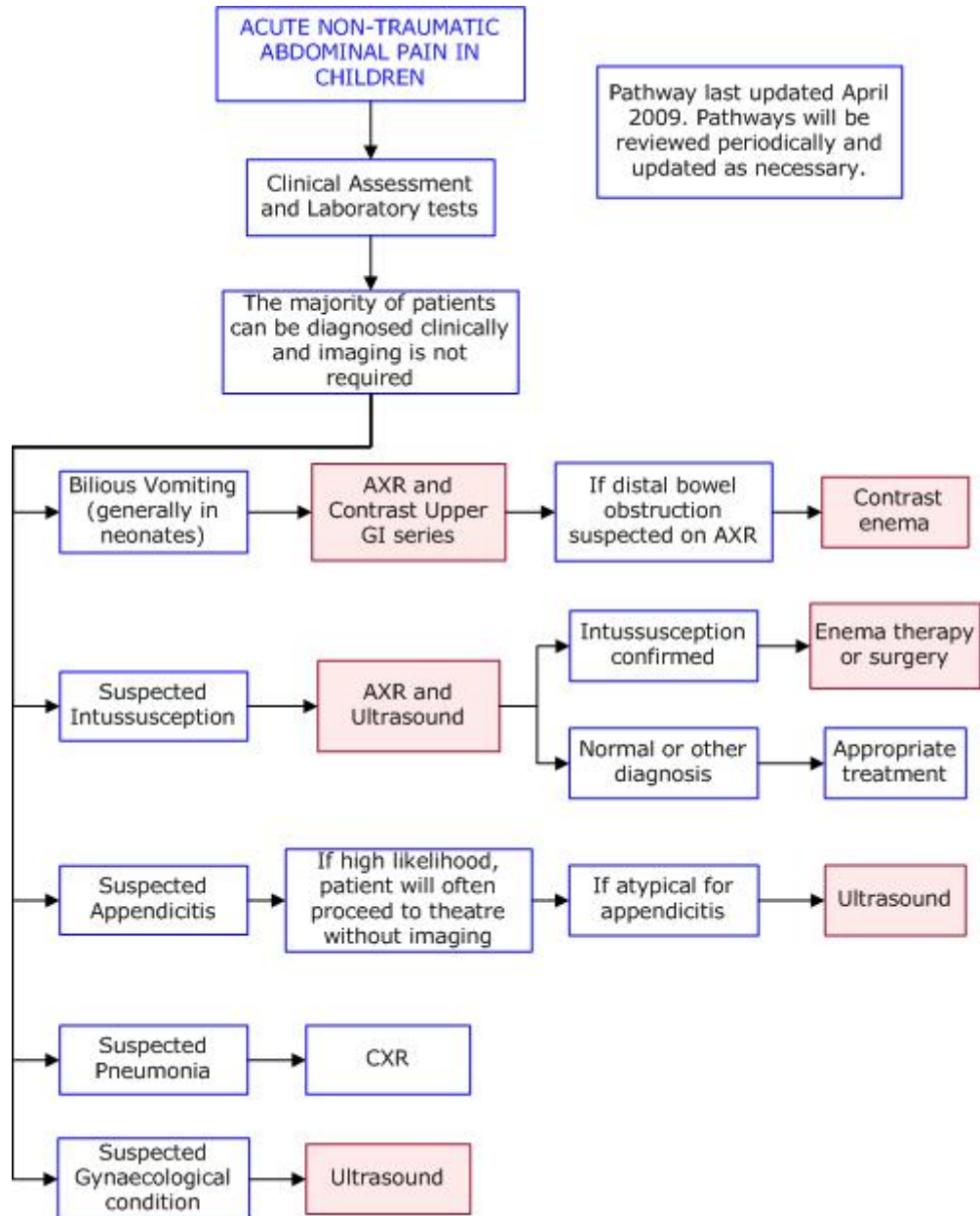




DIAGNOSTIC IMAGING PATHWAYS

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PLAIN RADIOGRAPHY

Bilious Vomiting

- Plain films are appropriate in neonates or infants who present with bilious vomiting as it can help to differentiate proximal from distal bowel obstruction. [1](#)

- It may suggest the presence of volvulus-related ischaemia, or specific diagnoses such as volvulus or duodenal atresia. [1,2](#)

Intussusception

- Several radiographic signs suggestive for intussusception have been described. [3-5](#)
- If a normally located caecum containing gas or faeces is seen the diagnosis of intussusception is unlikely. [6](#)
- The accuracy of plain radiography for the diagnosis of intussusception has been shown to vary from 40-90%. Plain radiography is no substitute for ultrasonography for diagnosis but may demonstrate other causes of abdominal pain and may show evidence of intestinal perforation which is a contraindication to enema treatment. [4,6,7,8](#)
- If there is high clinical suspicion for intussusception, an imaging modality with high sensitivity such as ultrasound is necessary. [3,7](#)

CONTRAST UPPER GASTROINTESTINAL SERIES

- The imaging study of choice to evaluate bilious vomiting in neonates and infants. Exceptions include critically ill patients who require urgent surgical intervention and suspected complete duodenal obstruction. [9,10](#)
- Involves the use of a contrast agent, usually barium to evaluate the stomach, duodenum and position of the duodeno-jejunal junction. Contrast can be administered orally or via a nasojejunal tube.
- Upper GI contrast studies are primarily used to diagnose malrotation/volvulus and detect other obstructive lesions of the upper GI tract. [11](#)
 - With malrotation/volvulus the ligament of Treitz (duodenojejunal junction) is typically located inferiorly and to the right of normal. [2,9,10,11,12](#)

CONTRAST ENEMA

- Its primary use is for evaluation of distal obstruction (eg. atresia, meconium ileus). The location of the caecum and proximal colon can suggest malrotation but it is neither sensitive nor specific in this regard. [13](#)

ULTRASOUND

Intussusception

- Has a sensitivity of 98-100% for the diagnosis of intussusception. [14-17](#)
- Axial and longitudinal images are used to try and identify the intussusception mass. [3](#)
- Various terms have been used to describe the characteristic appearance of the mass. [17-21](#)

Malrotation/Volvulus

- There are features on ultrasound that may suggest a diagnosis of malrotation/volvulus including inversion of the normal relationship between the superior mesenteric artery and vein; or the 'whirlpool' sign of a side-by-side arrangement of superior mesenteric vessels with opposite flow directions. However, these signs are neither sensitive nor specific and if there is clinical suspicion of malrotation/volvulus, an upper GI contrast study is indicated. [23-27](#)

Appendicitis

- Routine imaging is not required if a diagnosis can be established on history and physical examination. [28](#)
- The principal imaging technique for evaluating suspected appendicitis is graded-compression sonography. In children this has a sensitivity and specificity of between 78%-100%, and 88%-95% respectively. Sensitivity and specificity is higher for uncomplicated appendicitis compared to cases with appendiceal perforation. [28,29,30](#)
- Criteria for sonographic diagnosis is visualisation of an incompressible appendix that has a maximal cross-sectional diameter greater than 6mm, identification of an appendicolith, positive sonographic McBurney sign, demonstration of a complex mass, or focal fluid collection representing a peri-appendiceal abscess following perforation. [28,29](#)

Gynaecological Disorders

- Gynaecological disorders should be considered especially in adolescent girls. Disorders include Mittelschmerz syndrome, ovarian torsion, pelvic inflammatory disease, and ectopic pregnancy.
- Pelvic ultrasonography combined with measurement of serum β -hCG levels, is an effective screening strategy for diagnosing ectopic pregnancy. [31-35](#)
- Allows identification of an intrauterine pregnancy, which is the single most important finding for the exclusion of ectopic gestation as the presence of both intra- and extra-uterine pregnancy, is very rare. [32,35-37](#)

ENEMA THERAPY FOR INTUSSUSCEPTION

- Treatment options for intussusception include enema therapy and surgery. [3](#)
- The rationale of enema therapy is to exert pressure on the apex of the intussusceptum and in doing so push it back from the pathological to the normal position. [3](#)
- There are a number of agents used to perform enema therapy including air, barium, water-soluble contrast. There are few randomised control trials, one of which showed no significant difference. However the consensus among Paediatric Radiologists in Australia employing fluoroscopic guided reduction is the use of air enema if there is no clinical evidence of bowel perforation. [22,38-41](#)
- Compared to barium, there is a smaller risk of bowel perforation using air as the agent for enema therapy. [41](#)

- If required, fluid resuscitation should occur prior to enema therapy.
- If the initial attempt is unsuccessful, the enema can be repeated 1-3 hours later.
- The technique of ultrasound guided saline enemas has been shown to be an option that does not require exposure to radiation but is not widely used due to the lack of expertise and concern regarding its ability to detect the occurrence of perforation. [3](#)

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