Appendicitis Management Pathway

Introduction

This pathway is for use with children aged 2-18 years old with no underlying disease or co-morbidity who have a confirmed diagnosis of appendicitis (either non-perforated or perforated) by the General Surgery Team who require a surgical appendectomy or medical management. Patients are to be removed from this pathway if there are significant postoperative complications (eg. bowel obstruction or prolonged TPN) or a change in diagnosis.

Target Users

- General Surgery Surgeons, Residents, Fellow, Nurse Practitioners, and nurses on the inpatient units

Definitions

- **Non-perforated appendicitis** - Appendix is normal, injected, inflamed or suppurative. Presence of cloudy fluid +/- local fibrinous exudate, or gangrenous appendicitis but with no visible hole in appendix, abscess or free fecalith
- **Perforated appendicitis** - Visible hole in appendix, free fecalith, diffuse peritonitis with fibrinous exudate or abscess
- **Appendectomy** - surgical removal of the appendix
- **Fever** - a fever is defined as any temperature reading greater than 38°C
Appendicitis Management Pathway

Recommendations - Printable Version

If child ED with confirmed diagnosis of Appendicitis on ultrasound:

ED to consult General Surgery team and initiate ED Appendicitis protocol.

- Are there signs of perforation on ultrasound? (symptoms for >3 days? Is there a sign of abscess on ultrasound? Appendiceal mass?)

- Initiate surgical management
- Admit patient to General Surgery for further management

- Are there dilatable colonic changes on ultrasound?

- Initiate medical management of perforated appendicitis with IV colistin/metronidazole using Epic order set. (Refer to Algorithm)

- Is perforation seen on operating room?

- Discharge child normal diet/diarrhea diet with no further antibiotics

- Admit patient to General Surgery for further management

Post-op:

- Continue IV colistin/metronidazole (Refer to Algorithm)

- Convert to oral antibiotics when child is able to tolerate a minimum of 12 hours (optional diet and maintaining oral hydration, antibiotics to be tapered/terminated)

- Switch to oral Ceftriaxone (500 mg/dose) for an additional 7 days of oral antibiotics (days indicate equivalent day on oral antibiotics) (Refer to Algorithm)

If patient clinically worsens, consider upgrade to IV antibiotics/dialysis. If no ultrasound within the past 2-3 days, repeat in order to evaluate for drainable collection.

**Alternative oral antibiotic therapy with Ceftriaxone and Metronidazole may be considered in settings of confirmed beta-lactam allergy.

**Antibiotic therapy should be assessed based on any available microbiological data (i.e., if cultures are obtained from an abdominal abscess aspiration).

*** A fever is defined as any temperature reading greater than 38°C (Refer to Suspect Clinical Pathway)
## Appendicitis Management Pathway

### Inpatient Non-Perforated Appendicitis Care Pathway

<table>
<thead>
<tr>
<th>PRE-OPERATIVE</th>
<th>POST-OPERATIVE</th>
<th>DISCHARGE: WITHIN 24 HOURS POST-OP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOALS</strong></td>
<td><strong>GOALS</strong></td>
<td><strong>GOALS</strong></td>
</tr>
<tr>
<td>4. Child/parent are advised of pre-op lab work to be used upon arrival. Refer to procedure document</td>
<td>4. Able to tolerate diet (clear fluids to regular diet)</td>
<td>4. Able to tolerate diet</td>
</tr>
<tr>
<td>5. Inocent site, no drainage/dry and intact</td>
<td>5. Inocent site, no drainage/dry and intact</td>
<td>5. Inocent site, no drainage/dry and intact</td>
</tr>
<tr>
<td><strong>PHYSICAL EXAM</strong></td>
<td><strong>PHYSICAL EXAM</strong></td>
<td><strong>PHYSICAL EXAM</strong></td>
</tr>
<tr>
<td>• Obtain history</td>
<td>• Complete pain assessment every 4 hours</td>
<td>• Complete pain assessment every 4 hours</td>
</tr>
<tr>
<td>• Complete physical exam</td>
<td>• Ensure child has adequate pain control (refer to Pain Management Guidelines)</td>
<td>• Ensure child has adequate pain control (refer to Pain Management Guidelines)</td>
</tr>
<tr>
<td>• Assess vital signs</td>
<td>• Monitor vital signs as per Bedside Orders (refer to General Pathway)</td>
<td>• Monitor vital signs as per Bedside Orders (refer to General Pathway)</td>
</tr>
<tr>
<td>• Complete pain assessment (refer to Pain Assessment Guidelines)</td>
<td>• Obtain accurate in and out</td>
<td>• Obtain accurate in and out</td>
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<tr>
<td>• Obtain accurate in and out</td>
<td>• Complete abdominal assessment</td>
<td>• Complete abdominal assessment</td>
</tr>
<tr>
<td><strong>FLUID NUTRITION</strong></td>
<td><strong>FLUID NUTRITION</strong></td>
<td><strong>FLUID NUTRITION</strong></td>
</tr>
<tr>
<td>• Ensure that patient is NPO</td>
<td>• Clear fluids to regular diet as tolerated</td>
<td>• Clear fluids to regular diet as tolerated</td>
</tr>
<tr>
<td>• Administration of D5W and 0.45% NaCl with 20mmol KCl at maintenance</td>
<td>• IV to maintenance, TKD or adequate oral fluid intake</td>
<td>• IV to maintenance, TKD or adequate oral fluid intake</td>
</tr>
<tr>
<td>• IV as indicated</td>
<td>• IV as indicated</td>
<td>• IV as indicated</td>
</tr>
<tr>
<td>• Refer to Fluid and Electrolyte Guidelines</td>
<td>• Refer to Fluid and Electrolyte Guidelines</td>
<td>• Refer to Fluid and Electrolyte Guidelines</td>
</tr>
<tr>
<td><strong>MEDICATION</strong></td>
<td><strong>MEDICATION</strong></td>
<td><strong>MEDICATION</strong></td>
</tr>
<tr>
<td>• Ceftazide/Mezlocillin IV if allergy then Ceftriaxone or Ciprofloxacin &amp; Metronidazole. Refer to the e-formulary</td>
<td>• Acetaminophen as needed for pain, fever</td>
<td>• Acetaminophen as needed for pain, fever</td>
</tr>
<tr>
<td>• Pain medication as needed, morphine, acetaminophen NDAOs. Refer to the e-formulary</td>
<td>• Morphine IV bolus PRN</td>
<td>• Morphine IV bolus PRN</td>
</tr>
<tr>
<td><strong>ACTIVITY EDUCATION</strong></td>
<td><strong>ACTIVITY EDUCATION</strong></td>
<td><strong>ACTIVITY EDUCATION</strong></td>
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<tr>
<td>• Activity as tolerated</td>
<td>• Activity as tolerated</td>
<td>• Activity as tolerated</td>
</tr>
<tr>
<td>• Consent for surgery</td>
<td>• Consent for surgery</td>
<td>• Consent for surgery</td>
</tr>
<tr>
<td>• Pre-approach procedures for child and caregiver</td>
<td>• Pre-approach procedures for child and caregiver</td>
<td>• Pre-approach procedures for child and caregiver</td>
</tr>
<tr>
<td>• Review parental involvement in care (pre- and post-operatively)</td>
<td>• Review parental involvement in care (pre- and post-operatively)</td>
<td>• Review parental involvement in care (pre- and post-operatively)</td>
</tr>
<tr>
<td><strong>Diet</strong></td>
<td><strong>Diet</strong></td>
<td><strong>Diet</strong></td>
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<tr>
<td>• Advance diet as tolerated</td>
<td>• Advance diet as tolerated</td>
<td>• Advance diet as tolerated</td>
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<tr>
<td><strong>Pain</strong></td>
<td><strong>Pain</strong></td>
<td><strong>Pain</strong></td>
</tr>
<tr>
<td>• Acetaminophen and ibuprofen (if not contraindicated) for 48 hours then as needed</td>
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<td>• Acetaminophen and ibuprofen (if not contraindicated) for 48 hours then as needed</td>
</tr>
<tr>
<td><strong>Inclusion cases</strong></td>
<td><strong>Inclusion cases</strong></td>
<td><strong>Inclusion cases</strong></td>
</tr>
<tr>
<td>• Leave stoma-site(s) undressed, fall off on own or remove after 10 days</td>
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<td>• Leave stoma-site(s) undressed, fall off on own or remove after 10 days</td>
</tr>
<tr>
<td>• Once stoma-site(s) removed, may wash stoma-site(s) with soap and water</td>
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</tr>
<tr>
<td><strong>Signs and symptoms of wound infection:</strong></td>
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<td><strong>Signs and symptoms of wound infection:</strong></td>
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<tr>
<td>• Fever</td>
<td>• Fever</td>
<td>• Fever</td>
</tr>
<tr>
<td>• Redness around incision</td>
<td>• Redness around incision</td>
<td>• Redness around incision</td>
</tr>
<tr>
<td>• Drainage from incision</td>
<td>• Drainage from incision</td>
<td>• Drainage from incision</td>
</tr>
<tr>
<td>• Increasing pain around incision</td>
<td>• Increasing pain around incision</td>
<td>• Increasing pain around incision</td>
</tr>
<tr>
<td><strong>Follow-up:</strong></td>
<td><strong>Follow-up:</strong></td>
<td><strong>Follow-up:</strong></td>
</tr>
<tr>
<td>• May shower or bathe, 48 hours after surgery</td>
<td>• May shower or bathe, 48 hours after surgery</td>
<td>• May shower or bathe, 48 hours after surgery</td>
</tr>
<tr>
<td>• Activity:</td>
<td>• Activity:</td>
<td>• Activity:</td>
</tr>
<tr>
<td>• Ambulate in hallways</td>
<td>• Ambulate in hallways</td>
<td>• Ambulate in hallways</td>
</tr>
<tr>
<td>• May return to normal daily activities as patient feels able</td>
<td>• May return to normal daily activities as patient feels able</td>
<td>• May return to normal daily activities as patient feels able</td>
</tr>
</tbody>
</table>

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## Inpatient Perforated Appendicitis Care Pathway

### DAY OF ADMISSION
- **Goal:**
  - Hydration maintained
  - Adequate pain control
  - Patient prepared for CR if surgical management required
- **Care:**
  - Ceftriaxone or equivalent antibiotic, or initial broad-spectrum antibiotic
  - Abdominal pain control
  - Ambulating
  - Vital signs as per IPERG (Refer to Sepsis Clinical Pathway)
  - Pain assessment (focus on abdomen) every 4 hours
  - NPO

### DAY 1
- **Goal:**
  - Abdominal pain control
  - Ambulating
  - Ability to tolerable oral diet
  - Pain management
  - Diet as tolerated
  - If NPO, ensure that child is receiving IV fluids with DSW

### DAY 2-3
- **Goal:**
  - Abdominal pain control
  - Ambulating
  - Ability to tolerable oral diet
  - Pain management
  - Diet as tolerated

### DAY 4
- **Goal:**
  - Abdominal pain control
  - Ambulating
  - Ability to tolerable oral diet
  - Pain management
  - Diet as tolerated

### DAY 5
- **Goal:**
  - Abdominal pain control
  - Ambulating
  - Ability to tolerable oral diet
  - Pain management
  - Diet as tolerated

### Pre-operatively:
- Pain medication as needed (morphine/acetaminophen)
- Start IV (1/2 dose of IV cefazolin and metronidazole) (Refer to e-formulary for dosing)

### Post-operatively:
- Analgesia as needed for pain control
- Morphine IV as required
- Pain management
- Bed rest

### Pain management:
- Start IV (1/2 dose of IV cefazolin and metronidazole) (Refer to e-formulary for dosing)
- Post-operatively
- Pain medication as needed (morphine/acetaminophen)
- Start IV (1/2 dose of IV cefazolin and metronidazole) (Refer to e-formulary for dosing)

### Activity
- Ambulating
- Ambulating to chair daily
- Progress to ambulating in hallway X 5

### Radiographic Studies
- If collection is found, refer to Appendicitis Algorithm for child with drainable collection

### Follow-up
- Confirm need for follow-up with Prone Surgeon
- Family education given in 1-2 weeks

### Related Documents

- **E-formulary**
- **Sepsis Pathway**
- **Pain Management Guidelines**
- **Pain Assessment Guidelines**
- **Fluid & Electrolyte Guidelines**

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References


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7. Cincinnati Children's Hospital: Appendicitis Clinical Pathway- Inpatients

8. Cincinnati Children’s Hospital: Emergency Appendectomy Clinical Pathway


14. Inpatient and Surgical Care: Appendectomy for Ruptured Appendicitis or Generalized Peritonitis Care Guidelines.


28. University Hospitals of Cleveland: Pediatric Appendicitis/Simple Laparoscopic/Open Technique Care Path


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Attachments:
appendicitis algorithm.docx
appendicitis algorithm.pdf
Non perforated appy pathway.pdf
Non perforated appy pathway.rtf
Perforated appy pathway.pdf
Perforated appy pathway.rtf