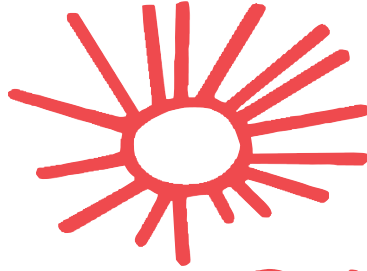


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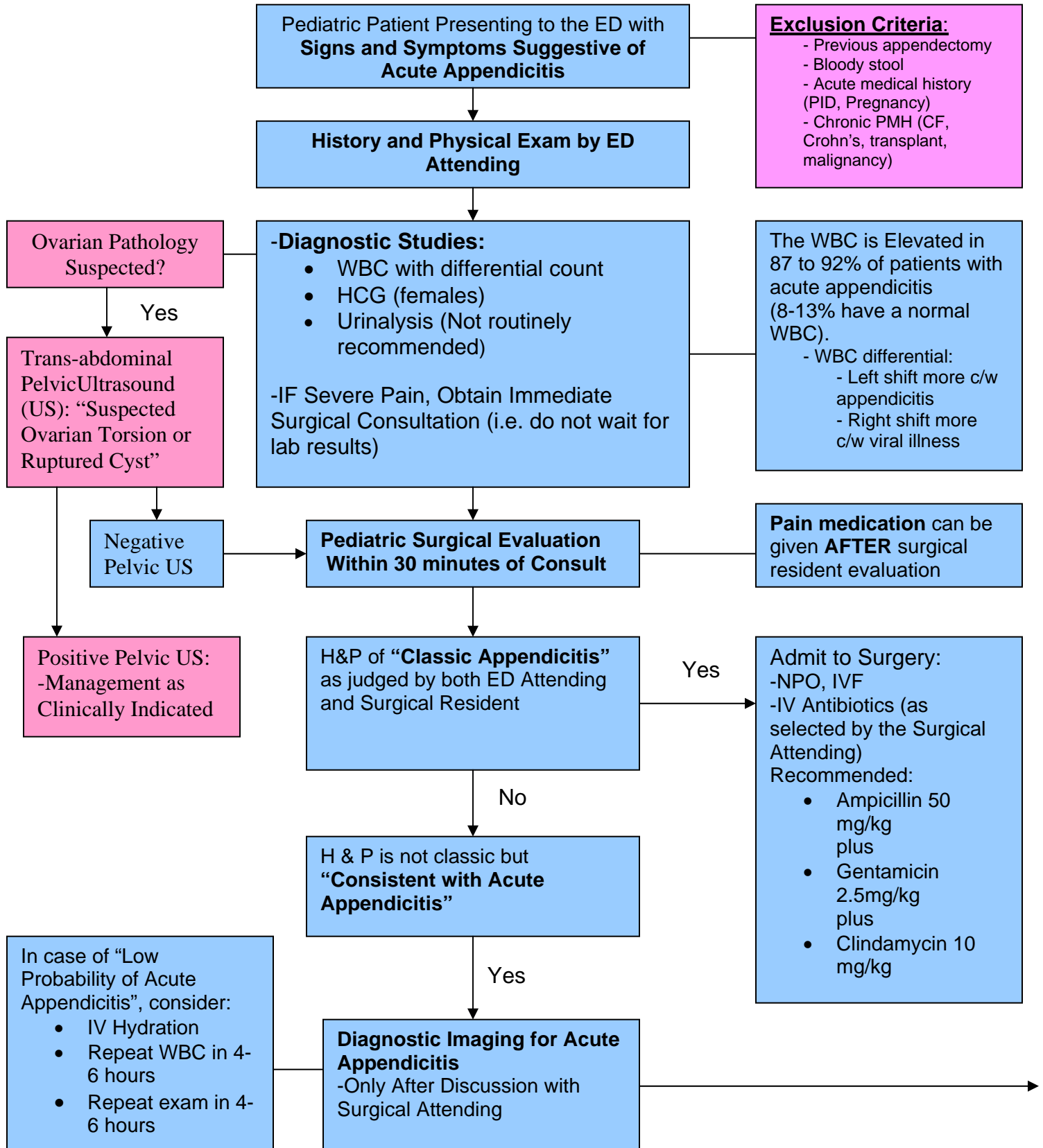
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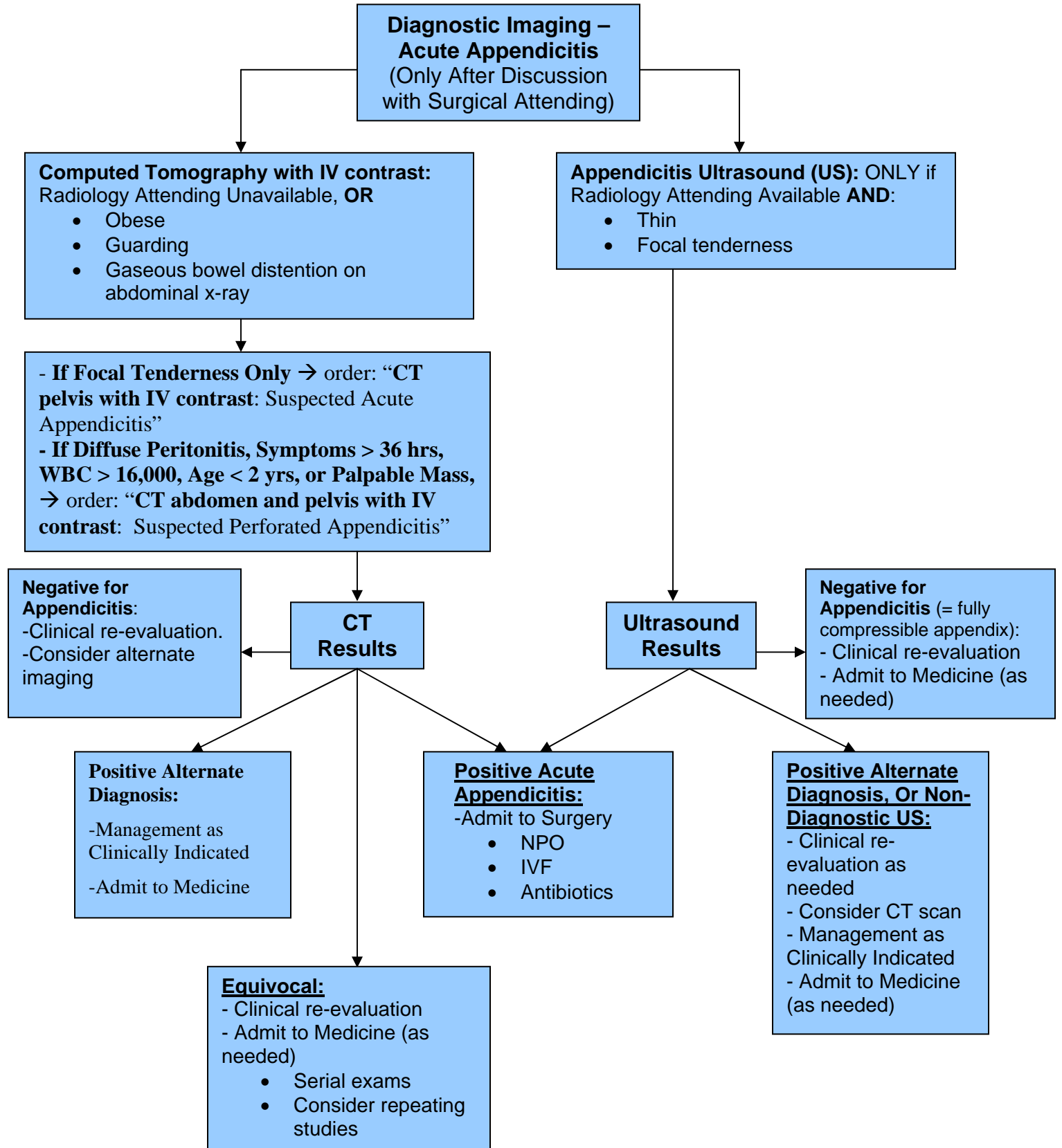
SSM Cardinal Glennon Children's Medical Center

# Appendicitis/Abdominal Pain

Approval Date February 2009

## Suspected Appendicitis Clinical Practice Guideline Work-up/ Diagnostic Algorithm





## **Emergency Department Evaluation and Management of Appendicitis in Children**

### ***I. Cardinal features***

- Diffuse periumbilical or central abdominal pain usually lasting several hours, with brief cessation, followed by pain in the right lower quadrant in a constant, localized form; pain may be atypical in patients with retrocecal appendix, and may be shifted up onto the right upper quadrant in pregnant women
- Tenderness to palpation of right lower quadrant
- Rebound tenderness
- Nausea, vomiting, and constipation may occur after right lower quadrant pain is established
- Body temperature around 37.8 C is common
- Leukocytosis and neutrophilia are common

### ***II. Causes***

- Increased incidence 1-2 weeks after a viral syndrome
- Luminal obstruction (secondary to lymphoid hyperplasia, fecolith, or less commonly by calculus, tumor, foreign body or parasites)
- Secondary infectious process
- Mucoïd secretions result in organ distention, increased intraluminal pressure, decreased venous drainage with venous engorgement, and arterial compromise leading to ischemia
- With diagnostic delay, increase in intraluminal pressure can ultimately result in gangrene leading to perforation, contamination of abdominal cavity with fecal contents, and development of peritonitis

### ***III. Epidemiology***

#### **Incidence and Prevalence**

- 1.1/1000 per year overall
- 2.3/1000 between ages 10 and 20

### ***IV. Demographics***

#### **Age**

- Peak incidence among teenagers

### **Gender**

- Male: female 3:2 between ages 10 and 30
- Male= females >30 years

### **Race**

- Caucasian: non Caucasian 1.5:1

### **Genetics**

- Some research suggests familial predisposition

### **Geography**

- Suspected, not well studied

### **Socioeconomic Status**

- Increased risk of morbidity and mortality associated with underinsured population

## **V. Differential Diagnosis**

- Ectopic pregnancy
- Crohn's terminal Ileitis
- Mesenteric Lymphadenitis
- Pelvic Inflammatory Diseases
- Ruptured graafian follicle or corpus luteum cyst
- Acute gastroenteritis
- Acute cholecystitis
- Diverticular disease
- Pyelonephritis
- Psoas abscess
- Cecal tumor with localized perforation
- Renal colic
- Perforated Meckle's diverticulum

## **VI. Signs and Symptoms**

- Fever
- Tachycardia
- Abdominal tenderness
- Localizing signs which may be present (but are not diagnostic)
  - Psoas sign (pain with right thigh extension),
  - Obturator sign (pain with internal rotation of the flexed right thigh)
  - Rovsing's sign (right lower quadrant pain on palpation of the left lower quadrant)
- May demonstrate cutaneous hyperesthesia between T10 and T12
- Patient often lies still, in right lateral decubitus position, slightly flexing hip

### **Symptoms**

- Possible diffuse periumbilical abdominal pain then right lower quadrant pain and tenderness approximately at McBurney's point
- ±Anorexia
- ±Nausea
- ±Vomiting
- Possible diarrhea or constipation
- Atypical presentation common in the elderly, young age, poorly localized pain

### ***VII. Summary of Investigative Laboratory Tests***

- Complete blood count with differential: Leukocytosis with left shift is present in 90% of patients with appendicitis
- Serum pregnancy test: consider ectopic pregnancy in women of child-bearing age
- Urinalysis: Hematuria and pyuria occur in 20% of patients and their presence may suggest another diagnosis (does not rule out appendicitis)
- Occasionally there are circumstances in which additional bloods tests prior to transfer to surgical care are appropriate. However, they are not normally required

### ***VIII. Diagnostic Imaging for Acute Appendicitis:***

#### **Graded Compression Ultrasonography (US):**

Performed by applying continuous pressure with the transducer in the right lower quadrant during transabdominal ultrasound, it is particularly useful in women of child-bearing age when diagnosis is unclear

#### **Abnormal**

- Appendiceal diameter > 6 mm
- No compressibility of appendix
- Absent peristalsis
- Collection of fluid surrounding the appendix
- Keep in mind the possibility of a falsely abnormal result
- Abnormal results have 85- 90% sensitivity and 92- 96% specificity for the diagnosis of appendicitis

**Advantages:** safe, relatively inexpensive, can rule out pelvic diseases in females, better for children

**Disadvantages:** Operator dependent(Requires expertise of Pediatric Radiologist), technically inadequate studies due to gas, pain, obesity

## **CT Scan with Intravenous Contrast:**

### **Normal**

- Normal abdomen visualized

### **Abnormal**

- Any number of abdominal processes may be visualized during CT, particularly with contrast or using a helical technique
- Keep in mind the possibility of a falsely abnormal result
- Abdominal CT scan has an accuracy of > 90% (sensitivity of 90 to 100%, and specificity of 95 to 97%). Is very sensitive and specific for appendicitis and is the confirmatory test of choice in equivocal situations

**Advantages:** More accurate, better identification of phlegmon, abscess, better identification of normal appendix

**Disadvantages:** cost, ionizing radiation, contrast use

## ***IX. Summary***

Points to remember:

- Consider analgesia if patient is distressed
- Treat/ avoid dehydration in a patient unable to eat or vomiting
- Obtain prompt surgical consult if appendicitis appears likely, or evaluate other causes of acute abdomen

References:

- Journal of American Family Physician
- Journal of Radiology
- Journal of Pediatric Surgery
- Pediatrics
- Hospital Practice, Capsule & Comment