Plain Abdominal X-ray has low sensitivity and specificity for diagnosis of intussusception

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Clinical question: In pediatric patients with clinical signs/symptoms of possible intussusception, how do plain abdominal x-rays and clinical judgment compare to gold standard in making the diagnosis of intussusception?

Clinical bottom line

1. Plain abdominal x-ray, when interpreted by pediatric emergency physicians, may be useful to increase the index of suspicion of intussusception, but should never be used to decrease this index.¹
2. Plain abdominal radiography adds little to the management of patients with suspected intussusception, but may demonstrate possible complications such as perforation or ileus.²
3. Abdominal pain is a common chief complaint in pediatric emergency rooms and office visits. Intussusception should be included in the differential diagnosis because of its potential significant morbidity and mortality.¹²³⁴
4. History and physical alone may very accurately diagnose intussusception (sensitivity 93-100%) if intermittent abdominal pain, vomiting, palpable RUQ mass, and bloody stools are present. However, the presentation of intussusception is highly variable and this triad/quadrad is rare (only present in 15-25% of cases).⁴
5. Ultrasound is the first-choice imaging technique in diagnosing intussusception. It is nearly 100% accurate, does not require radiation or sedation, and is low cost. Ultrasound can also be used to rule out other causes of acute abdominal pain. ⁴
6. Air or liquid enema can be used for non-operative reduction of intussusception and is successful 70-95% of the time, with approximately 1% risk of perforation. ³

Evidence summary¹

1. Prospective, experimental study of pediatric emergency room physicians (n=14), conducted in 2008 at a tertiary care, university-affiliated pediatric hospital.
2. PowerPoint presentation of abdominal radiographs from 50 cases of intussusception and 50 age- and sex-matched controls with abdominal pain were presented to participants, who indicated if films “increased, decreased, or did not change” suspicion of intussusception.
3. Sensitivity averaged 48% (CI 0.44-0.52), specificity 21% (CI 0.18-0.24), false-negative 11% (CI 0.09-0.13), and false-positive 21% (0.18-0.24).
4. Low kappa score 0.1233 shows very wide variation among interpreters. (Note when kappa=1, all interpreters agree; when kappa=0, results are same as if by chance.)
5. Previous studies have reported sensitivities of abdominal radiograph in diagnosing intussusception ranging from 29-89%, and specificities from 45-90%.

Comments
1. Morrison et al study\(^1\) looks at ability of ER physicians (not radiologists) to interpret x-rays, which conveys a real-world perspective of clinical decision making.

2. Experimental design may have influenced the participants’ interpretations, because their decisions had no impact on actual patients.

3. Participants were all from one center, which may not reflect the general population of ER physicians, but should reflect the standard of care of their profession.

4. Further studies involving pediatric radiologists could explore whether the low sensitivity is due to suboptimal interpretation by ER physicians or if abdominal x-rays have inherently poor sensitivity for diagnosing intussusception.

5. Multiple studies indicate that abdominal x-ray is not the preferred imaging modality for diagnosis of intussusception, and its primary use should be to assess for complications such as perforation or ileus. Ultrasound is the preferred method of imaging for diagnosis of intussusception.

References


Link to evidence on the medical library portal: TBD

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