Abdominal Pain – Karima Sajadi
Based on Chapter 27 in Rosen's Emergency Medicine

Common CC in ED, but presents lot of challenges for the pts and docs (pts have hard time conveying the nature and quality of AP, PE findings can be varying and misleading, location and severity changes over time, benign sympotms can progress to life-threatening and vice versa, severe symptoms can be fairly benign; even after ED workup Dx may not be found)

Epidemiology:

- 10% of all ED visits
- GI, GU, pelvic organs
- Several adult groups are of special consideration:
    1. Elderly (65+) – more likely to have life-threatening cause of AP (ruptured AAA, mesenteric ischemia, etc)
    2. Immunocompromised (HIV/AIDS, uncontrolled DM, chronic liver dz, chemotherapy, immunosuppressive drugs) – atypical presentations of diseases (lack of fever), labs unreliable (WBC elevation). If infection is considered, DDX is much broader
    3. Women of reproductive age – pelvic organs to be considered in addition to abdominal, pregnancy in itself presents DDx and it displaces normal abdominal content/relationship, thus atypical presentation

Pathophysiology:

- GI and GU are the main sources of AP, but AP can come from extra- and intra-abdominal locations
- Extraabdominal: thoracic (MI, pneumonia, PE, pericarditis), GU (testicular torsion, orchitis), abdominal wall (muscle spasms, herpes zoster), infections (Strep pharyngitis, RMSF, mononucleosis), systemic (DKA, AKA, uremia, sickle cell dz, porphyria, SLE), tox (methanol poisoning, heavy metal toxicity, scorpion, spider or snake bites)
- Types of AP:
    1. Visceral – from autonomic nerves in the visceral peritoneum that surrounds the organs. Distention of hollow organs by fluids or gas, capsular stretching of organs by edema, cysts, blood are the most common stimuli. Poorly characterized, difficult to localize. Usual intermittent, crampy, colicky. Usually follows the localization from the embryonic somatic segment: foregut (stomach, duodenum, liver pancreas) – upper AP, midgut (small bowel, proximal colon, appendix) – periumbilical pain, hindgut (distal colon and GU tract) – lower AP. Classic example - appendicitis
    2. Somatic – from irritation of parietal peritoneum, sensation is conducted by peripheral nerves, and thus is localized better. Usually intense and

constant. Generally follows topographical anatomy of the abdomen (quadrants)
3. Referred – pain felt at the distance from its source, because afferent nerve fibers from many organs en through enter spinal cord through nerve roots that carry pain fibers from other locations. Classic example: shoulder pain from blood in peritoneal cavity irritating the diaphragm.

- We are not going to discuss ob/gyn problems here since they deserve the whole separate discussion.

Diagnostic approach

- Should be focused on early stabilization, history and PE with the aid of necessary ancillary testing
- Classically, DDX is divided into 2 large groups:
  1. Intra-abdominopelvic – abdominal, retroperitoneal, pelvic
  2. Extra-abdominopelvic – MI, pneumonia, DKA, tox
- Important life-threatening non-traumatic causes of AP:
  1. Ruptured ectopic pregnancy
  2. Ruptured or leaking aortic aneurysm
  3. Mesenteric ischemia
  4. Intestinal obstruction
  5. Perforated viscus
  6. Acute pancreatitis
- Rapid assessment and stabilization:
  - Triage is the first critical step – most patients with AP don't have hemodynamic instability – important to have a high index of suspicion, especially in elderly and immunocompromised
  - Those who are physiologically compromised (abnormal vital signs, change in mental status) should be brought in to treatment room immediately, and resuscitation initiated. Sepsis or profound volume loss from severe vomiting/diarrhea can lead to shock
  - Extreme conditions, such as ruptured AAA, massive GI bleed, ruptured ectopic pregnancy, ruptured spleen, hemorrhagic pancreatitis, may necessitate blood or blood products replacement, think of type and cross/massive transfusion protocols
  - Bedside US is useful to quickly look for free fluid/blood in the abdomen, volume status, presence of aortic pathology. Should be used as an extention of PE, as it is quick and invaluable in guiding Dx and treatment
  - Since many life-threatening conditions may require surgical intervention, early involvement of the surgical/ob/gyn consultants are important
- Pivotal findings:
  - High-yield historical questions:
    1. How old are you? – Advanced age means increased risk

2. Which came first – pain or vomiting? – Pain first is worse, as more likely to be caused by surgical disease
3. How long you had this pain? – the longer, the more reassuring (48 hours +)
4. Have you ever had abdominal surgery? – adhesions from previous surgery can cause bowel obstruction
5. Is the pain constant or intermittent? – constant pain is worse
6. Have you had this before? – no prior episode is worse
7. Do you have any history of CA, diverticulosis, pancreatitis, kidney failure, gallstones, or IBD? – all are suggestive of more serious dz
8. Do you have HIV? – consider occult infections and drug-related pancreatitis
9. How much alcohol do you drink per day? – consider pancreatitis, hepatitis, cirrhosis, Boorhaev's, AKA
10. Are you pregnant or could be pregnant? – consider ectopic
11. Did the pain start centrally and migrated to RLQ? – specific for appendicitis
12. Do you have a hx of vascular or heart dz, HTN, a/fib? – consider mesenteric ischemia
13. Are you taking Abx or steroids? – effects of these drugs may mask infection

- Language and cultural difference may influence accurate communication – consider professional interpreter
- Onset: abrupt is indicative of more serious cause, although delayed presentation may also represent a surgical condition
- Surgical causes of AP are more likely to start with pain first, then N/V, although in elderly the presentation may be atypical, and pain can be absent entirely
- Localization and pain migration can be helpful in aiding the Dx – diffuse pain is generally non-surgical, but it may represent an early visceral component.
- Character of pain: colicky pain is frequently associated with hollow viscus distention
- Severity and description of AP is the most subjective aspect of history. Few classic descriptions:
    - Diffuse severe colicky AP – bowel obstruction
    - "Pain out of proportion to the exam" – mesenteric ischemia
    - Epigastric pain radiating to the midback – pancreatitis, penetrating ulcer
    - Left shoulder pain or radiation of AP to left shoulder – spleen, diaphragmatic irritation, free intraperitoneal fluid
    - AP and syncope – perforated gastric or duodenal ulcer, ruptured AAA, ruptured ectopic pregnancy
- PMH and medication hx can significantly aid in Dx (i.e., NSAIDs and GI bleeing)
- Signs:

    - Vital signs – tachycardia, hypotension, fever/hypothermia. Can be misleading, especially in elderly and immunocompromised. Meds can affect vitals (beta-blockers and tachycardia)
    - Abdominal exam – must be thorough, very high-yield in diagnosing causes and selecting imaging modality
    - Rectal exam – mainly useful for heme-occult blood testing, detecting fistulas, fissures, hemorrhoids, stool impaction. Otherwise limited use in evaluating AP
    - Pelvic exam – mandatory in females with lower AP to differentiate abdominal from pelvic sources. It's very helpful in choosing imaging modality, thus to be done early.
    - Urogenital exam – in males with AP is required. Prostatitis, orchitis, epidydimitis commonly present as abdominal pain. Inguinal hernias.
- In the light of the evolving nature of AP, serial abd exams may be necessary

Ancillary testing:
- UA and pregnancy test – most high-yield tests in evaluating AP
- CBC – seldom contributory
- Serum electrolytes – even with protracted vomiting/D are only abnormal in less than 1%. BUN is elevated in GI bleeding, but H&P are far more helpful in Dx. Serum creatinine indicates renal dysfunction.
- Blood glucose, anion gap, serum ketones – DKA
- Liver enzymes and coags – limited helpfulness
- Serum lipase – pancreatitis
- Serum lactate – elevated in mesenteric ischemia late in the disease process, cannot be relied upon.
- Flat plate – limited usefulness, should be performed in radiopaque FB or bowel obstruction evaluation
- Upright CXR – more helpful to detect free air in patients with perforated ulcer, but cannot be relied upon.
- CT abdomen/pelvis – became an imaging modality of choice, helps visualize intra- and extraperitoneal structures, has high degree of accuracy. Not indicated for biliary dz and for obstetric purposes
- Bedside transabdominal and transvaginal US – extremely useful as an adjunct to H&P. Conditions that can be quickly diagnosed are: IUP, measurements of cross-sectional aorta to exclude AAA, detection of free fluid. Can also be very helpful in Dx cholelithiasis or cholecystitis, ascites, hydronephrosis, IVC distention or collapse as indicator of volume status

DDx:
- DDX of AP includes a significant number of life-threatening and organ-threatening conditions
- Focused H&P should be conducted
- Patients should be placed in the rooms where adequate monitoring and resuscitation tools are readily available

- ABC, venous access - should start resuscitation before diagnosis
- Appropriate diagnostic studies after stabilization/resuscitation
- This is particularly important in elderly and pregnant
- Women of reproductive age with AP must get pregnancy test early. Any pregnant female with AP has ectopic pregnancy until proven otherwise!
- Approach to DDx of AP is generally based on the location of maximum tenderness
- About 50% of AP in ED will have no conclusive Dx even after all the testing

Empirical management:
- Main therapeutic goals are: resuscitation, mitigation of symptoms, expedious Dx
- No evidence to withhold pain meds in AP for accuracy of subsequent exams.
- Antiemetics
- Abx for suspected/confirmed infections

Disposition:
- 40% of patients will receive Dx of "nonspecific AP", dispo can be difficult
- Surgical consultation
- Non-surgical consultation
- Admission for observation or symptoms control
- Admission for serial abdominal exams
- Discharge with close follow-up
- Before discharging a patient with "Non-specific AP", several conditions must be met:
    - Workup should not indicate the presence of potentially life-threatening condition
    - Discharge vital signs must be normal
    - Symptoms are controlled
    - Patient must be able to tolerate PO
    - Clear DCI should be given and must contain: what to do for relief of symptoms (avoiding certain food, taking appropriated meds), under what circumstances and with whom to seek a follow-up care, what to look for and under what circumstance to return to ED
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