American Pediatric Surgical Association

Standardized Toolbox of Education for Pediatric Surgery

Appendicitis

APSA Committee of Education
2012-13

STEPS
STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

APPENDICITIS

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OBJECTIVES

- Understand the pathophysiology of appendicitis
- Learn elements in the history and physical examination pertinent to the diagnosis of appendicitis
- Understand the basic steps of the operation, including common risks of the procedure
- Learn the expected outcomes of the disease

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APPENDICITIS

- Most common cause of acute surgical abdomen in children and adolescents
- Peak incidence between 10-12 years
- Increased rate of perforation in children

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CASE STUDY

- **12 year old girl with 16 hr h/o abd pain**
  - **Initially diffuse discomfort, now RLQ**
  - **Nausea and vomiting**
  - **Normal BM yesterday**

  - **Sitting still, calm**
  - **100.2 100 18 90/60**
  - **Abd--flat, RLQ tenderness, hypoactive BS**

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DIFFERENTIAL DIAGNOSIS

- Appendicitis
- Gastroenteritis
- Ovarian cyst, torsion
- Urinary tract infection
- Spontaneous bacterial peritonitis

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HISTORY

- Classic history is a diffuse/periumbilical pain, which eventually localizes to the right lower quadrant
- Pain followed by nausea/vomiting
- Anorexia may be associated.
- Ask a child whether the “bumps on the road” on the ride over made the pain worse.
  - This usually signifies peritoneal irritation that can be seen with appendicitis

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PHYSICAL EXAM

- Tachycardia may be present.
- Fever
  - Acute appendicitis--low grade fever.
  - Ruptured appendicitis—often presents with higher Temperature.
- Tenderness in the right lower quadrant
- Rovsing's sign —tenderness in the right lower quadrant elicited when pressure is exerted in the left lower quadrant.

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APPENDICITIS: ACUTE VS. RUPTURED

- Duration of symptoms: 36 to 48 hours
- Fever grade: low vs high (38.5 °C)
- Abdominal or rectal mass
- Localized vs diffuse peritonitis

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ADJUNCTIVE TESTS

- WBC may be normal or elevated
- Elevated bands
- Urine dipstick excludes UTI

- CT or Ultrasound
  - if H & P is not confirmatory
  - if suspicious for rupture

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Consent

- **Discuss whether an open or laparoscopic approach is most applicable**

- **Risks**
  - **Infectious complications**
  - **Damage to adjacent structures—intestine, bladder, ureter, iliac vessels (trocar injury)**

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Preparation for Surgery

- **Intravenous fluids**
  - **Tailor fluids to level of dehydration**
- **Intravenous antibiotics**
  - **Antibiotics should be administered as soon as the diagnosis of appendicitis is made (NOT to be considered "prophylaxis")**
  - **Evidence to show single agent antibiotic therapy is effective even in ruptured appendicitis. (ref: APSA Systematic Review)**

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OPERATION: Open procedure

Right lower quadrant incision

Muscle sparing technique

Locate the appendix

Secure the mesoappendix

Amputate the appendix at the base

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OPERATION: Laparoscopic procedure

- Contemporary approaches: Three port technique or SILS
- Abdomen is insufflated with carbon dioxide.
- Mesoappendix is secured with cautery, linear stapling device or Endoloops
- Base of appendix is secured with linear stapling device or Endoloops.
- Drainage of abscess if present

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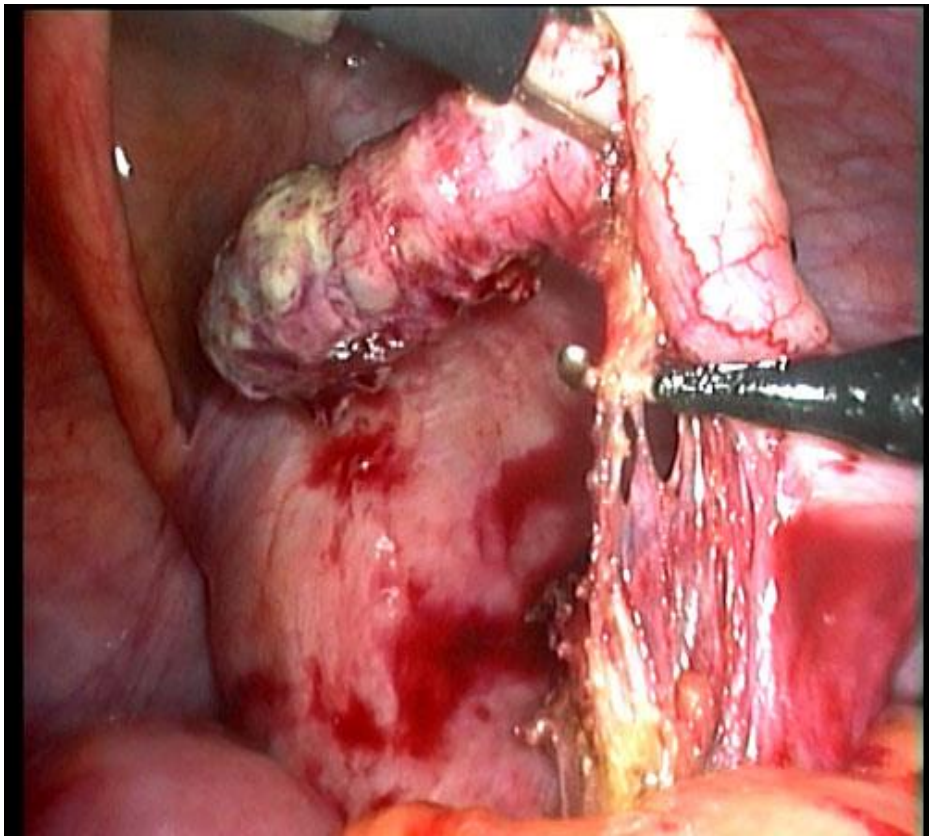

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INTERVAL APPENDECTOMY

- When a patient presents with ruptured appendicitis associated with a localized abscess, he or she may benefit from percutaneous drainage of the abscess, IV antibiotics, and appendectomy in 6-8 weeks
  - Operation performed when the acute inflammation has resolved may result in less physiologic insult to patient.

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ACUTE APPENDICITIS: OUTCOME

- Average hospital stay of 1 day
- Risk of wound or pelvic infection—1-2%
- Rapid return to school and regular activity
  - 1-2 weeks

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RUPTURED APPENDICITIS: OUTCOME

- Longer hospital stay 5 days
- Need for antibiotics for 7 to 10 days
- Prolonged recovery 2-4 weeks
- More prone to complications
  - wound, intra-abdominal and pelvic infections (10-20%)
  - prolonged ileus
  - intestinal obstruction
  - Scarring of Fallopian tubes

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COMPLICATIONS

- **Peri-operative**
  - **Wound infection**
    - **Acute 1-5%**
    - **Ruptured 5-15%**
- **Long Term**
  - **Adhesive intestinal obstruction—higher in ruptured appendicitis**

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Questions

3 year old with 5 day history of abdominal pain and vomiting undergoes a laparoscopic appendectomy for ruptured appendicitis. The most appropriate immediate post-operative antibiotic therapy for this patient is:

a. IV ampicillin, gentamycin, metronidazole

b. IV piperacillin-tazobactam

c. oral trimethoprim-sulfamethosazole

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Question

- 12 year old male presents with a two day history of vague abdominal pain, now localized to the RLQ.

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Acknowledgement SLide

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