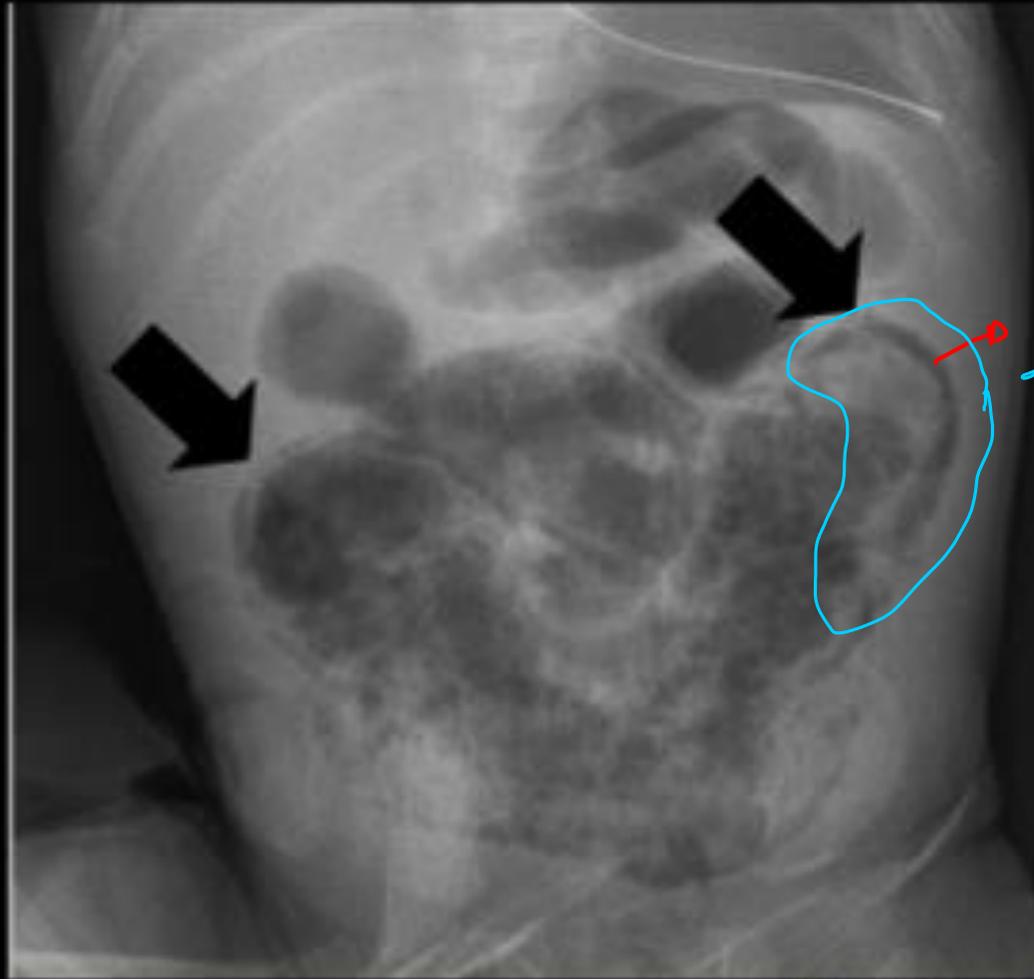
(B) STRICTURE (CHRONIC)

also can cause
(chilidiarrhis)

Pseudo → overlapping of the intestines
(Redundancy of the Bowel)

Necrotizing enterocolitis (NEC)

Pneumatosis intestinalis on radiographs

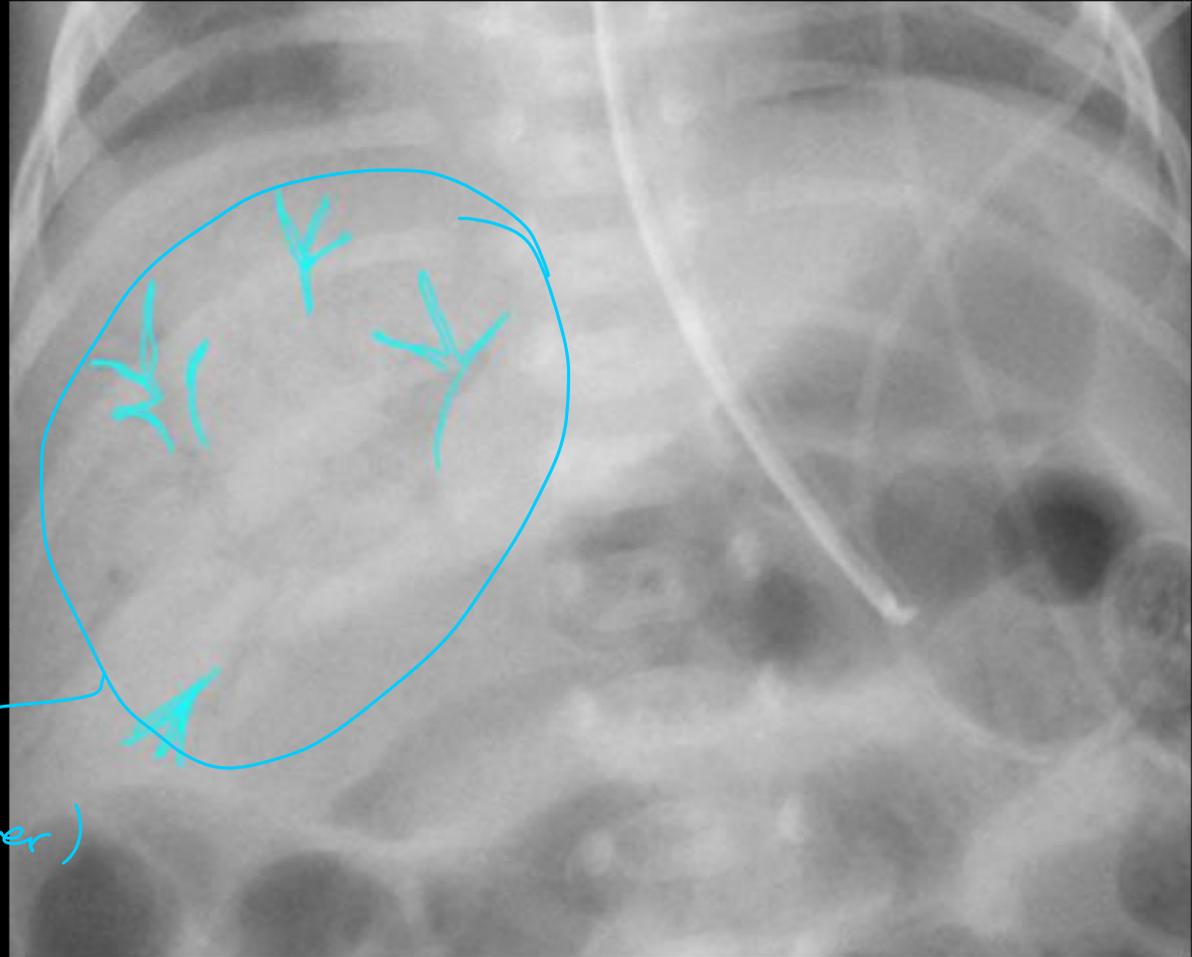


gas within ~~the~~ wall of the Bowel

Necrotizing enterocolitis (NEC)

May see **portal venous gas** (air tracks along bowel wall to mesentery to SMV to portal vein)

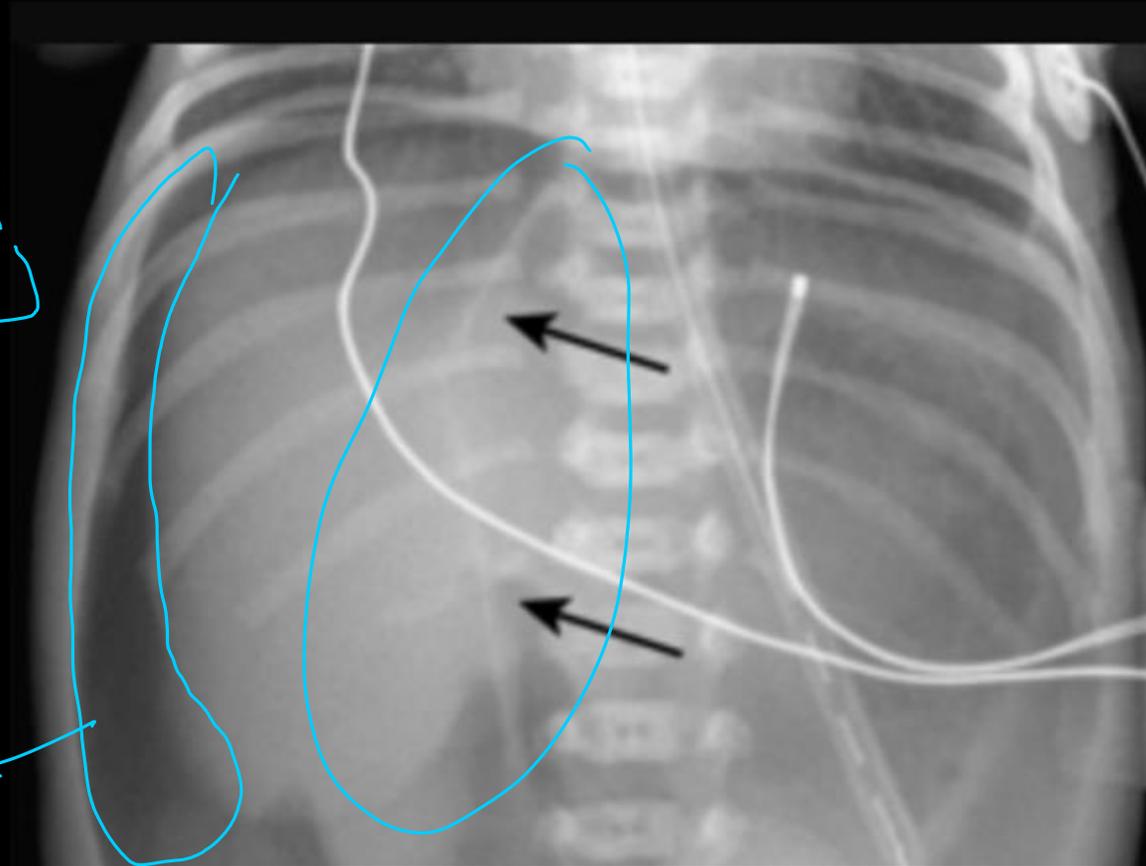
Branching
(*lancing over the liver*)



Necrotizing enterocolitis (NEC)

May see
pneumoperitoneum
(falciform ligament
[black arrows]
outlined by air if
patient is supine)

Air ←

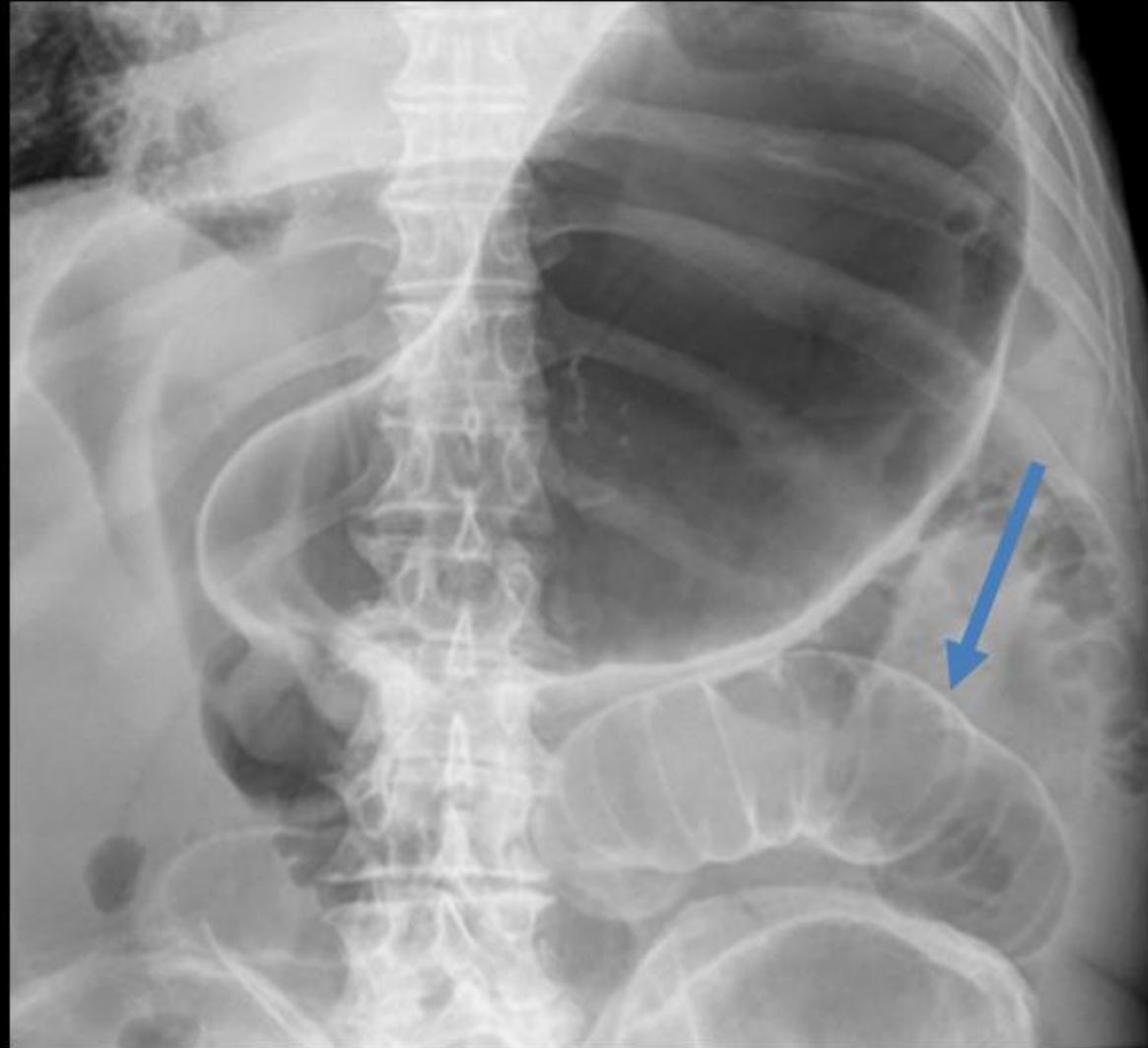


Necrotizing enterocolitis (NEC)

Another sign of pneumoperitoneum on supine radiograph

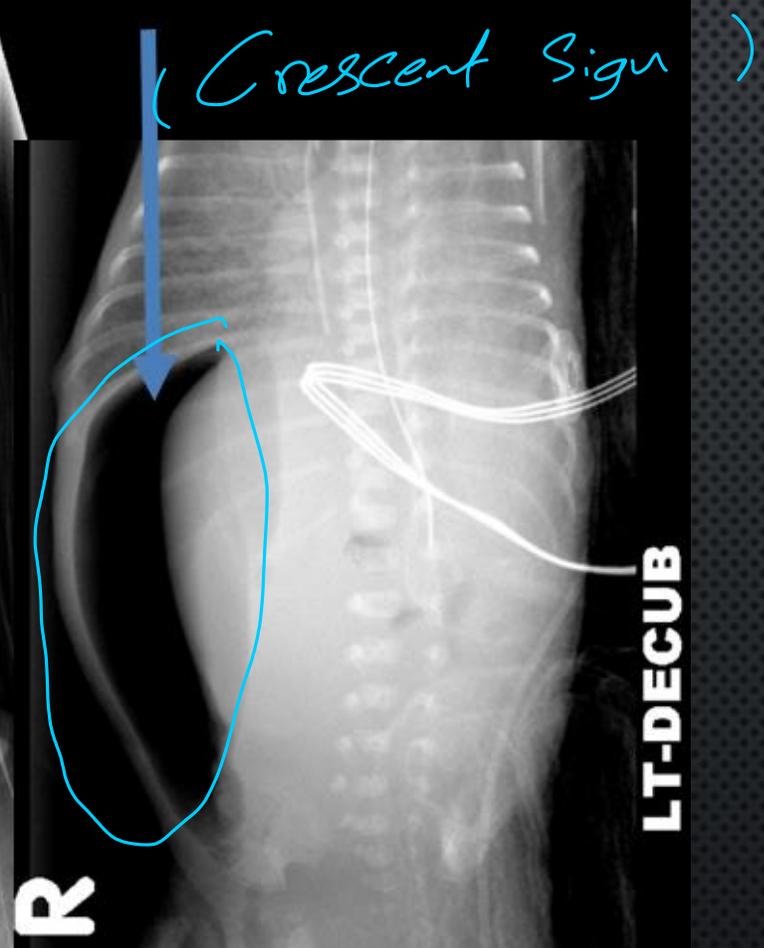
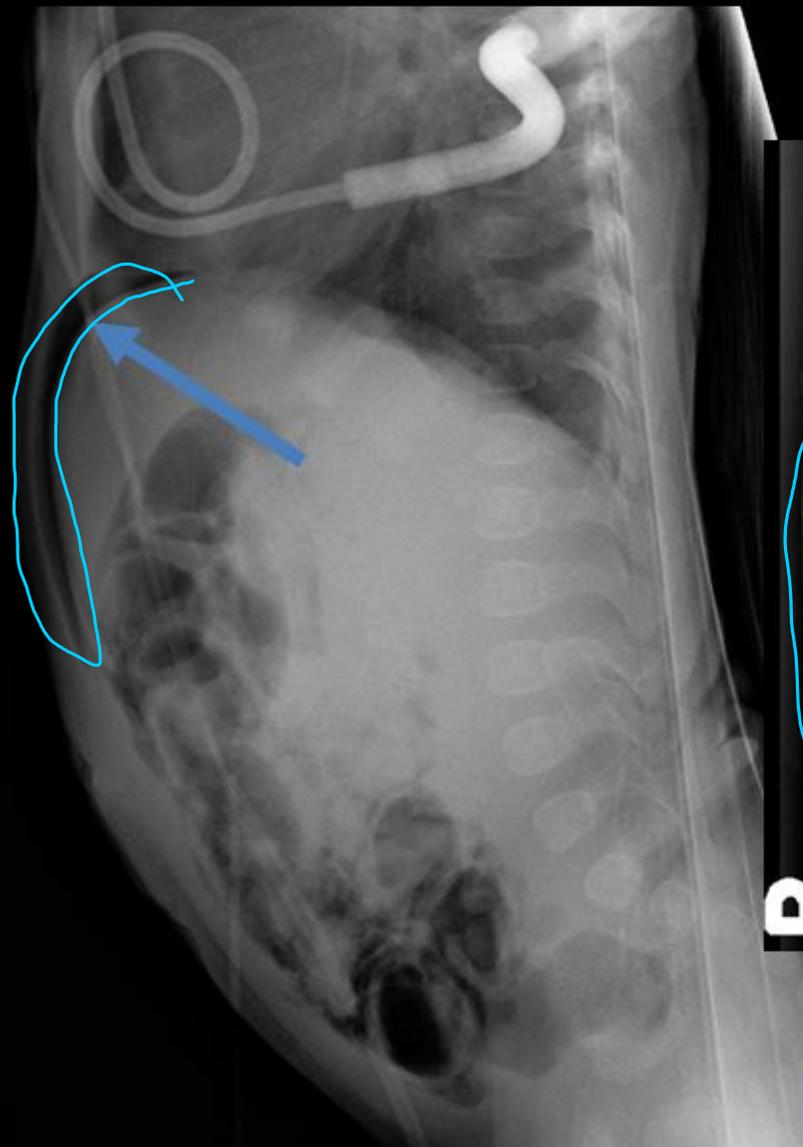
Rigler's sign:

Both sides of bowel wall visible
wall visible
(normally you can only see air inside bowel)



Necrotizing enterocolitis (NEC)

Cross table lateral (left) or left lateral decubitus (right image) will confirm free air



Necrotizing enterocolitis (NEC)

Contrast enema
shows contrast
fails to pass
proximal to
stricture

→ water soluble (more safe in case if the perforation of the contrast outside - chemical peritonitis could be occur)



Necrotizing enterocolitis (NEC)

- Most commonly occurs in premature infants <750g
 - Incidence inversely related to patient age
- Premature neonates have decreased motility, altered intestinal microbiome
 - Leads to stasis, inflammation, altered mucosal integrity
 - Bacteria invade mucosa into bowel wall
 - Gas forms in bowel wall
- May have distention, bloody stools, thrombocytopenia, acidosis, perforation

- NECROTIZING ENTEROCOLITIS IS A SEVERE BOWEL INFLAMMATION.

THE ETIOLOGY IS NOT ENTIRELY CLEAR AND SEEMS TO BE A COMBINATION OF IMMATURE BOWEL MUCOSA, INFECTION AND ISCHEMIA.

- INITIALLY RADIOGRAPHS ARE NONSPECIFIC AND MAY ONLY SHOW BOWEL DILATATION.
ABSENCE OF A CHANGING BOWEL PATTERN OVER TIME IS WORRISOME.

→ PNEUMATOSIS INTESTINALIS AND PORTAL VENOUS AIR (PNEUMOPORTOGRAM) CAN BOTH BE SEEN ON RADIOGRAPHS AND WITH ULTRASOUND.
THE MOST FEARED COMPLICATION IS PERFORATION.

Different stages of necrotizing enterocolitis

- Bowel dilatation ± bowel wall thickening
- Pneumatosis intestinalis ± portal venous air
- Perforation with pneumoperitoneum [Life threatening condition]

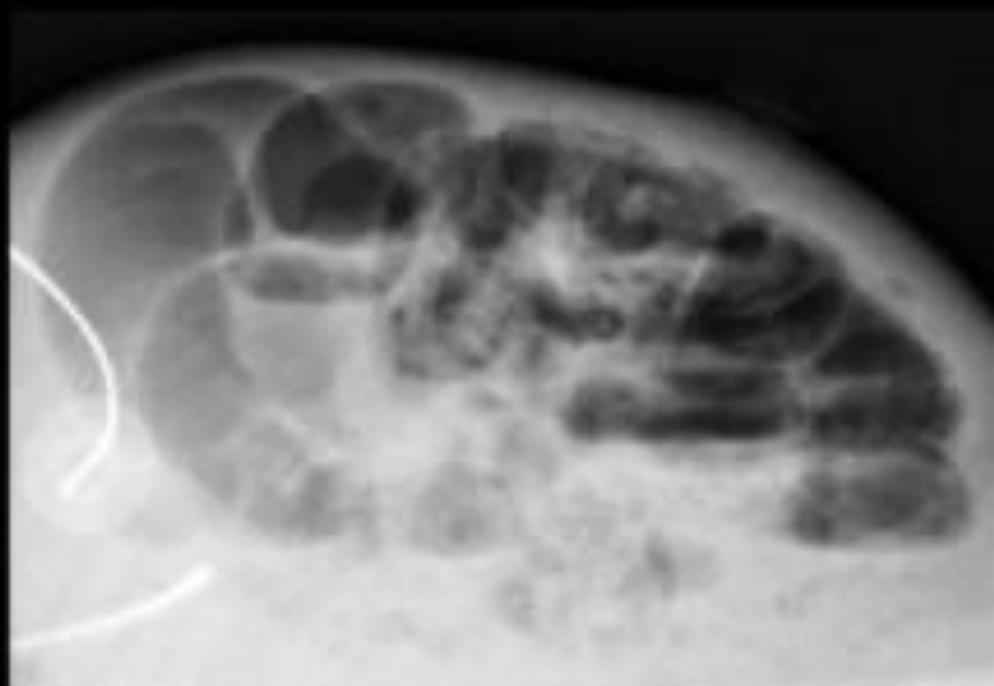
- NEC OCCURS MOST OFTEN, BUT NOT EXCLUSIVELY, IN PREMATURES.
NEONATES WITH SEVERE STRESS, FOR EXAMPLE WITH CARDIAC DISEASE, ARE ALSO AT RISK.
CLINICALLY, RETENTIONS AND BLOODY STOOLS CAN BE A KEY TO THE DIAGNOSIS.

NEC Cases

stage 2

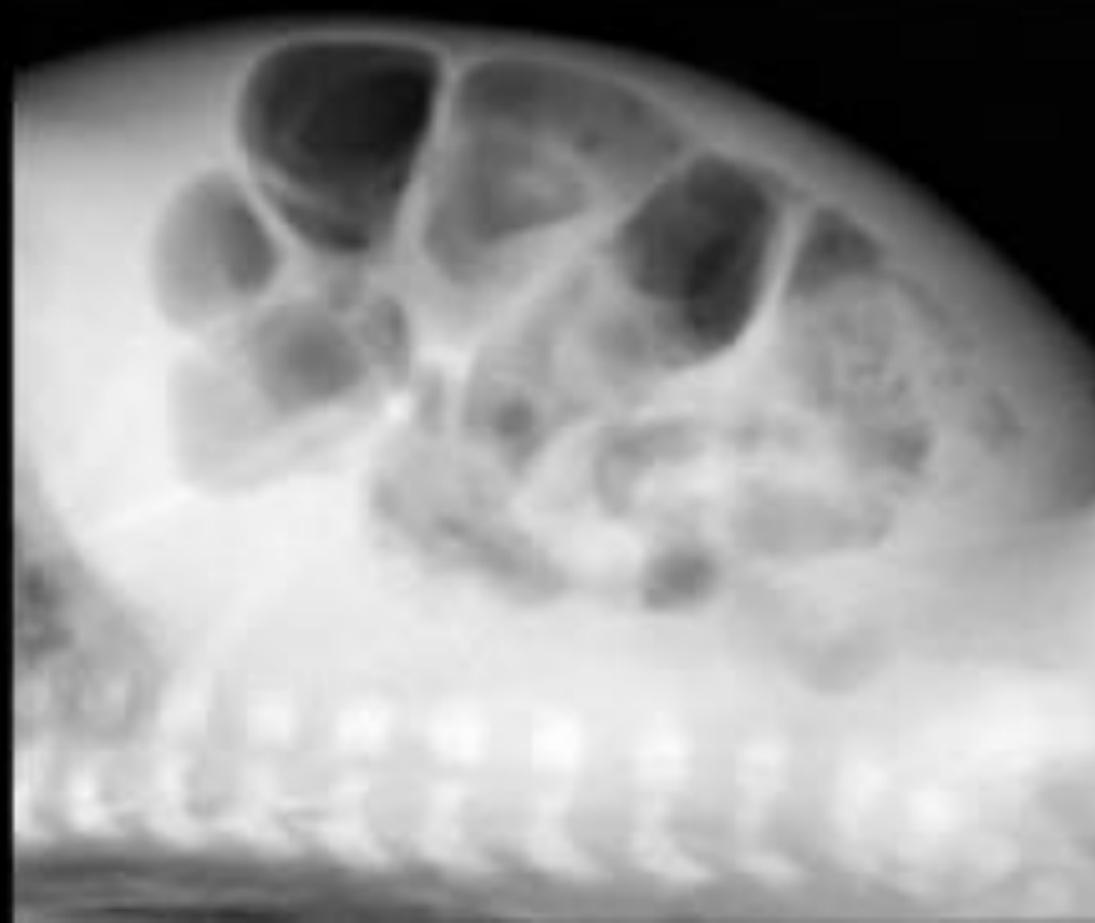


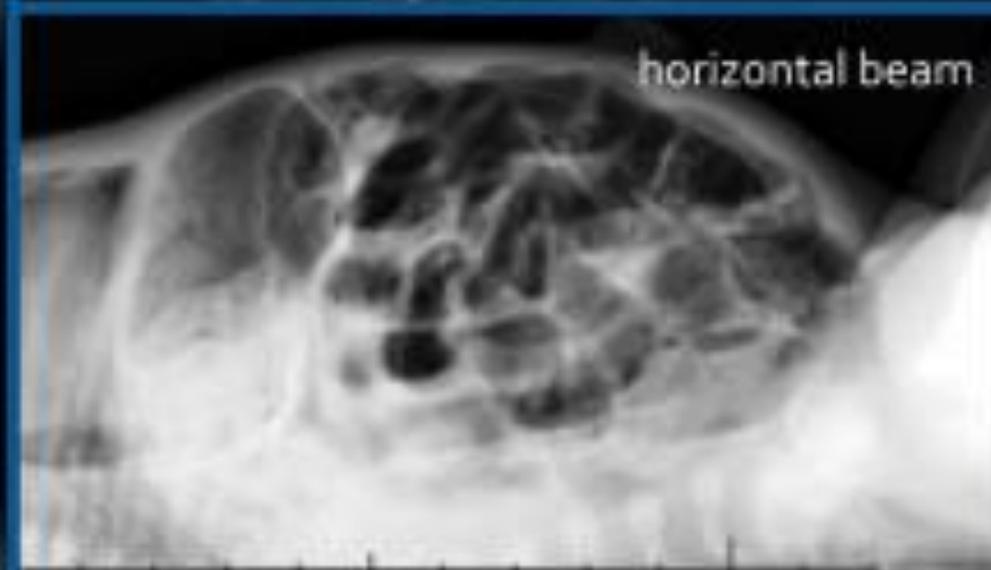
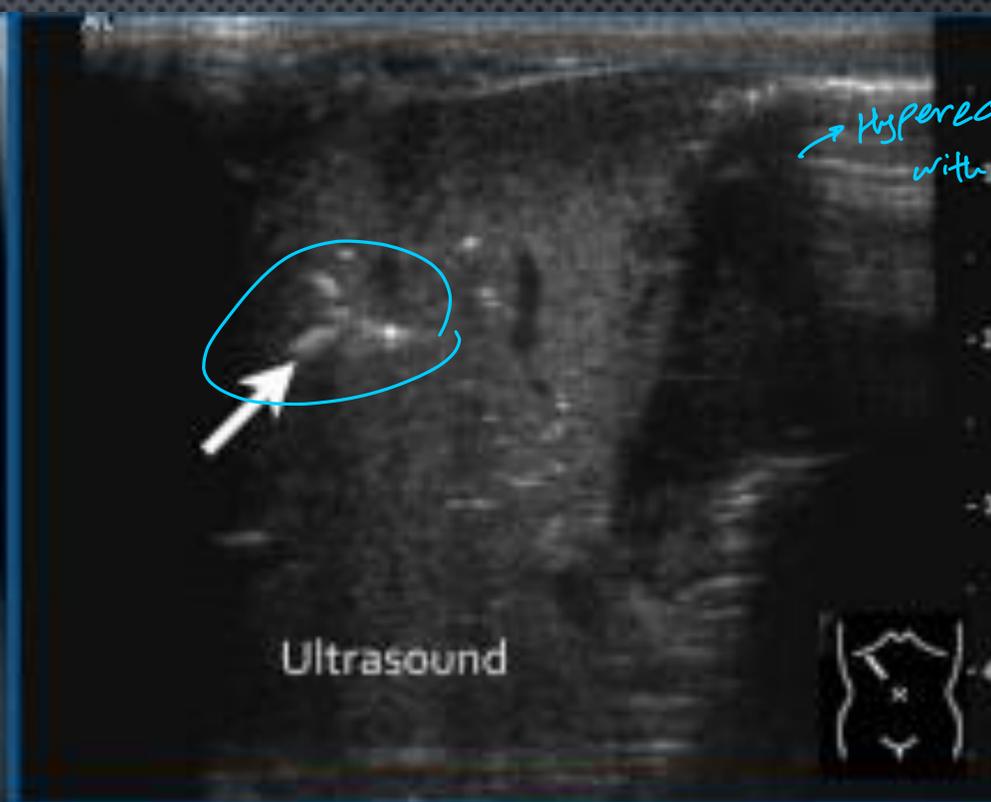
▷ Soap Bubble Appearance (misdiagnosed with
muconium-ilius)
horizontal beam





horizontal beam







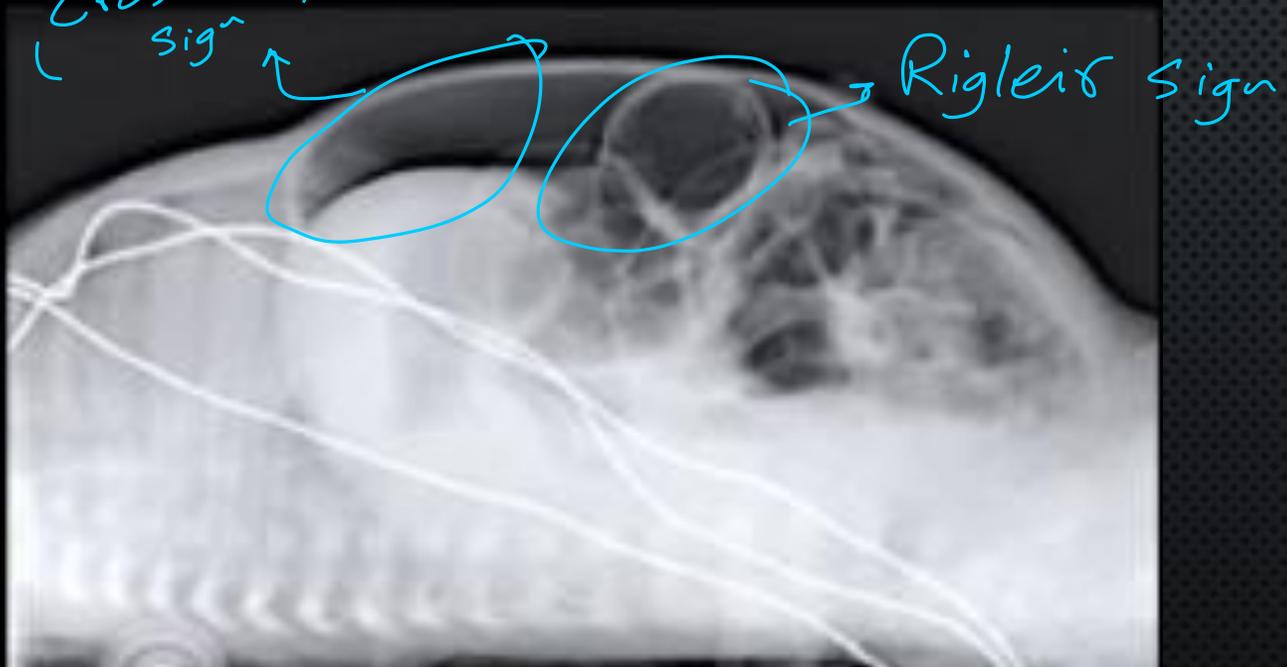
pneumoperitoneum

⊗ Some time, (NFC) occurs in intrauterine infants, and can be found complicated with or without perforation.

- In some neglected cases we may find (calcifications to the mucosium inside)

horizontal beam

(Crescent sign)



Rigler's Sign

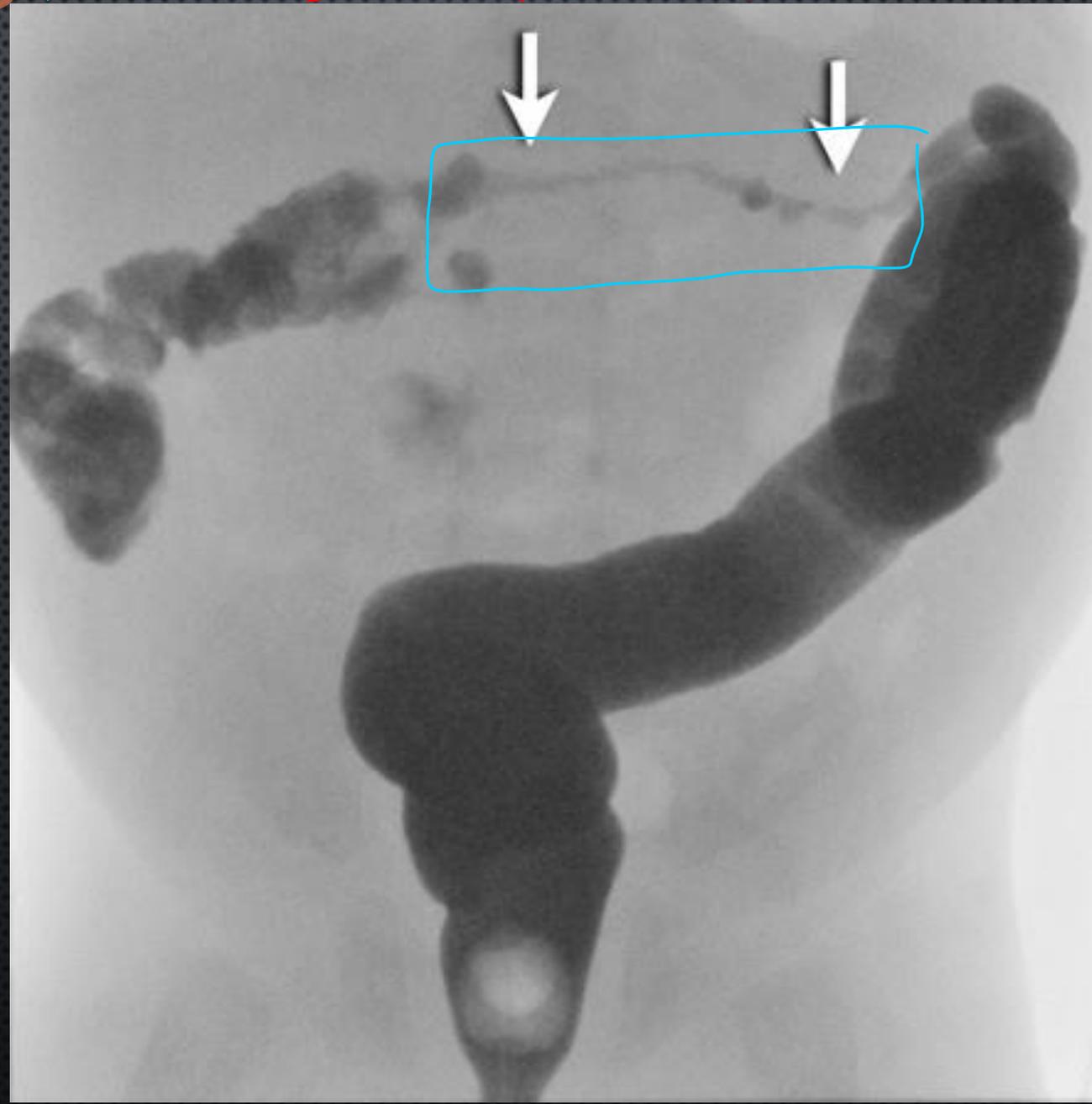
Structure / chronic NEC

← **الكويحة**: في حالات ال

Complicated - NEC
(stricture)

الأفضل والأكثر أماناً، انه استخدم
(Air) عتاي أبتع مسار
ال (Bowel) .

لانه له استخدام (contrast) كالأء
(NEC) صفة وقتها في اصقالية
كثير كبيرة، انه ليس فيه (Perforation)
وهو من أفضل الأفضل ب
(chemical peritonitis)
وهذا شيء خطير جداً



Necrotizing enterocolitis (NEC)

- Prevention
 - Breast milk?
- Treatment
 - Medical (no perforation): antibiotics, NPO with IV nutrition
 - Bowel resection if perforation (implies necrotic bowel)
< Surgery >
- Complications
 - Strictures long term (more surgery)
 - Short bowel syndrome if severe