CLINICAL PRACTICE GUIDELINES
Pediatric Appendicitis

What it is how it is diagnosed
Acute abdominal pain is a common presenting complaint in children. While frequently due to benign and self-limiting conditions, some causes require urgent intervention. Acute appendicitis is the most common surgical etiology of acute abdominal pain in pediatrics.\(^1\)

Scoring systems based on the presence or absence of symptoms have been created to aid in the rapid and effective diagnosis of appendicitis.\(^3,4\) These scoring tools have been studied in a variety of populations and are generally more sensitive than specific.\(^5,6\)

Ultrasound results can supplement scoring systems to identify patients with possible appendicitis; this noninvasive modality has the additional benefit of no radiation exposure. Antibiotic therapy is essential in the management of acute appendicitis, and simplified regimens can be used in the acute setting.\(^7,8\)

Of note, diagnosis of appendicitis may be particularly difficult in children younger than 5 years and requires a high index of suspicion.\(^2\)

Definitions/terms

- **Pediatric Appendicitis Score (PAS)**\(^3\): Simple diagnostic tool to identify children with increased risk of appendicitis. PAS <4 has low likelihood of appendicitis while PAS >6 has increased likelihood of appendicitis (PAS 4-6 indeterminate).

- **Simple appendicitis**: Early in disease time course. Mild inflammation; not perforated.

- **Complicated appendicitis**: Late in disease time course. Includes phlegmon, perforation and abscess.

Imaging modalities and recommendations

- Ultrasound (US): Ideal because of lack of radiation. Best if performed when patient has full bladder (this is especially important in girls because full bladder aids in ovary visualization). Technician should look for secondary signs of appendicitis.

- Secondary signs of appendicitis on ultrasound: moderate to large amount of free fluid, fluid collection or phlegmon, pericecal inflammatory changes in the fat

- CT Scan: Should be avoided if possible to minimize radiation exposure. However, if obtaining CT, it is recommended to scan abdomen and pelvis with both IV and oral contrast. Consider nasogastric (NG) placement if unable to tolerate oral contrast. CT should be agreed upon after discussion between Ped Surgeon, ED physician and/or Hospitalist.

- Secondary signs of appendicitis on CT Scan: right lower quadrant free fluid, fat stranding, or fluid collection

Goals/quality indicators:

- Use objective data to identify children who are at low risk for appendicitis, those who may be monitored with serial abdominal examinations, and those who require surgical consultation

- Reduced utilization of abdominal CT in children

- Minimize rate of missed appendicitis

- Minimize rate of readmissions

Inclusion criteria
Children 4-18 years old with possible appendicitis

Exclusion criteria
Children <4 years of age, children who appear toxic, children with surgical abdomen (generalized peritonitis), children with signs/symptoms suggesting alternative diagnosis

---

continued
Inclusion criteria: Children 4–18 years old with acute abdominal pain
Exclusion Criteria: pregnancy, trauma, previous abdominal surgery, peritoneal signs

ASSESSMENT*
- **History:** time of onset, intensity of pain, location of pain, migration of pain, anorexia, nausea, vomiting, diarrhea, fever, pain with bumps in road, LMP if female, sick contacts, constipation
- **Clinical Examination:** vital signs, affect, guarding, rigidity, localized tenderness, observe walking, hopping/coughing/heel-tapping causing pain in RLQ
- **Labs:** CBC with differential, CRP**, U/A & culture, electrolytes, HCG if > 10 yrs old and female

INTERVENTIONS
- **NPO**
- **IV fluids:** If hypovolemic give 20cc/kg of NS
- **Antiemetics:** Ondansetron 0.15mg /kg IV Q8 hours, max dose 4mg
- **Pain Medications:** 0.05mg/kg of Morphine IV x 1 up to 40 Kg or 2 mg IV if > 40Kg (if it will be more than 2 hours before surgical evaluation.)
  Discuss further pain management with pediatric surgeon — *Avoid use of NSAIDs before surgery consult.*

*PEDI APPENDICITIS SCORE*

<table>
<thead>
<tr>
<th>Sign/Symptom</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough/percussion/heel-tapping</td>
<td>2</td>
</tr>
<tr>
<td>Causing pain in RLQ</td>
<td></td>
</tr>
<tr>
<td>Anorexia</td>
<td>1</td>
</tr>
<tr>
<td>Fever ≥ 38 or 100.4</td>
<td>1</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>1</td>
</tr>
<tr>
<td>RLQ tenderness on light palpation</td>
<td>2</td>
</tr>
<tr>
<td>Leukocytosis (&gt; 10,000)</td>
<td>1</td>
</tr>
<tr>
<td>Left shift (&gt; 75% neutrophils)</td>
<td>1</td>
</tr>
<tr>
<td>Migration of pain to RLQ</td>
<td>1</td>
</tr>
</tbody>
</table>

**CRP**
- If within normal range
- > 48 hours after onset of symptoms, low risk of appendicitis

**IMAGING RESULTS**

- **NEGATIVE**
  Discharge home with follow up within 24 hrs and instructions to return to ED if pain worsens
- **EQUIVOCAL**
  Page pedi hospitalist if available and consult surgery. Discuss with pediatric surgeon prior to ordering CT.
- **POSITIVE**
  Contact surgeon on call to review OR plans. Maintain NPO, and start antibiotics:
  - Simple: cefoxitin 40mg/kg q6h
  - Abscess: ceftriaxone 50mg/kg once daily + metronidazole 30mg/kg once daily
  *(For penicillin or cephalosporin allergy consider ciprofloxacin + metronidazole)*
References:


Practice guidelines do not necessarily apply to every patient. A provider’s clinical judgment is essential. As always, clinicians are urged to document management strategies.

Floating Hospital For Children at Tufts Medical Center contributors: Carl-Christian Jackson, MD, Lisa Capra, MD, Elena Aragona, MD, Dan Hale, MD.

Contact: Dan Hale, MD, dhale@tuftsmedicalcenter.org