

Abstract:

One of the most common causes of surgical abdominal pain among children is appendicitis. History of present illness and physical examination are important in distinguishing appendicitis from other etiologies of abdominal pain, and surgical decisions can be made sometimes on these findings alone. The addition of laboratory results and various imaging modalities can help in equivocal cases. Ultrasound and computed tomography, and more recently magnetic resonance imaging, are beneficial in the diagnosis of acute appendicitis. The use of clinical practice guidelines also can be helpful in the triage and treatment of children with abdominal pain. Patients who present with history or physical examination findings concerning for appendicitis should be managed in a stepwise fashion to facilitate timing of imaging studies and surgical consultation. Management should include early resuscitation, appropriate laboratory testing and imaging studies, serial examinations, and early consultation of the surgical team in suspicious cases.

Keywords:

appendicitis; abdominal pain; children

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Clinical Evaluation of Acute Appendicitis

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Abdominal pain is a common complaint in the pediatric emergency department. Most often, children with abdominal pain do not require surgical evaluation or intervention, but approximately 11% undergo surgery.¹ One of the most common surgical causes of abdominal pain is acute appendicitis. In this article, we present 2 cases of acute appendicitis, one complicated and discuss the clinical evaluation and management of appendicitis in children.

CASE 1

A 7-year-old boy presented to the emergency department with a 3-day history of abdominal pain, which began in the periumbilical region and then localized to the right lower quadrant. He also complained of fever, anorexia, and one episode of emesis. He had no medical history. On physical examination, he was tender in the right lower quadrant with guarding. Laboratory values were significant for a white blood cell (WBC) count of 17.6 with 76% neutrophils (reference range, WBC 4.6–9.8 K/ μ L; neutrophils, 22–56%). C-reactive protein (CRP) was 5.8 mg/dL (reference range, 0–0.9 mg/dL). Ultrasound (US) of the right lower quadrant demonstrated a 9.1-cm blind-ending structure in the right lower quadrant with a hyperemic wall, which was interpreted as being consistent with acute appendicitis (Figure 1). After preoperative antibiotics were given, he underwent an uneventful laparoscopic appendectomy for acute nonperforated appendicitis. The patient had an uneventful recovery and was discharged home postoperative day 1.

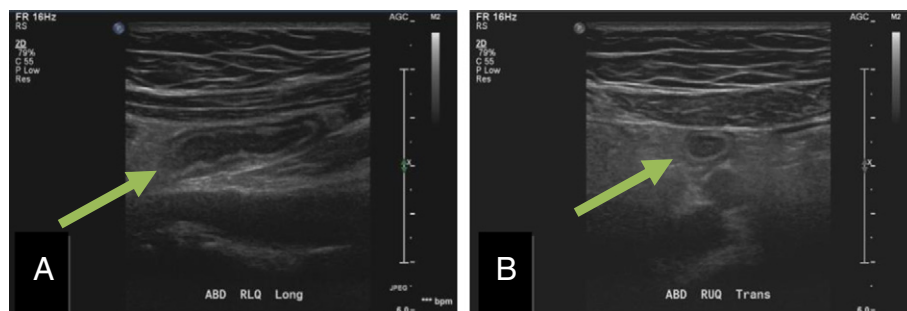


Figure 1. Ultrasound demonstrating acute appendicitis. A and B, Ultrasound right lower quadrant. Seven-year-old boy who presented with a 72-hour history of abdominal pain that now localizes to the right lower quadrant. Ultrasound demonstrated acute wall thickening and dilation up to 9.1 mm.

HISTORY

Patients with appendicitis typically present with a history of abdominal pain that starts in the periumbilical region and then migrates to the right lower quadrant. The pain usually starts insidiously, is persistent, and worsens over time. Waxing and waning pain is usually suggestive of other causes of abdominal pain. History may include fever, nausea with or without vomiting, and anorexia. When evaluating young children with abdominal pain, it can be particularly difficult to determine the onset and duration of symptoms, but it can be helpful to ask parents or guardians, when they last noticed their child at a normal level of activity. Practitioners should elicit a history of diarrhea, cough, sore throat, myalgias, rhinorrhea, and sick contacts to evaluate for the potential presence of a viral infection that might mimic appendicitis. It is also important to ask about a history of constipation, which can cause acute abdominal pain. The perimenarchal female should be asked about her menstrual status and sexual history.

PHYSICAL EXAMINATION

Children with acute appendicitis are usually less active than their baseline, lying still on the stretcher. Patients tend to be most tender at McBurney's point, which is one-third of the way between the anterior iliac spine and the umbilicus. On physical examination, patients might also demonstrate a positive Rovsing sign, in which palpation of the left lower quadrant causes pain in the right lower quadrant; obturator sign, in which flexion and internal rotation of the right hip causes pain in the right lower quadrant; and psoas sign, in which right lower quadrant pain is caused by extension of the right leg.² Any irritation of the peritoneum can cause acute abdominal discomfort.

Having the patient ambulate or jump up and down or even jostling the stretcher should elicit abdominal pain in the child with acute appendicitis. The examination of the child being evaluated for appendicitis should be complete. Nasal congestion, tonsillar erythema or exudates, or asymmetric breath sounds might suggest a different etiology of abdominal pain.

Depending on the duration of symptoms, the child with acute onset abdominal pain concerning for appendicitis might also have symptoms of dehydration with tachycardia, tachypnea, or dry mucus membranes. Treating the dehydration can make the child more comfortable, although in the case of appendicitis, it should not completely relieve the abdominal pain.

DIFFERENTIAL DIAGNOSIS

Viral gastroenteritis is the most common disease state seen in children who are being evaluated for appendicitis. Children with gastroenteritis typically present with nausea, vomiting, and abdominal pain, but they also tend to have concurrent diarrhea, which is less common in appendicitis. Right lower quadrant tenderness can result from mesenteric adenitis, which is inflammation of lymph nodes in the mesentery of the terminal ileum, or from constipation.

Other infectious etiologies can also cause abdominal pain. Pneumonia and streptococcal pharyngitis can present with nausea, vomiting and abdominal pain, and few if any, primary respiratory symptoms. Urinary tract infections typically present with urgency, hesitancy, frequency, and burning with urination, but abdominal pain may be the chief complaint. Ascending infection can cause pyelonephritis, which often presents with fever, costovertebral angle pain, and nausea or vomiting. Urinalysis is the initial test in evaluating a child with suspected

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