



Shownotes

Topic #1: Abdominal Pain

1. Given a patient with abdominal pain, paying particular attention to its location and chronicity:

a) Distinguish between acute and chronic pain.

- Acute pain is usually an onset of hours or days, often worsening and severe
- Most references will say abdominal pain that lasts 3 months is considered chronic, but there really is no distinct amount of time that defines acute vs chronic

b) Generate a complete differential diagnosis (ddx). From Tintinalli's

- Specify chest vs. pleuritic vs abdominal vs. pelvic pain
- intra-abdominal processes often difficult to localize; vague intra-abdominal pain is **visceral pain** often described by patients as “crampy”, “dull” or “achy”
- organs of the digestive tract are bilaterally innervated, often felt as midline pain - if vague midline pain present, you can guide localization by embryological origin
- Upper abdomen: foregut, from oesophagus to 2nd section of duodenum and including all the biliary structures
- Mid-abdomen: midgut, 2nd half of the duodenum to mid-transverse colon
- Lower abdomen: hindgut, the rest of the transverse colon to the rectum (not including anus, which is innervated somatically and very localizable)
- non-GI organs like the kidneys and ovaries are more likely to cause lateralizing abdominal pain
- Parietal peritoneum is innervated in a way that localizes pain; once the underlying process interacts with the peritoneum, the likely culprit can be localized to that area
- If pain is generalized and not mid-line, think of conditions such as: gastroenteritis, metabolic causes (DKA, porphyria, lead poisoning), bowel obstruction, constipation, IBS, mesenteric ischemia
- Don't forget skin and MSK causes: herpes zoster, costochondritis, etc.

RUQ	Epigastric	LUQ
hepatitis, biliary colic, acute cholecystitis, ascending cholangitis, pyelonephritis, dyspepsia, pneumonia	MI, aortic dissection, pancreatitis, dyspepsia (PUD, GERD.), Zollinger-Ellison syndrome, pneumonia	Pyelonephritis, pancreatitis, splenic infarct, pneumonia

<p>Right flank</p> <p>AAA, IBD, pyelonephritis, nephrolithiasis, PID, ovarian torsion/hemorrhagic or ruptured ovarian cyst</p>	<p>Periumbilical</p> <p>AAA, mesenteric ischemia, pancreatitis, bowel obstruction, peritonitis, early appendicitis, gastroenteritis</p>	<p>Left flank</p> <p>AAA, IBD, pyelonephritis, nephrolithiasis, PID, ovarian torsion/hemorrhagic or ruptured ovarian cyst</p>
<p>RLQ</p> <p>Appendicitis, IBD, PID, ovarian torsion/hemorrhagic or ruptured ovarian cyst</p>	<p>Hypogastric</p> <p>usually genital or urinary causes like PID, renal stones, UTI</p>	<p>LLQ</p> <p>diverticulitis, sigmoid volvulus, renal stone</p>

c) Investigate in an appropriate and timely fashion. *From Edmonton Manual*

Lab:

- CBC+diff, to look for evidence of infection or inflammatory response
- electrolytes + extended lytes, as these can cause a generalized abdo pain, constipation, etc
- kidney function tests like GFR, creatinine, BUN and can trigger an investigation of renal causes, nephrolithiasis, obstruction
- LFTs and enzymes, for the hepatitidies, or biliary causes
- Lipase, for ye olde pancreatitis
- CRP, can help identify autoimmune conditions or inflammatory causes that have evaded clinical identification otherwise
- Glucose, for DKA
- Urinalysis if suspicion for UTI, stones, renal causes
- B-hCG in EVERY woman of child-bearing age

Imaging:

- 3 views abdomen can be helpful if suspecting obstruction (more than three air fluid levels on upright)
- U/S most often indicated for biliary, renal causes of abdo pain, though a bedside POCUS (if you're competent) can screen for AAA, free fluid, ectopic pregnancy, cholecystitis or uterine pregnancy
- CT if concerns for surgical abdomen, cancer, AAA, etc. and
- CT angiography if suspecting mesenteric ischemia

Special tests:

- ECG + cardiac workup if concerned about CVD cause of abdo pain, and remember that particularly in elders, women, people with diabetes, who may have atypical presentations of MI
- Scopes for GI causes
- Serum markers (e.g. anti-TTG for celiac or hepatic serologies for RUQ pain)
- Serum iron studies, Vitamin B12 and folate levels for an unexplainable anaemia
- Urea breath test (H. pylori)

- Fasting serum gastrin levels or serum secretin tests (Zollinger-Ellison syndrome)
- Stool samples for ova and parasite / culture and staining,
- Diagnostic laparoscopies, for example for endometriosis

2. In a patient with diagnosed abdominal pain (e.g., gastroesophageal reflux disease, peptic ulcer disease, ulcerative colitis, Crohn's disease), manage specific pathology appropriately (e.g., with medication, lifestyle modifications).

From Toronto Notes 2017 (G7), and BMJ Best Practice "GORD" 2020

GERD Management: suppress gastric acid production

- Non-pharmacologic: weight loss if obese, avoid or reduce alcohol, spicy foods, acidic foods and caffeine, elevate head of bed if nocturnal symptoms
- Pharmacologic:
 - o PPIs are most often used, initially as trial for relief then continued as maintenance if symptoms persist with removal of PPI for a period of time
 - o If no response to PPI trial, and you still suspect a gastro-oesophageal aetiology, or if there are alarm symptoms such as GI bleed, anaemia or dysphagia, an upper endoscopy is indicated
 - o "Choosing Wisely" states PPI holiday should be trialled annually as symptoms are often found to have gone and thus PPI no longer needed, at least for a time
- Surgical: patients unresponsive to PPIs are also unlikely to respond to surgery such as funduplications, thus these are usually reserved for PPI responders who cannot take the PPI for whatever reason
- Can also consider bariatric surgery if they meet appropriate criteria and the obesity is a likely factor in their GERD symptoms
- Known non-erosive disease can be treated symptomatically with prn:
 - o Antacids such as Magnesium hydroxide or Aluminum hydroxide,
 - o H2 blockers
 - o Or even prn PPIs
 - o Non-erosive reflux disease(NERD) is symptom relief only, while erosive requires continuous gastric inhibition to allow healing or erosions

Peptic Ulcer Disease Management *From Dynamed*

- Non-pharmacologic: STOP SMOKING (predisposing, increases risks of complications and morbidity/mortality, impairs healing)
- Pharmacologic: treat based on etiology
- H. pylori: test using urea breath test; PPI should be held 1-2 weeks prior to avoid false negative, treat with bismuth quadruple therapy
- NSAID-induced: lower dose or stop NSAID/aspirin, consider non-NSAID like tylenol for pain relief, give PPI for cytoprotective therapy 4-6 weeks for duodenal ulcers, 6-8 weeks for gastric ulcers
- Physiologic stress-induced: more common in ICU patients; treatment is challenging due to comorbidities but often gastric acid suppression prophylaxis given as either PPI or H2 blocker for 6-8 weeks
- Zollinger-Ellison Syndrome: rare cause of PUD, consider if patients young & otherwise healthy or those with recurrent PUD unexplained by other causes

Crohn's Disease Management *From Dynamed*

- Non-pharmacologic: smoking cessation electrolyte/micronutrient/vitamin replacement (D, Ca, Mg, zinc, Fe, B12 depending on segment involvement), assess for depression/anxiety/stress, assess for medication non-adherence, limited evidence for dietary adjustments
- Ileocolonoscopy 8 years after symptom onset due to increased risk of colorectal cancer
- Most patients will receive immunosuppressive treatment so reduce risk of opportunistic infections by making sure vaccinations up to date and screen for hepatitis/HIV/tuberculosis
- Pharmacologic:

- Functional Sx: loperamide can be used
- Functional pain: antispasmodics, neuropathic agents, acetaminophen
- Mood: consider counselling +/- medications
- 5-ASA/Sulfasalazine: according to CAG should be considered for mild Crohns limited to colon
- Corticosteroids, especially for flairs: CAG recommends first trialing budesonide, 2nd line prednisone if no response
- Immunosuppression: azathioprine, 6-MP, methotrexate; CAG recommends combined thiopurine + TNF-antagonist for induction of remission rather than monotherapy
- Immunomodulators for moderate-severe luminal disease: TNF-antagonists infliximab, adalimumab
- Surgery: may be indicated if evidence of obstruction due to intraluminal strictures, perianal abscesses or fistulas

Ulcerative Colitis Management

- Non-surgical:
- Mainstay of treatment is 5-ASA (mesalamine) in mild-moderate disease and corticosteroids for acute flares
- If becoming too steroid-dependent or resistant, likely need to consider azathioprine or immunologics like infliximab/adalimumab
- Surgical: colectomy can be curative if non-pharmacologic treatments not effective, bowel continuity can be restored with ileal pouch-anal anastomosis

3. In a woman with abdominal pain:

a) Always rule out pregnancy if she is of reproductive age.

- Urine b-hCG should be a reflex order in any woman of reproductive age who walks through the door with abdominal or pelvic pain
- Urine b-hCG is qualitative and can only pick up levels >20-120 mIU/mL, so there is a possibility of false negatives. A serum or quantitative beta-hCG is a better test if you are suspecting threatened abortion and may need to trend over time

b) Suspect gynecologic etiology for abdominal pain.

- Endometriosis, ovarian torsion, hemorrhagic ovarian cyst, tubo-ovarian abscess, PID, and gynecological cancers
- Bedside U/S or FAST scan can help rule out life-threatening causes, like a hemorrhagic ovarian cyst rupture or ectopic pregnancy causing hemorrhage, etc.

c) Do a pelvic examination, if appropriate.

- Cervical motion tenderness may help lead you to a diagnosis of PID
- Visualization of the cervix and any exudates or inflammation can help guide diagnosis and treatment
- If the woman is pregnant, make sure you know **where the placenta is** before doing a bimanual pelvic exam → watch out for placenta previa

4. In a patient with acute abdominal pain, differentiate between a surgical and a non-surgical abdomen. *From Toronto Notes 2017, GS5*

Surgical abdomen is essentially acute onset abdominal pain that requires surgical intervention. This may look like significant bleeding, unstable patient, peritonitis, or severe pain out of proportion to clinical expectations. Most common presentations are:

- Sudden onset pain with rigid abdomen, suggesting perforated viscus
- Pain out of proportion to physical findings, suggesting ischemic bowel
- Vague pain that later localizes suggests appendicitis or other intra-abdominal process that irritates the parietal peritoneum
- Waves of colicky pain with other symptoms of obstruction (ex. Hiccups, N/V) suggests bowel obstruction

5. In specific patient groups (e.g., children, pregnant women, the elderly), include group-specific surgical causes of acute abdominal pain in the ddx.

From Tintinalli's 8th E, p485

Neonates and young infants: necrotizing enterocolitis, malrotation midgut volvulus, incarcerated hernia, non-accidental trauma

Older infants and toddlers: intussusception, meckel's diverticulum, testicular torsion, non-accidental trauma

3-15 years old: more similar to adults but most common surgical abdomen cause is appendicitis, DKA as this could be their first presentation of T1DM, testicular torsion location based etiology as with adults, constipation and functional pain is quite common in kids (ask about psychosocial stressors)

Pregnant women: R/O ectopic (hemorrhagic ectopic pregnancy accounts for 10% all maternal deaths) → obtain a urine or serum bHCG, transvaginal ultrasonography is next step to assess for an intrauterine pregnancy if positive result, b-hCG >1500 should enable a transvaginal ultrasound to see at least a gestational sac

Elderly: symptoms may be deceptively mild, vague, late and atypical and surgical complications are more common. Fever and WBC are notoriously unreliable in this population. Causes that occur more often in elderly: cholecystitis, spontaneous bacterial overgrowth, perforated viscus, appendicitis (fewer than 20% have classic presentation), large bowel obstruction, gangrenous gallbladder, necrotizing pancreatitis, strangulated hernia, infarcted bowel

6. Given a patient with a life-threatening cause of acute abdominal pain (e.g., a ruptured abdominal aortic aneurysm or a ruptured ectopic pregnancy) *From Tintinalli's*

a) Recognize the life-threatening situation.

- Stable vs unstable, surgical vs. non-surgical
- Is patient extremes of age or immunocompromised? Is pain severe with sudden onset? Are there signs of dehydration? Evidence of visceral involvement like pallor, diaphoresis or vomiting? Abnormal vital signs (tachycardia more than BP)?
- Instability such as tachycardia, altered mental status or hypotension needs a FAST scan immediately, especially with history of abdo pain or trauma

b) Make the diagnosis.

- FAST scan is your BFF for identifying free fluid in abdomen, an ectopic or AAA causing life-threatening abdominal pain
- Can help stratify patients into risk groups, ie. that need immediate OR vs. stable enough for CT vs. those who need to be observed and investigated

c) Stabilize the patient.

- Fluid resuscitation if appropriate and not contraindicated (AAA), type and screen, crossmatch blood, oxygen if hypoxic, pressors with IM/ICU consultation if needed

d) Promptly refer the patient for definitive treatment.

- Recognize if patient is stable enough to go to imaging
- FAST scan very helpful in ED context for rapid assessment and indication to involve surgeons
- Consult appropriate specialist early on if patient looks unwell

7. In a patient with chronic or recurrent abdominal pain:

a) Ensure adequate follow-up to monitor new or changing symptoms or signs.

Every patient should have some kind of follow-up. Timing and type depends on presentation and presumed diagnosis.

- Specific info on red flag features and when to re-present to ED
- If etiology unclear, refer to GP for follow-up

b) Manage symptomatically with medication and lifestyle modification (e.g., for irritable bowel syndrome).

BMJ suggests first categorizing patient into constipation or diarrhea predominant IBS

- Constipation predominant IBS: encourage fibre supplementation and FODMAPS diet, lactulose or PEG if refractory, gastroenterology consultation if unresolved
- Diarrhea predominant IBS: trial loperamide after loose BM, cholestyramine can be more beneficial if patient has had cholecystectomy
- Associated pain/bloating: antispasmodics such as hyosciamine are first line, peppermint has mixed evidence but little risk and side effects, if refractory can try TCAs or SSRIs

c) Always consider cancer in a patient at risk.

Colorectal risk factors: age >50, IBD, personal history colorectal cancer or polyps, family history 1st degree relative colorectal cancer, history or predisposition to familial adenomatous polyposis or hereditary non-polyposis colorectal cancer, low physical activity, overweight/obese, alcohol use, smoking, low fiber diet, little fruits or vegetables

8. Given a patient with a diagnosis of inflammatory bowel disease (IBD) recognize an extra intestinal manifestation.

Extraintestinal manifestations that occur with flares:

- Peripheral arthritis, usually involving the large joints. This arthritis is often transient and migratory
- Episcleritis: benign and self-resolving
- Aphthous ulcers. These are non-contagious oral ulcers. Known colloquially as 'canker sore'
- Erythema nodosum: tender red nodules, usually seen on shins

Extraintestinal manifestations that occur without flare:

- Ankylosing spondylitis: pain and tenderness at the sacroiliac joint
- Uveitis: more serious, should be seen by ophthalmologist
- Primary sclerosing cholangitis: check the liver enzymes

Extraintestinal manifestations seen in severe disease

- Ileocecal resection patients may have deficiencies in fat soluble vitamins, Vit B12, iron, calcium, magnesium related to malabsorption; in children this may look like growth retardation
- Severe colonic inflammation can cause ureteric compression and resulting hydronephrosis
- Gallstones from impaired ileal reabsorption of bile salts



Resources

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