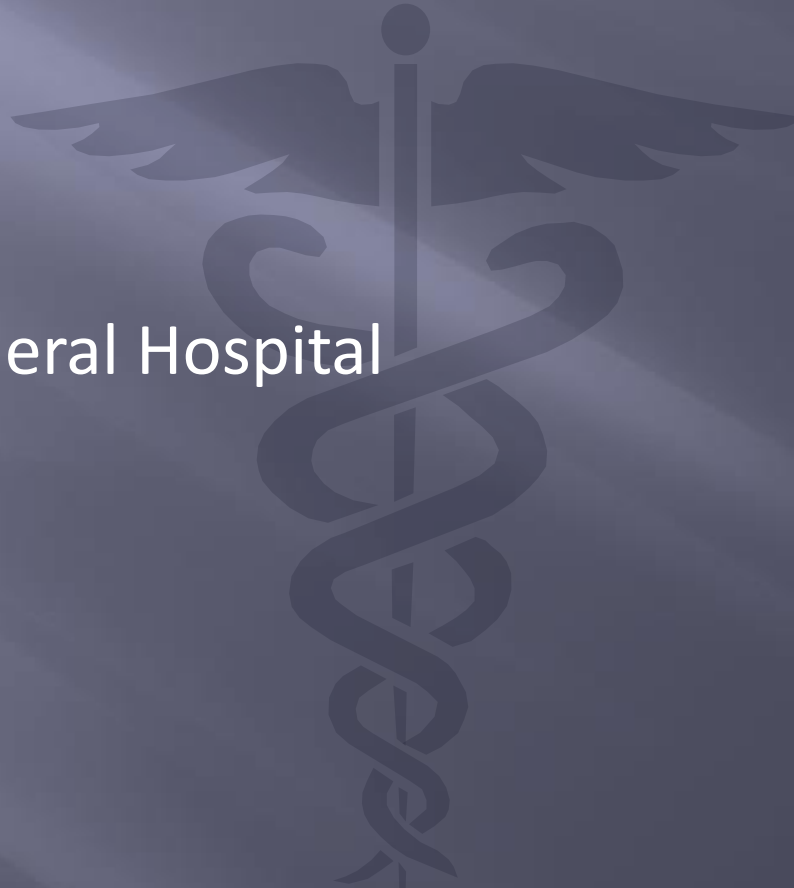


ULTRASOUND OF THE ACUTE ABDOMEN IN PAEDIATRICS

Dr. Rob Hawkes

Stepping Hill Hospital

Macclesfield District General Hospital



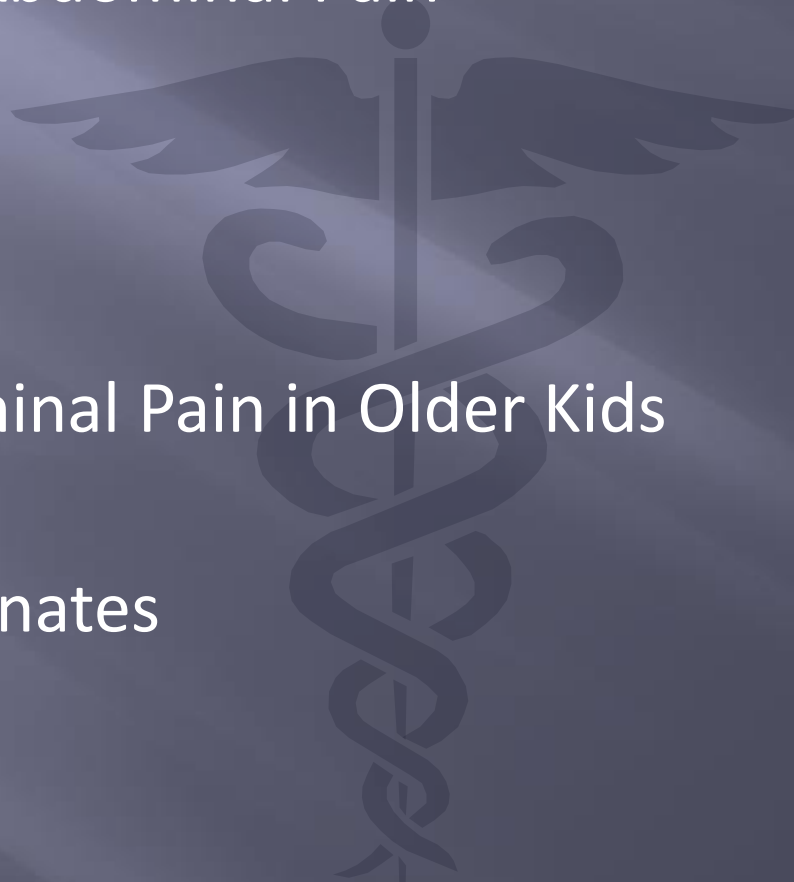
Aims and Objectives

Presentation of Acute Abdominal Pain

Appendicitis or Mimics

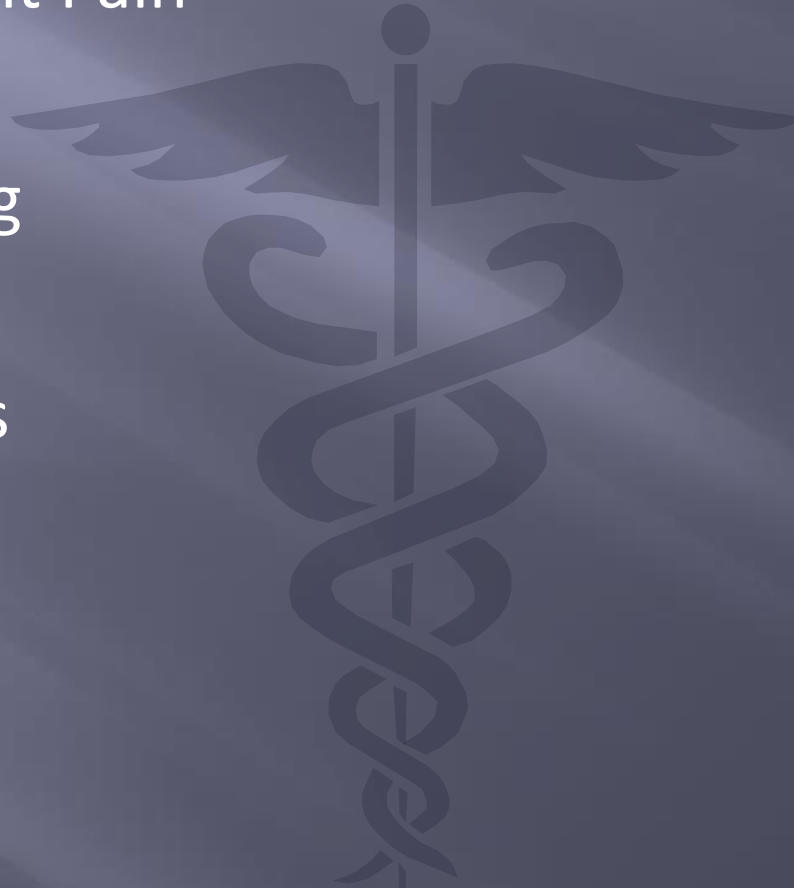
Other Causes of Abdominal Pain in Older Kids

Acute Abdomen in Neonates



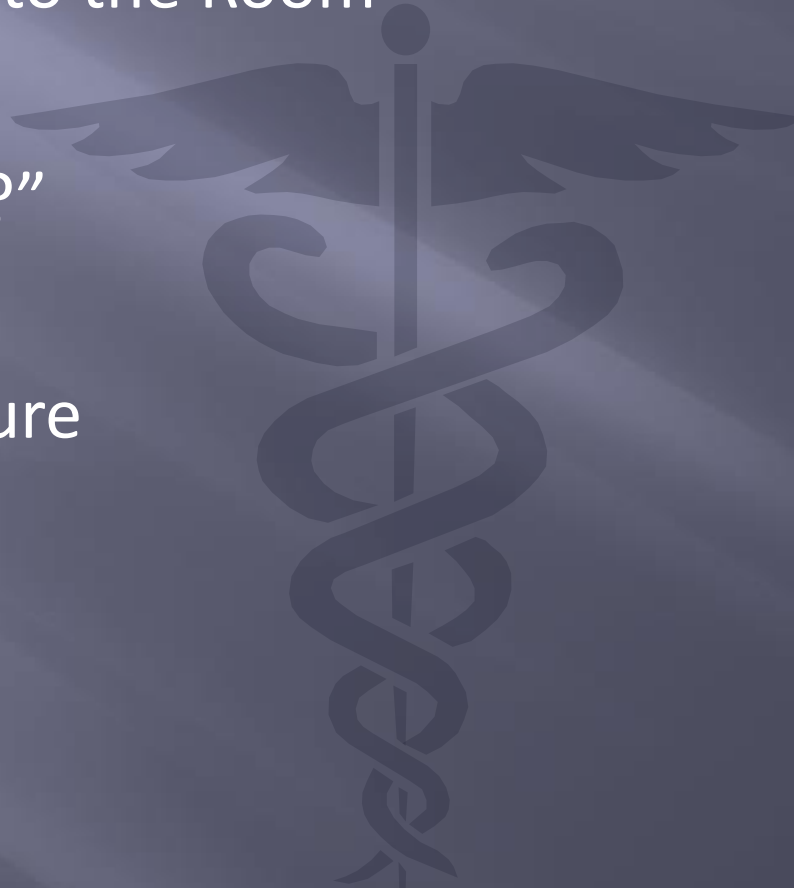
Appendicitis

- ▣ Right Lower Quadrant Pain
- ▣ Pain Migration
- ▣ Nausea and Vomiting
- ▣ Anorexia
- ▣ Rebound Tenderness



“Clinical Examination”

- ▣ Watch Them Walk into the Room
- ▣ Getting on The Bed
- ▣ “Where does it hurt?”
- ▣ “Are you hungry?”
- ▣ Good Enough Exposure
- ▣ Warm Jelly, etc, etc.



Ultrasound Examination

- ▣ General Ultrasound First
 - Curvilinear General Examination
 - ▣ Pleural Effusions
 - Subdiaphragmatic Collections
 - Masses/Inflammation
 - Ovaries Particularly the Right.

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DIFFERENTIAL DIAGNOSIS OF LOBAR PNEUMONIA AND APPENDICITIS IN CHILDREN *

F. DENNETTE ADAMS, M.D.

WASHINGTON, D. C.

AND

BEN J. BERGER, M.D.

KANSAS CITY, MO.

Although lobar pneumonia is generally conceded to be one of the easiest diseases in which to make a correct diagnosis, it is well recognized that its differentiation in the early stages, and particularly in children, from one or two quite remote conditions, notably so-called surgical conditions of the abdomen and cerebrospinal meningitis, is not always simple. Much has been written on this subject, but the frequency with which the diseases are confounded, in both general and hospital practice, the relative frequency with which patients with early pneumonia are subjected to unnecessary surgery, and the importance from a therapeutic standpoint of establishing immediate diagnosis, have made it seem worth while to review the records of a series of such cases in the hope of being able to point out what clinical features are of the greatest significance in differentiating the two conditions. Only children between the ages of 2 and 15 have been considered.

dititis or of acute surgical conditions of the abdomen; or in which this diagnosis was made on the admitting floor, and then of those cases in the same group in which a diagnosis of cerebrospinal meningitis was made either by the outside physician or by the admitting physician in the hospital.

The cases of appendicitis are listed in three groups: acute appendicitis, acute appendicitis with abscess, and perforated appendix with peritonitis.

DIAGNOSIS

Of the total series of 145 lobar pneumonia patients, it is interesting to note that only sixty-six, or 45.5 per cent., were sent to the hospital with the diagnosis of bronchopneumonia or lobar pneumonia; but it is startling to observe that twenty-five, or 17.6 per cent., were either sent in with a diagnosis of appendicitis, admitted with that diagnosis, or were about to be operated on for that condition when seen by the pneumonia service. This figure is much higher than in adults, as shown by Abrahams,¹ who found that in a series of 558 cases of lobar pneumonia in adults, only seven, or 1.4 per cent., were admitted as appendicitis. In many of our cases there was some doubt in the mind of the visiting surgeon as to whether there were sufficient abdominal signs to warrant exploration; but in some, abdominal symptoms and signs were so striking that even in the face of a definite diagnosis of lobar pneumonia made by the pneumonia service, there was reluctance on the part of the surgeon to postpone

Is it Appendicitis?

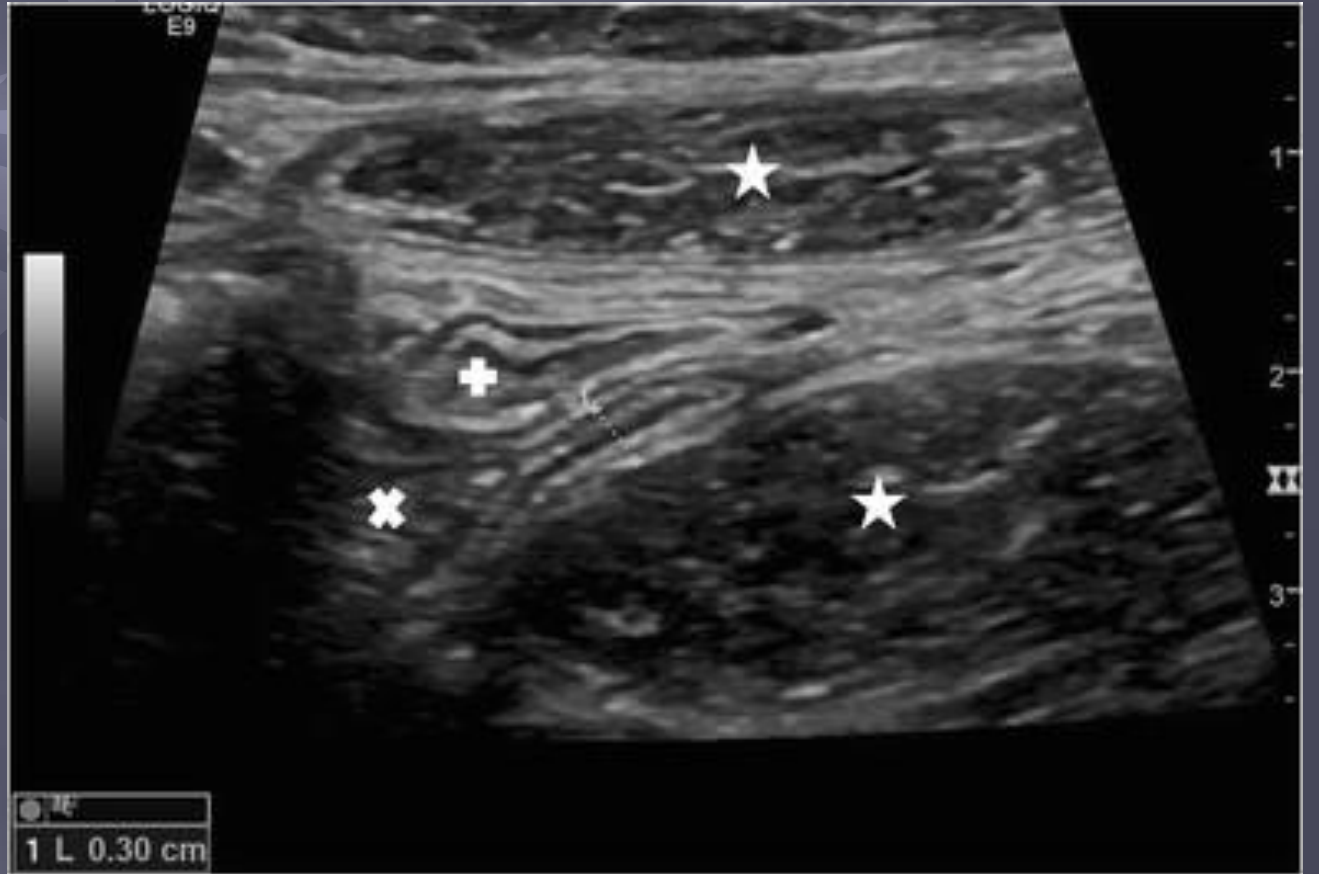


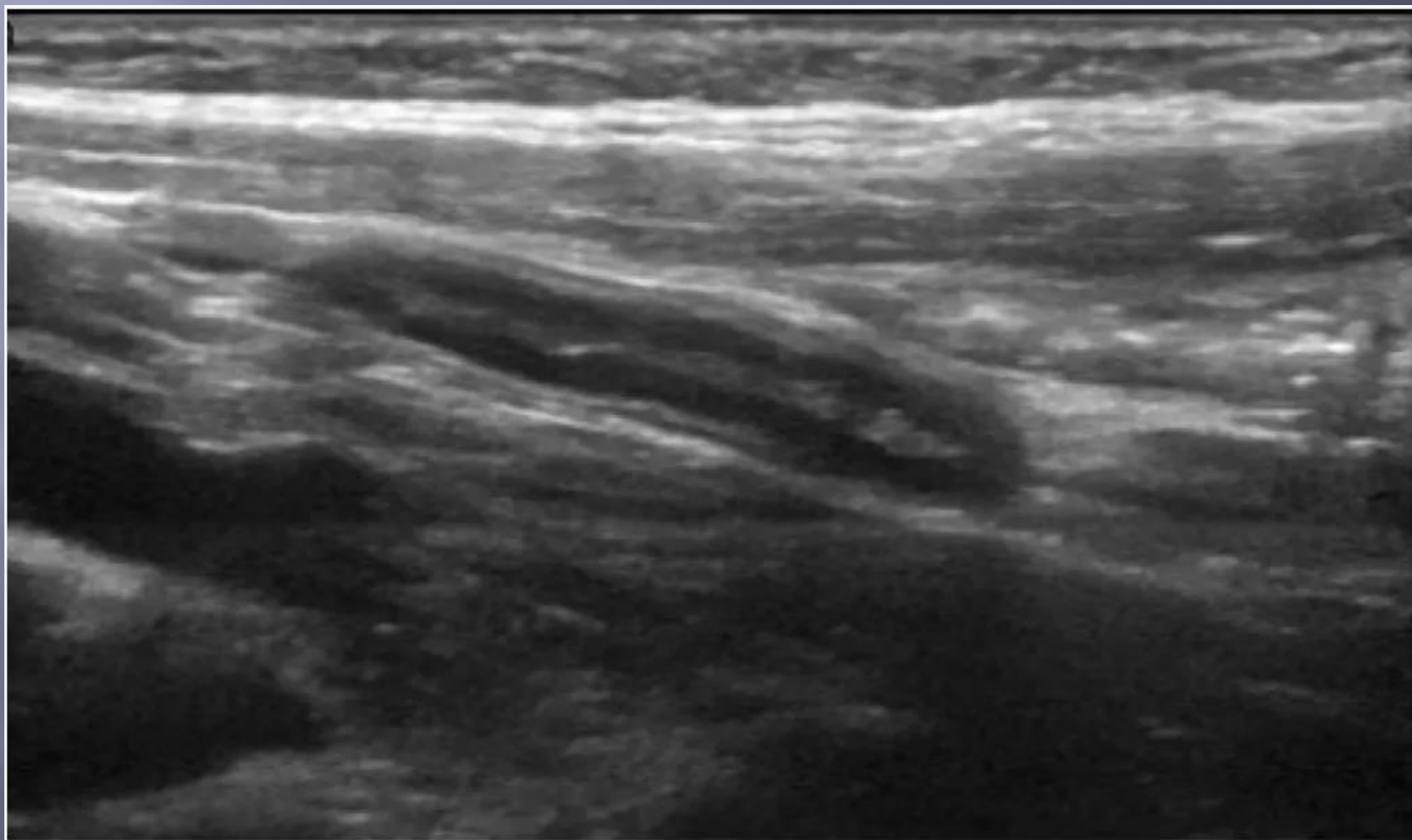
Is it Appendicitis?

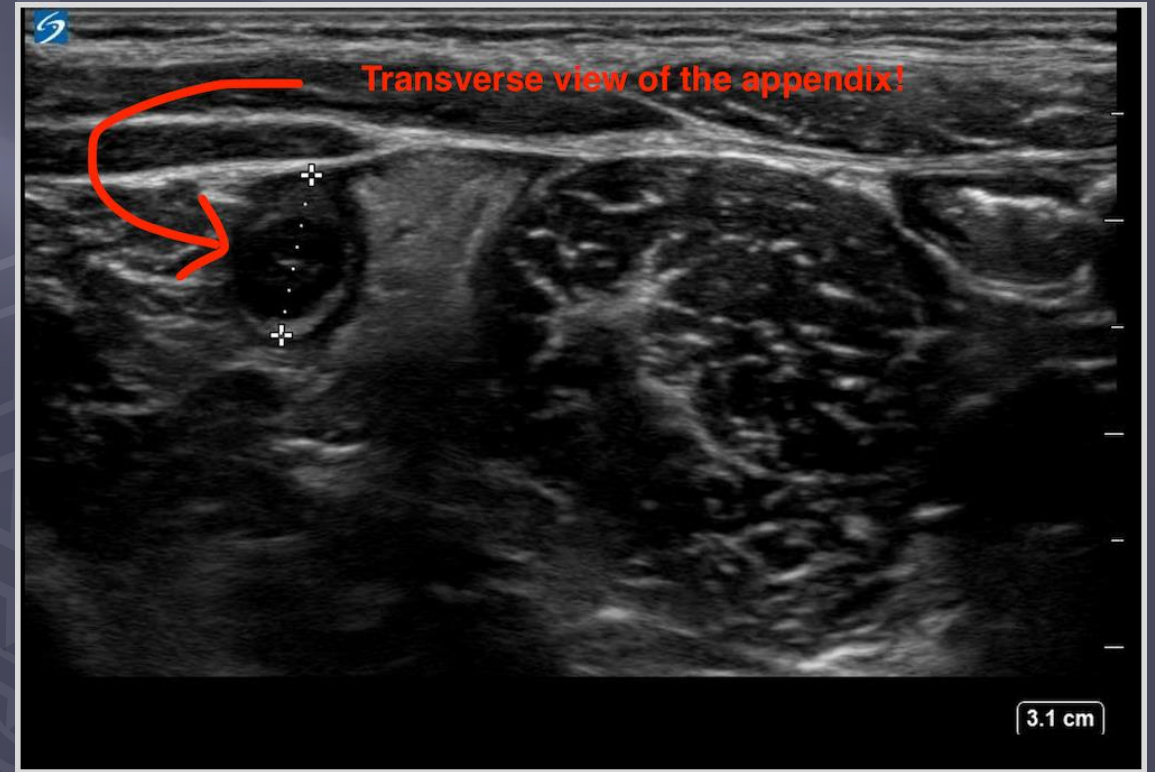


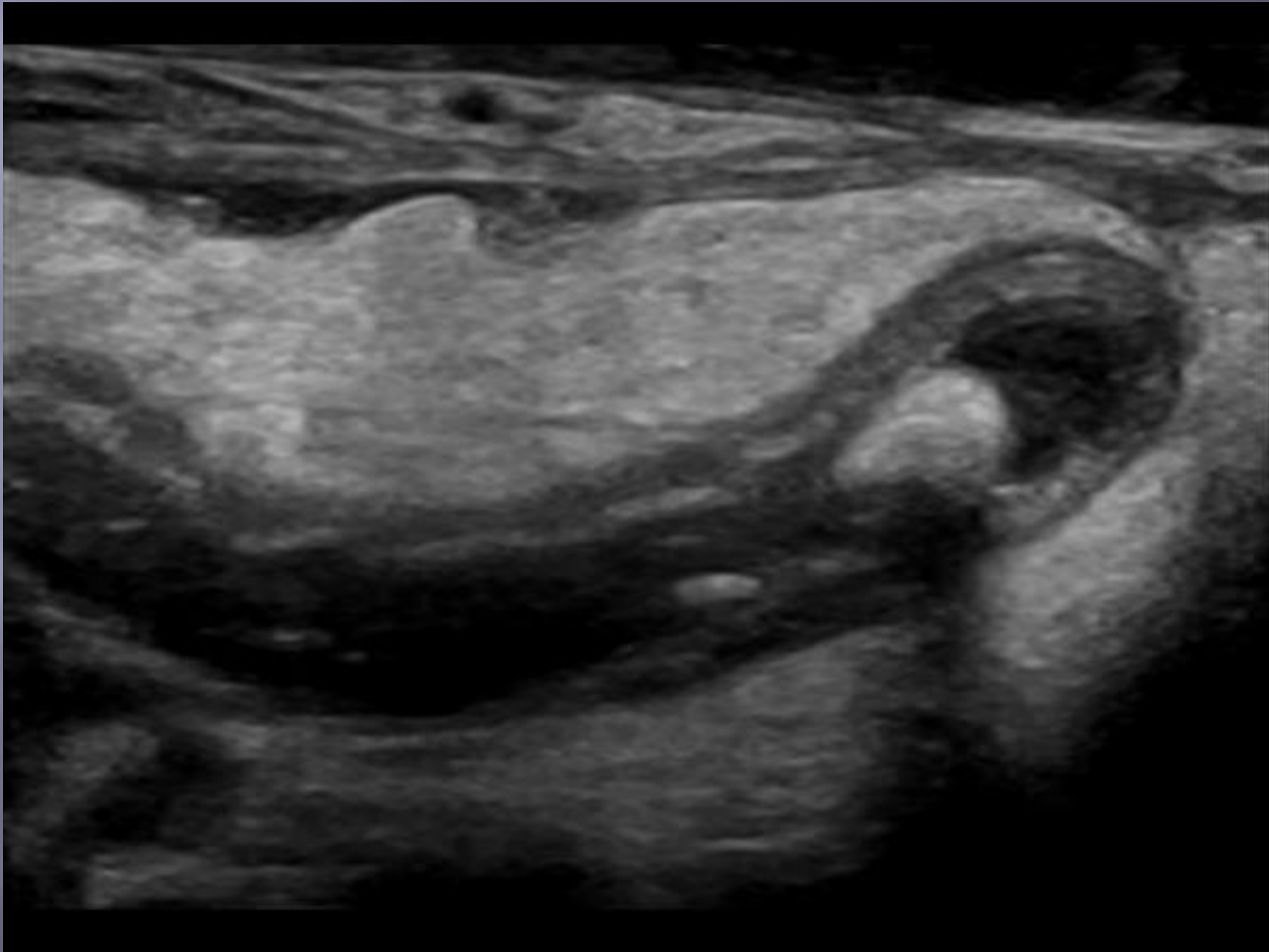
Graded Compression Ultrasound

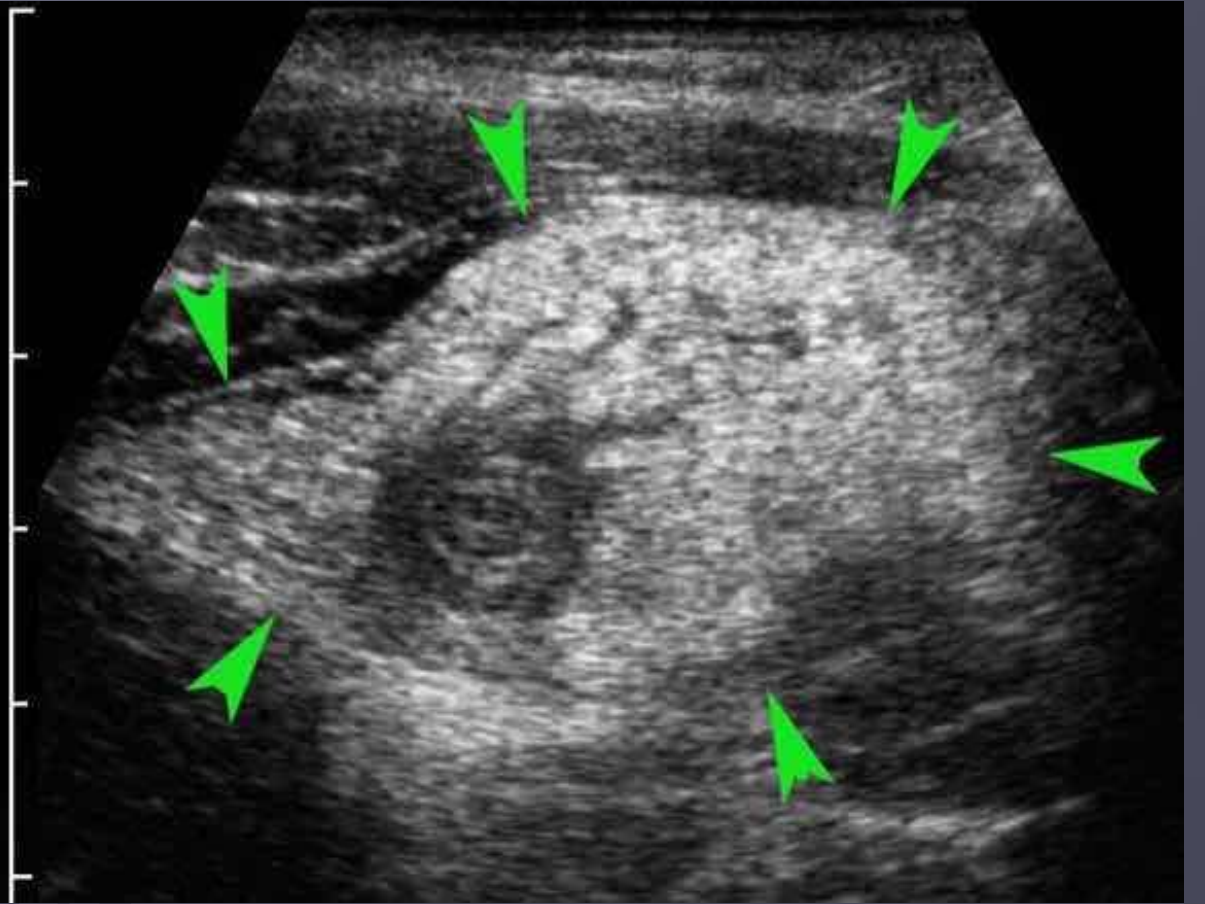
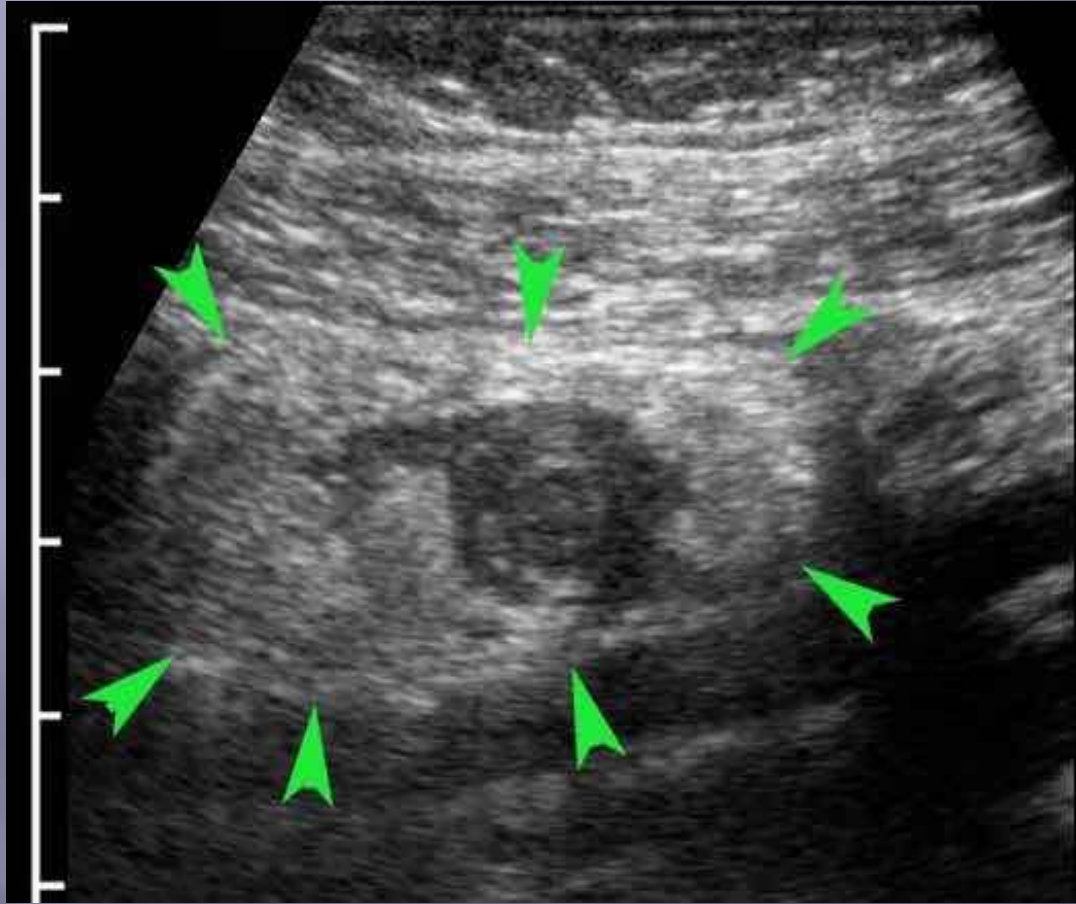












yes



CAECUM



BASE

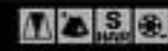
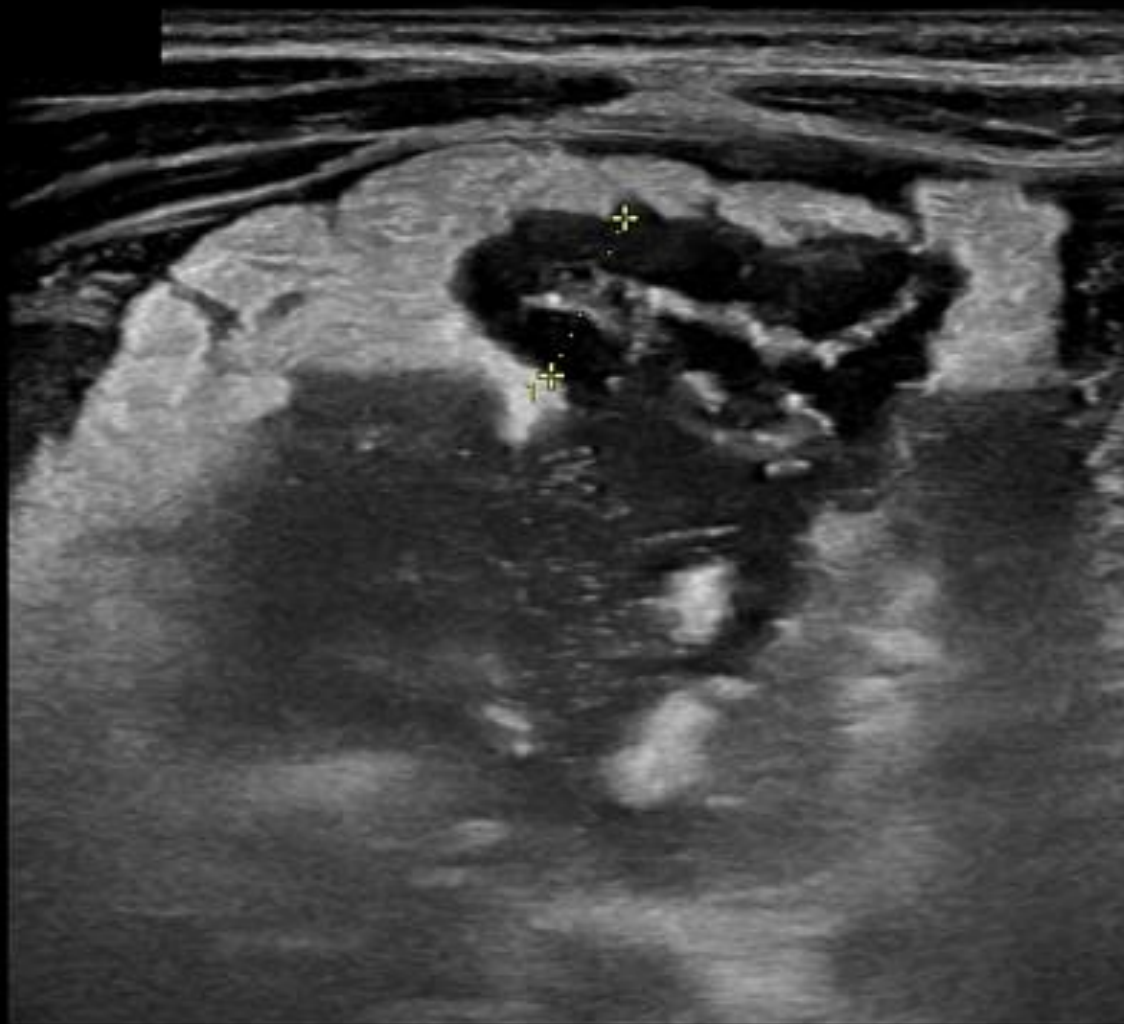


APPENDIX

SAMSUNG

Bowel
LA3-14AD
4.5cm
54Hz

[2D]
Pen1
Gn 46
DR 120
FA 7
P 90%



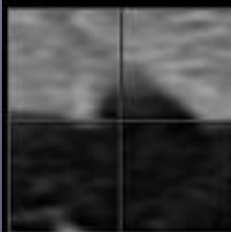
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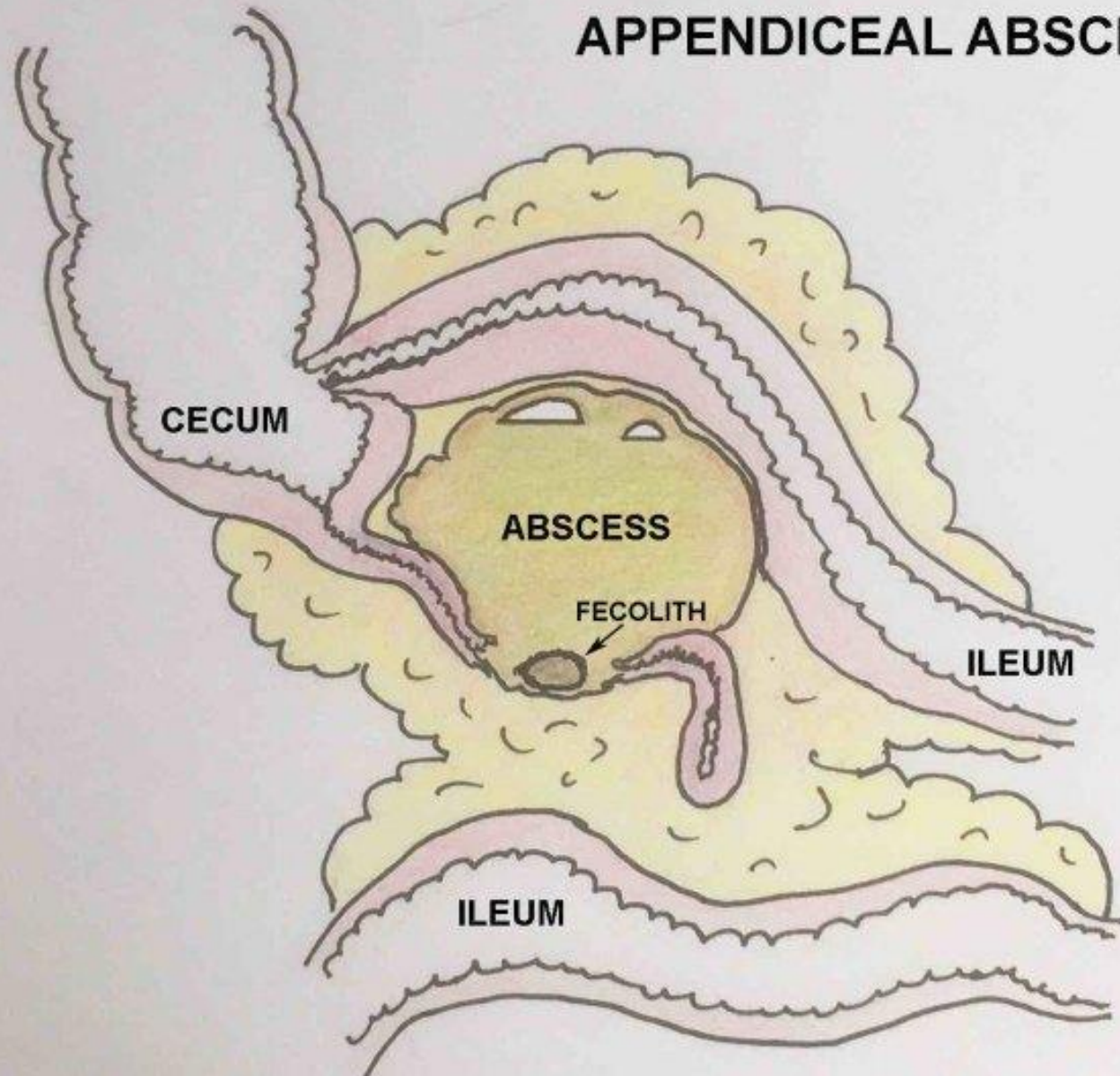
- 2

- 3

- 4



APPENDICEAL ABSCESS





Acute Abdomen Older Children

- * Appendicitis & complications
- * Intussusception: pathological lead point
- * Meckel's diverticulum: pain or PR bleeding
- * Infection: congenital cysts (urachal/ mesenteric/ duplication)
- * IBD: Crohn's and ulcerative colitis
- * Mesenteric adenitis
- * Pancreatitis: idiopathic/ stones/ metabolic patients
- * Renal: stones, obstruction & infection

- * Gynae:
- * Haematocolpos/ ovarian cyst/ haemorrhage/ infection/ torsion



RIF

[Pediatr Radiol](#). 2022; 52(6): 1038–1047.

PMCID: PMC8990674

Published online 2022 Apr 8. doi: [10.1007/s00247-022-05346-2](https://doi.org/10.1007/s00247-022-05346-2)

PMID: [35394163](https://pubmed.ncbi.nlm.nih.gov/35394163/)

Appendiceal involvement in pediatric inflammatory multisystem syndrome temporally associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): a diagnostic challenge in the coronavirus disease (COVID) era

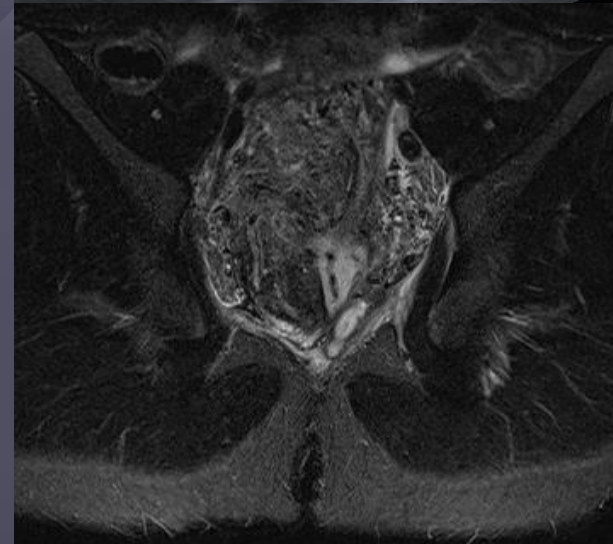
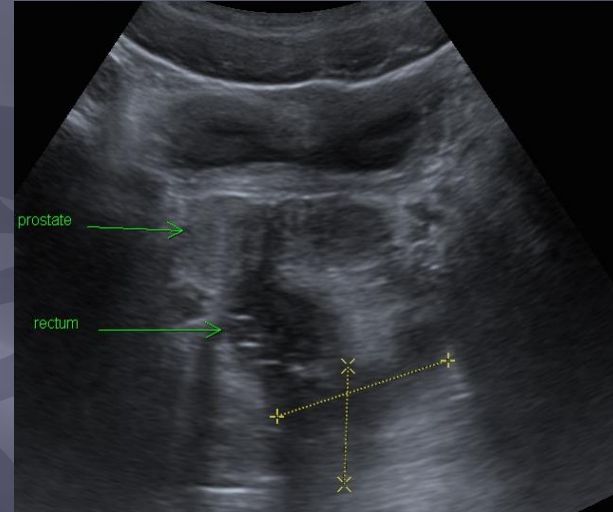
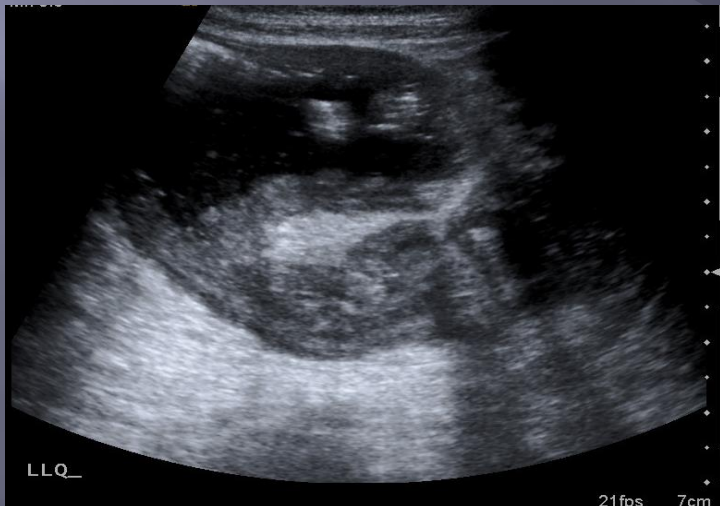
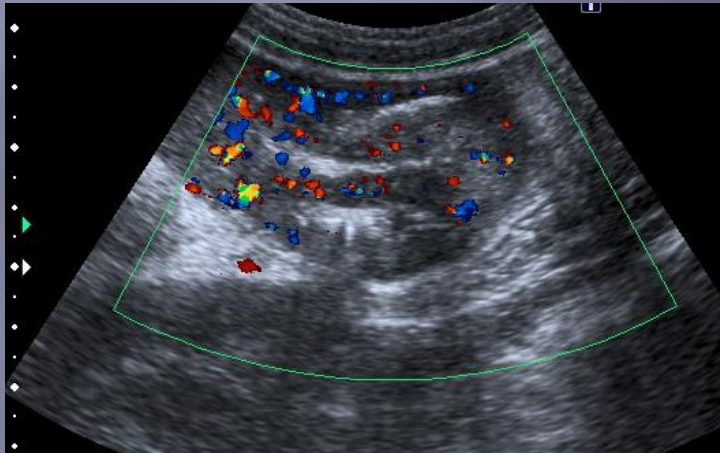
[Tejas H. Kapadia](#),¹ [Mohammed T. Abdulla](#),¹ [Rob A. Hawkes](#),¹ [Vivian Tang](#),¹ [Jenny A. Maniyar](#),¹ [Rachel E. Dixon](#),¹ [Amit F. Maniyar](#),¹ [Kirsten M. S. Kind](#),¹ [Emily Willis](#),² [Phil Riley](#),² [Yousef M. Alwan](#),¹ and [Stavros Michael Stivaros](#)^{✉1,3}

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IBD: Crohns and ulcerative colitis

COLLECTION AND FISTULA

BOWEL THICKENING
STRICTURE/ OBSTRUCTION



Intussusception

Peak age: 5-10 months

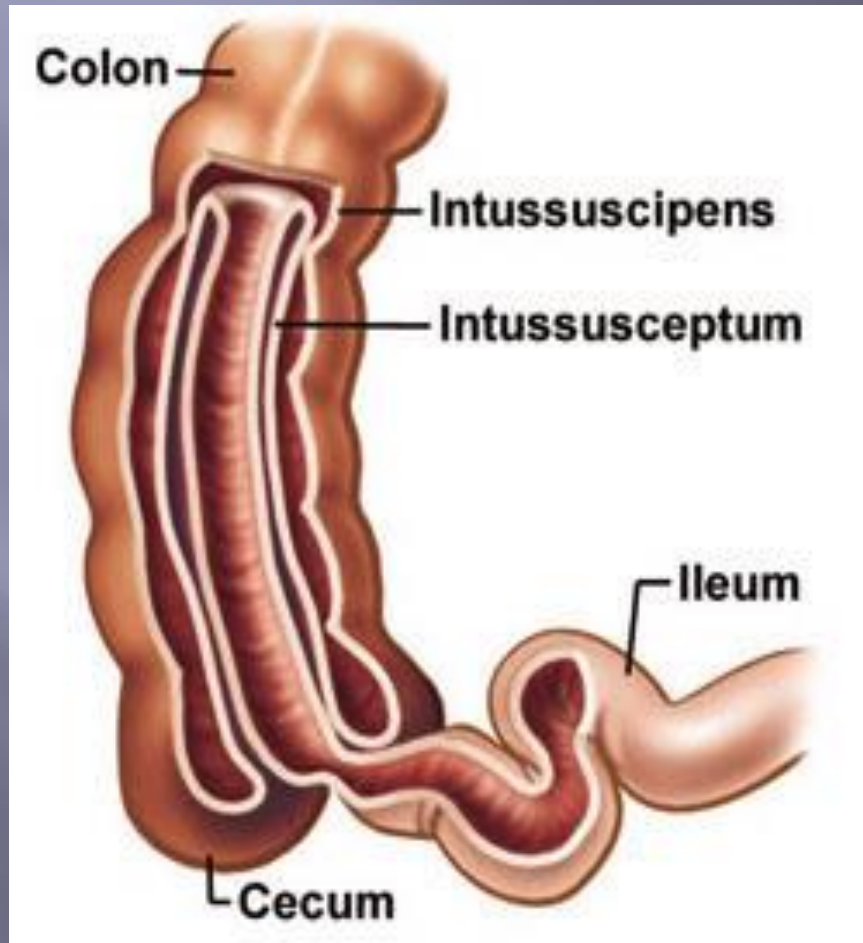
Presentation:

- ▣ Red current jelly stool (PR blood)
- ▣ Abdominal pain/ drawing legs up/ irritable and unwell/ Intermittent

Assessment: Linear high frequency

- ▣ Location: start in RLQ/ ileocolic/ Extent : follow it
- ▣ No pathological lead point
- ▣ Appearance of the bowel : oedema/ necrosis/ perforation
- ▣ Colour flow: ischaemia
- ▣ Any trapped fluid
- ▣ Complications: perforation/ collection/obstruction

Intussusception

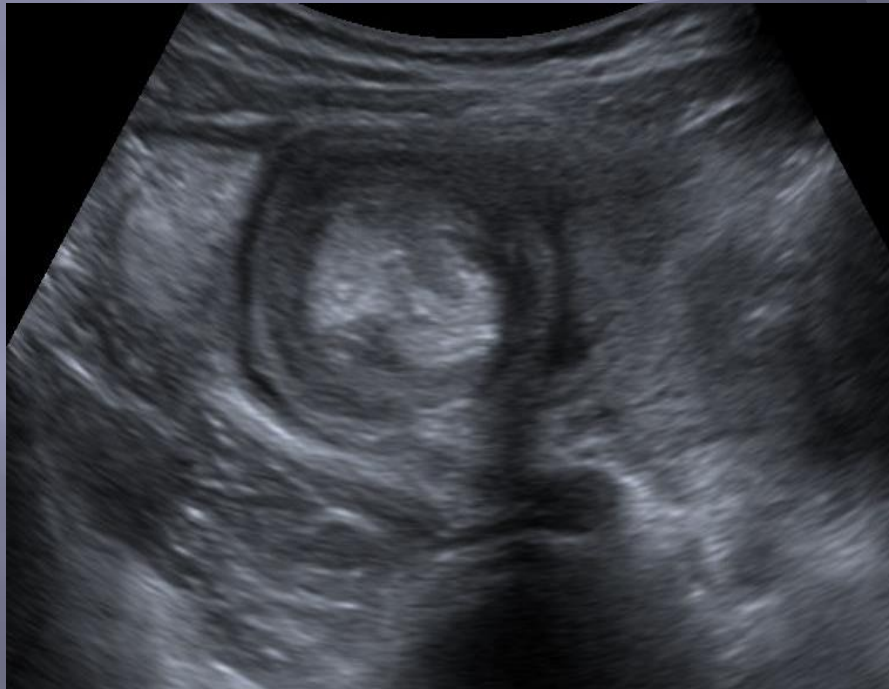


Intussusception: Pathological lead point

- ▣ Meckel's diverticulum
- ▣ Polyp
- ▣ Mass: lymphoma/ TB
- ▣ HSP/ HUS: Small bowel thickening haemorrhage
- ▣ Cystic fibrosis
- ▣ Jejunal feeding tube
- ▣ Small bowel vs ileocolic location

Intussusception

TS



LS



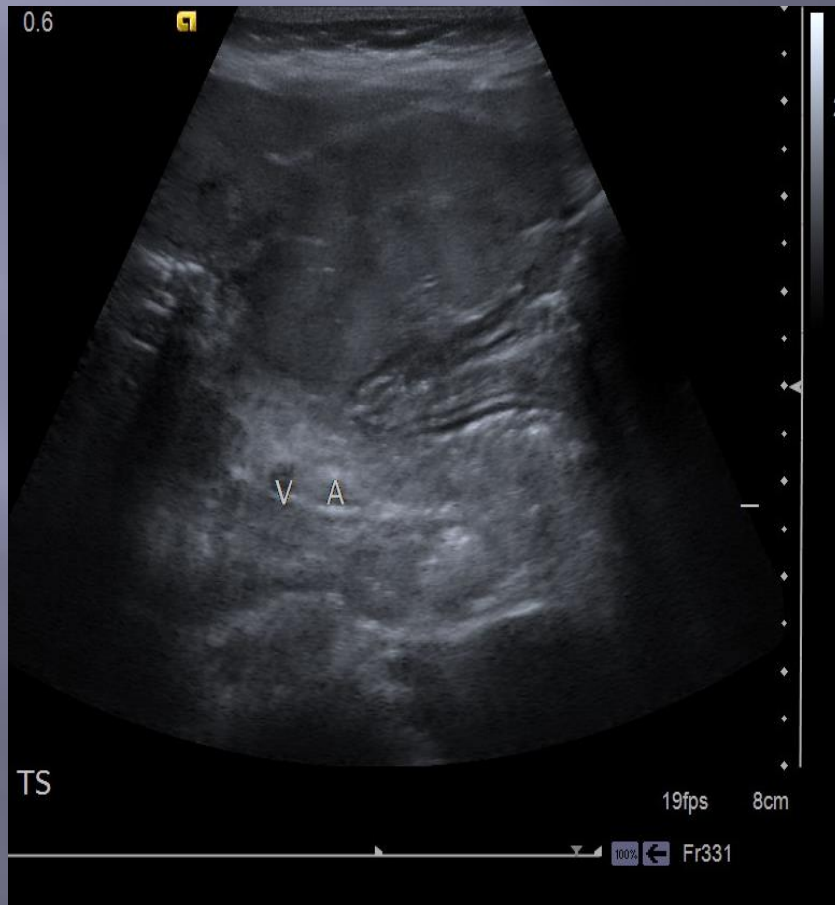
Acute Abdomen

Neonates and Infants

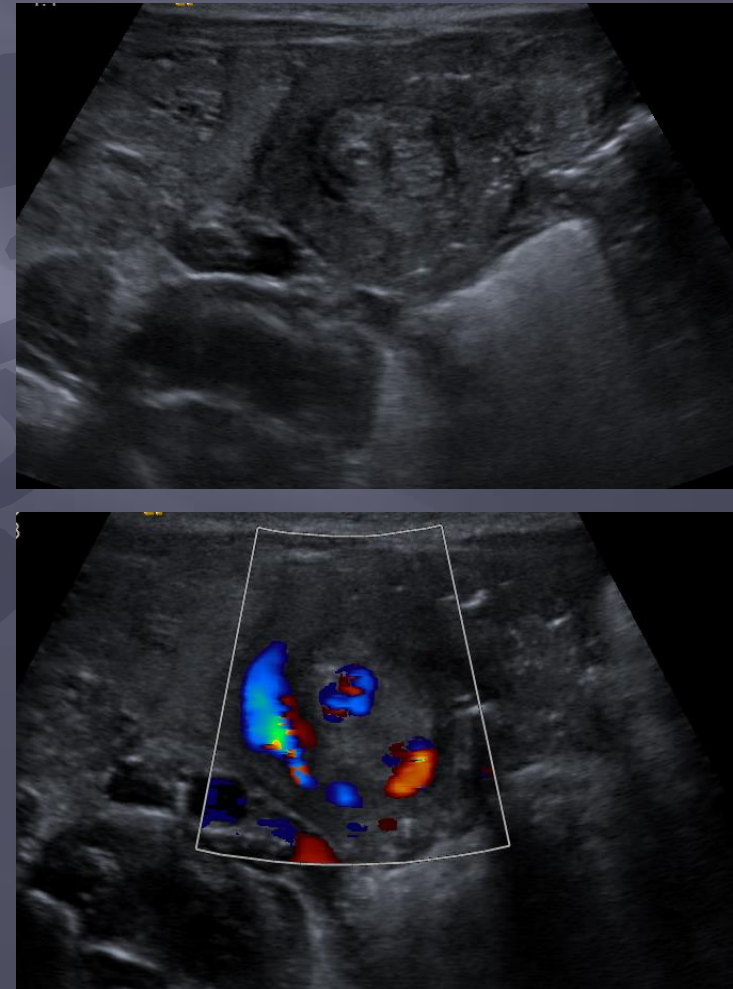
- ▣ Neonate: newborn-1 month
- ▣ Infant: 1 month-12 month
- ▣ Malrotation & midgut volvulus
- ▣ Hypertrophic pyloric stenosis
- ▣ Intussusception
- ▣ Inguinal hernia
- ▣ Necrotizing enterocolitis (NEC): Premature

Malrotation & midgut volvulus

NORMAL SMA/SMV



VOLVULUS



Malrotation & midgut volvulus



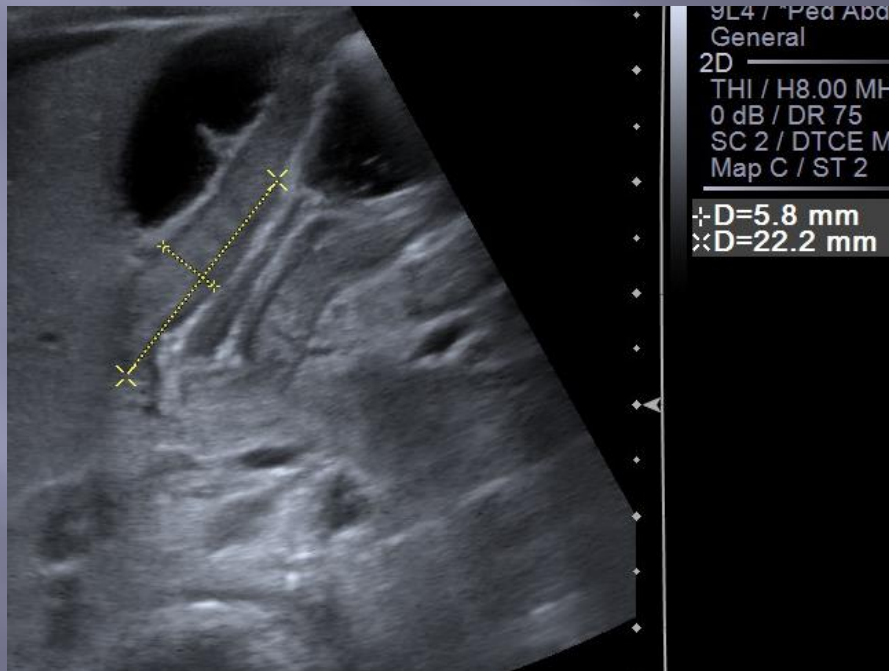
Hypertrophic pyloric stenosis

- ▣ Peak age : 4 weeks old
- ▣ Rare in premature
- ▣ Risk factor: First degree relative/ Male

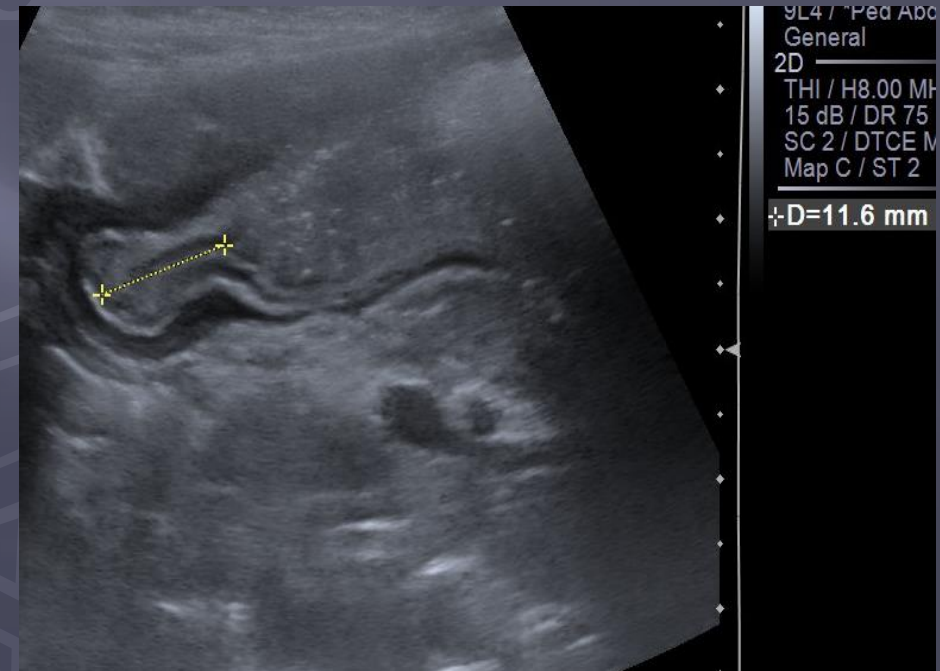
- ▣ Projectile vomiting of feeds: No green bile
- ▣ Progressive condition

Ultrasound criteria: Linear high frequency probe
Single wall > 3mm Length >15mm Diameter > 11mm

PYLORIC STENOSIS

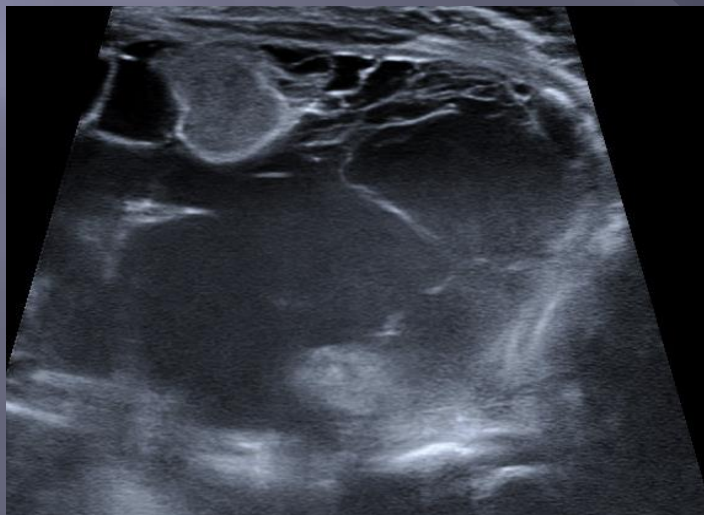
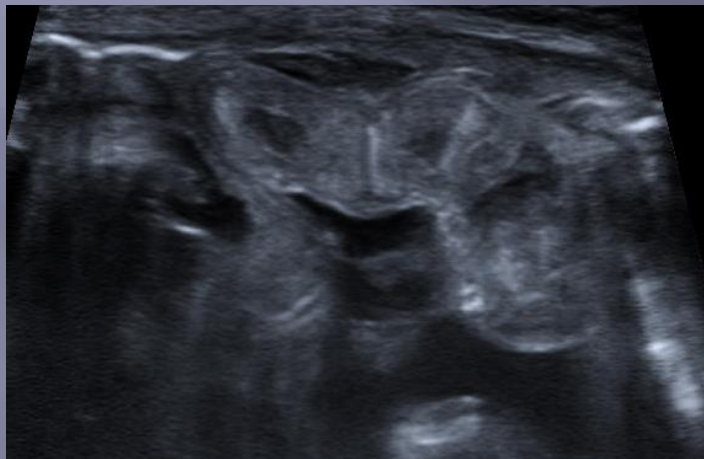


NORMAL PYLORUS

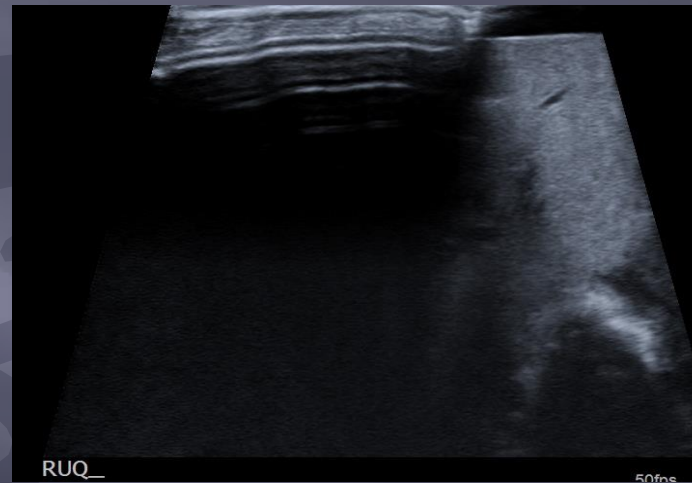


Necrotizing enterocolitis (NEC) : Premature

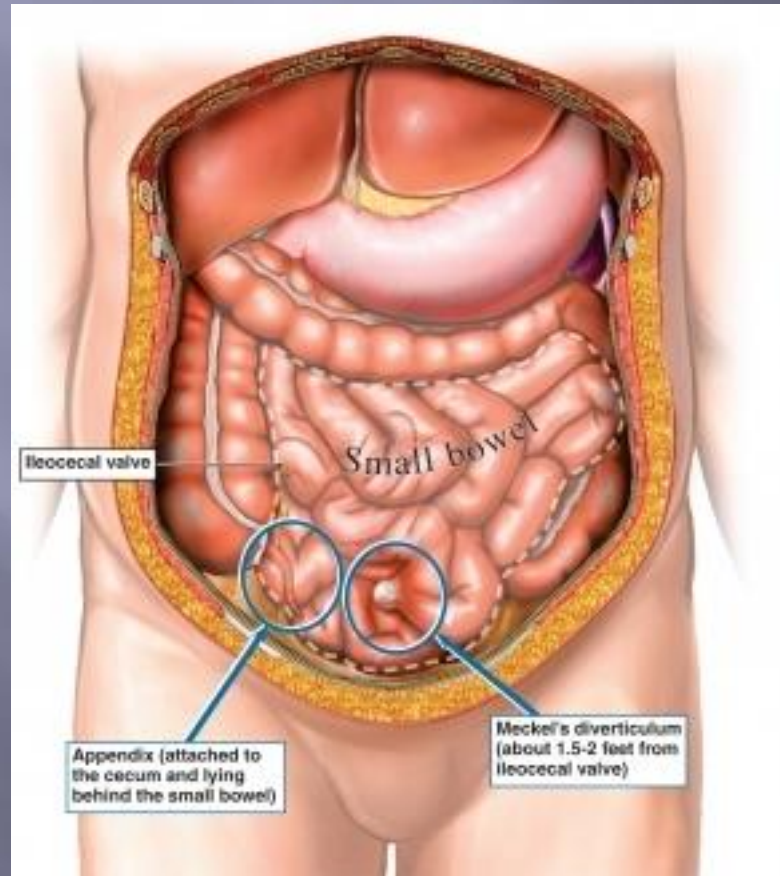
NEC



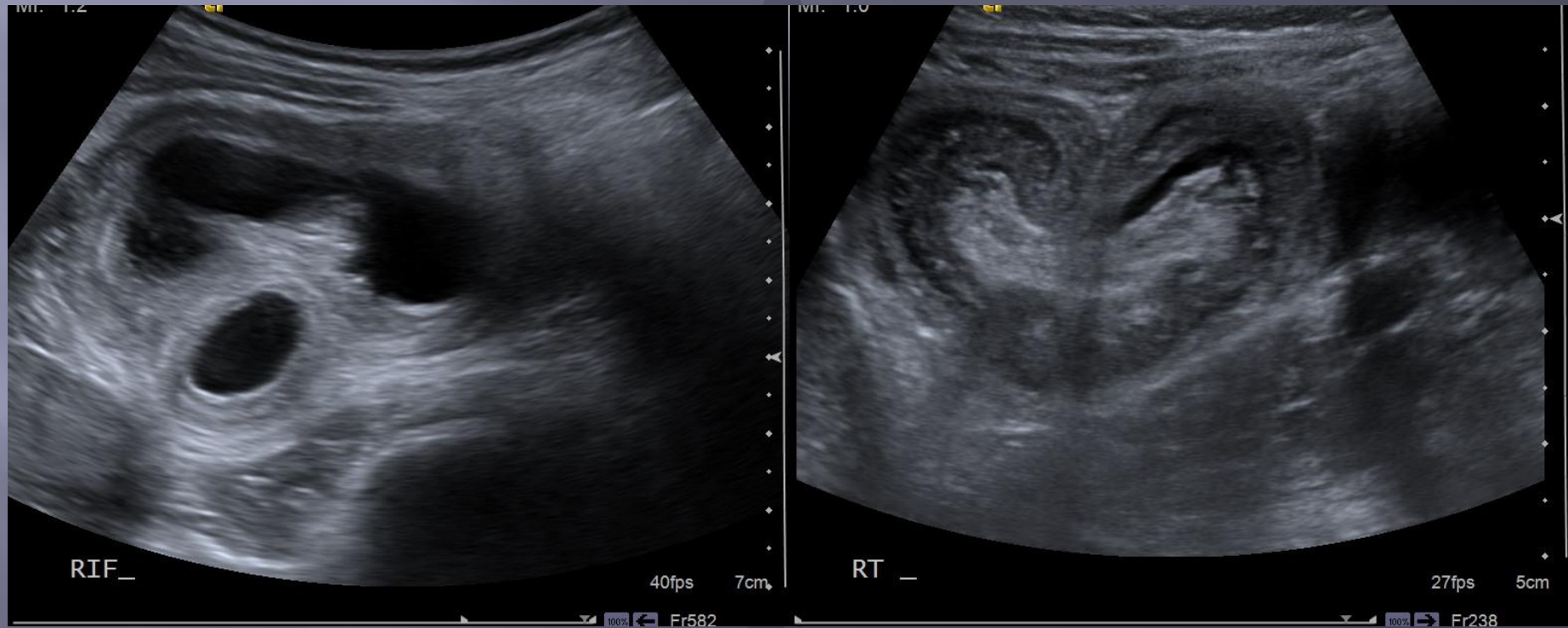
PERFORATION



Meckel's diverticulum



Meckel's diverticulum



Take Home Messages

- ▣ Wide Variation in Presentation of Appendicitis
 - ▣ Think Clinically
 - ▣ Think of Other Diagnoses
 - ▣ Be Aware of Different Pathologies at Different Ages
-
- Thanks to Dr. Viv Tang for help with images