Gastrointestinal & Genitourinary Emergencies

CEN Review Course
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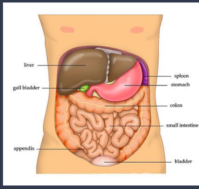
Overview

The CEN exam will ask approx. 21 questions related to GI/GU Emergencies (also including gynecologic and OB), which is ~14% of the total exam's content

GI Emergencies

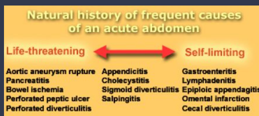
- Acute abdomen
- GI bleeding
- Cholecystitis
- Diverticulitis
- Esophageal varices and ulcers
- Foreign bodies
- Gastritis
- Hepatitis
- Hernia
- Inflammatory Bowel Disease
- Intussusception
- Bowel obstruction
- Abdominal trauma

Abdominal Cavity A&P Review



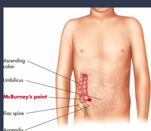
- Abdominal cavity extends from diaphragm to pelvis; bounded anteriorly by abdominal wall and posteriorly by vertebral column
- Serous, smooth membrane covering abdominal structures is the peritoneum
  - Smooth, lubricated layer enabling viscera to move without friction
- Retroperitoneal space
  - Anatomical space in the abdominal cavity behind (retro) the peritoneum
  - Retroperitoneal organs (kidneys, pancreas, aorta, vena cava, duodenum) have peritoneum on their anterior side only
- Solid organs
  - Liver, Spleen, Kidneys, Pancreas
- Hollow organs
  - Stomach, Small Bowel, Large Bowel, Bladder

Acute Abdomen



- Defined generally as an intra abdominal process causing severe pain and often requiring surgical intervention
- Requires prompt judgment/decisions as to medical management
- Can be:
  - Inflammatory - Acute appendicitis
  - Mechanical - Bowel obstruction, Incarcerated hernia
  - Traumatic - penetrating trauma or blunt abdominal injury
  - Vascular - Mesenteric arterial thrombosis or embolism
  - Congenital - Diaphragmatic hernia
  - Neoplastic

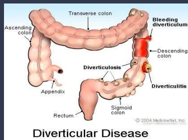
Acute Abdomen (cont)



Acute Appendicitis *Inflammation or Obstruction*	**Peritonitis** *Infection/Inflammation of Peritoneum*
Dull, then sharp pain (slow or acute onset)	Vague, then sharp pain (slow or acute onset)
-Periumbilical pain, radiating to RLQ (McBurney's) -RUQ in pregnancy -LLQ pressure intensifies RLQ pain (Rovsing's)	Diffuse pain, worsening with movement/coughing
Enlarged appendix on US or CT	Tenderness to palpation; rigid (washboard) abdomen
Elevated WBC	Decreased bowel sounds
Low-grade fever, vomiting	Fever/sepsis; fluid shift in the peritoneal cavity/bowel, leading to severe dehydration & electrolyte disturbances

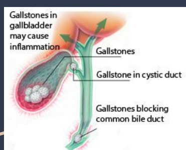
- Ischemia, necrosis or perforation of appendix can allow for possible bacterial invasion of peritoneum -- triggering abscess formation or peritonitis

Diverticulitis



- The presence of small out-pouchings in the wall of GI tract is diverticulosis
  - Inflammation/infection of colon diverticula, esp of the descending and Sigmoid colon, is diverticulitis
- Low-fiber diet and age >50 are risk factors
- Symptoms include abrupt onset of cramping pain, LLQ
- Fever and elevated WBC
- Patient teaching
  - Avoid straining w/BMs
  - PO fluid intake key
  - Increase fiber intake (after acute phase)
  - Stool softeners

Cholecystitis



- Inflammation of gallbladder, most frequently caused by gallstones obstructing the cystic or common bile ducts
- Blockage of bile secretion may result in gangrene
- Symptoms include
  - RUQ tenderness, guarding, rigidity
  - Often following ingestion of fried foods or large meal
  - Inability to breathe deeply during palpation under right costal margin/near liver
  - Fever, elevated WBCs, elevated ALT, bilirubin
  - Thickened gallbladder wall, gallstones on US
  - Jaundice, dark urine
- Treatment

Hepatitis

- Viral syndrome affecting liver
  - Heavy alcohol use, toxins, some medications, and certain medical conditions can all cause hepatitis.
  - Hep A, B, C most common in U.S.
- Mild cases
  - Fatigue, LOA, RUQ abd pain, nausea, and jaundice, usu resolving within 2 months
- Severe cases
  - Jaundice, clay-colored stool, dark urine
- Treatment
- Patient teaching
  - Avoid ETOH and meds (unless absolutely necessary)
  - Avoid steroids, which delay healing
  - Do not donate blood, organs, tissue
  - Maintain balanced diet, moderate protein consumption

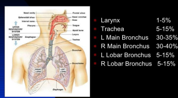
Hep A	Fecal/oral	Vaccine Self-limited disease that does not result in chronic infection
Hep B	Parenteral, sexual, perinatal, exposure	Vaccine Acute or chronic (< or > 6 months); increased risk for cirrhosis or liver cancer
Hep C	Parenteral, sexual, perinatal, exposure	No vaccine Most often by needle-sharing 70%–85% of people who become infected with Hepatitis C, it becomes a long-term, chronic infection Asymptomatic at first, 50% become chronic
Hep D	Defective RNA virus, requiring HBV to survive	Similar to Hep B; increased risk for cirrhosis
Hep E	Enteric - contaminated fish/water	Similar to Hep A; rare in US (common in Asia, Mexico, Africa)

Cirrhosis/ liver dysfunction

- End-stage of any condition in which the liver has become progressively scarred

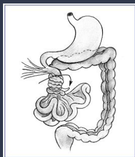
Indicator	Treatment
Elevated ammonia, decreased urea levels (decreased BUN)	Lactulose
Generalized edema and ascites, decreased albumin	Albumin, paracentesis
Lack of clotting factors	Vitamin K
Elevated serum and urine bilirubin, clay-colored stool, jaundice, steatorrhea (chunky, yellow, foul-smelling fatty stool), elevated liver enzymes, elevated PT/PTT	

Foreign body aspiration/ obstruction



- Common cause of accidental death in U.S., especially in children
- Top culprits: food, seeds, metal, plastic
- Clinical signs
    - Stridor, wheezing, coughing, inability to swallow/eat/drink, apnea
- Airway is top priority, esp until location confirmed
    - By xray (CXR, soft tissue neck), direct laryngoscopy
- Esophageal obstruction
    - Potential for airway obstruction
    - Glucagon, nitro, valium (smooth muscle relaxants)
    - Esophagoscopy or endoscopy
    - Bougienage, inserted into esophagus to widen the passageway and dislodge an object
- Tracheal/bronchial - removal under GA

Bowel Obstruction



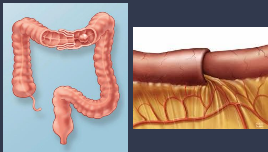
- Inability of intestinal contents to flow normally along GI tract; partial or complete (lumen closed)
    - Accumulation of intestinal contents, fluids, gas proximal to the obstruction
    - Increasing pressure = edema, congestion, necrosis, eventual rupture or perforation of intestinal wall
- Causes include cancer, foreign bodies, strictures, hernias, postoperative peritoneal adhesions, volvulus (loop of intestine twists around itself and the mesentery that supports it), Crohn's disease, stenosis, congenital defects, neurogenic conditions
- Treatment
    - Bowel rest (NPO and NG tube)
    - Surgery to correct volvulus, pyloric stenosis, perforation

Bowel Obstruction

- Clinical manifestations/symptoms include:

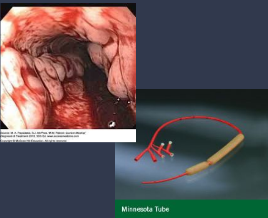
	Small Bowel	Large Bowel
Onset	Rapid	Gradual
Vomiting	Frequent, copious	Rare
Pain	Colicky, cramping, intermittent	Low-grade cramping
Bowel Movement	Feces for short time	Absolute constipation
Distention	Minimal	Great
Shared	Fever, tachycardia, HTN (early) to hypotension (late), increased WBC High pitched peristaltic rush near obstruction > borborygmi > absent bowel sounds	

Intussusception



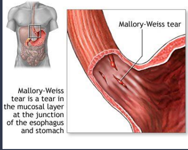
- Telescoping of bowel within itself, causing a mechanical bowel obstruction
  - Most common in babies (3 mos - 1 yr)
  - In adults, near colon tumor or polyp
- Signs and symptoms include
  - Colicky, intermittent pain
  - Lethargy and fever, worsening w/ischemia
  - Mucousy, bloody stool (grape or currant jelly); rare
  - Vomiting food, mucus or fecal matter
  - Tender, palpable "sausage-shaped" mass in RLQ or mid abdomen
- Barium or US-guided air enema used to diagnose and treat
  - Pressure from the air or fluid may cause the intestine to correct itself

Esophageal varices



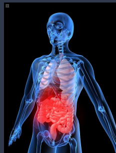
- Bleeding from dilated blood vessels in esophagus and stomach, often r/t obstructed portal vein circulation, liver disease & alcoholism
  - High mortality r/t ruptured varices and hemorrhage
- Signs and symptoms:
  - Pallor, diaphoresis
  - Melena
  - Hematemesis
  - Tachycardia and hypotension
  - Ascites, hepato/splenomegaly
- Treatment
  - Correct hypovolemic shock (blood, fluids)
  - Meds (vasopressors, vitamin K, octreotide)
  - Endoscopy or mechanical tamponade (Blakemore or Minnesota tube)

Esophageal injuries/tears



- Mallory-Weiss tears
  - Linear mucosal tear occurring at the esophageogastric junction (junction of the esophagus and stomach) produced by sudden increase in intra-abdominal pressure
  - Violent retching, vomiting, coughing
  - Alcoholism, bulimia nervosa, hiatal hernia, hyperemesis gravidarum
  - Often self-limiting
- Boerhaave syndrome
  - High morbidity and mortality
  - Rupture of esophageal wall secondary to violent vomiting, retching, childbirth, seizure, prolonged coughing, weightlifting
  - Longitudinal esophageal perforation requires surgery

GI/Abdominal Trauma



- Mortality rate of 13-15% (only exceeded by head and chest injuries as cause of traumatic death)
- Leading cause of intra abdominal injury is blunt force trauma
  - MVCs, auto-ped, assault, falls, contact sports
- Penetrating trauma
  - GSWs, stabbings, scissors, arrows, horned animals, fences
  - Abdominal injury should be suspected with all penetrating injuries to back, flank, buttocks
- Rarely a single-system injury - often in conjunction with thoracic, pulmonary, cardiac, pelvic injuries

GI/Abdominal Trauma

Gastric and Esophageal Injuries

- Gastric and esophageal trauma/injuries quite rare; mostly in conjunction with multiorgan and multisystem injuries
- Most common with penetrating trauma (GSW) and in pediatrics
- Cervical region of esophagus most frequently injured

Gastric Injury	Esophageal Injury
Abdominal pain	Subcutaneous emphysema
Peritoneal irritation; severe peritonitis from chemical irritation with gastric perforation	Peritoneal irritation
Stomach evisceration Free air on CXR	Pain radiating to neck, chest, shoulders
Gross blood in stomach aspirate; hematemesis	Gross blood in stomach aspirate

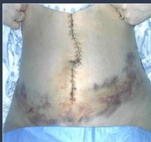
GI/Abdominal Trauma

Splenic and Hepatic Injuries

Splenic Injury	Hepatic Injury
Most frequently injured intra-abdominal organ; most often with blunt trauma (b/c of role w/immune function, spleen salvage is esp important)	Friability of liver tissue and extensive blood supply (~30% of cardiac output) can result in profuse hemorrhage
Associated with rib fractures -- left ribs 10-12	Associated with rib fractures -- right ribs 8-12
LUQ bruising and pain, referred to left shoulder (Kehr's sign)	RUQ pain, referred to right shoulder
Hypovolemia	Hypovolemia
Peritoneal irritability	Rigid abdomen, rebound tenderness, involuntary guarding, absent bowel sounds
Graded I to V	Graded I to VI (I to III nonoperative)

GI/Abdominal Trauma

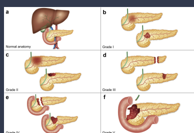
Large and Small Bowel



- Small bowel (duodenum, jejunum, ileum) injured more frequently than large bowel, most commonly by direct blow to the abdominal wall
- Clinical signs/symptoms often develop slowly, but may include:
  - Peritoneal irritation (rigid abdomen, rebound tenderness, involuntary guarding)
  - Evisceration of small bowel or stomach
  - Gross blood from the rectum
  - Decreased or absent bowel sounds
  - Diagnostic peritoneal lavage (DPL) presence of bile, feces or food particles
  - Hypovolemia/sepsis
- Any patient presenting with +seat belt sign (bruising to lower abdomen) should be r/o for intestinal injury
- Requires surgery

GI/Abdominal Trauma

Pancreatic



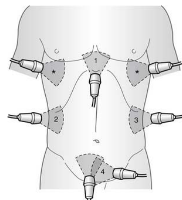
- Rare, frequently missed injury with high mortality rate
  - Retroperitoneal, with symptoms often not manifesting for 24-72 hours
- Direct blunt force to epigastric area; also associated with injuries to liver, stomach, spleen, great vessels
- Clinical signs/symptoms often develop slowly, but may include:
  - Epigastric pain
  - Abdominal distention
  - Decreased bowel sounds
  - Increased serum amylase, lipase and glucose
- Requires surgery

Blunt Abdominal Trauma Diagnostic Test Comparison

	Pros	Cons	Results
FAST Focused Sonography for Trauma	-Noninvasive -Rapid, bedside eval of hemoperitoneum -Repeatable	-Operator-dependent -Rarely ids hollow, viscus injury (HVI) -Distorted by bowel gas, subcutaneous air -Misses diaphragm, bowel and pancreatic injuries	-As accurate as DPL -Free fluid appears as black stripe -Sensitivity/specificity of 85-95%
CT Computed Tomography	-Most detailed images -Useful in determining nonoperative mgmt -Noninvasive	-Expensive, time-consuming -Can only perform on hemodynamically stable pts -May miss injuries to diaphragm or GI tract	-Most specific for injury (92-98% accurate) -Primary diagnostic modality for dx of intra-abdominal injuries
DPL Diagnostic peritoneal lavage	-Rapid eval of intraperitoneal blood -Detects bowel injury	-Invasive -Complications include bleeding, infection	-Can have false-positive results, leading to unnecessary laparotomy -Not in pregnant women or pediatrics

FAST Exam

- Detects bleeding within the chest or abdominal cavity (hemoperitoneum), esp s/p blunt abdominal trauma
- US views of 4 abdominal sites:
  - Hepatorenal fossa (RUQ)
  - Splenorenal fossa (LUQ)
  - Pericardial sac
  - Pelvis
- Exam generally considered positive when at least 200-500 mL of fluid noted
- Small/large bowel, retro and intraperitoneal trauma unable to be diagnosed with FAST

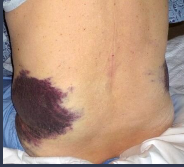


GU Emergencies

GU trauma
Foreign bodies
Priapism
Renal calculi
Testicular torsion
Infections
- UTI/Pyelonephritis
- Epididymitis
- Orchitis

Urologic Trauma

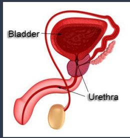
Renal



- Renal injury is the most frequent GU trauma
- Blunt force trauma/contusion from MVCs and falls most common cause
- Suspect if fractures to posterior lower ribs or lumbar vertebrae/spinous processes
- Clinical signs/symptoms:
  - Hematuria – gross or microscopic
  - Flank or abdominal tenderness during palpation
  - Ecchymosis over flank (Grey Turner's sign), normally 6-12 hrs post-injury
  - Hypovolemia
- Renal Injury Scale rated I to V

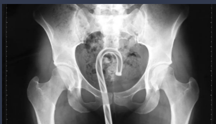
Urologic Trauma

Bladder and Urethral



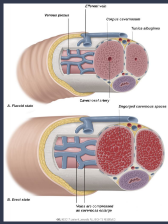
- Majority result from blunt mechanisms
- Risks include full bladder and pelvic fractures
  - When full, bladder rises above symphysis pubis into abdominal cavity increasing risk for injury
- Urethral trauma more common in males
  - Straddle injuries (injury to penile portion of urethra)
  - Prostatic (posterior) urethral injury often leads to incontinence and impotence
- Clinical signs/symptoms:
  - Suprapubic, genital, perineal pain
  - Urge, but inability, to urinate
  - Hematuria (gross or microscopic)
  - Blood at urethral meatus; in scrotum
  - Hematoma(s) and/or distention
- Diagnosis with cystogram, urethrogram, CT

Genitourinary Foreign Bodies



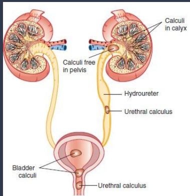
- Objects placed in urethra for exploration, sexual enhancement or by accident (i.e. patients with psychiatric condition, learning impairments, kids)
- Embarrassment or fear of punishment may delay healthcare treatment until pain or infection is present
- Symptoms could include:
  - Urethral discharge
  - Blood or object at meatus
  - Hematuria
- Cystoscope/retrograde urethrography

Priapism



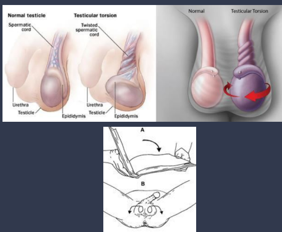
- Persistent, painful erection in the absence of arousal
- Common causes:
  - Spinal cord injury, sickle cell crisis, leukemia, drug use (i.e. erectile dysfunction meds, cocaine, THC, trazodone)
- Urinary retention occurs in 50% of cases, requiring catheterization
- Treatment
  - Analgesia, sedation
  - Local injection of vasoconstrictors (i.e., epinephrine, phenylephrine, pseudoephedrine, terbutaline)
  - Intracavernosal aspiration of blood
  - Treat underlying condition
- If treatment doesn't work, surgical stent might be placed

Renal/Urinary Calculi



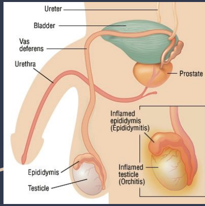
- Abnormal collection of one or more substances in urinary system
  - Calcium, struvite, uric acid, cystine
- Renal pelvis is most common collection site
- 80-85% pass and exit spontaneously
- Risk factors include
  - Sedentary lifestyle, gout, frequent UTIs, large intake of protein/calcium, dehydration, pregnancy
- Obstructing calculi, with associated pyelonephritis, is a urologic emergency
  - Could lead to abscess, urosepsis, death

Testicular Torsion



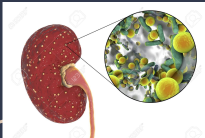
- Urologic emergency
- Strangulation of testicle, r/t twisting of spermatic cord and obstruction of arterial blood supply
- Symptoms include:
  - Rapid onset of scrotal/inguinal pain, often with no precipitating event
  - Scrotal elevation increases pain
  - Scrotum red or pale
  - Elevated testicle on affected side
  - Firm, tender testicle
  - Loss of cremasteric reflex (elevation of testicle when inside of thigh is stimulated)
- Rapid de-torsion is vital (manually or surgically) to reverse ischemia and salvage function

Genitourinary Infections



- Epididymitis
  - Inflammatory or infectious process of the epididymis (posterior surface of testicle)
  - From STI, catheterization, E. Coli from obstructive urinary disease
- Orchitis
  - Infection of the testicle, often viral
  - Much less common than epididymitis
- Signs/symptoms
  - Gradual onset of often unilateral testicular/scrotal pain
  - Scrotal warmth, swelling, erythema, urethral discharge, fever
- Treatment/DC teaching

Genitourinary Infections (cont)



- Pyelonephritis
  - Kidney infection, results from ascending infxn from lower urinary tract
  - *E. coli* most common cause
  - Women more susceptible
- Cystitis
  - Uncomplicated infection of lower urinary tract/bladder infection
  - Change in mental status in elderly patients important clue
- Complications
  - Scarring of renal tissue
  - Renal insufficiency/failure
  - Bacteremia
  - Maternal/fetal complications (preterm labor, preeclampsia, amnionitis)

Practice Questions

Which of the following lab values is likely to be *decreased* in a patient with cirrhosis?

A. Serum bilirubin

B. Serum ammonia

C. Blood urea nitrogen

D. Partial thromboplastin time

Which of the following lab values is likely to be *decreased* in a patient with cirrhosis?

A.

B.

C. Blood urea nitrogen

D.

Which of the following presentations is most consistent with a patient with pancreatitis?

A. Epigastric pain radiating to umbilical region

B. Epigastric pain radiating midline through to the back

C. Left upper quadrant pain radiating to the left shoulder

D. Right upper quadrant pain radiating to the right shoulder

Which of the following presentations is most consistent with a patient with pancreatitis?

A.
B. Epigastric pain radiating midline through to the back
C.
D.

Which of the following conditions will likely go directly to the OR?

A. Pancreatitis
B. Cholecystitis
C. Ulcerative colitis
D. Boerhaave syndrome

Which of the following conditions will likely go directly to the OR?

A.
B.
C.
D. Boerhaave syndrome

The ED nurse knows a patient with end-stage cirrhosis has understood DC instructions if they state they will maximize their intake of ______?

A. Starch
B. Protein
C. Carbohydrates
D. Fresh fruits and vegetables

The ED nurse knows a patient with end-stage cirrhosis has understood DC instructions if they state they will maximize their intake of ______?

A.
B. Protein
C.
D.

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Questions?