# RADY 403 Case Presentation: Intussusception

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UNC SCHOOL OF MEDICINE Radiology

# Patient History

- 20 month old F presents to ED with **chief concern of nonbilious nonbloody vomiting for 3 days**
- Mom reports patient has had abdominal pain with “cramping”
  - Afebrile
  - No diarrhea, but some constipation
  - Last bowel movement earlier that day
- Vital signs within normal limits
- Patient overall well-appearing & well-hydrated
  - Abdominal exam unremarkable
- Viral gastroenteritis vs. constipation-related emesis considered
- Ultimately, patient tolerated PO & was discharged home

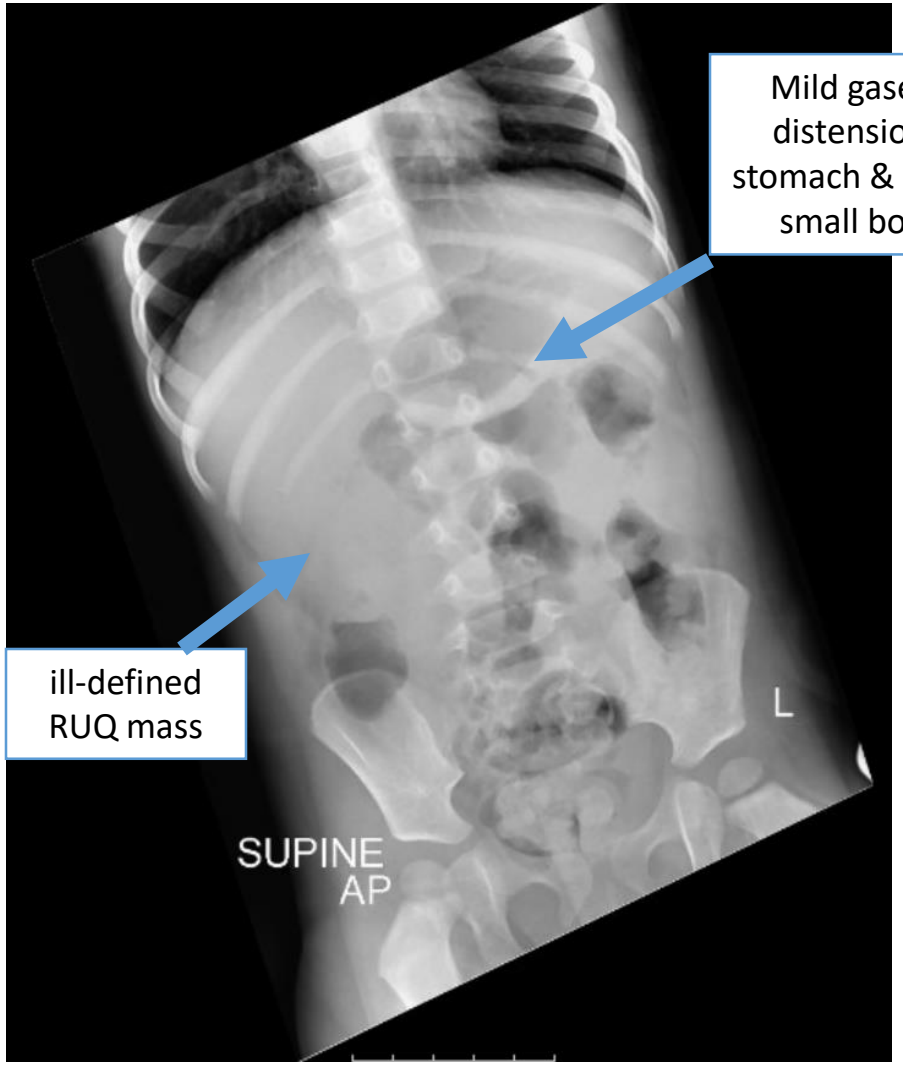
# Patient History and Workup (cont.)

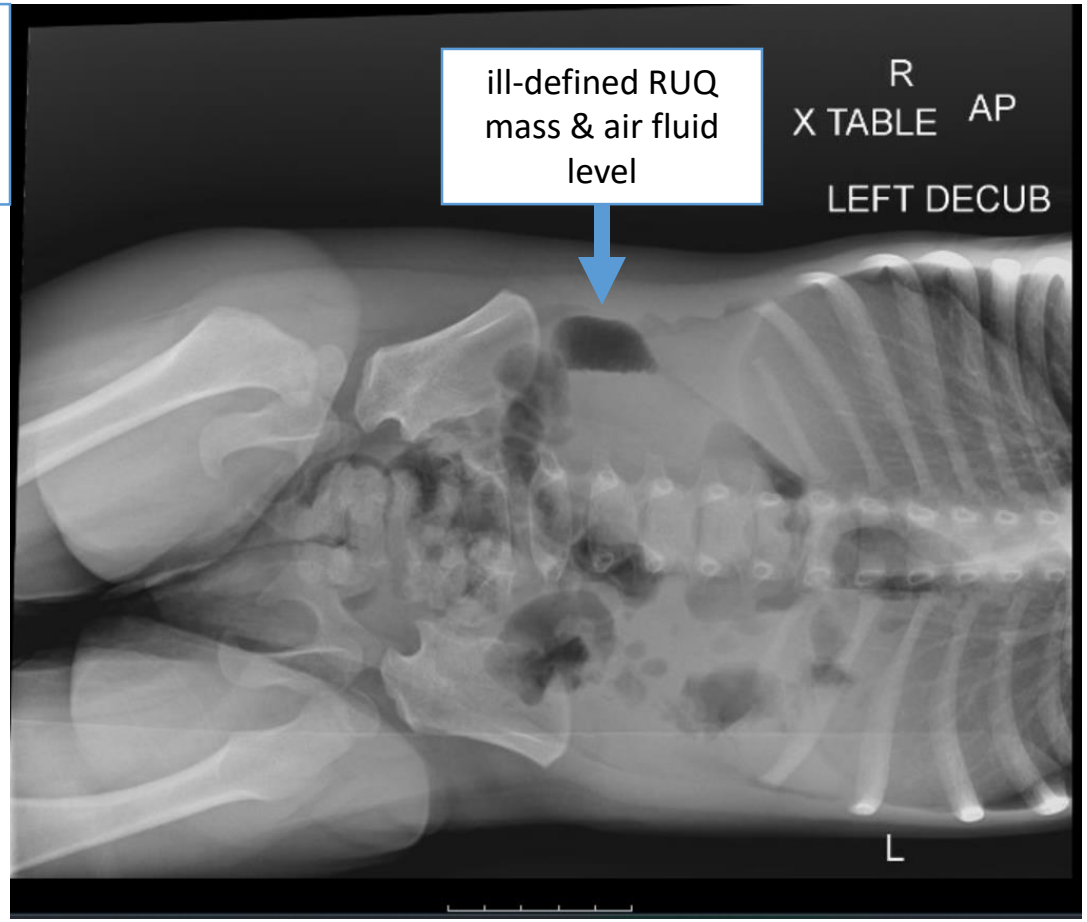
- Returned to ED the next day with right-sided abdominal pain & emesis
- Tolerating very minimal PO
- Next step… imaging!

# List of Imaging Studies

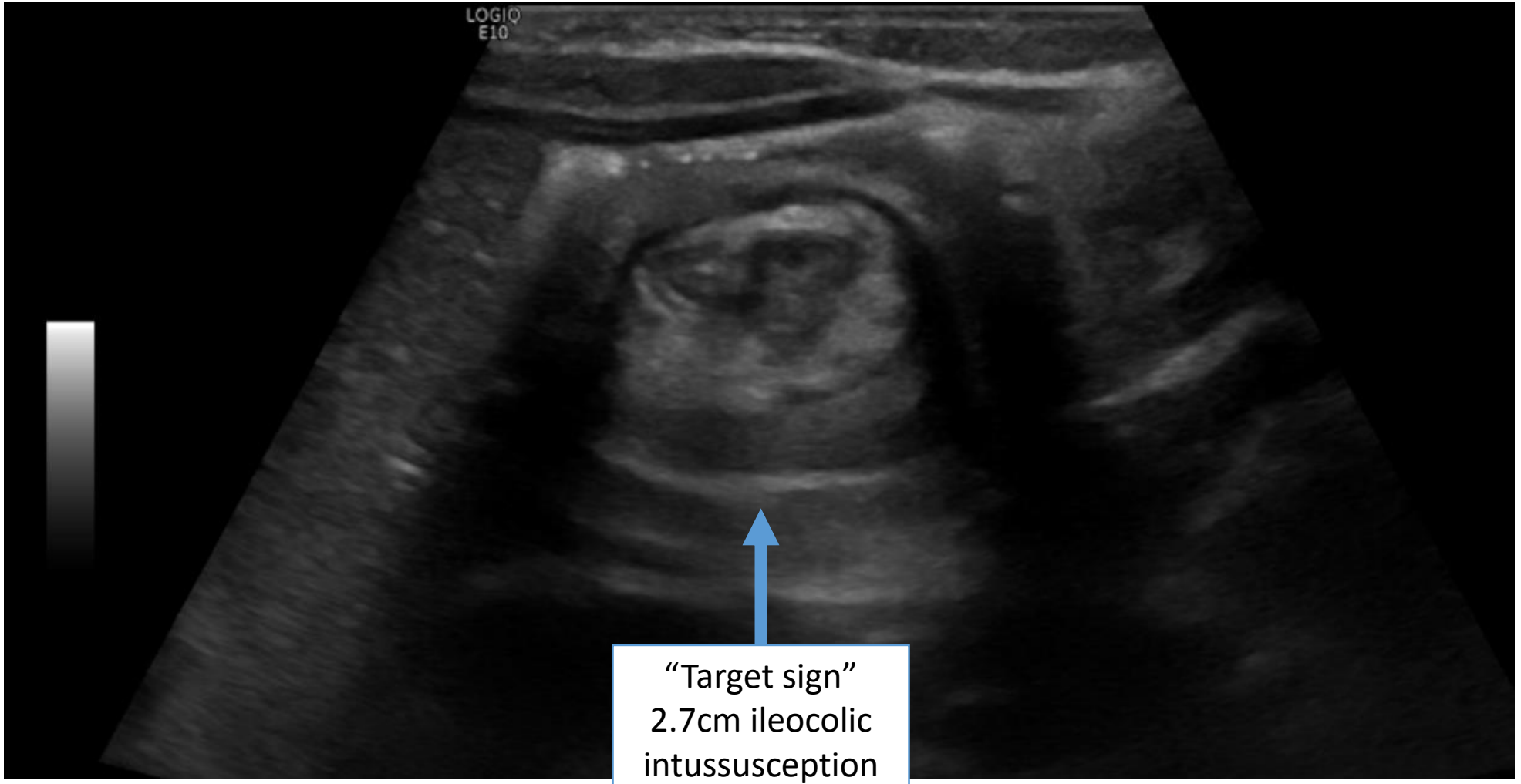
- Abdominal X-ray
  - Supine
  - Left lateral decubitus
- Abdominal Ultrasound

# Abdominal X-rays



# Abdominal Ultrasound




The **“Target sign”** is a key ultrasound finding for intussusception. It depicts a cross-section view of a round, soft tissue mass (bowel) surrounded by a hyperlucent ring of fat. This concentric “ring within a ring” appearance mimics the rings seen in a target board.

# Patient Treatment & Outcome

- Air contrast enema successfully performed under fluoroscopic guidance

Before air contrast enema

Air contrast enema insufflation

Encountered lobulated soft-tissue density (intussusceptum)

Further air insufflation reducing intussusception

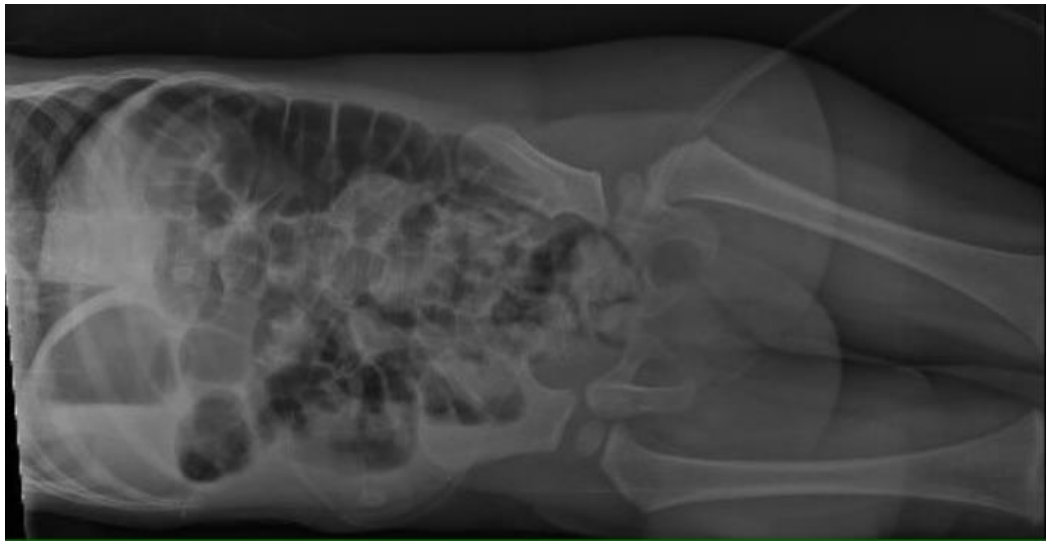
Successful reduction

# Patient Treatment & Outcome (cont.)

- Confirmation that there was no free intraperitoneal air

BEFORE air contrast enema

versus

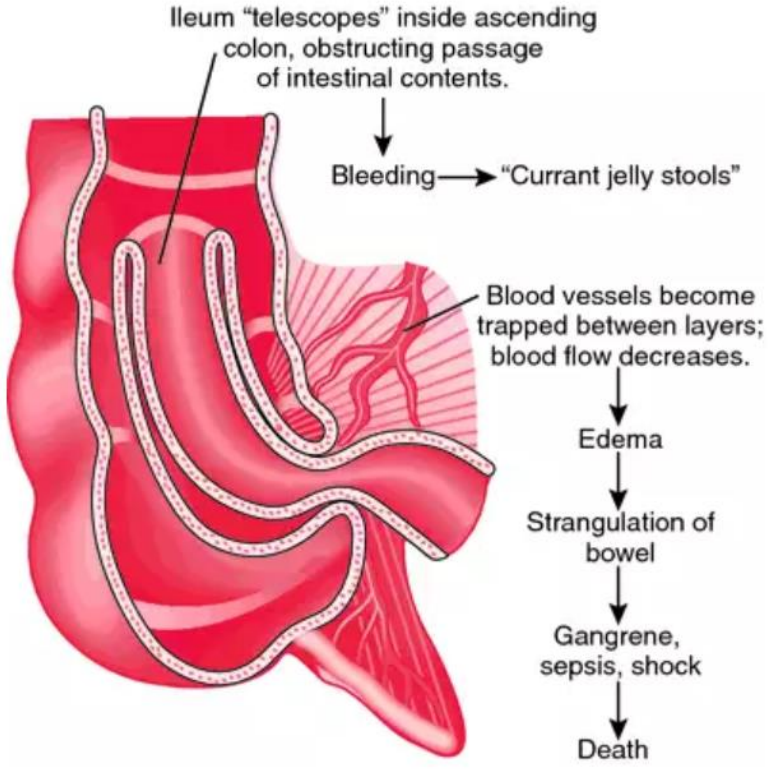


AFTER air contrast enema

- Patient tolerated the procedure well & was discharged in stable condition

# Discussion: Intussusception Pathology

- Occurs when a proximal segment of bowel is pulled into the distal lumen during peristalsis

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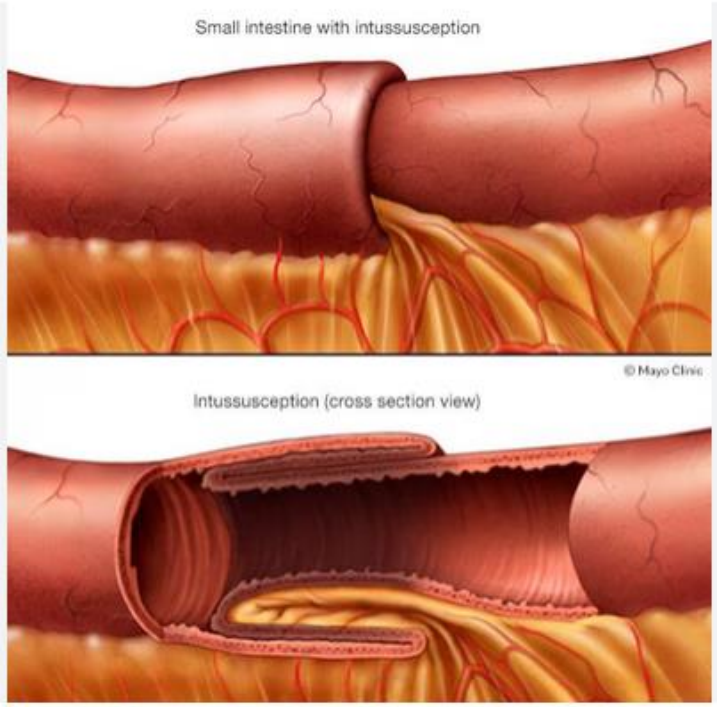
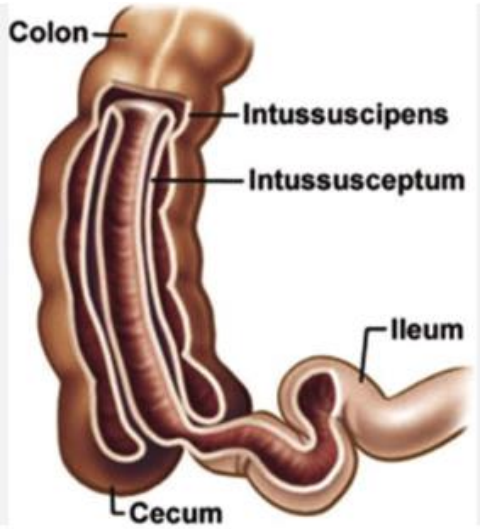



"Intussusception." *Mayo Clinic*, Mayo Foundation for Medical Education and Research, 2024, www.mayoclinic.org/diseases-conditions/intussusception/symptoms-causes/syc-20351452.




El-Sergany, Amr, et al. "Community teaching hospital surgical experience with adult intussusception: Study of nine cases and literature review." *International Journal of Surgery Case Reports*, vol. 12, May 2015, pp. 26–30, https://doi.org/10.1016/j.ijscr.2015.03.032.

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# Discussion: Intussusception Presentation

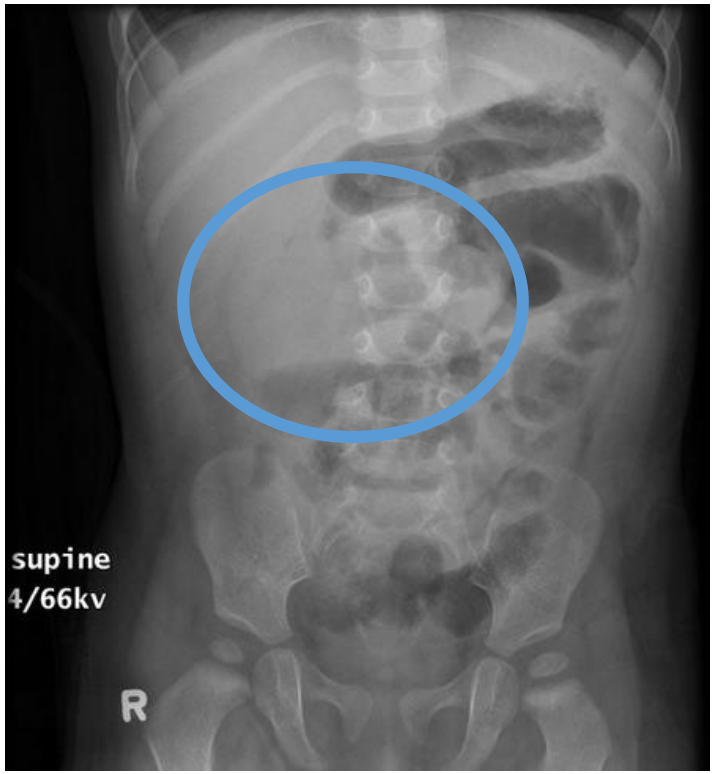
- Common cause of acute abdominal pain in pediatric population
  - Peak incidence between **4 and 36 months of age**
- Classic triad: Intermittent abdominal pain, RUQ mass, and bloody stool
  - High positive predictive value for intussusception
  - However, classic triad is only seen in <20% of cases
- Prompt reduction required to prevent sequelae (i.e. bowel necrosis)
  - Bowel necrosis presents as **"currant jelly" stool** (stool mixed with blood & mucus)

# Discussion: Intussusception Etiology

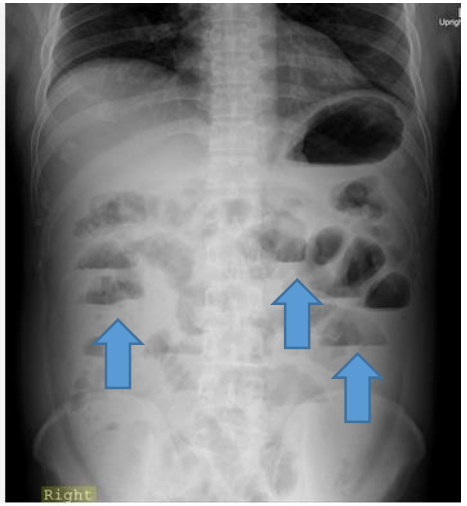
- In children, 90% of cases do NOT have a lead point identified
  - Possibly due to hypertrophic lymphoid tissue following an infection
- In adults, 90% of cases DO have a lead point
  - Most often due to large bowel malignancy, metastases, or small bowel lymphoma
- Example lead points in pediatric population:
  - **Meckel's diverticulum**, intestinal malrotation, ectopic pancreas
- **Ileocolic region** = most common location for intussusception (in up to 75-95% of cases)
  - Potentially due to the anatomy of this region & abundance of lymphoid tissue

# Discussion: Intussusception & Radiographs

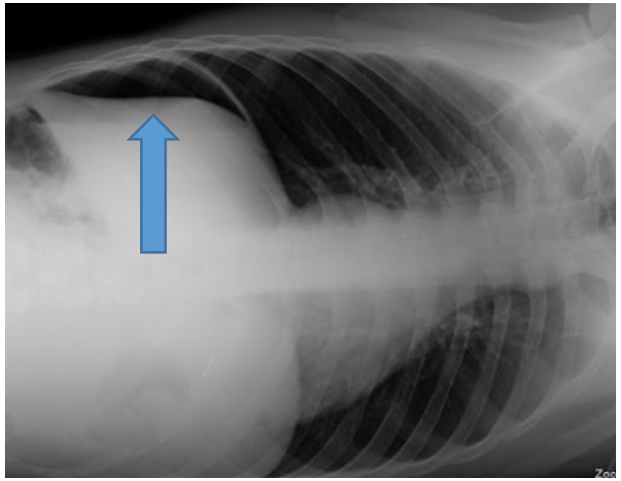
- Intussusception on X-ray
  - In the example image to the right, there is a large RUQ soft tissue opacity appearing to bulge into the transverse colon




Keep an eye out for signs of bowel obstruction and/or perforation!



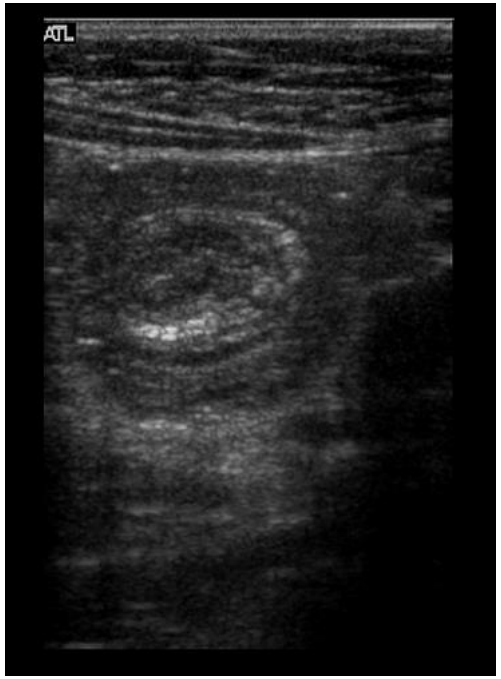

Air fluid levels (concerning for bowel obstruction)



Pneumoperitoneum (consistent with perforation)

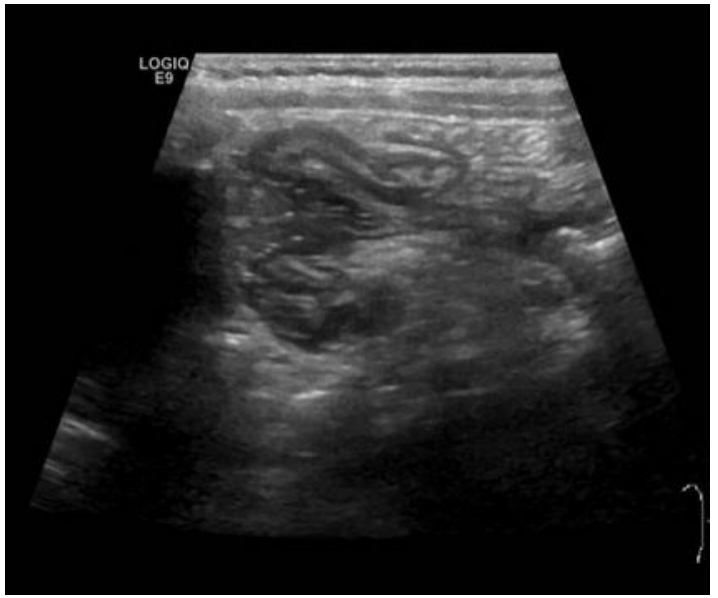
Images consulted from *Radiopaedia.org*

# Discussion: Intussusception & Ultrasound




Crescent in a doughnut sign


Target sign (axial view)




Target sign (long view)


Pseudo-kidney sign

Images consulted from
*Radiopaedia.org*

# Discussion: Intussusception & Fluoroscopy

- Contrast enema remains the GOLD standard
  - Main contraindication = perforation

Before air contrast enema

Air contrast enema insufflation

Encountered lobulated soft-tissue density (intussusceptum)

Further air insufflation reducing intussusception

Successful reduction

# ACR Appropriateness Criteria (revised 2019)

- Currently no listed criteria regarding intussusception in patients >3 months old and <18 y/o

## NBNB Emesis age 2 weeks – 3 months old

**Variant 7:** **Infant older than 2 weeks and up to 3 months old. New onset nonbilious vomiting (suspected hypertrophic pyloric stenosis). Initial imaging.**

| Procedure | Appropriateness Category | Relative Radiation Level |
|---|---|---|
| US abdomen (UGI tract) | Usually Appropriate | O |
| Fluoroscopy upper GI series | May Be Appropriate | ☢☢☢ |
| Radiography abdomen | Usually Not Appropriate | ☢☢ |
| Fluoroscopy contrast enema | Usually Not Appropriate | ☢☢☢☢ |
| Nuclear medicine gastroesophageal reflux scan | Usually Not Appropriate | ☢☢☢ |

## Criteria for SBO age >18 y/o

**Variant 1:** **Suspected small-bowel obstruction. Acute presentation. Initial imaging.**

| Procedure | Appropriateness Category | Relative Radiation Level |
|---|---|---|
| CT abdomen and pelvis with IV contrast | Usually Appropriate | ☢☢☢ |
| CT abdomen and pelvis without IV contrast | May Be Appropriate | ☢☢☢ |
| MRI abdomen and pelvis without and with IV contrast | May Be Appropriate | O |
| Radiography abdomen and pelvis | May Be Appropriate (Disagreement) | ☢☢☢ |
| Fluoroscopy small bowel follow-through | May Be Appropriate | ☢☢☢ |
| MRI abdomen and pelvis without IV contrast | May Be Appropriate | O |
| CT abdomen and pelvis without and with IV contrast | Usually Not Appropriate | ☢☢☢☢ |
| CT enteroclysis | Usually Not Appropriate | ☢☢☢☢ |
| CT enterography | Usually Not Appropriate | ☢☢☢☢ |
| MR enterography | Usually Not Appropriate | O |
| US abdomen and pelvis | Usually Not Appropriate | O |
| Fluoroscopy small bowel enteroclysis | Usually Not Appropriate | ☢☢☢ |
| MR enteroclysis | Usually Not Appropriate | O |

# POCUS & Intussusception

- Systematic review & meta-analysis of patients <18y/o with abdominal signs & symptoms suggestive of intussusception in US, Korea, Taiwan, & Canada
- Of those who had intussusception, POCUS sensitivity and specificity were 95.1% (95% CI: 90.3%-97.2%) and 98.1% (95% CI: 95.8%-99.2%), respectively.
  - The positive and negative likelihood ratios were 50 (95% CI: 23-113) and 0.05 (95% CI: 0.03-0.09), respectively.

Lin-Martore M, Firnberg MT, Kohn MA, Kornblith AE, Gottlieb M. Diagnostic accuracy of point-of-care ultrasonography for intussusception in children: A systematic review and meta-analysis. *Am J Emerg Med*. 2022;58:255-64.

# Top 3 Takeaways

- Intussusception is a common cause of acute abdominal pain in the pediatric population particularly among patients ages 4 to 36 months

- **Classic triad: Intermittent abdominal pain, RUQ mass, and bloody stool**
  - Helpful, but keep in mind this is only observed in <20% of cases

- Contrast enema remains the gold standard
  - Both diagnostic AND therapeutic

# References


- "ACR Appropriateness Criteria®." ® | *American College of Radiology*, American College of Radiology, www.acr.org/Clinical-Resources/ACR-Appropriateness-Criteria. Accessed 21 Mar. 2024.
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