

# AMSER Case of the Month

## January 2025

3 year 8 month-old female presents with migratory sharp abdominal pain  
from periumbilical region to RLQ

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# Patient Presentation

- **HPI:** 3 year 8 month-old female with no significant PMHx presented with 16 hours of sharp abdominal pain migratory from periumbilical region to RLQ. Had subjective fever at home, NBNB emesis, and persistent nausea/anorexia. Stools were soft and brown. Mother reports urine smells bad but denies any pain or burning with urination.
- **Vitals:** Temp 99.8 F, Pulse 114
- **Physical Exam:** RLQ abdominal tenderness, + Murphy's sign

# Pertinent Labs

- **CBC:** WBC 13.7 (neutrophils 81%)
- **CMP:** WNL
- **UA:** 1+ leukocyte esterase

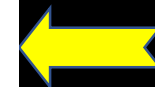
What Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

**Variante 2:**

**Child. Suspected acute appendicitis, intermediate clinical risk. Initial imaging.**

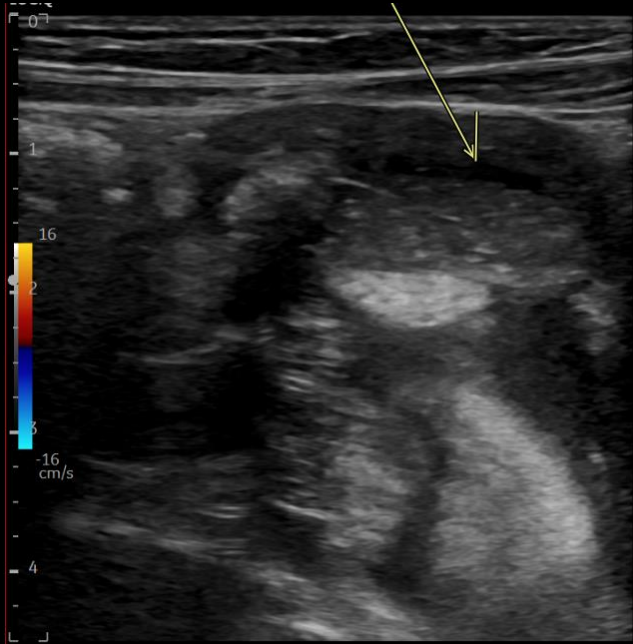
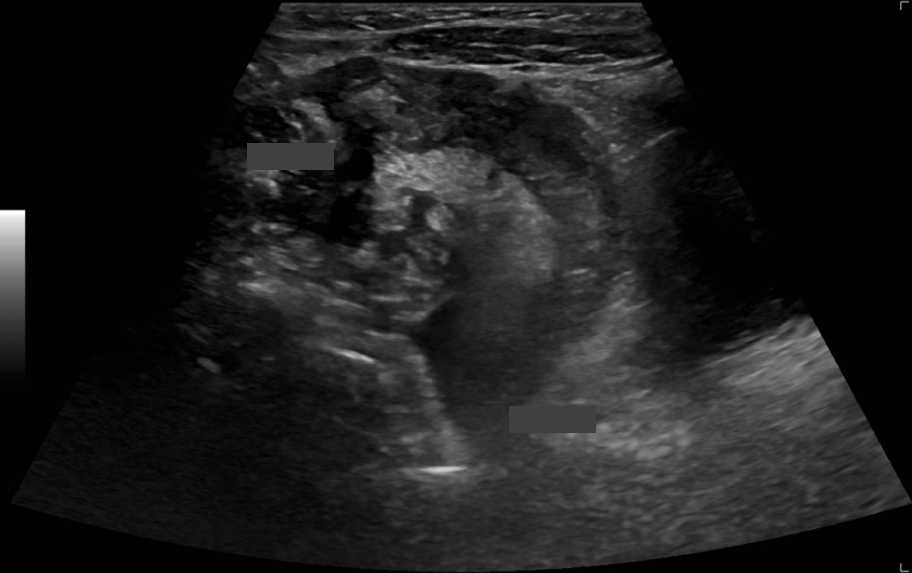
Procedure	Appropriateness Category	Relative Radiation Level
US abdomen RLQ	Usually Appropriate	0
US abdomen	Usually Appropriate	0
CT abdomen and pelvis with IV contrast	May Be Appropriate (Disagreement)	⊕⊕⊕⊕
CT abdomen and pelvis without IV contrast	May Be Appropriate (Disagreement)	⊕⊕⊕⊕
MRI abdomen and pelvis without and with IV contrast	May Be Appropriate (Disagreement)	0
MRI abdomen and pelvis without IV contrast	May Be Appropriate (Disagreement)	0
Radiography abdomen	May Be Appropriate (Disagreement)	⊕⊕
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	⊕⊕⊕⊕⊕
US pelvis	Usually Not Appropriate	0



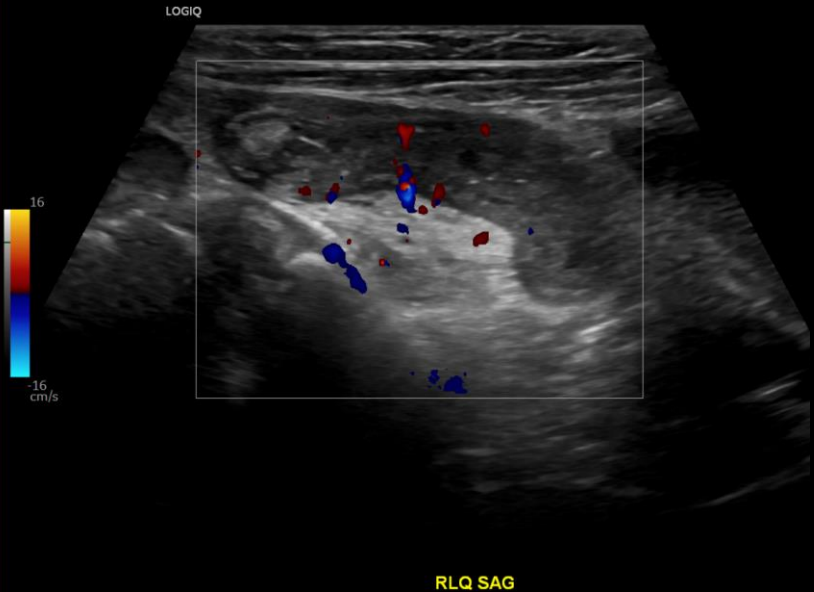
This imaging modality was ordered by the ER physician

# Findings (unlabeled)

RLQ Sagittal View

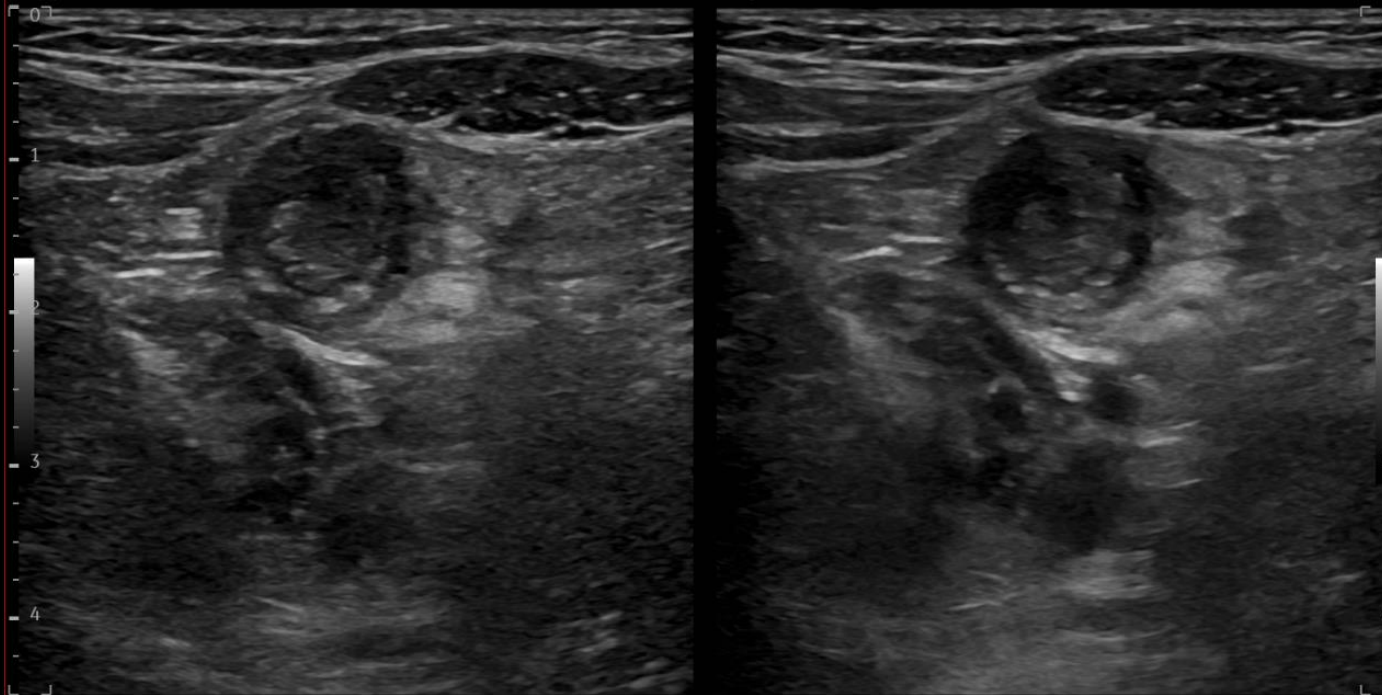


RLQ Sagittal View



# Findings (unlabeled)

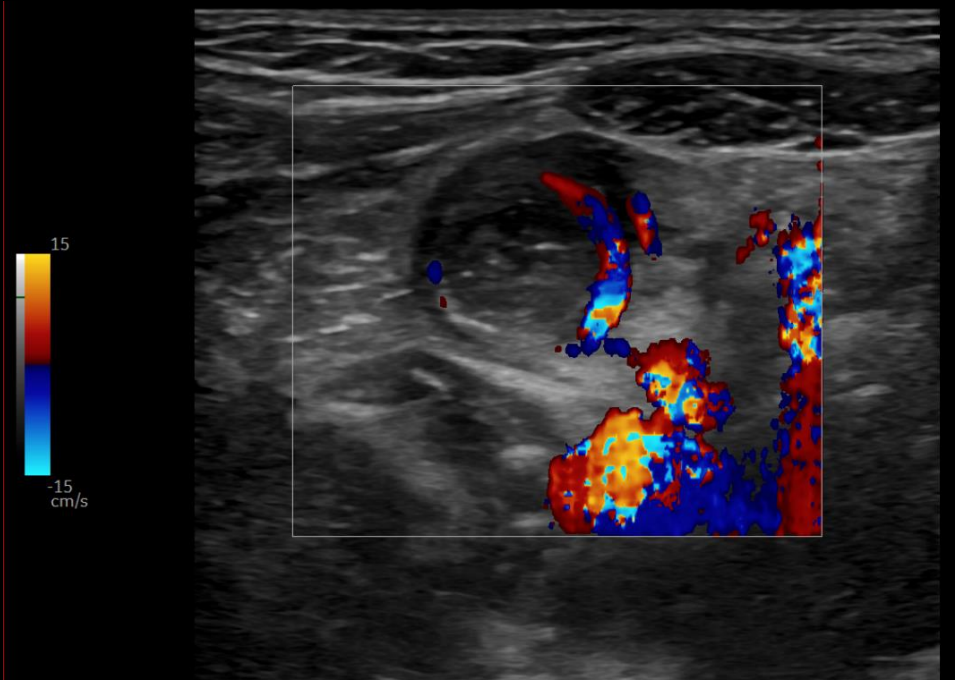
RLQ Short Axis View



RLQ TRANS

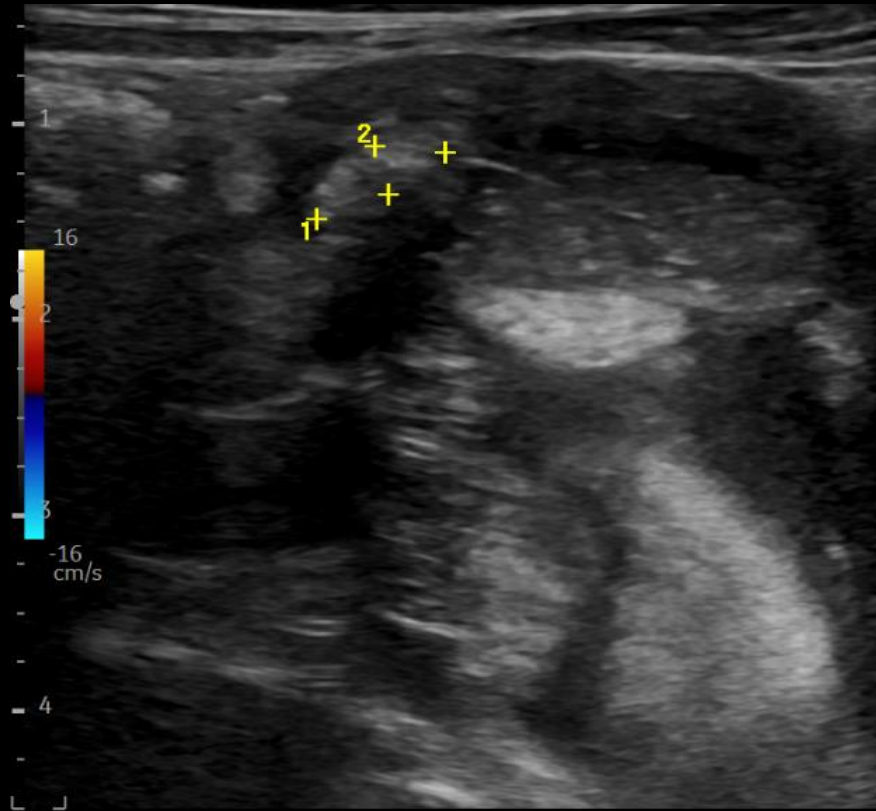
WCOMP

RLQ Short Axis View with Doppler

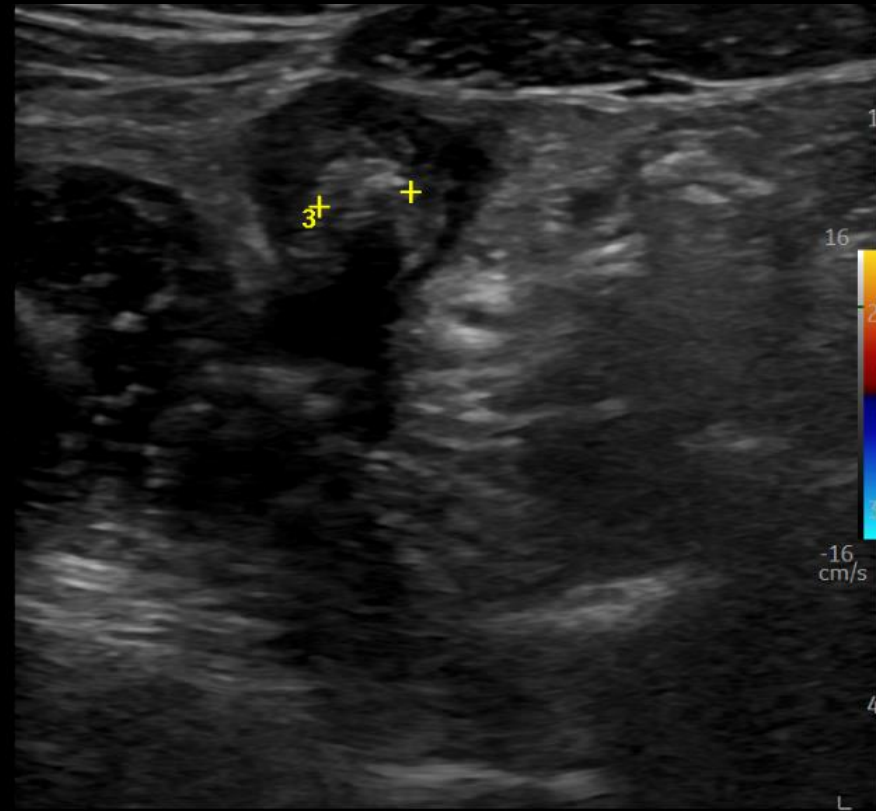


RLQ TRANS

# Findings (unlabeled)



RLQ SAG

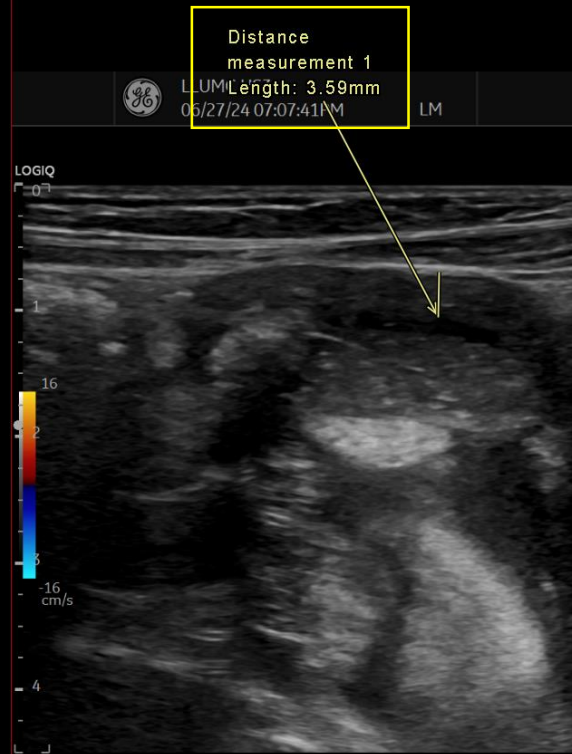
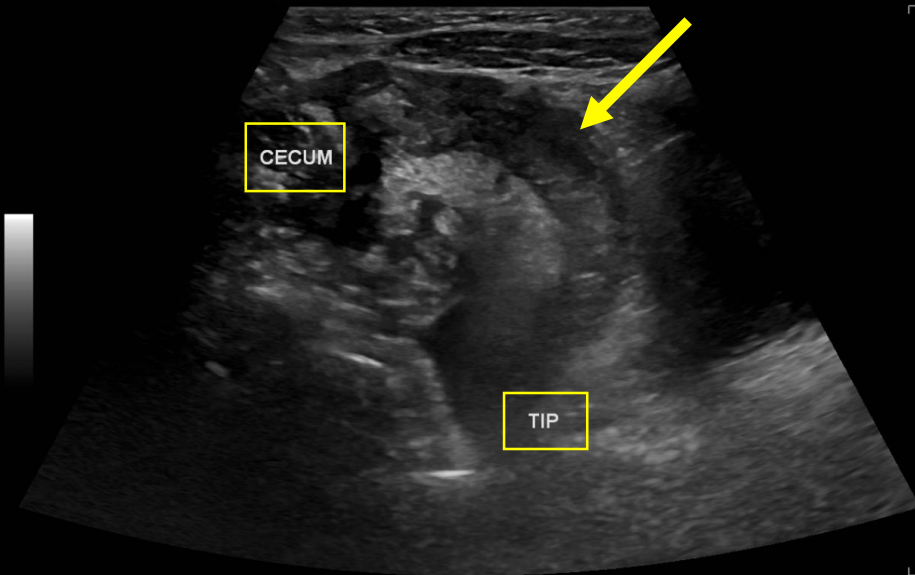


TRANS



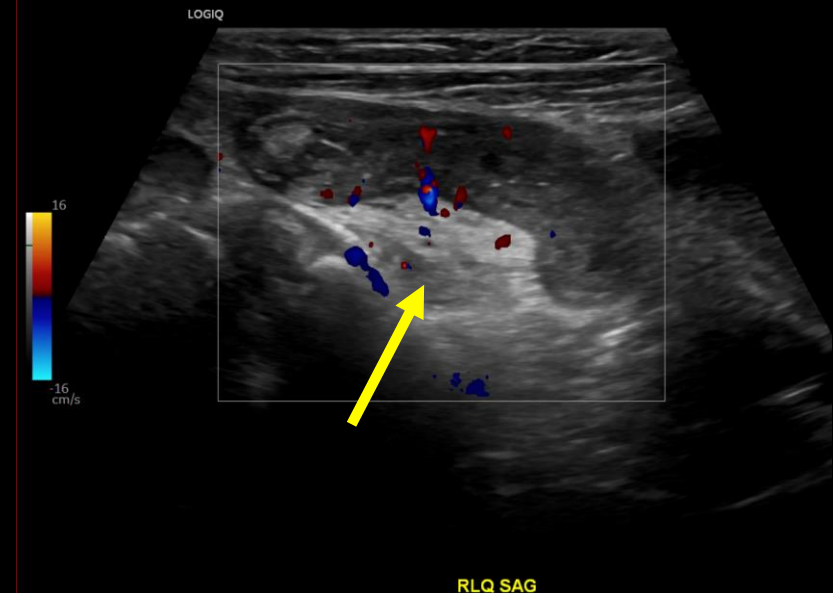
# Findings: (labeled)

RLQ Sagittal View



RLQ SAG

RLQ Sagittal View



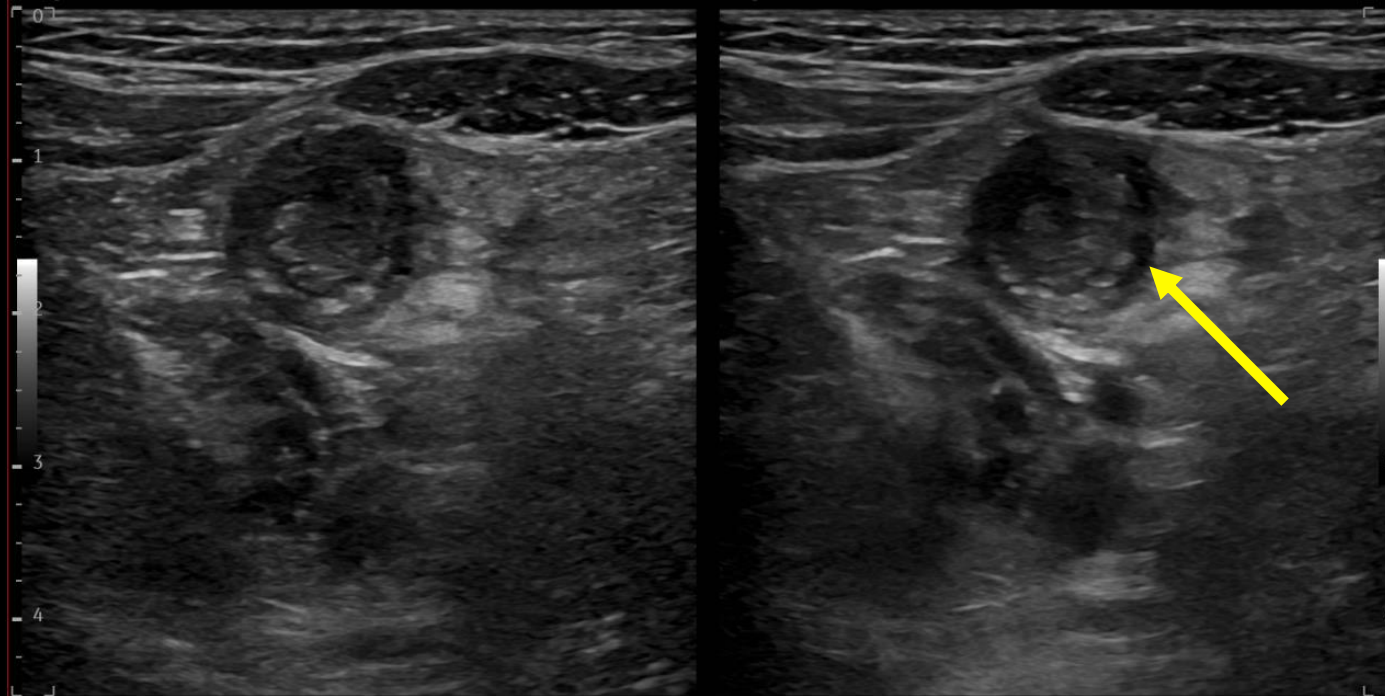
RLQ SAG

Adjacent hyperechoic mesenteric fat.

Blind-ending loop of bowel in the right lower quadrant dilated up to 14 mm with abnormal wall thickening measuring 3.6 mm.

# Findings: (labeled)

RLQ Short Axis View

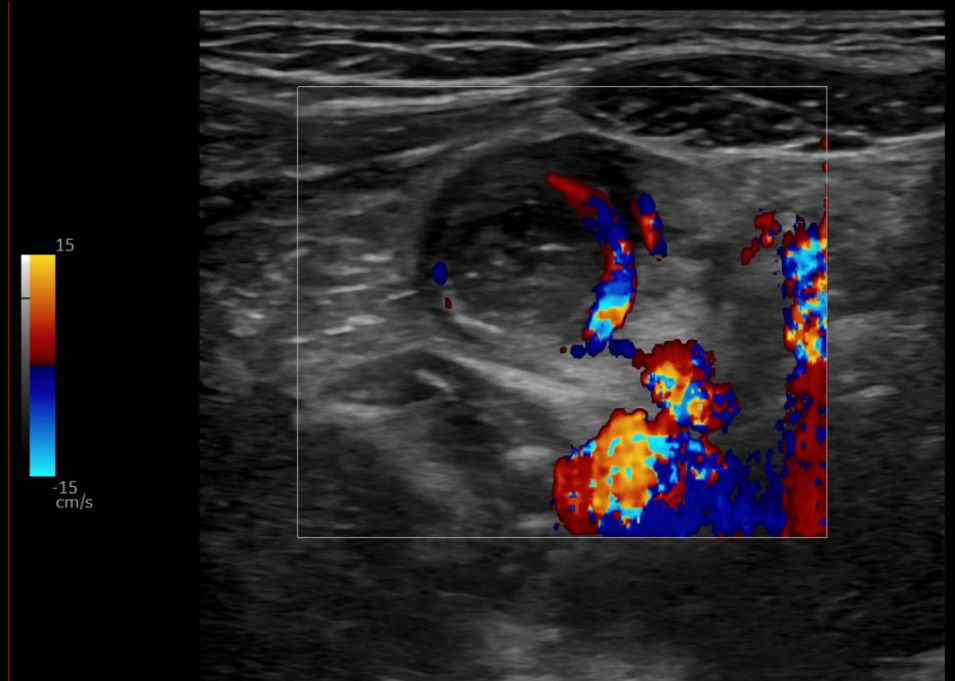


RLQ TRANS

WICOMP

The abnormal bowel is non-compressible with adjacent hypoechoic fluid

RLQ Short Axis View with Doppler

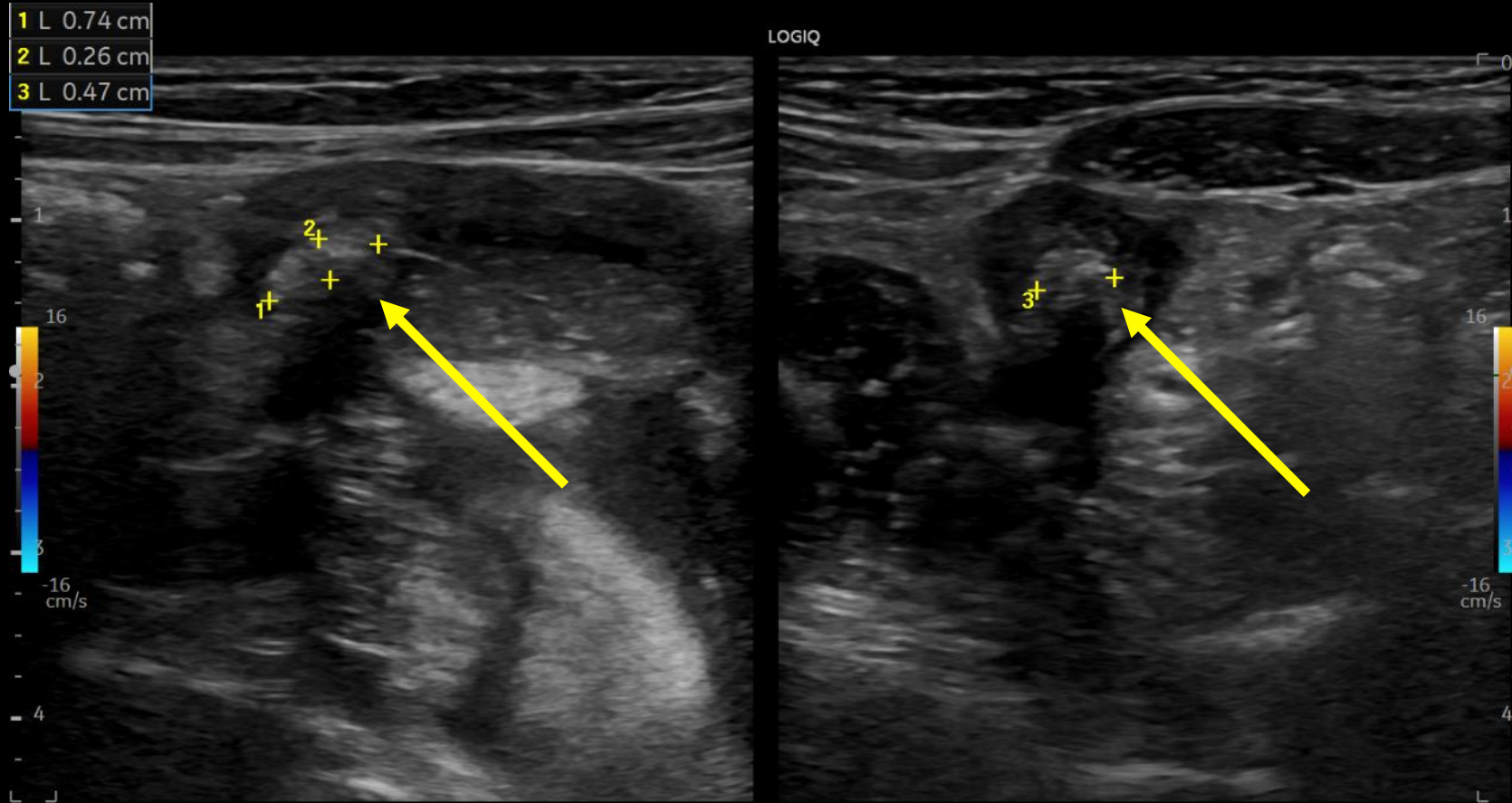


RLQ TRANS

Associated increased vascularity

# Findings: (labeled)

- 1 L 0.74 cm
- 2 L 0.26 cm
- 3 L 0.47 cm



RLQ SAG

TRANS

Echogenic foci present within the distal blind-ending portion, measuring approximately 7 x 5 x 3 mm

Final Dx:

Acute Appendicitis (with appendicolith)

# Acute Appendicitis

- **Definition:** Acute inflammation of the vermiform appendix.
- **Epidemiology:**
  - Lifetime incidence of appendicitis is 7%.
  - Most common in adolescents when have peak appendiceal lymphoid tissue (10-19Y), less common in infants and preschool children, and rare in newborns.
  - It is the number one surgical emergency and one of the most common causes of abdominal pain, particularly in children.
- **Etiology:** Due to an obstruction of the appendix from inflammation of the wall, appendicolith, or lymphoid hyperplasia.

# Acute Appendicitis

- **Clinical Features:**

- Fever
- Referred periumbilical pain that localizes to McBurney's point in the right iliac fossa or can have vague abdominal pain
- Rebound tenderness over RLQ/appendix (McBurney's sign)
- Nausea, vomiting, loss of appetite
- Constipation
- Dysuria or hematuria due to proximity to urinary tract
- Leukocytosis, elevated CRP, and an elevated bilirubin

# Acute Appendicitis

- Radiographic Features of Ultrasound:

- Aperistaltic, non-compressible, fluid-filled blind-ending tube arising from cecum
- Diameter  $> 6$  mm
- Hyperechoic appendicolith with posterior acoustic shadowing
- Periappendiceal hyperechoic indurated fat; periappendiceal complex fluid collection
- Wall thickening  $> 3$  mm
  - Hyperemia with color flow Doppler increases the specificity

# Acute Appendicitis

- **Differential Diagnosis:**
  - Mesenteric adenitis
  - Meckel diverticulum
  - Viral/Bacterial gastroenteritis
  - Diverticulitis
- **Treatment:** Appendectomy (open or laparoscopic)
  - NPO, IVF
  - Nonperforated: Cefoxitin or Cefotetan
  - Perforated: Carbapenem, Zosyn, Unasyn



# References:

- Anupindi SA, Halverson M, Khwaja A, Mihajlo Jecković, Wang X, Bellah RD. Common and Uncommon Applications of Bowel Ultrasound With Pathologic Correlation in Children. *American Journal of Roentgenology*. 2014;202(5):946-959. doi:<https://doi.org/10.2214/ajr.13.11661>
- Bonomo RA, Chow AW, Edwards MS, et al. 2024 Clinical Practice Guideline Update by the Infectious Diseases Society of America on Complicated Intra-abdominal Infections: Risk Assessment, Diagnostic Imaging, and Microbiological Evaluation in Adults, Children, and Pregnant People. *Clinical Infectious Diseases*. Published online July 5, 2024. doi:<https://doi.org/10.1093/cid/ciae346>
- Gadiparthi R, Waseem M. Pediatric Appendicitis. [Updated 2023 Jul 3]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK441864/>
- Nonoperative Management of Pediatric Appendicitis. *AAP Grand Rounds*. 2022;48(3):30-30. doi:<https://doi.org/10.1542/gr.48-3-30>
- Paul RI. Pediatric Appendicitis: Typical and Atypical Presentations. *AAP Grand Rounds*. 2007;18(1):3-4. doi:<https://doi.org/10.1542/gr.18-1-3>
- Romero C, Bardo DME. Patient-Friendly Summary of the ACR Appropriateness Criteria: Suspected Appendicitis—Child. *Journal of the American College of Radiology*. 2020;17(6):e24. doi:<https://doi.org/10.1016/j.jacr.2020.01.003>
- Taylor G, Brandt M, Lopez M. Acute appendicitis in children: Diagnostic imaging. *UpToDate*. <https://www.uptodate.com/contents/acute-appendicitis-in-children-diagnostic-imaging>