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 (e.g., 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 Algorithm

Recommendations - **Printable Version**

Dicte in 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?
- Is perforation seen on ultrasound?

**Initiate surgical management**

- Child placed on OR Priority 2 list
- Initiate Colloids/Metronidazole IV infused appendicitis using Epic order set
- Refer to Surgery

**Initiate medical management of perforated appendicitis with IV colloids/metronidazole using Epic order set**

- Are there drains visible on ultrasound?

**YES**

- IOT to insert percutaneous drain for collection, and determine length of time until drain removal
- Child will remain on IV Colloids/Metronidazole until drain is removed

**Discharge child home/Discharge child with no further antibiotics**

**YES**

- Admit patient to General Surgery for further management

**Are there drains visible on ultrasound?**

**YES**

- IOT to insert percutaneous drain for collection, and determine length of time until drain removal
- Child will remain on IV Colloids/Metronidazole until drain is removed

**Post-op**

- Initiate IV colloids/metronidazole using Epic order set
- Refer to Surgery

**Convert to oral antibiotics when child is able to tolerate a minimum of 12 hours, tolerating oral diet and maintaining oral hydration, abdominal pain is managed/improving**

- Switch to oral Cefuroxime (or clindamycin) for an additional 7 days of oral antibiotics (days include patient stay on oral antibiotics) Refer to **Surgery**

**IF patient clinically worsens, consider upgrade to IV antibiotics/dialysis. If no ultrasound within the past 2-3 days, repeat in order to rule out a possible collection.**

**Alternative oral antibiotic with Ceftriaxone and Metronidazole may be considered in setting of confirmed abscess/stenosis**

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

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

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Appendicitis Management Pathway
# Inpatient Non-Perforated Appendicitis Care Pathway

<table>
<thead>
<tr>
<th>Pre-Operative</th>
<th>Post Operatively</th>
<th>Discharge - Within 24 hours Post Op</th>
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</thead>
<tbody>
<tr>
<td><strong>Goals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Hydration maintained</td>
<td>1. Alabax</td>
<td>1. Alabax</td>
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<tr>
<td>2. Adequate pain control</td>
<td>2. Adequate pain control</td>
<td></td>
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<tr>
<td>3. Fluid prepared for OR</td>
<td>3. Ambulating</td>
<td></td>
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<tr>
<td>4. Child/parents advised of pre-op bath, Wipes to be used upon arrival. Refer to procedure assessment</td>
<td>4. Able to tolerate diet (clear fluids to regular diet)</td>
<td>5. Incision dry and intact</td>
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<tr>
<td></td>
<td>5. Incision dry and intact</td>
<td></td>
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<tr>
<td></td>
<td>6. Child/caregiver teaching</td>
<td></td>
</tr>
</tbody>
</table>

**Physiological**

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

**Fluid and Electrolyte Guidelines**

- Ensure that patient is NPO
- Administer D5W and 0.9% NaCl with 20ml KCl at maintenance
- Bolus as indicated
- Refer to Fluid and Electrolyte Guidelines
- Clear fluids to regular diet as tolerated
- IV to maintenance, TK/I once adequate oral fluid intake
- Bolus as indicated
- Refer to Fluid and Electrolyte Guidelines

**Medication**

- Ceftriaxone/Metronidazole IV, if allergy then Cilnimucillin or Ciprofloxacin & Metronidazole. Refer to the e-formulary
- Pain medication as needed, morphine
- Acetaminophen as needed for pain/fever
- Kombetor or Buscopan as needed for pain management
- Morphine IV bolus PRN

**Activity & Education**

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

**Diet**

- Advance diet as tolerated

**Pain**

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

**Injuries**

- Leave drain sites undisturbed or remove after 10 days
- Once drain sites 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

**Bathing**

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

**When to call Surgery office**

- Wound infection
- Vomiting
- Fever
- Pain

**Follow-up**

- Confirm need for post-operative incorporation with Primary Surgeon
- Family doctor/pediatrician in 1-2 weeks
# Inpatient Perforated Appendicitis Care Pathway

## DAY OF ADMISSION
1. **Hydration maintenance**
2. **Adequate pain control**
3. **Patient prepared for OR if surgical management required**

### EXTREMITIES
- Thromboprophylaxis activated? (Cephalothin, SQ, 1 gm 12 hr PO as needed)
- Blood work: CBC, Cr, LFT, SMA, electrolytes, PT/PTT
- **Signs of peritonitis may occur even in the absence of rhabdomyolysis**

### VITAL SIGNS
- Monitor and record every 4 hours
- **Adequate response to pain management**

### DRESS & HABITS
- **Daily consult with Pain Team**
- **Daily consult with Social Worker**
- **Daily consult with Dietitians**
- **Daily consult with Intensive Care**

## DAY 1
1. **Admit**
2. **Adequate pain control**
3. **Ambulating**
4. **Able to tolerate clear fluids (post-op)**
5. **Increase IV, no drainage, dry and intact**
6. **IV started, intravenous access from intermittent suction to straight drainage**

### Vital signs (as per BPEMS): **Refer to Sepsis Clinical Pathway**
- **Pain assessment (focus on abdomen):** every 4 hours
- **Adequate pain control**
- **Accurate In & Out**
- **Wound assessment:** remove surgical dressing, leave sterile strips

### IV fluid & electrolytes (Lactated Ringer’s)
- **Initial 1.4% NaCl with 20 mmol KCl**
- **Oxycodone 5 mg Q 6 hr prn**
- **Electrolytes**
- **Refer to Fluid and Electrolyte Guidelines**

### **Maintenance**
- **Adequate oral fluid intake**
- **T&O**

## DAY 2 - 3
1. **Admit**
2. **Adequate pain control**
3. **Ambulating**
4. **Able to tolerate oral diet**
5. **Adequate fluid intake**
6. **Check for pain, watch for signs of wound infection**

### **Activities**
- **Ambulating**
- **Progression to ambulating in hallway 5 x 5**

### **Wound Care**
- **Closed wound, sterile dressing**
- **Vital signs:** every 4 hours as needed
- **Wound assessment:** remove surgical dressing, leave sterile strips

### **Vital signs:**
- **Pulse oximetry**
- **Temperature**
- **SPO2**
- **Blood pressure**
- **Respiratory rate**

### **Activity**
- **Ambulating**
- **Progression to ambulating in hallway 5 x 5**

## DAY 4
1. **Admit**
2. **Adequate pain control**
3. **Ambulating**
4. **Able to tolerate oral diet**
5. **Adequate fluid intake**
6. **Child and family understand discharge planning**
7. **Adequate oral intake**

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

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**PRINTABLE VERSION**

**Related Documents**

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


6. Children’s Hospital of Philadelphia: Appendicitis without Known GI Disease Clinical Pathway- Emergency perforated Hospital of Philadelphia: Appendicitis Clinical Pathway- Inpatients

7. Cincinnati Children's Hospital: Emergency Appendectomy Clinical Pathway


13. Inpatient and Surgical Care: Appendectomy for Ruptured Appendicitis or Generalized Peritonitis Care Guideline


27. 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