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 initial ED with confirmed diagnosis of Appendicitis on ultrasound:
  - ED to consult General Surgery team and initiate ED Appendicitis protocol.

- Is perforation seen on ultrasound?
  - NO: Discharge child home/office visiting doctor with no further antibiotics.
  - YES: Admit patient to General Surgery for further management.

- Are there drainable collections on ultrasound?
  - NO: Initiate IV cefazolin/metronidazole using Epic order set (Refer to Algorithms).
  - YES: Initiate surgical management of perforated appendicitis with IV cefazolin/metronidazole using Epic order set (Refer to Algorithms).

- Are there drainable collections on ultrasound?
  - YES: IOD to insert percutaneous drain for collection, and determine length of time until drain removal.
  - NO: Child will remain on IV Cefeazolin/Metronidazole until drain is removed.

- Post-op:
  - IOD: Initiate IV cefazolin/metronidazole (Refer to Algorithms).
  - Convert to oral antibiotics when child is able to tolerate minimum of 12 hours, tolerating oral diet and maintaining oral hydration: antibiotic to be managed/adjusted.

- Switch to oral antibiotics (refer to Algorithms) to complete an additional 7 days of oral antibiotics (days include patient stay on oral antibiotics) (Refer to Algorithms).

**Notes:**
- If patient clinically worsens, consider upgrade to IV antibiotics +/- drain.
- If no ultrasound within the past 2-3 days, repeat in order to evaluate for drainable collection.
- If colonic perforation, refer to algorithms for patient with drainable collections (IOD).
- If cefazolin is used, refer to guidelines for patient with drainable collections (IOD).
- Antimicrobial therapy should be reassessed based on any available microbiological data (e.g., cultures are obtained from an abdominal abscess aspiration).
- A fever is defined as any temperature reading greater than 38°C (Refer to Severe Clinical Pathway).
## Inpatient Non-Perforated Appendicitis Care Pathway

### Pre-Operative

1. Hydration maintained
2. Adequate pain control
3. Patient prepared for OR
4. Child/Parent are advised of pre-op bath. Wipes to be used upon arrival. Refer to procedure document

### Post-Operative

1. Alkaline
2. Adequate pain control
3. Arrange NG
4. Able to tolerate diet (clear fluids to regular diet)
5. Incision intact, no drainage, dry and intact
6. Child/caregiver teaching

### Physical Exam

- Obtain history
- Complete physical exam
- Assess vital signs
- Complete pain assessment (refer to Pain Assessment Guidelines)
- Obtain accurate in and out

### Labs

- Ensure that patient is NPO
- Administer D5W and 0.9 NaCl with 20mEq KCl at maintenance
- Blood as indicated
- Refer to Fluid and Electrolyte Guidelines

### Medication

- Ceftriaxone/Metronidazole IV if allergy then Clindamycin or Ciprofloxacin & Metronidazole. Refer to the e-formulary
- Pain medication as needed, morphine acetaminophen NSAIDs. Refer to the e-formulary

### Activity Education

- Activity as tolerated
- Consent for surgery
- Pre-op procedures for child and caregiver
- Retrieve parental involvement in care (pre and post-operatively)

### Diet

- Advance diet as tolerated

### Pain

- Acetaminophen and ibuprofen (if not contraindicated) for 48 hours then as needed
- Review need for pain management

### Infection care

- Leave drain tubes until fall off or removed after 10 days
- Once drain tubes removed, may wash incision gently with soap and water

### Signs and symptoms of wound infection:

- Fever
- Redness around incision
- Drainage from incision
- Increasing pain around incision

### Follow-up

- May shower or bathe, 48 hours after surgery
- Activity:
  - Ambulate in hallway
  - May return to normal daily activities as patient feels able

### When to call surgeon’s office:

- Wound infection
- Vomiting
- Fever
- Pain

- Confirm need for follow-up with Primary Surgeon
- Family doctor/pediatrician in 1-2 weeks
## Appendixitis Management Pathway

### Inpatient Perforated Appendixitis Care Pathway

<table>
<thead>
<tr>
<th>DAY OF ADMISSION</th>
<th>DAY #1</th>
<th>DAY #2-#3</th>
<th>DAY #4</th>
<th>DAY #5</th>
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<tr>
<td><strong>GENERAL</strong></td>
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<tr>
<td>1. Hydration maintenance</td>
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<tr>
<td>2. Adequate pain control</td>
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<tr>
<td>3. Patient prepared for OR if surgical management required</td>
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<td><strong>PHYSICAL</strong></td>
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<tr>
<td>History &amp; Physical</td>
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<tr>
<td>Vital Signs</td>
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<td>Height &amp; Weight</td>
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<tr>
<td>Pain Assessment [focus on abdomen] every 4 hours</td>
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<td>Accurate I &amp; O</td>
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<td><strong>LABS</strong></td>
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<tr>
<td>DSW &amp; 0.9% NaCl with 20mEq KCl</td>
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<tr>
<td>Order as clinically indicated with 0.9% NS or Lactated Ringer’s</td>
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<tr>
<td>Refer to <strong>Fluid and Electrolyte Guidelines</strong></td>
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<td><strong>DIAGNOSIS</strong></td>
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<tr>
<td>Pre-operatively:</td>
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<tr>
<td>Pain medication as needed (morphine / acetaminophen)</td>
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<tr>
<td>Start IV/IVIG of IV antibiotics and metronidazole (Refer to e-formulary for dosing)</td>
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<td>Post-operatively:</td>
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<tr>
<td>DSW &amp; 0.9% NaCl with 20mEq KCl at maintenance</td>
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<tr>
<td>Bolus as clinically indicated with 0.9% NS or Lactated Ringer’s</td>
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<tr>
<td>Refer to <strong>Fluid and Electrolyte Guidelines</strong></td>
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<td><strong>TREATMENT</strong></td>
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<td>Pain management:</td>
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<td>If an opioid infusion, wean as tolerated</td>
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<td>Avoid antibiotics every 4 to 6 hours for 48 hours then as needed for pain management</td>
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<td>Ketonuria or Hypokalemia every 6 hours for 48 hours</td>
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<td>Antibiotics:</td>
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<tr>
<td>Q12h dosing of IV antibiotics and metronidazole</td>
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<tr>
<td>Consider switching to oral antibiotics - Ciprofloxacin (children) or amoxicillin (adults) to complete an additional 72 hours when the child is able to tolerate a low caloric diet and maintaining oral hydration and abdominal pain is well managed/improving</td>
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<tr>
<td>Refer to <strong>Antimicrobial Guidelines</strong> for dosing</td>
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<tr>
<td><strong>ACTIVITY</strong></td>
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<tr>
<td>Ambulating</td>
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<tr>
<td>Ambulating to chair daily</td>
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<td>Progress to ambulating in hallway X 5</td>
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<td><strong>URINARY</strong></td>
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<td>Urology procedures for parent and child</td>
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<tr>
<td>Consent for surgery signed</td>
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<tr>
<td><strong>INFECTION</strong></td>
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<td>Incision care:</td>
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<td>Leave sternum - until fall off or remove after 10 days</td>
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<td>Once sternum is removed, may wash incision gently with soap and water</td>
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<td>Signs and symptoms of wound infection:</td>
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<td>Fever</td>
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<td>Redness around incision</td>
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<tr>
<td>Drainage from incision</td>
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<tr>
<td>Increasing pain around incision</td>
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<td><strong>BATHING</strong></td>
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<td>May shower or bathe, 48 hours after surgery</td>
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<tr>
<td><strong>Activity</strong></td>
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<td>Ambulate in hallway at least 5 times</td>
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<td>May return to normal daily activities as patient feels able</td>
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<td><strong>WHEN TO CALL NURSE’S OFFICE</strong></td>
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<tr>
<td>• Wound infection</td>
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<td>• Vomiting</td>
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<td>• Fever</td>
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<td>• Pain</td>
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<td><strong>Follow-up</strong></td>
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<td>Confirm need for follow-up with Primary Surgeon</td>
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<td>Family doctor/attendee can call 1-2 weeks</td>
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### Related Documents

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

References

6. Children’s Hospital of Philadelphia: Appendicitis without Known GI Disease Clinical Pathway- Emergency
7. Children’s Hospital of Philadelphia: Appendicitis Clinical Pathway- Inpatients
8. Cincinnati Children’s Hospital: Emergency Appendectomy Clinical Pathway
14. Inpatient and Surgical Care: Appendectomy for Ruptured Appendix with Abscess or Generalized Peritonitis Care Guideline
28. University Hospitals of Cleveland: Pediatric Appendicitis/Simple Laparoscopic/Open Technique Care Path

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Appendicitis Management Pathway
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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