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]

- Child in ED with confirmed diagnosis of Appendicitis on ultrasound:
  - ED to consult General Surgery team and initiate ED Appendicitis pathway.
  - Are there signs of perforation on ultrasound?
    - No: Initiate surgical management.
    - Yes:
      - Admit patient to General Surgery for further management.
      - Initiate medical management of perforated appendicitis with IV cefuroxime/metronidazole using Epic order set.

- Is perforation seen on ultrasound?
  - No: Discharge child home if stable and without further symptoms.
  - Yes:
    - Admit patient to General Surgery for further management.
    - Are there drainable collections on ultrasound?
      - Yes:
        - ICT to insert percutaneous drain for collection and determine length of time until drain removal.
        - Child to remain on IV Cefuroxime/Metronidazole until drain is removed.
      - NO: Continue IV cefuroxime/metronidazole (Refer to e-Refer).

- Post-op:
  - Initiate IV cefuroxime/metronidazole using Epic order set (Refer to e-Refer).
  - Convert to oral antibiotics when child is able to tolerate a minimum of 12 hours, tolerating oral diet and maintaining adequate hydration. Infection site to be managed/improved.
  - Switch to oral Cefdinir (500 mg bid) for an additional 7 days of oral antibiotics (days include day patient on oral antibiotics) (Refer to e-Refer).

*If patient clinically worsens, consider upgrade to IV antibiotic/intravenous fluid. If no ultrasound within the past 2-3 days, repeat in order to rule out drainsable collection. If collection is found, refer to algorithm for patient with drainable collections (ICT).

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

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

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

### Inpatient Non-Perforated Appendixitis Care Pathway

<table>
<thead>
<tr>
<th><strong>PRE-OPERATIVE</strong></th>
<th><strong>POST-OPERATIVE</strong></th>
<th><strong>DISCHARGE: WITHIN 24 HOURS POST-OP</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOALS</strong></td>
<td><strong>GOALS</strong></td>
<td><strong>GOALS</strong></td>
</tr>
<tr>
<td>3. Patient prepared for OR</td>
<td>3. Analgesia</td>
<td>3. Analgesia</td>
</tr>
<tr>
<td>4. Child-family are advised of pre-op bath</td>
<td>4. Able to tolerate diet (clear fluids to regular diet)</td>
<td>4. Able to tolerate diet</td>
</tr>
<tr>
<td></td>
<td>5. Incision intact, no drainage, dry and intact</td>
<td>5. Incision 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>• Obtain accurate</td>
<td>• Obtain accurate</td>
</tr>
<tr>
<td>• Complete physical exam</td>
<td>• In and out</td>
<td>• In and out</td>
</tr>
<tr>
<td>• Assess vital signs</td>
<td>• Complete abdominal assessment</td>
<td>• Complete abdominal assessment</td>
</tr>
<tr>
<td>• Complete pain assessment (refer to Pain Assessment Guidelines)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NEW/REV</strong></td>
<td><strong>NEW/REV</strong></td>
<td><strong>NEW/REV</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></td>
<td>• NPO at maintenance</td>
<td>• NPO at maintenance</td>
</tr>
<tr>
<td></td>
<td>• Blood glucose indicated</td>
<td>• Blood glucose indicated</td>
</tr>
<tr>
<td></td>
<td>• Refer to Fluid and Electrolyte Guidelines</td>
<td>• Refer to Fluid and Electrolyte Guidelines</td>
</tr>
<tr>
<td><strong>RECOVERY</strong></td>
<td><strong>RECOVERY</strong></td>
<td><strong>RECOVERY</strong></td>
</tr>
<tr>
<td>• Catheter/IV infusion if allergy to Ceftriaxone or Ciprofloxacin &amp; Metronidazole</td>
<td>• Acetaminophen as needed for pain/fever</td>
<td>• Acetaminophen as needed for pain/fever</td>
</tr>
<tr>
<td></td>
<td>• IV fluid as needed, morphine</td>
<td>• IV fluid as needed, morphine</td>
</tr>
<tr>
<td></td>
<td>• Acetaminophen/NSAIDs (if not contraindicated)</td>
<td>• Acetaminophen/NSAIDs (if not contraindicated)</td>
</tr>
<tr>
<td></td>
<td>• Morphine IV bolus PRN</td>
<td>• Morphine IV bolus PRN</td>
</tr>
</tbody>
</table>

### Activity Education

- **Diet:**
  - Advance diet as tolerated

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

- **Incision care:**
  - Leave skin-cuts until fall off or remove after 10 days
  - Once skin-cuts 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 hallways
  - May return to normal daily activities as patient feels able

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**When to call surgeon’s office:**
- **Wound infection**
- **Vomiting**
- **Fever**
- **Pain**

**Follow-up:**
- Confirm need for follow-up with Primary Surgeon
- Family doctor/pediatrician in 1-2 weeks

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## Inpatient Perforated Appendicitis Care Pathway

### DAY OF ADMISSION
1. Hydration maintained
2. Adequate pain control
3. Patient prepared for OR if surgical management required
4. Intravenous lines are in place for IV fluids
5. Orders are at the bedside to be used upon arrival

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

### Labs
- DSW & 0.9% NaCl with 20mEq KCL
- Order as clinically indicated with 0.9% NS or Lactated Ringer’s

### Ditch & Electolyte Guidelines
- Vital signs as per IPPM (Refer to Sepsis Clinical Pathway)
- Pain assessment (focus on abdomen) every 4 hours
- Accurate In & Out
- Balo on clinically indicated with 0.9% NS or Lactated Ringer’s

### Pain management:
- If pain medication required, start IV/IM/PO as needed
- Stop IV/IM/PO as needed

### Antibiotics:
- IV/IM/PO as needed
- Monitor for adverse effects

### Activities
- Ambulating
- Chair
- Progress to ambulating in hallway X 5

### In-hospital Considerations:
- 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 Appendectomy Algorithm for child with drainable collection

### Out-patients procedures for parent and child
- Consent for surgery signed

### Incision care:
- Leave drain tubes until they fall off or are removed after 1-2 days
- Monitor for infection
- Prevent pulling or twisting of drain tubes

### 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 hallway at least 5 times
- May return to normal daily activities as patient feels able

### When to call surgeon’s office:
- Wound infection
- Vomiting
- Fever
- Pain

### Follow-up:
- Confirm need for follow-up with Primary Surgeon
- Family doctor/eduroanitcan in 1-2 weeks

## 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. Children’s Hospital of Philadelphia: 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