

Intussusception

Intussusception is invagination of the intestine into an adjacent segment, most commonly involving the ileocecal valve. This process occludes blood supply to the bowel and can progress from tissue ischemia to necrosis/perforation. It is most likely to be idiopathic, but can be caused by a variety of pathological lead points.

Intussusception is the most common abdominal emergency of early childhood. The vast majority of cases (80%) occur in children less than 2 years, most frequently between 5-10 months of age.¹ Very rarely, intussusception can occur in the 7 days following rotavirus vaccine administration (1-3 cases per 100,000 vaccines administered).²

Presentation¹

- » Sudden onset of intermittent waves of severe abdominal pain and pallor that cause the child to cry inconsolably.
 - Episodes of pain typically occur every 15 to 20 minutes, with slight discomfort between episodes.
- » Vomiting may occur during (or after) the painful episodes, and may progress to bilious emesis with time.
 - Early intussusception may be confused with acute gastroenteritis.
- » Intussusception may present as lethargy or altered mental status, especially in young infants.
 - This presentation may be confused with sepsis.
- A **late** finding of intussusception is a mixture of blood and mucous in the stool that gives the appearance of "currant jelly".
 - The presence of bloody stool is **not** a diagnostic requirement.
- In **rare** cases, a "sausage-shaped" abdominal mass may be palpable in the right abdomen.

Making the diagnosis¹

Laboratory tests are **not** routinely indicated or helpful in the diagnosis or management of intussusception.

1. **Ultrasonography (US)** is the diagnostic tool of choice.
 - » The classic finding will be a "target" or "bull's-eye" lesion caused by layers of intestine within intestine.
 - » Experienced institutions have an US sensitivity and specificity that approaches 100%.
 - » Point of Care US (POCUS) can be used to identify intussusception, but only with specific training. If the diagnosis is still likely after a negative/indeterminate POCUS, a formal ultrasound should be obtained.
 - » If formal ultrasound is unavailable, arrange transport to Pediatric Referral Site.
2. **Abdominal radiographs** are less sensitive and specific than ultrasonography and should **not** be used routinely to confirm or rule out the diagnosis.
 - » If radiographs are obtained, intussusception should be considered if there is an absence of colonic gas or a "target sign" overlying the right kidney.

Management¹

ASSESS THE SEVERITY OF ILLNESS

- » Assess and manage ABCs.
- » For patients with signs of **hypoperfusion or hypovolemic shock**.
 - Initiate IV/IO access and give 20 mL/kg isotonic fluid bolus over 5-10 minutes (repeat as needed).
- » For patient with **peritonitis, other signs of perforation, or signs of sepsis/septic shock**:
 - Refer to [TREKK Pediatric Severe Sepsis Algorithm](#) for management.
 - Administer empiric antimicrobials for gut flora (e.g., ceftriaxone 100 mg/kg/dose IV once daily (MAX 2000 mg/dose) and metronidazole 30 mg/kg/day IV Q8H (MAX 500 mg/dose).
 - Obtain an **EMERGENT** pediatric/general surgery consultation or contact Pediatric Referral Site.
 - Assess and treat pain. IV opioids are recommended for associated moderate/severe pain; choice of agent should include consideration of the child's hemodynamic status. Refer to [TREKK Recommendations for Pain Treatment](#).

PROCEED TO REDUCTION BY AIR ENEMA IF PATIENT IS STABLE WITH NO SIGNS OF BOWEL PERFORATION

- » If pediatric radiology is not available for air enema reduction, arrange transport to Pediatric Referral Site.
- » Pediatric/general surgery team must be readily available, as perforation is a complication of air enema reduction in <1% of patients. If surgery team is not available, transfer to Pediatric Referral Site BEFORE attempting reduction.
- » Do not use pre-reduction antibiotics for uncomplicated (non-perforated) intussusception.
- » Either ultrasound or fluoroscopic guidance should be utilized to confirm successful reduction and have similar success rates (80 to 90%).³
- » Risk factors for failure of reduction or recurrence post-reduction include fever, rectal bleeding, vomiting, lactic acidosis, and female gender.⁴

IF AIR ENEMA REDUCTION FAILS

- » Contact pediatric/general surgery team.
- » Potential next steps include further air enema reduction attempts or operative reduction.

Post-reduction

AFTER SUCCESSFUL REDUCTION WITH AIR ENEMA

- » Overall recurrence rate is ~ 10%. Early recurrence within the first 4-6 hours post-reduction is ~ 2%.
- » Well-appearing children who are tolerating oral intake can be discharged home from the ED **4 hours** after reduction.⁵
- » Discharge instructions should include:
 - No need for medications or special precautions. Normal care at home.
 - Return to ED if recurrence of abdominal pain, vomiting, lethargy or other symptoms seen at onset, as they could be a sign of recurrence.⁵
- » Admission is recommended for any patient with persistent abdominal pain or inability to tolerate oral intake following the procedure, as this could indicate underlying bowel necrosis.⁵

IF THERE IS A RECURRENCE

- » Management is the same, with air enema reduction being favored.⁶
- » Patients who have a recurrence are more likely to have a pathological lead point but a single recurrence is not an indication to investigate for a lead point. Multiple recurrences should prompt further investigation.⁶

The purpose of this document is to provide healthcare professionals with key facts and recommendations for the diagnosis and treatment of intussusception in children. This summary was produced by the intussusception content advisors for the TREKK network, Dr. Blake Bulloch of the Phoenix Children's Hospital and Dr. Zebulon Timmons of the Children's Hospital and Medical Center Omaha. It uses the best available knowledge at the time of publication. However, healthcare professionals should continue to use their own judgment and take into consideration context, resources and other relevant factors. The TREKK Network is not liable for any damages, claims, liabilities, costs or obligations arising from the use of this document including loss or damages arising from any claims made by a third party. The TREKK Network also assumes no responsibility or liability for changes made to this document without its consent. This summary is based on:

1. Kelley-Quon I, Arthur LG, et al. Management of intussusception in children: A systematic review. *J Pediatr Surg.* 2021 Mar;56 (3):587-596.
2. Soares-Weiser K, Macle hose H, Bergman H, et al. Vaccines for preventing rotavirus diarrhea: vaccines in use. *Cochrane Database Syst Rev.* 2012 Nov 14;11:CD008521
3. Beres AL, Baird R. An institutional analysis and systemic review with meta-analysis of pneumatic versus hydrostatic reduction for pediatric intussusception. *Surgery.* 2013 Aug; 154(2): 328-34.
4. Weihmiller SN, Buonomo C, Bachur R. Risk stratification of children being evaluated for intussusception. *Pediatrics.* 2011 Feb;127(2): e296-303.
5. Chien M, Willyerd FA, Mandeville K, et al. Management of the child after enema-reduced intussusception: hospital or home. *J Emerg Med.* 2013 Jan;44(1):53-7.
6. Gray MP, Li SH, Hoffmann RG, et al. Recurrence rates after intussusception enema reduction: a meta-analysis. *Pediatrics.* 2014 Jul;134(2): 110-9.

