

# Acute Abdominal Pain in Children

- Acute abdominal pain in children is one of the most frequent reasons for emergency room visits and pediatric surgical consultations.
- Through a detailed history, physical exam findings and consideration of the incidence of specific etiologies, the differential diagnosis of can be narrowed

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The initial presentation in patients with abdominal pain can be associated with:

- Obstruction
- Inflammation
- Both.

# History Taking

- Abdominal pain features
  - pattern – constant (inflammatory) , intermittent (Obstruction)
  - character – dull, sharp, crampy
  - intensity – increasing, stable, decreasing; impact on normal activities
  - location – migratory or consistent location
- Associated symptoms
  - nausea, emesis – emesis color
  - diarrhea, constipation, obstipation; stool color/presence of blood
  - constitutional – fever, malaise, lethargy
  - other – cough, sore throat, dysuria
- Duration (time from onset)
- Exacerbating and/or relieving factors (Stay-Still)

# Physical exam

- Child's appearance and movement while obtaining the history
- Distraction, Warming the hands or examining while still clothed or in their parents arms
- Abdominal, Throat, respiratory, groin, costovertebral angle, scrotum
- Special maneuvers such Rovsing, obturator and psoas signs

# Obstruction

## Congenital (Neonatal Period)

Intestinal [malrotation](#)/volvulus

Congenital adhesions

Intestinal duplication cyst, mesenteric cyst

Incarcerated inguinal [hernia](#)

[Distal intestinal obstruction syndrome](#) (DIOS)

[Hirschsprung](#) associated enterocolitis (HAEC)

## Acquired:

[Intussusception](#) (6-18 months)

Adhesive bowel obstruction (post inflammatory)

[Crohn disease](#)-Stricture

Foreign bodies

Henoch-Schonlein purpura (HSP)

Idiopathic Constipation

# Inflammation

Appendicitis (The most common surgical cause of abdominal pain in children)

- Acute (simple/non complicated)
- Complicated/perforated

**Gallstone complications**

- cholecystitis
- choledocholithiasis/cholangitis

**Pancreatitis**

**Pelvic inflammatory disease (PID)**

**Other intestinal**

- Meckel diverticulitis
- Crohn disease – phlegmon/abscess
- Neutropenic enterocolitis
- Perforated viscus
- Peptic ulcer disease (PUD)
- Nonaccidental abdominal trauma (NAT)
- Pneumonia
- Viral mesenteric adenitis/gastroenteritis

# Both

Intestinal obstruction with ischemic/infarcted bowel:

- Complicated [appendicitis](#)
- [Crohn](#) disease
- [Hirschsprung](#) associated enterocolitis (HAEC)

## Other

[Abdominal](#)/retroperitoneal neoplasm

Ovarian/Scrotal pathology

- Torsion
- Ovarian ruptured cyst

gastroesophageal reflux (GERD)

# Assessment

## Laboratory tests:

**CBC, CRP, ESR, BMP, CMP, Amylase, Lipase, UA**

## Radiological Tests:

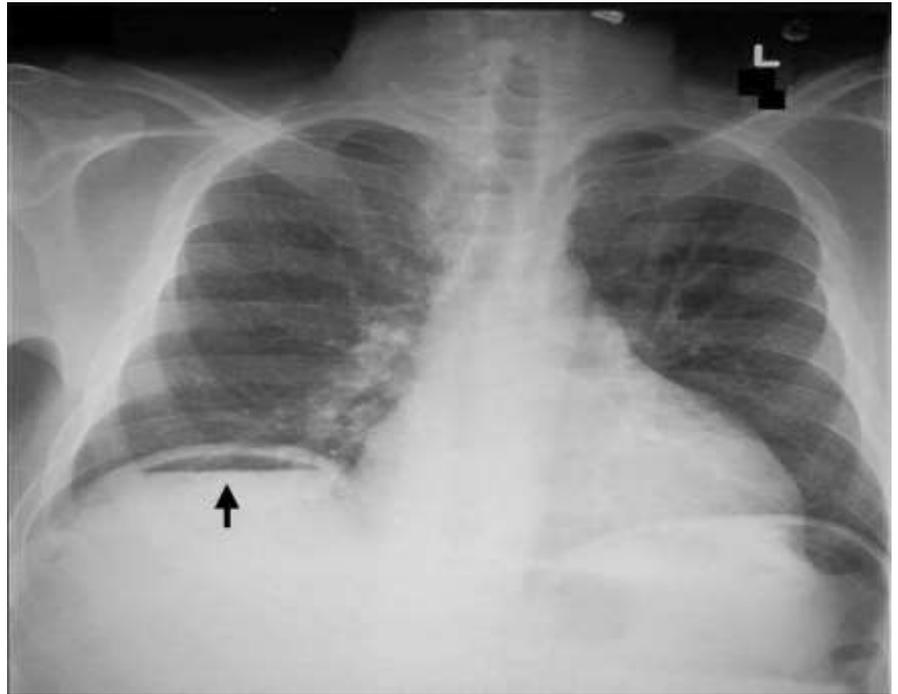
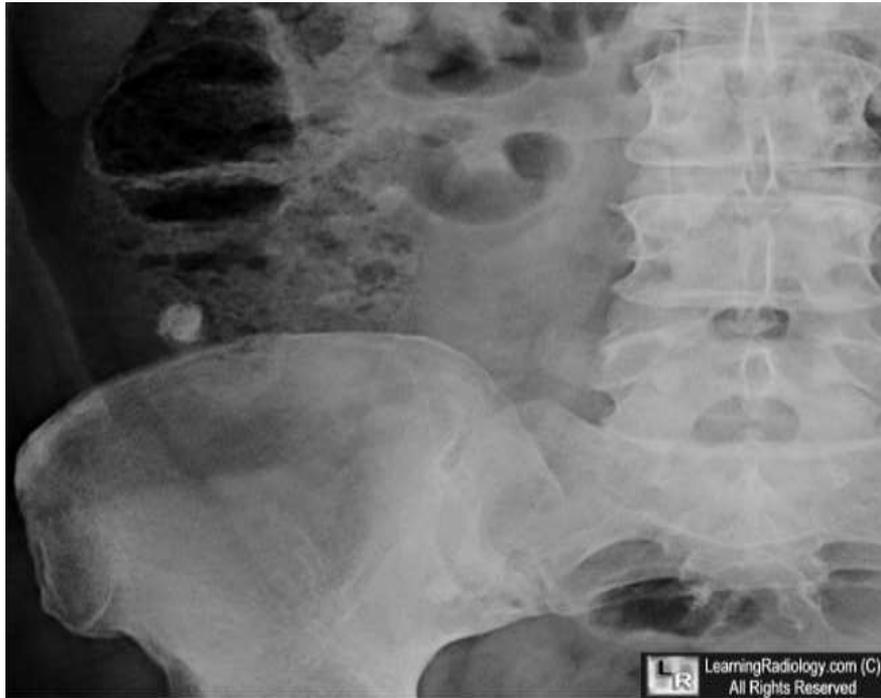
- **Abdominal X-Ray (Erect/Supine)**
- **Abdominal/Pelvis Ultrasound**
- **UGI Contrast study/SBFT/Contrast Enema**
- **Abdomen/Pelvis CT scan**
- **Abdominal MRI**
- **CXR when respiratory symptoms or signs are present**

## **X-Ray findings of appendicitis:**

- loss of psoas shadow
- focal ileus
- scoliosis
- fecalith

## **Pneumatosis: NEC**

## **Pneumoperitoneum: Perforated viscus**



# Ultrasound Findings

**Target Sign:**  
**Intussusception**

**Appendicitis:**  
non-compressible tubular structure in right lower quadrant (greater than 7 mm diameter)

**Cholecystitis:**  
gall bladder wall thickening  
pericholecystic fluid,  
sonographic Murphy sign



# Common scenario

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**12 years old boy with 16hrs of abdominal pain**

**Pain initially diffuse and non-specific, now located in the right lower quadrant**

**Nausea and 1-2 episodes of emesis**

**Fever, No Similar previous episodes of pain**

**Anorexia**

# Differential Diagnosis

- **Gas pain from constipation (acute onset, severe, episodic pain)**
- **Viral gastroenteritis (high volume emesis prior to pain, then diarrhea)**
- **Viral mesenteric lymphadenitis**
- **Ovarian torsion, ruptured ovarian cyst**
- **Urinary tract infection, IBD**
- **Ileocolic intussusception**

# Acute Appendicitis

- **Most common indication for emergency abdominal surgery in children**
- **Peak incidence between 10-12 years**
- **Rate of perforation is 10-30% in children  $> 5$ yo, and 50-90% in children  $< 5$ yo**

## Pathophysiology:

- **Appendiceal luminal obstruction – Fecalith (appendicolith) – Lymphoid hyperplasia (viral infection)**
- **Increased intraluminal pressure leading to ischemia and intramural bacterial infection**

**McBurney point:** 1.5-2 inches from the anterior superior iliac process along a line drawn from the process to the umbilicus

**Rovsing sign:** RLQ pain that results from palpation of the left lower abdomen

**The obturator sign:** RLQ pain with flexion and internal rotation of the right hip.

**psoas sign:** RLQ pain when the patient is in the left decubitus position and the right leg is extended. A positive psoas sign is often suggestive of a retrocecal appendicitis.

**The Dunphy sign:** is increased RLQ pain with coughing

# Pediatric Appendicitis Score (Points)

	Variable	Value
Symptoms	Migration of pain	1
	Anorexia	1
	Nausea/vomiting	1
Signs	Right lower quadrant tenderness	2
	Rebound pain	2
	Elevation of temperature $\geq 38^{\circ}\text{C}$	1
Laboratory	Leukocytosis $\geq 10 \times 10^9/\text{L}$	1
	Polymorphonuclear neutrophilia $\geq 75\%$	1

**Sum of 6 suggests appendicitis**

# Risk factors for complicated appendicitis

- Symptom duration >36hrs
- High or persistent fevers
- Palpable RLQ mass on physical exam
- Diffuse peritonitis
- Significant abdominal distention
- Diarrhea
- Extremely elevated WBC count, CRP

# Treatment

**Uncomplicated appendicitis:  
Surgery vs antibiotics and no surgery**

**Complicated appendicitis:  
surgery vs antibiotics and delayed  
surgery (interval appendectomy in  
case of abscess)**

