

## ABDOMINAL ASSESSMENT

### LESSON #10

#### Web Sources of Interest:

**Health Assessment Courses from New York University, Division of Nursing:**

Features study guides for health assessment and links

to case studies for the following topics:

- History-taking & documentation
- Techniques & Equipment
- Integument
- Head & neck
- Lung & thorax
- Cardiovascular
- Abdominal
- Male & female genitalia
- Musculoskeletal
- Neurological

<http://www.nyu.edu/classes/kirton/>

**Case studies: Canadian Association of Gastroenterology:**

<http://www.gi.ucalgary.ca/janssen/slide-kits/index.html>

## MOST COMMON GASTROINTESTINAL DISORDERS IN ADULTS

- Peptic Ulcer Disease:
  - Duodenal more common than peptic
  - Epigastric pain when stomach is empty & relieved by food or antacids
- Diverticulitis:
  - Inflammation of existing diverticula produces LLQ pain, anorexia, nausea, vomiting, altered bowel habits (usually constipation) & localized abdominal tenderness
- Cancer: Large bowel, colo-rectal cancer
  - Earliest sign is usually occult blood in stool & changing in frequency & character of stool
- In child-bearing age female: always consider pregnancy or ectopic pregnancy in acute abdominal pathology

## ANATOMY & PHYSIOLOGY

**GI Tract:** 27 feet long

- **Mouth: Key Points**
  - Digestion begins
  - Teeth & tongue initial breakdown of food
  - Salivary enzymes from parotid, submaxillary & sublingual glands begin digestive process

- **Esophagus: Key Points**

- Length: 10 inches
- Food moves down esophagus by smooth muscle contraction
- Lower esophageal sphincter prevents reflux of gastric content up into esophagus
- Dysphasia: difficulty swallowing: may be due to obstruction
- Gastrointestinal reflux: may lead to heartburn

- **Stomach: Key Points**

- Components:
  - Fundus: upper portion or cardia
  - Body: middle portion or corpus
  - Antrum: lower portion
  - Pylorus: narrow sphincter, or outlet into duodenum
- Acts as food reservoir
- Secretes gastric juice: 2-3 liters per day
- Provides parastaltic activity via muscular wall
- Mixes food with digestive enzymes & hydrochloric acid that begin break down of fats & proteins
- Liquefies food into chyme: a partial digestion
- Digestive Enzymes:
  - Pepsin: acts on proteins
  - Lipase: acts on fats
  - Very little absorption occurs in stomach
- Timing of Digestion:
  - Secretion of hydrochloric acid may produce pain if gastric ulcer is present
  - Gastric ulcer pain begins ½ hour after eating
  - Obstruction produces vomiting
  - Total stomach emptying time: 6 hours average for adult

- **Small intestine: Key Points**

- Length: 21 feet from pyloric sphincter to ileocecal valve
- 3 major sections:
  - Duodenum: 12 inches
  - Jejunum: 8 feet
  - Ileum: 12 feet

- **Duodenum: Key Points**

- Chyme enters the duodenum via the pyloric sphincter
- Acidity of chyme becomes more alkaline, Due to bile & pancreatic secretions
- Bile duct: empties bile into duodenum
- Pancreatic duct: empties pancreatic enzymes into duodenum 2 hours after eating

- **Liver: Key Points**

- Weight: 3 pounds
- Produces & secretes bile: uses cholesterol to form bile salts
- Active in regulating blood glucose levels: conversion of glycogen & amino acids to glucose
- Active in protein, carbohydrate & lipid metabolism
- Blood flow: from aorta via hepatic artery
- Stores vitamins (A, B12, B complex), minerals, iron, copper
- Synthesizes most plasma proteins (albumin, globulin, fibrinogen, prothrombin & blood clotting factors)
- Conjugates & excretes steroid hormones
- Active in antibody production
- Detoxifies & secretes organic waste into bile
- Converts fat-soluble waste into water soluble waste & urea
- **Liver Circulation:**
  - Receives arterial blood supply from hepatic artery
  - Enterohepatic circulation, via portal vein from Gastrointestinal tract & spleen
  - Venous drainage away from liver: via 3 hepatic veins, draining into inferior vena cava
- **Defective Liver Function:** results in
  - Jaundice
  - Coma
  - Ascities

- **Gallbladder: Key Points**

- Pear-shaped, 4 inches long, located in inferior area of liver
- Function: concentrate & store bile from liver
- Bile release: into cystic duct to hepatic duct to common bile duct, into duodenum
- Bile: maintains alkaline pH of small intestine & helps Emulsify fats
- Lack of bile leads to decreased digestion & absorption of fats, leading to diarrhea
- Lack of bile & it's metabolite, stercobilin produces clay colored or acholic stool

- **Pancreas: Key Points**

- Maximum output of pancreatic secretions occurs 2 hours after eating
- Produces 1-2 liters of pancreatic secretions per day
- Reduces acidity of chyme
- Pancreatic enzymes active in digestion:
  - Lipase: active in fat digestion
  - Amylase: active in carbohydrate digestions
  - Trypsin: active in protein digestion
- Exocrine function: exocrine or acinar cells produce bicarbonate, & pancreatic enzymes for digestion & absorption (fats, carbohydrates & proteins)

- Endocrine function: Isles of Langerans produce insulin & glucagon, for glucose regulation
  - Insulin: carbohydrate metabolism, and also major anabolic hormone
  - Pancreatic Insufficiency:
    - Present in Cystic Fibrosis, Celiac Disease other digestive disorders
    - Stools are:
      - Pale
      - Bulky (fatty)
      - Have foul odor
  - **Acute Inflammation:** In duodenum, gallbladder or pancreas
    - Pain worsens at this site during digestion
    - Pain worsens 2-3 hours after eating
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- **Jejunum & Ileum: Key Points**
    - Further digestion & absorption of nutrients occurs
    - Bile acids & vitamin B12 are absorbed in the ileum
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- **Ileocecal valve: Key Points**
    - Located at entrance into large intestine
    - Prevents backward flow of fecal material
    - Cecum: the blind pouch, located 2-3 inches into the large intestine
    - Vermiform appendix: located at base of cecum
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- **Large Intestine: Key Points**
    - **Landmarks**
      - Ascending colon
      - Hepatic flexure
      - Transverse colon
      - Splenic flexure
      - Descending colon
      - Sigmoid colon
      - Anal canal & anus
    - Length: 4.5 to 5 feet in length
    - Diameter: 2.5 inches
    - Water & electrolyte absorption occurs
    - Secretions are more alkaline
    - Bacterial putrefication occurs
    - Fluids:
      - 600 ml of fluid enter per day
      - 200 ml of fluids are excreted in stool daily

- **Abnormal function:**
  - Diarrhea & constipation
  - Aneurysmal pouches: may cause bleeding, constipation, diarrhea around fecal constipation
  - Infection: causes pain
  - Obstruction: causes pain
  - Tumors: may cause obstruction or bleeding
- **Common Problems or Conditions:**
  - Diverticulitis: LLQ pain, anorexia, nausea, vomiting, altered bowel habits
  - Inflammatory Bowel Disease: several etiologies: common features (fever, anorexia, weight loss, abdominal discomfort, diarrhea, rectal urgency & rectal bleeding)
  - Ulcerative Colitis: chronic inflammatory disorder of colon & rectum: with bloody, frequent watery diarrhea, weight loss, fatigue, debilitation; predisposes to rectal carcinoma
  - Crohn Disease: chronic inflammatory disorder occurring anywhere along the GI tract: with chronic diarrhea, mild bleeding, malabsorption, fistula or fissure formation & characteristic cobblestone changes of mucosa
  
- **Spleen: Key points**
  - Located above left kidney, between 9-11<sup>th</sup> ribs in right anterior axillary line
  - White pulp: consists of lymphoid tissue
    - Reticuloendothelial system
      - Filters blood
      - Makes lymphocytes
      - Makes monocytes
  - Red pulp: consists of capillary network for storage & release of blood
    - Is a reservoir for 1%-2% of RBC mass
    - Removes old/agglutinated RBSs & platelets
    - Partial iron metabolism
    - RBS production occurs outside of marrow in fetus & & during marrow depression

- **Kidneys, Ureters & Bladder: Key Points**

- **Kidneys**

- Located at T12-L3 vertebrae
- Right kidney is lower than left
- Function: glomerulofiltration of blood, 110-125 ml per minute, via flow through renal arteries
- Urine volume: controlled by ADH, antidiuretic hormone
- Urine flow: kidneys, renal pelvis, ureters to bladder via Peristaltic waves, then elimination via urethra & voiding
- Adult bladder capacity: 400-500ml (maximum 1000-1800 ml)
- Serves as the endocrine gland responsible for production of renin (which is important in aldosterone secretion, from the adrenals & regulates metabolism of sodium, chloride & potassium)
- A primary source of erythropoietin production RBC mass in adults
- Synthesizes some prostanoids
- Produces biologically active form of vitamin D

- **Vasculature: Key Points**

- Descending Aorta: Observe abdominal midline, above umbilicus for pulsations (visible in thin adults). In older adults, try to assess width of aorta by palpating on each side of aorta. Diameter should not be more than 3.0 cms wide (average is 2.5 cms) & pulsations should anterior & not expand laterally
- Renal arteries: bruits (MCL, bilaterally above umbilicus) suggest hypertension or narrowing of renal arteries
- Iliac arteries: auscultate MCL, bilaterally, below umbilicus
- Femoral arteries: auscultate over femoral/inguinal area

- **Musculature: Key Points**

- Muscles for & protect abdominal cavity
- Rectus abdominis: most exterior, para midline, anterior vertical location
- Internal & external oblique: next layer of muscles, Positioned more horizontally
- Transverse abdominis: third layer below obliques, horizontal or transverse
- Iliacus: lower abdominal, oblique placement
- Psoas: lower abdominal, oblique placement
- Iliopsoas test: a stretching of the iliacus & psoas muscles, considered a positive test for peritoneal irritation, if the maneuver produces localized abdominal pain

## HISTORY

- **Present Illness (PI):** focus on presenting gastrointestinal symptoms plus:
  - Nutrition
  - Allergies
  - Alcohol/drug use
  - Cigarette smoking
  - Medications (prescription, OTC & complimentary therapies)
  - Stools
  - Urine
  - Exposures to infection
  - Recent stressors
  - Pregnancy (LMP)
- **General Past Medical History (PMH)**
  - Focus on GI History: Ulcer disease, colitis, polyps, obstruction, pancreatitis, gallbladder disease, hepatitis, cirrhosis of liver, abdominal surgeries
- **Family History (FH)**
  - Focus on gastrointestinal & abdominal histories: peptic ulcer disease, kidney problems, colon cancer, malabsorption (cystic fibrosis, celiac disease) gallbladder disease, colitis, familial polyposis
- **PI: Common Symptoms**
  - **Pain**
    - **Timing:** sudden, severe pain, keeping from sleep, indicates perforation, inflammation, torsion of abdominal organ or biliary or renal stones
      - Relationship to LMP
    - **Acute Pain:** consider
      - Ectopic pregnancy (fallopian tube rupture)
      - Perforation of gastric/duodenal ulcer (tearing, burning)
      - Peritonitis (more slow in development)
      - Pancreatitis
    - **Location:** note localization, radiation & character
      - Small intestine: umbilical or gastric
      - RLQ: appendix (starts periumbilical)
      - Colon: LLQ, diverticulitis

- **Nature or characteristics:**
  - Perforated ulcers: burning
  - Dissecting aneurysm: tearing
  - Intestinal obstruction: gripping, cramping
  - Pyelonephritis: dull, aching
  - Biliary or renal: colicky, crampy
  
- **Referral:** Pain originates in areas supplied by Somatic nerves entering spinal cord
  - Note: textbook & “Location of Pain in Abdominal Disease” listing, later in Notes
  - Examples: pain located in:
    - Right shoulder: acute cholecystitis
    - Testicular pain: renal colic or appendix
  
- **Aggravating and Alleviating Factors:** examples
  - Epigastric pain ½ hour to 1 hour after eating:
    - peptic ulcer
  - Epigastric pain 2-3 hours after eating:
    - duodenal ulcer
  - Acute back pain:
    - may indicate ruptured duodenal ulcer
  - Nocturnal back pain:
    - may be associated with duodenal ulcer
  - Pain after eating in older adult
    - abdominal angina, from vascular disease
  
- **Nausea & Vomiting:** common associations
  - Inflammatory process
  - Irritation of peritoneum, due to perforation of abdominal organ
  - Obstruction of bile duct, Ureter or intestine
  - Toxins
  - Nature of emesis:
    - Gastric content: gastritis, obstruction at pylorus
    - Bilious: below bile duct
    - Feculent: lower intestinal obstruction
  
- **Change in Bowel Habits:** common associations
  - Alternating diarrhea & constipation:
    - colon cancer, diverticulitis
  - Floating, fatty or clay colored:
    - malabsorption
  - Blood & mucus: ulcerative colitis & some inflammatory processes
  - Change in caliber: (narrowing)
    - Carcinoma
  - Weight changes with constipation:
    - Increase: consider hypothyroid
    - Decrease: consider colon cancer

- **Rectal Bleeding:** common associations
  - **Hemataochezia** (bright red blood  
Or blood mixed with stool:  
colonic tumors, diverticulitis,  
ulcerative colitis, hemorrhoids
  - **Tenesmus:** painful straining:  
inflammation, distal tumor,  
hemorrhoids
  - **Melena:** high GI bleeding, above first section  
of duodenum
  - **Silver-colored:** acholic stools with melena:  
duodenal cancer
  
- **Jaundice (icterus):** associated with liver disease, due to hepatic,  
obstructive or hemolytic causes: bilirubin  
must exceed 2.5 mg/dL to produce clinical  
jaundice
  - **Hepatocellular :** viral hepatitis,  
cirrhosis, infectious mononucleosis
  - **Obstructive:** usually due  
to obstruction of common bile or  
hepatic ducts, due to stones or  
neoplasms: slowly developing,  
colored stool, cola-colored urine
  - **Hemolytic:** overproduction of  
bilirubin resulting from hemolytic  
process: from blood transfusion  
reactions or ABO/Rh incompatibility:  
hemolytic anemias: trauma: cancer  
of pancreas
  - **Cholangitis:** jaundice with  
fever & chills: stasis of bile, from  
gallstones or cancer
  - **Viral Hepatitis:** associated with  
nausea, vomiting, loss of appetite  
& aversion to smoking
  
- **Abdominal distention:** differentiate between:
  - **Gas:** malabsorption  
irritable bowel, aerophagia
  - **Ascities:** cirrhosis, CHF,  
portal hypertension, peritonitis,  
neoplasia
  
- **Mass:** differentiate between:
  - **Tumor, neoplasm**
  - **Hernia**
  - **Pulsating abdominal mass:**  
aortic aneurysm

- **Pruritis:** differentiate between
  - **Chronic illness:** renal or hepatic disease
  - **Hernia**
- **Urinary changes:**
  - **Frequency or incontinence**
  - **Dysuria:** lower urinary tract: cystitis
  - **Flank pain:** upper urinary tract: Pyelonephritis
  - **Color:** hematuria or pigment changes due to medications or other substances

### Considerations for Age & Condition

- **Infants & Children**
  - **Low birth weight:** risk for necrotizing enterocolitis
  - **Meconium stool in first 24 hours:** meconium ileus, malabsorption, cystic fibrosis, Hirschsprung's disease
  - **Diarrhea & Constipation:** differentiate between disease process & toilet training problems
  - **Pyloric stenosis:** projectile vomiting of gastric contents (not bile) in neonate, beginning at 3-4 weeks of age
  - **Intussusception:** acute abdominal obstruction, due to invagination of intestine, infant-toddler group, "current jelly" stools
  - **Hirschsprung's Disease:** congenital aganglionic megacolon: symptoms vary with age: failure to pass meconium in newborn: abdominal distention & constipation with intermittent watery diarrhea & failure to thrive in older child
- **Pregnant:** changes in urinary frequency and experience of abdominal pain may vary with stage of pregnancy
- **Older Adult:** changes urinary symptoms, bowel patterns dietary habits

### Abdominal Exam

- **Landmarks**
  - Four Quadrants
  - Nine abdominal areas

- **General Inspection**
  - **Vital Signs**
  - **Appearance**
    - Colic:** writhing in bed, no comfort
    - Peritonitis:** remain still, movement aggravates
    - Shock:** pale, diaphoresis
  - Skin**
    - Jaundice (sclera also):** bilirubin > 2.5 mg/dL in adults & >6.0 mg/dL in neonates
    - Spider angiomas:** alcoholic cirrhosis, pregnancy, collagen vascular diseases
    - Ulcerations:** inflammatory bowel & systemic disease
  - Hands**
    - Muscle wasting**
    - Nails:** Lindsay's nails (cirrhosis)
  - Facies**
    - Wasting or sunken eyes**
    - Changes in mouth & oral mucosa**
    - Cushing's syndrome:** moon facies
- **Abdomen:**
  - Inspection:**
    - Symmetry:** contour, asymmetry, distention, masses, peristalsis hernias, superficial veins & skin markings
    - Scaphoid:** cacexia
    - Protruberant:** gas distention, ascities, organomegally, tumors, obesity
    - Striae:** silver (weight loss): Pink-purple (adrenocortical excess)
    - Scars:** surgeries, trauma
    - Hernias:** umbilical, femoral, Inguinal or weakness due to scars: cough maneuvers to increase abdominal pressure
    - Superficial veins:** if distended, Evaluate direction of drainage: Hepatic cirrhosis or inferior vena cava obstruction
    - Aortic pulsation:** aortic aneurysm or increased pulse pressure
    - Peristalsis:** increased in intestinal obstruction

**Auscultation:** Bowel sounds, bruits, peritoneal rubs  
**Hypoactive or absent bowel sounds:**  
Paralytic ileus or peritonitis: listen for at least 5 minutes for absence  
**Hyperactive (borborygmi):**  
diarrhea, early intestinal obstruction  
**Bruits:** suggest arterial stenosis, or partial obstruction: hypertension:  
Aorta  
Renal  
Iliac  
Femoral  
Hepatic bruits: suggest carcinoma of liver or alcoholic hepatitis  
**Venous hum:** suggests increased collateral circulation between portal & systemic venous systems, as in hepatic cirrhosis  
**Friction rubs:** with respiratory movements, suggest inflammation of peritoneal surface of an organ, such as liver

**Percussion:** **Stomach, small bowel, colon, suprapubic areas, liver, spleen, R/O ascites: use systematic pattern**  
**Liver:** span 6-12 cms in RMCL & 4-8 cms in midsternal line: increased with liver enlargement: normal size displaced downward with COPD  
**Spleen:** between 9-11 rib in right mid-axillary line: enlargement progresses anteriorly & toward midline: Facilitate exam by having patient hold deep breath or turn on right side, supine  
**Shifting dullness, fluid wave & Bulging flanks:** ascities

**Palpation:** Light & then deep: size, shape, consistency, mobility, tension  
**Abdominal organs:**  
Liver, spleen, kidneys, aorta  
**Masses**  
**Tenderness & rebound tenderness**  
**Superficial abdominal reflexes**  
**Light palpation:** detect tenderness & muscle guarding  
**Muscle rigidity:** diffuse (peritonitis): localized (over inflamed organ, appendix, gallbladder, ovary)  
**Hyperesthesia:** inflammation of peritoneum

**Deep palpation:** organ size & masses  
**Kidney:** right pole lower than left:  
may palpate by flank ballotment  
**Rebound tenderness:** peritoneal irritation

**ASSESSMENT OF ABDOMINAL PAIN AND SPECIAL TECHNIQUES:**  
See next page

**DIAGNOSTIC TESTS TO CONSIDER:**

- CBC: hematocrit & hemoglobin: WBC & Differential
- UA
- Pregnancy
- Stool for:
  - WBC or fecal leukocytes  
(elevated in bacterial inflammatory disease)
  - Culture
  - Ova & parasites
  - Occult blood
  - Fat content
- Lactose tolerance testing: when lactose intolerance suspected  
(cramping, pain, loose stools following milk ingestion)
- Sedimentation Rate: non-specific for inflammatory process
- Serum electrolytes
- Liver chemistries:
  - Total bilirubin: best screen  
Evaluates liver function hemolytic anemia, newborn jaundice
  - Alanine transaminase (also referred to as ALT, GPT and SGPT)  
Rises with liver disease: helps differentiate between  
Hemolytic jaundice & jaundice caused by liver disease
  - Aspartate transaminase (also referred to as AST, GOT AND SGOT)  
Rises in liver disease and myocardial infarction
  - Gamma glutamyltransferase m(GTT):  
Sensitive early indicator of liver disease
- Pancreatic Function Tests: used to diagnose & monitor  
treatment of acute pancreatitis and to differentiate  
pancreatitis from other acute abdominal disorders
  - Serum Amylase
  - Serum Lipase
- X-rays & ultrasound visualization techniques

**LOCATION OF PAIN & PAIN REFERRAL  
IN ABDOMINAL DISEASE (Swartz)**

	<u>Area of Pain</u>	<u>Organ Involved</u>	<u>Example</u>
1.	Substernal	Esophagus	Esophagitis
2.	Shoulder	Diaphragm	Subphrenic abscess
3.	Epigastric	Stomach	Peptic gastric ulcer
		Duodenum	Peptic duodenal ulcer
		Gallbladder	Cholecystitis
		Liver	Hepatitis
		Bile ducts	Cholangitis
		Pancreas	Pancreatitis
4.	Right scapula	Biliary tract	Biliary colic
5.	Midback	Aorta	Aortic dissection
6.		Pancreas	Pancreatitis
7.	Periumbilical	Small intestine	Obstruction
8.	Hypogastrium	Colon	Ulcerative colitis
			Diverticulitis
9.	Sacrum	Rectum	Proctitis
			Perirectal abscess

**ABDOMINAL SIGNS & SPECIAL TESTS (Seidel, et al)**

	<u>Sign</u>	<u>Description</u>	<u>Associated Conditions</u>
1.	Cullen	Ecchymosis (umbilicus)	Hemoperitoneum, pancreatitis, ectopic pregnancy
2.	Gray Turner	Ecchymosis (flank)	Hemoperitoneum, pancreatitis
3.	Kehr	Abdominal pain to left shoulder	Spleen rupture, renal calculi
4.	Murphy	Abrupt cessation of inspiration on palpation of gallbladder	Cholecystitis
5.	Dance	Absence of bowel sounds in right lower quadrant	Intussusception
6.	Romberg-Howship	Pain down medial aspect of thigh to knee	Strangulated obturator hernia
7.	Blumberg	Rebound tenderness	Peritoneal irritation, appendicitis
8.	Markle (heel jar)	Patients stands with straightened knees, then raises up on toes, relaxes, and allows heels to hit floor, jarring body--abdominal pain	Peritoneal irritation, appendicitis
9.	Rovsing	Right lower quadrant pain intensified by left lower quadrant abdominal pressure	Peritoneal irritation, appendicitis

**SIGNS OF PERITONEAL IRRITATION**

Involuntary rigidity of abdominal muscles, tenderness & guarding, absent bowel sounds, positive obturator test, positive iliopsoas test, rebound tenderness (Blumberg sign), abdominal pain on walking, Positive heel jar test (Markle sign), Positive Rovsing sign.