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

Appendicitis Algorithm

**Recommendations**

- **Child in ED with confirmed diagnosis of Appendicitis on ultrasound:**
  - ED to consult General Surgery team and initiate ED Appendicitis underet.
  - Does the patient have symptoms of peritonitis on ultrasound? Does the patient have abdominal tenderness on ultrasound? Is there a sign of abscess on ultrasound?

**Initiate surgical management**

- Child placed on OR Priority 2 list
- Initiate Cefazolin/Metronidazole or Metronidazole/IV Ceftriaxone (in case of allergic reaction to Cefazolin)
- Refer to a consultant

**Admit patient to General Surgery for further management**

- Is perforation seen on ultrasound?
- Are there drainable collections on ultrasound?

**Discharge child home if adhering to without further antibiotics**

**Initiate medical management of perforated appendicitis with IV Ceftriaxone/Metronidazole using Epic order set (Refer to Algorithm)**

**Initiate IV ceftriaxone/acetaminophen using Epic order set (Refer to Algorithm)**

**Are there drainable collections on ultrasound?**

- YES
  - CECT to insert percutaneous drain for collection, and determine length of time until drain removal
  - Child will receive IV Ceftriaxone/Metronidazole until drain is removed

**Post-op**

- Convert to oral antibiotics when child is able tolerate a minimum of 12 hours, tolerating oral diet and maintaining oral hydration, abdominal pain is managed/improving
- Switch to oral Ceftriaxone/acetaminophen (to complete additional 7 days of oral antibiotics (days include outpatient stay on oral antibiotics) (Refer to Algorithm)

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

**Alternative oral antibiotic therapy with Ceftriaxone and Metronidazole may be considered in setting of confirmed bowel perforation.**

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

**A fever is defined as any temperature rising greater than 38°C (Refer to Suspect Clinical Pathway).**

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Appendicitis Management Pathway  Page 2 of 6
# Appendicitis Management Pathway

## Inpatient Non-Perforated Appendicitis Care Pathway

<table>
<thead>
<tr>
<th>Goal</th>
<th>Pre-Operative</th>
<th>Post Operatively</th>
<th>Discharge: Within 24 Hours Post Op</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Fluids prepared for OR</td>
<td>3. Anticholinergics</td>
<td>3. Anticholinergics</td>
<td></td>
</tr>
<tr>
<td>4. Child/parent is advised of pre-op bath. Wipes 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>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Incision site, no drainage, dry and intact</td>
<td>5. Incision dry and intact</td>
<td></td>
</tr>
</tbody>
</table>

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

### Fluid/IV
- Ensure that patient is NPO
- Administer 1500mL of 0.9% NaCl at maintenance
- BID as indicated
- Refer to Fluid and Electrolyte Guidelines

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

### Activity/Position
- Activity as tolerated
- Consent for surgery
- Pre-operatives for child and caregiver
- Review potential involvement in care (pre and post-operativeness)
- When to call surgeon's office:
  - Wound infection
  - Vomiting
  - Fever
  - Pain

### Diet
- Advance diet as tolerated
- Acetaminophen and ibuprofen (if not contraindicated) for 48 hours then as needed
- Review need for pain management

### Incision Care
- Leave skin-strips until fall off on own or remove after 10 days
- Once skin-strips 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
- Bathing:
  - May shower or bath, 48 hours after surgery
  - Activity:
    - Ambulate in hallways
    - May return to normal daily activities as patient feels able
### Inpatient Perforated Appendicitis Care Pathway

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

**PHYSICAL EXAM**
- History & Physical
- Vital Signs
- Height and Weight
- Pain Assessment (focus on abdomen) every 4 hours
- Accurate In & Out

**TESTS/FLUIDS**
- D5W 0.9% NaCl with 20mmol KCl
- Oral or intravenous with 0.9% NS or Lactated Ringer’s
- Refer to Fluid and Electrolyte Guidelines

**TREATMENT**
- Pre-operatively:
  - Pain medication as needed (morphine / acetaminophen)
  - Start 24h dosing of IV ceftriaxone and metronidazole (Refer to formulary for dosing)

**POST-TREATMENT**
- Analgesia as needed for pain (Fentanyl/Piritramide)
- Morphone IV as required
- Please check with Primary Surgeon if NSAsIDs can be prescribed (Ketorolac vs. Acetaminophen)
- IV dosing of IV ceftriaxone and metronidazole for 12 hours (Refer to Appendicitis Management Pathway Algorithm Refer to formulary for dosing)

**ACTIVITY**
- Ambulating
- Ambulating to chair daily

**DIAGNOSTIC TESTING**
- Consider an abdominal ultrasound to evaluate for drainable intra-abdominal collection if child is not improving or clinically worsens
- If collection is found, refer to Appendicitis Algorithm for child with drainable collection

**FAMILY / CAREGIVER EDUCATION**
- When diet will be started
- Need for pain management
  - Need for mobilization
  - Potential involvement in care

**INFECTION CONTROL**
- Incision care:
  - Leave sterile sites until heal off on own or remove after 10 days
  - Once sterile 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 bathe; 48 hours after surgery

**ACTIVITY**
- Ambulate in hallway at least 5 times
- May return to normal daily activities as patient feels able

**WHEN TO CALL NURSE’S OFFICE:**
- Wound infection
- Vomiting
- Fever
- Pain

**FOLLOW-UP:**
- Confirm need for follow-up with Primary Surgeon
- Family doctor/ED/Inpatient 1-2 weeks

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### PRINTABLE VERSION

**Related Documents**

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

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References

6. Children’s Hospital of Philadelphia: Appendicitis without Known GI Disease Clinical Pathway- Emergency
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 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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**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](#)