Abdominal Pain & Appendicitis

History OPQRST Pain history
Onset
Provokers and Palliators
Quality
Region and Radiation
Severity (0-10 pain scale)
Therapies and Trauma
Associated symptoms
Fever
Nausea, vomiting
Diarrhea, constipation
Dysuria, frequency, urgency
GU pain, vaginal bleeding
Cough, dyspnea, chest pain
Sore throat
Other history
PMH, PSH, LMP / menarche, Sexual history, Meds, recent PO

Physical Exam
Full body: HEENT, Lungs, Heart
Abdomen: distension, tenderness, guarding, rebound, Murphy's / RUQ, McBurney's / RLQ, flank / CVAT, psoas and obturator signs, bowel sounds, hop test
GU: male – testicular, female – external GU vs pelvic exam prn

Suspicion for appendicitis
(Maintain high index of suspicion)
- RLQ abdominal tenderness
- Migration of pain from periumbilical to RLQ
- Rebound tenderness
- Psoas sign
- Obturator sign
- Guarding
- Pain with hopping
- Anorexia
- Low-grade fever
- Pain precedes vomiting

yes

Suspect acute abdomen
Toxic appearing
Rigidity
Rebound tenderness
Bilious vomiting in infant
Sepsis

yes

Consult surgeon

CBC with diff
Electrolytes
Consider LFTs, urine, blood cx
IVF resuscitate
IV pain meds

no

CBC with differential
Urine, Urine pregnancy prn
IVF bolus, IV pain meds
RLQ ultrasound

Consider Ddx
other surgical causes, non-acute causes, non-GI causes

Ultrasound + for appendicitis

yes

no

US: appendix not visualized but secondary signs present (free fluid, echogenic fat, appendicolith) and RLQ pain

yes

no

Calculate pediatric appendicitis risk score (pARC)

low risk

Consider discharge with repeat exam in 12-24 hours

med or high risk

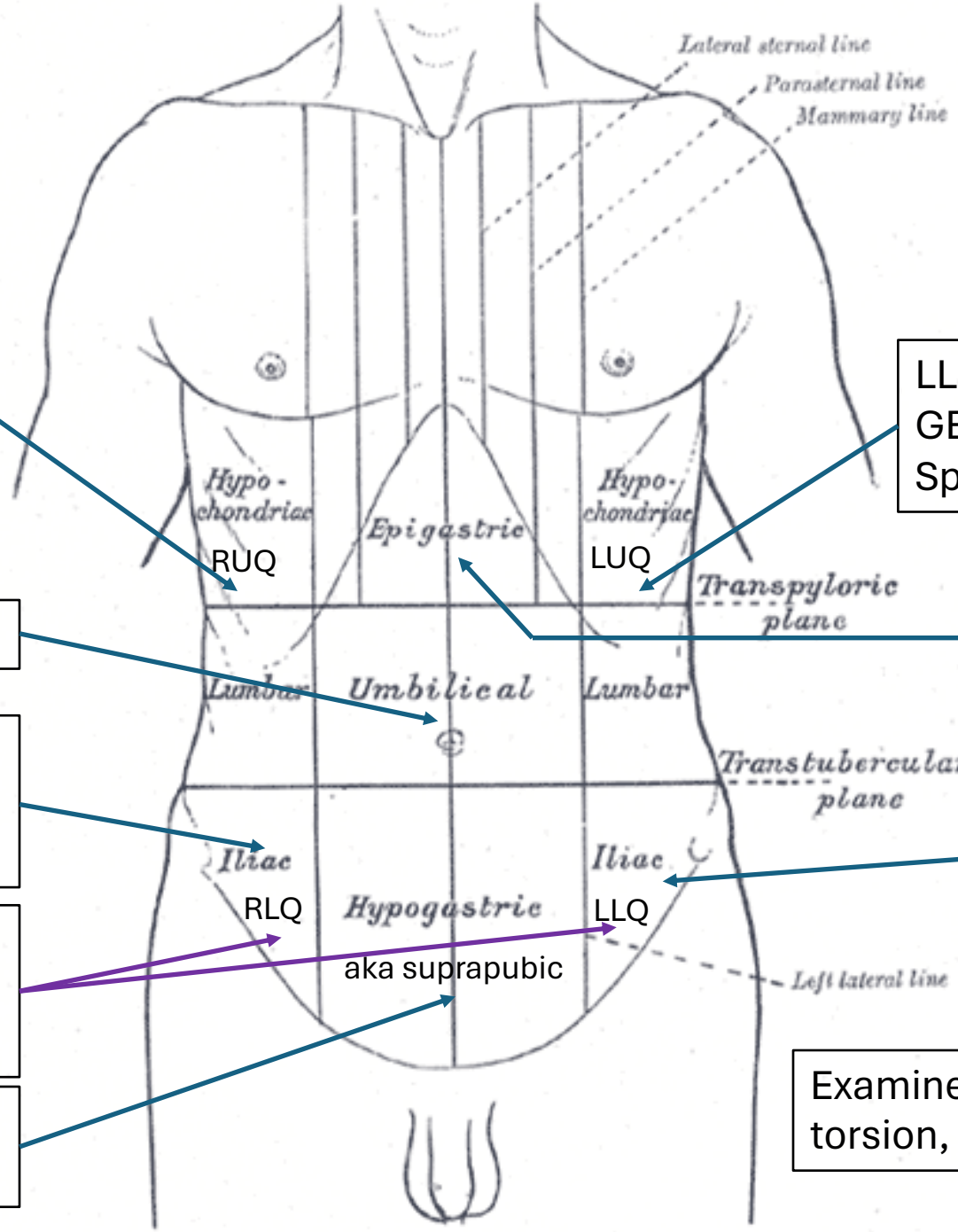
Surgeon available to consult?

yes

no

CT abd/pelvis with IV contrast

Abdominal Pain DDx by Location



RLL pneumonia
Retrocecal appendicitis
Cholelithiasis
Cholecystitis
Hepatitis

Early appendicitis

Appendicitis
Mesenteric adenitis
Intussusception

Ovarian issues (cyst, torsion), ectopic, Mittelschmerz

UTI
Dysmenorrhea

LLL pneumonia
GERD / Dyspepsia
Splenic rupture

GERD / Dyspepsia
Pancreatitis

Constipation
Diverticulitis

Examine genitalia: testicular torsion, PID

Note: not a comprehensive differential diagnosis

Serious / surgical causes of abdominal pain

Diagnosis	Epidemiology	When to suspect
Appendicitis	All ages, ↑ 2nd decade of life, M > F (lifetime risk 9% M, 7% F)	Anorexia, Periumbilical pain that migrates to the RLQ, Pain with movement, Vomiting *after* pain onset, McBurney's point tenderness, involuntary guarding, Rovsings, Psoas, Obturator, Rebound tenderness
Cholecystitis	Obesity, pregnancy, certain genetic conditions	RUQ pain and tenderness, often occurs after a fatty food meal, may have fever, Murphy's sign, work-up: CBC, LFTs, amylase, lipase, RUQ ultrasound
Bowel obstruction	Post-surgical adhesions, incarcerated hernia, M = F	Intermittent, colicky pain, vomiting – may relieve the pain. May have distension. Air-fluid-levels (AFL) on KUB, but CT w/contrast best diagnostic test. Lab work-up: CBC, lytes, BUN/Cr, lactate
Intussusception	Peak 4-36 months old if no lead point, 10% > 5yo, M:F 3:2	Sudden onset pain episodes, draw up legs, 15-20 min per episode, vomiting (may become bilious), blood in stool (classic: currant jelly), +/- sausage-shape mass RLQ, atypical: lethargy / altered mental status. US
Midgut Volvulus	Any age but 30% in 1st month of life, majority < 1yo, M > F	Infant: bilious emesis, distension, tenderness, +/- hematochezia, advanced – peritonitis, shock. Older: chronic intermittent abdominal pain. Consult surgeon to guide work-up and management; resuscitate. UGI, CT
Incarcerated hernia	Inguinal hernia ↑ in premies, M:F 3-4:1, incarceration 85% < 1yo	Hx of intermittent groin bulge, incarceration: pain, irritability, crying, vomiting, abdominal distension. Firm, tender inguinal mass +/- overlying erythema, edema.
Meckel's diverticulum	Rule of 2's: 2% pop'n, 2 % complic, m/c < 2yo, M:F 2:1, 2 ft from ileocecal valve	Painless GI bleeding, may lead to anemia, child: dark / maroon stools, adult: melena. Can cause obstruction, perforation / peritonitis. Diagnose with Meckel's scan (nuclear medicine scan)
Hepatitis	Viral hepatitis, epidemiology varies by etiology	Nausea, vomiting, diarrhea, fever, jaundice, pale stools, dark urine, RUQ tenderness, ill contacts. Lab work-up: AST, ALT, Alk phos, bilirubin, hepatitis serology panel, CBC, PT/INR
Pancreatitis	Trauma (abuse), viral, drugs / toxins, gallstones	Epigastric pain radiating to back, nausea, vomiting, may have fever, jaundice. May lie on side with hips & knees flexed. Work-up: amylase, lipase in addition to CBC, lytes, coags. CT, US, assess for gallstones, pseudocyst
Traumatic injury	Common in children: liver, spleen, kidney injury, hollow viscus injury	History of trauma or suspicion for abuse, seat-belt sign, abdominal tenderness, falling hemoglobin. Diagnosis: FAST US, CT w/IV contrast. Labs: serial hemoglobin, AST, ALT, amylase, lipase, lactate. Algorithm
Ectopic pregnancy	Risk factors: prior PID, STI, tubal anomalies, infertility, IVF, douching	First trimester abdominopelvic pain, vaginal bleeding. Sx typically 6-8 weeks after LMP. Rupture may → lightheaded, shoulder pain, shock. Quant HCG, Transvaginal US to assess for intrauterine pregnancy.

Note: not a comprehensive differential diagnosis

Non-acute causes of abdominal pain

Diagnosis	Risk factors	Symptoms
Constipation	Transitions: breast to formula fed, addition of solids, potty training, starting school. More information	Stools both infrequent AND hard (skipping a day or more if stools are soft when they do come is *not* constipation), LLQ pain, pain after eating
Gas	Gas-producing foods: beans, lentils, peas, carbonated drinks, sugar and sugar substitutes, cabbage, broccoli, whole grains	Crampy pain, belching and passing gas, bloating
Muscular strain	Heavy lifting, sports or exercise (esp. with twisting motions), coughing / sneezing / vomiting hard	Localized pain with movement or palpation of the area, normal appetite and eating
GERD	Prematurity, pulmonary diseases / chronic cough, neuromuscular disorders, Down syndrome, obesity, eating trigger foods	Epigastric pain, nausea, belching, radiating to mid-chest and sometimes to back, symptoms ↑ after meals, when supine, w/trigger foods, w/stress
Gastroenteritis	↑ in Fall, Winter, ill contacts (daycare, preschool), recent travel, eating street food, recent travel, poor food preparer hygiene	Nausea, vomiting (often first), diarrhea, abdominal cramps (periumbilical to lower abdomen), may have fever. More information
Food poisoning	Eating high-risk food: left out (picnic, party, street food), improperly cooked or stored, raw meat, eggs, shellfish	Nausea, vomiting, diarrhea, abdominal cramps, may have fever, others who ate same food are also symptomatic. More information (slides 5 & 6)
Lactose intolerance	Asian-American, African-American, Native-American, (↓ lactase begins at 2yo); recent small intestine inflammation (e.g. AGE)	Abdominal bloating, cramps, diarrhea, nausea, flatulence, borborygmi, 30 min to 2 hours after dairy ingestion
Dysmenorrhea	Adolescents and young women, stress, smoking. Reduced risk with hormonal contraceptives	Crampy, lower abdominal pain, typically 1-2 days before menses onset, lasts 12-72 hrs (may last entire menses), +/- nausea, malaise, headache, diarrhea
Imperforate hymen	Lack of menarche in an adolescent with pubertal development at level expecting menses	Lower midline abdominal pain, may have palpable mass, +/- dysuria, constipation, back pain; bulging hymen, often blue-purple
Functional abd pain	Anxiety, stress, depression, school phobia, secondary gain (e.g. avoiding unwanted activity that a parent pressures the child to do)	Chronic, intermittent or continuous, often periumbilical, normal eating and sleeping, normal physical exam. May be diagnosis of exclusion

Note: not a comprehensive differential diagnosis

Non-GI acute abdominal pain

Diagnosis	Epidemiology	When to suspect
Strep throat	5-15 years old, Winter and early Spring, close contact with Grp A strep infection	Sudden onset fever, sore throat, no viral URI sx, +/- headache, abdominal pain; red tonsils with exudate, palatal petechiae, cervical lymphadenopathy, Centor criteria. < 3yo (rare): streptococcosis, URI sx
Pneumonia	Younger children, daycare, underlying illnesses, unimmunized	Fever, cough, tachypnea, increased work of breathing, ↓ pulse ox, chest pain, lower lobe pneumonia may → abdominal pain, focal crackles, decreased breath sounds
Myocarditis	Bimodal presenting age: infant / toddler, adolescent; recent viral illness	Nonspecific: anorexia, fatigue, chest pain, abdominal pain, nausea, tachypnea, exercise intolerance; retractions, rales gallop rhythm, hepatomegaly, poor perfusion
Testicular torsion	Any age, but peak 12-18yo, + personal or family prior history, 4-8% preceding trauma	Sudden onset severe scrotal pain, swelling & tenderness, horizontal lie to testis, pain reduced with elevating testis (Prehn's sign), absent cremasteric reflex. Undescended → abdominsl pain
Ovarian torsion	Ovarian mass (e.g. cyst), esp if ≥ 5cm	Unilateral sharp pelvic pain, ovarian mass on pelvic exam, nausea / vomiting, may have low-grade fever. Premenarchal more likely to have diffuse pain, fever, and present with nausea & vomiting
Ovarian cyst rupture	Known prior ovarian cyst, post-coital or post-exercise; combined OCPs protective	Sudden onset unilateral lower abdominal pain, often after sex, exercise, or trauma, RLQ (more common) or LLQ tenderness; if significant hemorrhage, tachycardia, +/- peritoneal signs
STI / PID	Condomless sexual activity, multiple partners, receptive penile intercourse	Genital lesions, pelvic pain, genital discharge, dysuria, dyspareunia, inguinal lymphadenopathy, unusual vaginal bleeding
Pregnancy-related	Known or suspected pregnancy (unprotected sex, late / missed menses)	Causes: miscarriage, ectopic pregnancy, hyperemesis gravidarum, placental abruption, round ligament pain. All the other causes of abdominal pain can also occur in pregnant patients
UTI / pyelonephritis	Females, uncircumcised males < 3-6 mo, prior UTI, diapers / potty training, poor hygiene	Fever (w/o other source in infant – risk calculator febrile 2-23mo), dysuria, urinary frequency, hematuria, suprapubic pain, nausea / vomiting, CVA tenderness in pyelonephritis. More information
Nephrolithiasis	Adolescents, low urine flow rate, hypocitraturia, hypercalciuria, + personal or FH, recurrent UTIs	Colicky flank, back, or abdominal pain, hematuria (microscopic or gross), nausea and vomiting, dysuria and urgency in 10%
Abdominal migraine	2-10yo, + FH of migraines, F > M, stress / anxiety / depression	Attacks of midline, poorly localized abdominal pain + 2 of: anorexia, nausea, vomiting, pallor; typically lasts 1-72 hours, normal in between attacks; usually no headache, phono/photophobia
Sickle cell pain crisis	Known sickle cell anemia or high-risk group or FH+ for undiagnosed	Causes: vaso-occlusive pain crisis (many have triggers, eg: cold, dehydration, stress, menses) , splenic sequestration, opioid-induced constipation