

Abdominal and Gastrointestinal

Clinical Conditions Lecture Notes

Abdomen Anatomy and Function

- There are many structures contained within the abdominal cavity, each with unique anatomy and function
- We, however, tend to lump all of the components together into one amorphous entity
- Consequently, we have a tendency to talk about “abdominal pain” and not isolate it to the pertinent anatomy

Anatomy and Function

- The peritoneum is a serous membrane that lines the abdominal cavity and covers many (but not all) of the abdominal structures
- The alimentary tract is about 27 feet long, and begins with the mouth, ends at the anus, and contains the esophagus, stomach, and intestines

Esophagus

- The esophagus is a collapsible tube (contrast with the trachea) about 10 inches long, connecting the pharynx and stomach
- It passes through the diaphragm through the cardiac sphincter
- It passes posterior to the trachea and anterior to the spine

GERD

- Gastroesophageal reflux disease occurs with relaxation or incompetence of the lower esophagus
- The reflux causes a backflush of stomach acid, leading to symptoms of heartburn or acid indigestion
- The symptoms are described as burning chest pain, localized behind the sternum, sometimes moving up to the neck and throat

Causes of GERD

- Malfunction of the lower esophageal sphincter (LES) muscles, leading to diminished sphincter tone, caused by:
 - The nervous system
 - Dietary substances
 - Drugs
- Abnormalities in the esophagus
 - Motility abnormalities (peristalsis): cause or effect?
 - Adult-ringed esophagus

Abdomen Anatomy and Function

- There are many structures contained within the abdominal cavity, each with unique anatomy and function
- We, however, tend to lump all of the components together into one amorphous entity
- Consequently, we have a tendency to talk about “abdominal pain” and not isolate it to the pertinent anatomy

Anatomy and Function

- The peritoneum is a serous membrane that lines the abdominal cavity and covers many (but not all) of the abdominal structures
- The alimentary tract is about 27 feet long, and begins with the mouth, ends at the anus, and contains the esophagus, stomach, and intestines

Esophagus

- The esophagus is a collapsible tube (contrast with the trachea) about 10 inches long, connecting the pharynx and stomach
- It passes through the diaphragm through the cardiac sphincter
- It passes posterior to the trachea and anterior to the spine

GERD

- Gastroesophageal reflux disease occurs with relaxation or incompetence of the lower esophagus
- The reflux causes a backflush of stomach acid, leading to symptoms of heartburn or acid indigestion
- The symptoms are described as burning chest pain, localized behind the sternum, sometimes moving up to the neck and throat

Causes of GERD

- Malfunction of the lower esophageal sphincter (LES) muscles, leading to diminished sphincter tone, caused by:
 - The nervous system
 - Dietary substances
 - Drugs
- Abnormalities in the esophagus
 - Motility abnormalities (peristalsis): cause or effect?
 - Adult-ringed esophagus

Causes of GERD

- Impaired Stomach Function: abnormal nerve or muscle function causes impaired motility, leading to delayed stomach emptying and increased pressure
- Hiatal Hernia (discussed later)
- Drugs (OTC and prescription):
 - NSAIDS (regular use for 6 months or more)
 - Calcium channel blockers, anticholinergics, Beta adrenergics, Dopamine, Biphosphonates, Sedatives, Antibiotics, Potassium, Iron supplements
- What’s the problem with swallowing pills?

Causes of GERD

- Asthma
 - More than 50% of asthmatic sufferers have GERD
 - It is debated which causes which
 - Some believe that coughing accompanies asthmatic attacks, leading to pressure changes in the chest, triggering reflux; also, some meds used to relax the bronchioles can relax the LES muscles
 - Some believe that since GERD has been associated with several other respiratory problems, it may be a cause of asthma, rather than a result of asthma

Causes of GERD

- Those with Type I diabetes often develop a condition called gastroparesis
- This condition occurs in at least 20% of patients with long-standing diabetes
- It is characterized by delayed stomach emptying
- As discussed with impaired stomach function, delayed emptying leads to increased pressure, resulting in reflux

GERD

- GERD doesn't sound like a big problem, but it can lead to significant complications
- Infants and children can have symptoms of vomiting, leading to weight loss and fatigue
- Dysphagia can develop, as well as a change in the voice characteristic (hoarseness)
- GERD can also lead to respiratory complications from aspiration and bleeding
- GERD can also change the cells of the esophagus

Esophagus abnormalities

- Barrett's esophagus: Normally, the esophagus is lined with squamous epithelium; Barrett's esophagus is a condition in which the normal epithelium is replaced by columnar epithelium called specialized intestinal metaplasia
- Most people with Barrett's esophagus have a hiatal hernia, but not everyone with a hiatal hernia has a Barrett's esophagus

Hiatal Hernia

- There are two types of hiatal hernias: paraesophageal and gastric/sliding
- Which one do you think is the most common?
- The condition is VERY common, and occurs most frequently in women and older adults
- It is associated with obesity, pregnancy, ascites, and tight clothing or belts
- Muscle and diaphragmatic weakness are contributing factors

- **In the US:** Hiatal hernias are more common in Western countries. The frequency of hiatus hernia increases with age, from 10% in patients younger than 40 years to 70% in patients older than 70 years.
- **Internationally:** Burkitt et al suggest that the Western, fiber-depleted diet leads to a state of chronic constipation and straining during bowel movement, which could explain the higher incidence of this condition in Western countries.
- Hiatal Hernia; Qureshi; 2/28/06; emedicine.com

Hiatal Hernia

- Patients complain of epigastric pain and/or heartburn that worsens with lying down and is relieved by sitting up or with antacids
- Patients also complain of water brash, which is a filling of the mouth with fluid, sometimes with changing positions, and of dysphagia
- The hernia can become incarcerated, which is a surgical emergency
- Incarceration symptoms included sudden onset vomiting, pain, and complete dysphagia

Peptic ulcers

- Peptic ulcer is the collective term for ulcers that occur within the upper gastrointestinal tract
- Gastric ulcer: occurs in the stomach
- Duodenal ulcer: occurs in the duodenal bulb
- Esophageal ulcer: occurs in the esophagus and is associated with GERD

Peptic ulcers

- Duodenal ulcers are 4-5 times more common than gastric ulcers and are the most common form of peptic ulcer disease
- They affect up to 10% of patients at any one time; lifetime risk is 25%
- Peptic ulcers are usually caused by *Helicobacter pylori* or *H. pylori*
 - (90% of duodenal ulcers and 70-75% of gastric ulcers)
- Other than causing erosions and craters in the stomach and duodenum, they cause deformities of the abdominal bulb ("cloverleaf deformity")
- 95% of the **pre-bulbar** peptic ulcers are benign

Risk factors for ulcers

- Use of aspirin and nonsteroidal anti-inflammatory medications (NSAIDs)
- Excessive drinking of alcohol
- Use of tobacco

- Stress??
- Diet??

Rarer cause of ulcers

- Zollinger-Ellison syndrome is caused by gastrin-secreting tumors (gastrinoma) of the pancreas that causes severe ulceration of the upper gastrointestinal tract

Treatment for ulcers

- Antibiotics to kill *Helicobacter pylori*
- Acid blockers (cimetidine, ranitidine, or famotidine)
- Proton pump inhibitors (omeprazole)
- Medications that protect the tissue lining (sucralfate)
- Bismuth (may help protect the lining and kill the bacteria)

Complications of ulcers

- Bleeding
- Bowel obstruction
- Bowel perforation
- Perforation leading to peritonitis

Symptoms of ulcers

- **It is important to remember that ulcers may cause no symptoms at all**
- The most common ulcer symptom is abdominal pain
 - May wake you at night
 - May be relieved by antacids or milk
 - May occur 2 to 3 hours after a meal
 - May be worse if you don't eat
- Nausea
- Vomiting
- Weight loss
- Fatigue
- Heartburn, indigestion, belching
- Chest pain
- Vomiting blood
- Bloody, dark, tarry stools

Gastritis

- Gastritis is an inflammation of the stomach
- The white blood cells move into the wall of the stomach as a response to some type of injury
- Gastritis does not mean that there is an ulcer or cancer
- It is simply inflammation, either acute or chronic

Causes of gastritis

- Helicobacter pylori
- Aspirin & NSAID Gastritis (similar to esophagus)
- Alcohol
- Hypertrophic Gastritis
 - The folds in the stomach become hypertrophied and edematous, without a known cause
 - A variation of this type of gastritis is called Ménétrier's disease where the gastric folds become markedly enlarged
 - With this condition, there is often protein loss into the stomach from these weeping folds

- Autoimmune Gastritis - Pernicious Anemia

- In some disorders, the body mistakenly targets one of its own organs as a foreign protein or infection
- It makes antibodies against it and can severely damage or even destroy the organ
- It is seen in lupus, hypothyroidism, rheumatoid arthritis and the type of diabetes that requires insulin
- The stomach lining also may be attacked by the immune system leading to loss of the stomach cells
- This causes acute and chronic inflammation which can result in pernicious anemia
- The anemia occurs because the body no longer can absorb vitamin B12 due to a lack of a key stomach factor, destroyed by the chronic inflammation
- Stomach cancer can occur later in life

- Miscellaneous

- There are other rarer types of gastritis such as eosinophilic, phlegmonous (a severe bacterial infection) and granulomatous gastritis

Bezoars or other foreign body

- A bezoar (Persian for "counterpoison") is a mass of swallowed foreign material within the stomach. The material may be hair - a trichobezoar - vegetable elements such as leaves - a phytobezoar, or other unusual items. They are usually ingested by psychiatrically disturbed patients or are a result of delayed gastric emptying, for example after gastric surgery.
- The mass of material may fill the whole of the stomach. This results in the symptoms of obstruction and ulceration with subsequent disrupted nutrition and loss of weight.
- Treatment is ideally removal of the bezoar endoscopically, but laparotomy and gastrotomy may be required. Phytobezoars have been treated with oral cellulase enzyme, such as 75 mg in solution with food.

Pyloric stenosis in infants

- Infantile pyloric stenosis occurs in neonates; it is acquired in the early stages of life; it was at one time thought to be a purely congenital condition.
- The neonate vomits large quantities of curdled and unpleasant smelling milk. The vomit is forcefully ejected, justifying the adjective "projectile".
- Careful examination reveals the distended stomach and a smooth ovoid mass just below the right costal margin, which is the hypertrophied pylorus.

Pyloric stenosis symptoms

- Vomiting
 - Usually mild at first, becoming progressively more forceful within one half hour of feeding
 - Projectile vomiting
- Infant appears constantly hungry
- Diarrhea (loose green stools)
- Wave-like motion of the abdomen shortly after feeding and just before vomiting occurs
- Dehydration (becoming more profound with the severity of the vomiting)
- Failure to gain weight or weight loss
- Abdominal fullness very shortly after meals
- Belching
- Abdominal pain

Pyloric stenosis in adults

- An adult with pyloric stenosis presents with vomiting which is usually large in volume, not bile-stained and, if the condition is long-standing, not acidic because gastric acid secretion is reduced.
- The stomach contents are not digested and the patient may recognize food that was eaten 24 or 48 hours previously. Apart from the epigastric distension, visible gastric peristalsis and a succussion splash, there may be no other abnormal physical signs.

Stomach cancer

- There are several types of gastric cancer
- 95% of all gastric cancers are adenocarcinomas
- The other 5% are:
 - Sarcomas
 - Lymphomas
 - Squamous cell carcinoma
 - Neuroendocrine tumors (carcinoid tumors)

Risk Factors for Stomach Cancer

- [By Mayo Clinic](#)
- A diet high in salty and smoked foods
- A diet low in fruits and vegetables
- Eating foods contaminated with aflatoxin fungus
- Family history of stomach cancer
- Infection with *Helicobacter pylori*
- Long-term stomach inflammation (chronic gastritis)
- Pernicious anemia
- Smoking
- Stomach polyps

Gastric cancer symptoms

- Indigestion
- Heartburn
- Abdominal pain
- Nausea and vomiting
- Bowel ailments
- Bloating
- Fatigue
 - People often ignore the symptoms of gastric cancer because they associate them with other stomach maladies

- Also, because these symptoms are usually mild, early diagnosis is rare
- Only 10 to 20 percent of gastric cancers are diagnosed before spreading to other areas of the body
- If treated early, gastric cancer has a good cure rate
- However, the prognosis worldwide is generally poor, with only about 2 in 10 of those affected surviving for five years after diagnosis (much better survival rate in US)

Bowel Diseases

Inflammatory bowel disease

- Ulcerative colitis and Crohn's disease are idiopathic chronic inflammatory diseases of the GI tract
- They have much in common, but the differences in histological changes are marked

Ulcerative colitis (UC)

- Epidemiology:
 - Much more common in developed countries
 - Prevalence is greater than 70/100,000
 - Bimodal distribution, with peaks at 20-40 and 60-80 years of age
 - More common in women
 - Most common in Caucasians, particularly Jews
 - 10% increase in families with history of UC or CD, but no clear HLA or Mendelian inheritance
 - An association between ankylosing spondylitis and UC is seen

Etiology and pathogenesis

- The primary cause is **unknown**
- May result from an abnormally prolonged inflammatory host response
- Genetic and/or environmental factors
- Dietary or microbiological product in the lumen
- Postulated etiological factors:
 - Infection
 - Psychosocial factors
 - Immunological disorders
 - Increased inflammatory mediator production
 - Defective mucus

Pathology of UC

- The disease usually begins in the rectum, and either stays there or proceeds proximally
- Occasionally, the distal terminal ileum is involved (backwash ileitis) is involved
- Diffuse inflammation of affected mucosa with hyperemia, granularity, and surface pus and blood occur
- In severe cases, this leads to ulceration
- The ulcerations heal by granulation to form multiple pseudopolyps

- Microscopically, acute and chronic inflammatory cells infiltrate the lamina propria and crypts
- Goblet cells lose their mucus
- The mucosa is hyperemic and edematous with ulceration
- Biopsies of long-standing UC show dysplastic changes in which epithelial cell nuclei are enlarged, crowded, and lose polarity
- Consequently, dysplasia may lead to carcinoma

Clinical features

- The onset of UC is usually gradual
- Severity varies with activity and extent of disease
- The history is chronic, with relapses and remissions over many years
- Between attacks, there are usually no symptoms

Factors that precede a relapse

- Emotional stress
- Co-current infection
- Acute gastroenteritis
- Treatment with drugs (antibiotics and NSAIDs)
- Discontinuation of prophylactic treatments

(Clinical) Features of active UC

- Proctitis: rectal bleeding and mucus discharge
- Proctosigmoiditis: rectal bleeding and mucus discharge, with diarrhea, urgency, abdominal pain; may be malaise
- Extensive colitis: profuse, frequent diarrhea with blood and mucus, fever, malaise, anorexia, weight loss; patient is thin, anemic, fluid-depleted, febrile, and tachycardic

Local complications of UC

- Toxic megacolon: not common; patient has tachycardia, fever, pain, abdominal distention, tenderness, loss of bowel sounds
- Colonic perforation: occurs with very active UC; corticosteroids often mask symptoms, leading to peritonitis
- Hemorrhage: rare
- Carcinoma: increased in patients with UC for more than 10 years; cumulative risk is 20% at 30 years; childhood onset and continuous relapses also increase carcinoma risks

Systemic complications of UC

- GI: diarrhea, rectal bleeding and pus, weight loss, malaise, growth retardation
- Skin: erythema nodosum, pyoderma gangrene
- Eyes: episcleritis, uveitis
- Mouth: aphthous ulceration
- Joints: enteropathic arthropathy, sacroiliitis, AS
- Liver: fatty changes, hepatitis, amyloid deposits
- Biliary tract: sclerosing cholangitis, bile duct CA
- Lungs: fibrosing alveolitis
- Kidneys: uric acid stones, amyloid
- Blood: arterial and venous thrombosis

Differential diagnoses

- Inflammation: ulcerative colitis, Crohn's disease, Behcet's disease
- Infection: Campylobacter, Salmonella, shigella, E. coli, Staph. Aureus, Schistosoma, TB
- Iatrogenic: irradiation, drugs (NSAIDs)

Investigation

- Hematology: complete blood count (CBC), erythrocyte sedimentation rate (ESR)
- Biochemistry: serum albumin is often low
- Microbiology: stools show WBC and RBC
- Plain film: altered bowel gas patterns
- Barium enema: shows ulcerations, granulation with loss of haustra
- Sigmoidoscopy: inflamed rectal mucosa
- Colonoscopy: helps define extent of disease (ileum?); helps distinguish UC from CD with biopsies; screens for CA

Management

- The aim of all care is to induce and maintain remission
- High fiber diets, bulking agents
- Corticosteroids
- IV fluids
- Antibiotics
- Hematinic agents
- Surgery

Preventive treatments

- Surveillance colonoscopy with multiple biopsies to look for dysplasia every 1-2 years
- Colectomy if histology changes are noted

Prognosis

- Most people with UC experience recurrent episodes of acute colitis, but mortality rate is similar to general population
- The main risks are for those with severe acute colitis attacks and colonic cancer with chronic UC

Crohn's disease (CD)

- Epidemiology:
 - Like UC, CD is most common in developed countries
 - Prevalence is 50/100,000
 - Unlike UC, the incidence of CD has risen rapidly and continuously since 1960
 - Bimodal peak of occurrence at 20-30 years and elderly
 - More common in women
 - Most common in Caucasians, particularly Jews
 - 10% increase with first degree relatives and with AS

Etiology and pathogenesis

- Like UC, the cause of CD is unknown
- Possible factors:
 - Infection: resembles intestinal TB
 - Immunological: may be impaired
 - Diet: found more in those that eat refined carbohydrates, particularly sugar, but could be a secondary phenomenon
 - Smoking: patients with CD are more likely to smoke

Pathology

- Crohn's disease can affect any part of the gut, most frequently the anus, ileocecum, small bowel, and colon
- Typically, there are discontinuously affected gut segments (**skip lesions**)
- The first abnormality is aphthoid ulceration, which progresses to deep fissuring ulcers with cobblestoning, fibrosis, stricturing, and fistulation
- Histologically, there is transmural chronic inflammatory cell infiltration with ulceration, abscesses, granulomas

Clinical features

- **Clinical features vary depending upon site of disease (versus UC)**
- The history is usually chronic with relapses and remissions
- Common symptoms are:
 - Diarrhea
 - Weight loss
 - Abdominal pain
 - Fever

- With small bowel disease, steatorrhea is common
- With large bowel disease, rectal bleeding is common
- Chronic perianal symptoms are common
- Examination may show malabsorption, perianal disease (skin tags, fissures, fistulae, abscesses), abdominal mass, **digital clubbing**

Local complications

- Strictures: commonly present with obstruction and malabsorption
- Perforations: common, produce abscesses
- Abscess and fistula: usually form close to inflamed bowel and later discharge through fistulae into the skin, GI, bladder, vagina
- Hemorrhage: usually minor from inflamed mucosa
- Toxic megacolon: rarer in CD than UC
- Carcinoma: small bowel and colorectal CA are slightly more common among people with CD than in general population

Systemic complications

- GI: diarrhea, abdominal pain, steatorrhea, rectal bleeding, perianal disease, weight loss, fever, growth retardation, malabsorption
- Skin, eyes, and mouth: erythema nodosum, episcleritis, uveitis, aphthous ulceration
- Joints: enteropathic arthropathy, sacroiliitis, AS, clubbing
- Liver: fatty changes, hepatitis, cirrhosis, amyloid
- Biliary tract: gallstones, sclerosing cholangitis, bile duct CA
- Kidneys: oxalate stones, uric acid stones, amyloid
- Blood: arterial and venous thrombosis

Differential diagnoses

- Same as differentials for UC
- CD more likely to have a right-sided abdominal mass than UC
- **Ileocecal mass differentials:** Crohn's disease, appendix mass, lymphoma, TB, yersiniosis, amoebiasis, actinomycosis
- Masses at other sites: Ovarian, tubal, renal

Investigation

- Similar to those for UC, but also include small bowel radiology and tests for malabsorption

Management

- Treatment is again aimed at reducing relapses
- Unlike UC, prophylactic therapy is not as well-established
- Support groups
- Nutritional support

- Diet: avoid high-residue foods (corn, uncooked vegetables)
- Drugs: therapies for diarrhea, corticosteroids
- Surgery: about 80% of patients with CD require surgery eventually, and 50% of these will need a second operation within 15 years
- Because CD tends to recur, surgical removal is as conservative as possible

Prognosis

- Most patients experience recurrent morbidity throughout their lives from CD and its treatment
- The risk of death is 2 times that of general population

Irritable bowel syndrome (IBS)

- IBS is a syndrome of abdominal pain and disordered bowel habit for which there is no organic explanation
- Unsatisfactory synonyms are:
 - Nervous dyspepsia
 - Irritable colon
 - Spastic colon
 - Mucus colitis

Epidemiology

- 20% of normal adults have symptoms of IBS intermittently, but most do not seek care
- About 50% of referrals to US gastroenterologists are for IBS
- Peak age is 20-30 years
- More common in women

Etiology

- Personality: IBS sufferers tend to be more anxious and depressed than controls, but these could be secondary responses
- Dietary fiber: not much evidence
- Infection: IBS often starts after an episode of acute gastroenteritis or antibiotic-induced diarrhea, but the explanation is unclear

Pathogenesis

- Abdominal pain is often associated with abnormal intestinal motility and can be reproduced by luminal distention with a balloon or insufflation of air with sigmoidoscopy
- In some patients, symptoms seem to be due to heightened perception of normal intestinal activity
- Intestinal transit times are reduced in those with IBS complaining of diarrhea and increased with constipation

Clinical features

- Abdominal pain: felt anywhere, most commonly over iliac fossae, and related to defecation and flatus
- Varying bowel habits: diarrhea with urgency to constipation
- Passage of mucus rectally
- Feeling of fullness after defecation
- Abdominal distention

Other GI symptoms

- Nausea
- Vomiting
- Heartburn
- Dyspepsia
- Dysphagia

Symptoms from other systems

- Psychiatric symptoms: anxiety, depression, preoccupation with bowel habits (again, may be secondary phenomenon)
- Gynecological symptoms: dyspareunia, dysmenorrhea
- Urinary symptoms: frequency and urgency

Examination

- May reveal no abnormality
- Anxiety
- Diffuse or local abdominal tenderness
- Soft cecum
- Tender descending colon
- Loud borborygmi

Differential diagnoses

- Celiac disease
- Lactase deficiency
- Crohn's disease
- Giardiasis
- PID (pelvic inflammatory disease)
- Thyrotoxicosis
- Diverticulitis
- Peptic ulcers
- Gallstones