Appendicitis Debate

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Is there a formal triage system for imaging suspected appendicitis cases at your institution?
PAS < 4 “Low Risk”, no imaging

PAS > 4 “High Risk”, start with ultrasound
Do you use standardized reporting for appendix ultrasound?
A) Based on sonography alone, the diagnosis of appendicitis is thought to be very unlikely. This should be considered sonographically negative for appendicitis. Additional cross-sectional imaging may be warranted, but only if clinical suspicion for appendicitis is high.

B) Based on sonography alone, there is no evidence for appendicitis and/or right lower quadrant inflammation, in this cooperative patient with a good sonographic window, though neither a normal or abnormal appendix was specifically visualized. This should be considered sonographically negative for appendicitis. Additional cross-sectional imaging may be warranted, but only if clinical suspicion for appendicitis is high.

C) Based on sonography alone, the diagnosis of appendicitis is indeterminate, in this patient with a suboptimal sonographic window. Additional cross-sectional imaging may be warranted, depending on level of clinical suspicion for appendicitis.

D) Based on sonography alone, findings are suspicious, but not diagnostic, for a diagnosis of appendicitis. If clinical suspicion for appendicitis is high, correlating with sonography, the diagnosis of appendicitis is very likely. If clinical suspicion is not high, additional cross-sectional imaging is recommended.

E) Sonographic findings indicate a diagnosis of acute appendicitis, without current, convincing evidence for perforation or abscess formation.

F) Sonographic findings indicate a diagnosis of acute appendicitis, with signs suggestive of perforation and/or abscess formation. Depending on duration of symptoms, and relevance to clinical management, further evaluation with additional cross-sectional imaging may be helpful.

Carol Barnewolt, M.D.
What do you consider an “equivocal” ultrasound for appendicitis?
Evidence Based Guideline for Appendicitis

Inclusion Criteria:
- Children 6-12 years of age
- Previous abdominal surgery
- Inflammatory bowel disease
- History of cyclic vomiting, intussusception, or intussusception
- Nausea or vomiting

Exclusion Criteria:
- children under 6 months of age
- Previous appendectomy
- Evidence of perforation
- Evidence of peritonitis
- Presence of bowel obstruction

Point System for Appendicitis:

**PAS 1-4: LOW RISK**

- **Mild** (0-1)
  - No signs or symptoms
  - No increase in WBC
  - No fever or leukocytosis

**PAS 2-4: MODERATE TO HIGH RISK**

- **Severe** (4+)
  - High fever or leukocytosis
  - Severe pain or vomiting
  - Evidence of peritoneal irritation

Diagnosis:

**Positive U/S:** hyperemia, thickened wall, echogenic fat, fecolith; NOT free fluid, compressibility, or size.

**Equivocal U/S:** no primary or secondary signs, appendix not visualized; +/- free fluid.

NOTES:

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Does your institution have a formalized pathway for further work-up following an equivocal or discordant ultrasound?
Evidence Based Guideline for Appendicitis

Inclusion Criteria:
- Children 4-12 years of age
- Present with abdominal pain suspicious for appendicitis

Exclusion Criteria:
- Children <4 years of age
- Previous abdominal surgery
- Inflammatory bowel disease
- History of cyclic abdominal pain, transient, intermittent pain

<table>
<thead>
<tr>
<th>FAS Feature</th>
<th>Point Value</th>
<th>mFAS Feature/Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration of Pain</td>
<td>1</td>
<td>Starts anywhere, migrates to RUQ and remains there as muscular portion of pain</td>
</tr>
<tr>
<td>Amebiasis</td>
<td>1</td>
<td>Involved amebiasis of the appendix</td>
</tr>
<tr>
<td>Pyrexia/Leukocytosis</td>
<td>1</td>
<td>Rectal pyrexia/leukocytosis 48 hrs post acute pain</td>
</tr>
<tr>
<td>RUQ Tenderness</td>
<td>2</td>
<td>Tenderness/defensiveness 48 hrs post acute pain</td>
</tr>
<tr>
<td>Cough/Retching</td>
<td>2</td>
<td>Cough/Retching post acute pain/fasting, ASO positive, patient refuses oral feeds</td>
</tr>
</tbody>
</table>

Further evaluation as indicated, PCP follow-up in 12-24 hrs

- WBC ≥ 9 or PMN ≥ 65%
  - CBC
  - U/S positive
    - HIGH RISK
  - U/S negative or equivocal
    - MODERATE RISK
- WBC < 9 or PMN < 65%
  - CBC
  - U/S positive or equivocal
    - LOW RISK
  - U/S negative

Admit to OR

Additional notes:
- Secondary signs: appendix not visualized, +/- free fluid

Explanation of abbreviations:
- CBC: complete blood count
- U/S: ultrasound
- OR: operating room

Guideline was developed for educational purposes only and for use in the division of emergency medicine program at Boston Children’s Hospital. The use of evaluation and treatment plans are the responsibility of the treating clinician and should always be tailored to individual patient circumstances.

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Further imaging, admission or extended ED observation should be discussed in consultation with surgery.

**Imaging:**
- Further imaging should be considered based on the severity of presentation (e.g. suspected abscess) or concern for other intra-abdominal pathology.
- Non-sedated MRI using the appendicitis protocol is preferred over CT when available for patients over 5 years of age.

**Extended Observation:**
- ED Obs for 6hrs post fluid bolus
- D/C with surgery clinic follow-up/phone call
- Admit for inpatient observation

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**Evidence Based Guideline for Appendicitis**

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<tbody>
<tr>
<td>Migration of Pain</td>
<td>1</td>
<td>Starts anywhere, migrates to RUQ and remains there as most painful portion of exam.</td>
</tr>
</tbody>
</table>
Do you use MRI for appendicitis?
Yes

- > 5 years
- < 2 hour wait for MR imaging

- AX T2 HASTE w & w/o FS
- COR T2 HASTE w & w/o FS

Optional:
- AX DWI
- POST CONTRAST AX / COR VIBE
What is your personal opinion on the optimal pathway for appendicitis cases, balancing cost, length of stay, radiation, etc.?