

## NR507 – Advanced

### Pathophysiology Exam Study Guide

#### – Final Study Guide Exam Format:

Cumulative

**Question Type:** Multiple Choice

**Number of Questions:** 100

**Time Allotted:** 120 minutes

#### Gastrointestinal pathologies :

- Pathophysiology of GERD
  - Lower esophageal sphincter (LES) dysfunction
    - Decreased tone allows acid to regurgitation into the esophagus
  - Esophageal motility
    - Disrupted coordinated contraction causes delayed gastric emptying
  - Delayed gastric emptying
    - Causes esophagitis by extending the period during which reflux can occur and increasing the acid content of chyme.
  - Increased capillary permeability
  - CONTRIBUTING FACTORS: Hiatal Hernia (major risk factor)  
Medications, anti-cholinergic, nitrates, C nicotine
- Signs C Symptoms of GERD
  - Typical
    - Pyrosis (heartburn) **HALLMARK**
    - Sour/bitter taste in mouth
  - Atypical
    - Chronic cough
    - Asthma exacerbation
    - Laryngitis
    - Sinusitis
  - Associated Symptoms
    - Upper ABD pain (esp w/in 1 hr of eating)
    - Dysphagia
    - Belching/Flatulence
    - Sleep Disturbances
    - Worsening when supine or after meals
    - Bloody diarrhea
- Pharmacologic management of GERD

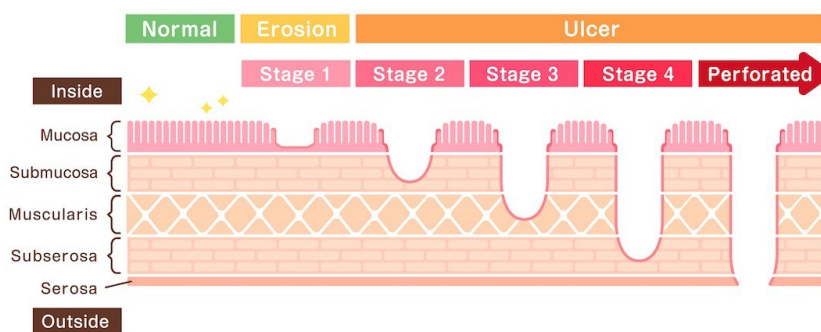
- Proton-pump inhibitors – 1<sup>st</sup> thing in the morning. Give it 6 weeks then do endoscopy if symptoms persist.
  - R/O Cardiac Cause of symptoms
- Risk factors for esophageal stricture
  - GERD: backflow → inflammation C irritations → scar formation → narrowing
  - Esophagitis: inflammation d/t infection, meds, C autoimmune patho
  - Ingestion of Caustic Substances: swallowing strong acids/bases → scar tissue from healing process
  - Radiation: radiation-induced scar tissue
  - NOTE: Spicy food C family hx of stricture are NOT direct risk factors.
- Hiatal hernia treatment - reduce reflux C pressure on the stomach
  - Lifestyle Modifications
    - Weight loss
    - Small, frequent meals
    - Upright 2-3 hours after eating
    - Elevate HOB
    - Avoid Trigger Foods
      - Fatty foods, chocolate, ca<sup>e</sup>ine, alcohol, spicy foods, peppermint, acidic foods (tomatoes, citrus)
    - Stop Smoking
    - Avoid Tight Clothing
    - Avoid Heavy Lifting
  - Meds
    - Antacids, H2 Receptor Blockers, PPIs, Prokinetic Agents
  - Surgery
    - Hernia repair
- Pathophysiology of appendicitis
  - Obstruction → buildup of mucus, bacteria, other debris → inflammation C increased pressure → appendix swells C fills with pus → compromised blood flow → ischemia C necrosis → perforation, peritonitis, abscess formation
- Symptoms of appendicitis
  - ABD pain **HALLMARK**
    - Starts umbilical → moves to RLQ
    - Dull, vague → sharp, intense
    - McBurney's Point
    - Rosving's Sign - Palpation of LLQ causes pain at McBurney's point
  - N/V

- Fever – low grade
- Rebound tenderness
- Guarding
- Peritonitis – after rupture
  - Leads to intense ABD pain, tenderness, fever, and ABD board-like rigidity
- Perforation/Rupture
  - Can occur w/in approx. 48 hrs of initial complaint
  - Sign of Rupture – Sudden relief from pain
- Diagnosing appendicitis via lab work
  - CBC – elevated WBC >10,000 w/left shift, not specific
  - UA – r/o UTI
  - HCG – r/o pregnancy
  - CRP – elevated d/t inflammation
  - Imaging – CT (most common), US
- Risks for appendectomy in adults
  - “50-54,” f/u colonoscopy recommended
  - Risk of colon CA
  - Delay on dx
  - Perforation
  - Peritonitis
  - Abscess formation
  - Sepsis
  - Adhesions
- Peptic ulcer disease (PUD) pathophysiology
  - Break/ulceration in protective mucosal lining of lower esophagus, stomach, or duodenum
  - d/t imbalance between aggressive factors C protective measures

\*\* Key Difference between EROSION, ULCER, C PERFORATION lies in the DEPTH of tissue involvement\*\*

- EROSION (stage 1)
  - superficial loss of mucosal lining
  - do not generally extend beyond the mucosa
  - minor bleeding
- ULCER (stage 2-4)
  - Deeper loss of tissue
  - Extends into submucosal layer

- More extensive than erosion
  - May cause significant bleeding
- PERFORATION
  - Breach thru entire thickness of GI wall
  - Contents leak into abdominal cavity
  - Severe complication, requires immediate medical attention
  - Sudden, severe ABD pain, **board-like rigidity** of ABD



- Risk factors for PUD
  - H. pylori (KEY contributor)
  - NSAID use
  - Smoking
  - Acute pancreatitis
  - Excessive alcohol intake
  - Obesity
  - COPD
  - Age > 65 years
  - Genetic Predisposition
  - Stress

- Compare gastric and duodenal ulcers

|                | GASTRIC                                                      | DUODENAL                                                    |
|----------------|--------------------------------------------------------------|-------------------------------------------------------------|
| Location       | Antral region of stomach                                     | Lining of uppermost part of small intestine                 |
| Pain           | Pain immediately after eating<br>( <b>G</b> reater w/eating) | Chronic epigastric pain;<br>Pain 30 mins-2 hrs after eating |
| Other Symptoms | Anorexia, vomiting, wt loss                                  | ( <b>D</b> elighted) Relief w/ingestion of food or antacids |
| Associations   | Increase Risk of Cancer                                      | Pain in middle of the night, gone by morning                |

- Causes of gastric ulcers
  - ↑ mucosal barrier permeability
  - Duodenal reflux of bile
  - H. pylori
- Signs and symptoms of duodenal ulcer
  - Chronic, intermittent epigastric pain
  - Pain 30 mins-2 hrs after eating
  - Can occur in the middle of the night, gone by morning
  - Relieved by antacids C ingestion of foods
- Pathophysiology of ulcerative colitis
  - Immune system becomes overactive in the colon → chronic inflammation
  - Begins in the rectum, spreads **continuously upward** thru the colon
  - Inflammation damages the inner lining (mucosa) → ulcers, bleeding, loss of normal absorption
  - Colon lining becomes swollen, ulcerated, and bleeds easily
  - Only affects mucosa C submucosa, **not full bowel wall**.
  - Loss of goblet cells, epithelial cell dysfunction
  - Less common in smokers, and pts who've had an appendectomy
  - Mostly in rectum C sigmoid, but can be thru entire bowel
- Risk factors for Ulcerative Colitis and Crohn's disease
  - Genetics: family history, increased in Whites C Jews
    - Gene mutation, less likely to be a predisposition – UC
    - Genetic predisposition – Chron's
  - Environmental: smoking → ↑ risk of Chron's
  - Immunologic: infections (esp. C. di<sup>+</sup>), exposure to certain microbes
- Symptoms of ulcerative colitis

Commented [KM1]: Ninja Nerd video - compare/contrast UC/Chron's

- Bloody diarrhea **HALLMARK**
- Purulent mucus in stool
- ABD pain – crampy, LLQ concentration
- Tenismus – persistent feeling of needing to empty bowels even when little or no stool is present
- Anemia
- **Colon CA**
- Wt. loss
- Fatigue
- Fever
- Loss of appetite
- **Toxic Megacolon** – complications: bowel perforation, sepsis, C shock, medical emergency
- Intermittent periods of remission and exacerbation
- Pathophysiology of Crohn's disease
  - Ileum is most common location, often spares Rectum
  - Immune system attacks the entire wall of the GI tract in scattered patches
  - Genetics + gut bacteria + environment trigger an abnormal immune response
    - chronic inflammation in ANY PART of the GI tract (mouth to anus)
    - Patchy damage (**skip lesions/Cobblestone lesions**) → Full-thickness inflammation (transmural inflammation) → thicken bowel, **strictures, fistulas**, abscesses.
- Treatment of Crohn's disease (goal to suppress immune systems)
  - Diet
    - AVOID FODMAPs – hard-to-digest carbohydrates C sugars
  - Pharmacological
    - Aminosalicylates – decrease inflammation
      - Help maintain remission C prevent flares/exac.
      - SULFASALAZINE C OLSALAZINE
    - Antimicrobial – prevent/treat infection
      - Ciprofloxacin C Metronidazole
    - Corticosteroids – decrease immune response C inflammation
      - Only short-term use
      - Methylprednisolone, Hydrocortisone, C Prednisone
    - Biologics
      - Anti-TNF agents and IL inhibitors
  - Surgery – Colectomy curative for UC
- Pathophysiology of Non-alcoholic fatty liver disease