Duodenum, Pancreas, Liver, & Gallbladder

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1:00 PM

**Peritoneum:**
- Fusion fascia (behind duodenum and pancreas) - avascular, used to mobilize pancreas/duodenum from posterior ab wall
- Ventral mesogastrium - liver development, forms falciform, coronary, triangular ligaments
- Falciform ligament (N 269, 287) - connects liver to umbilicus, contains round ligament of liver, continues as coronary ligament
- Coronary ligament (N 287) - connects liver to undersurface of diaphragm, borders bare area of liver
- Right triangular ligament (N 287) - right extreme of coronary ligament, continuous w/
- Left triangular ligament (N 287) - left extreme of coronary ligament, continuous w/

**Duodenum:**
- Subdivisions: (N 278)
  - Superior (1st): @L1; posterior to gallbladder and quadrate lobe of liver; anterior to bile duct, gastroduodenal artery, portal vein and IVC; inferior to neck of gallbladder; superior to neck of pancreas
  - Descending (2nd): L1-L3; point of entry for ducts; posterior to transverse colon, mesocolon, part of jejunum; anterior to hilum of right kidney, renal vessels, ureter, psoas major; lateral to head of pancreas, pancreatic and bile ducts
  - Inferior (3rd): @L3; posterior to SMA, SMV and parts of jejunum; anterior to psoas major, IVC, ab aorta, right ureter; inferior to head of pancreas, SMA, SMV
  - Ascending (4th): L3-L2; posterior to root of mesentery, parts of jenunum; anterior to left psoas major; later to head of pancreas and inferior to body of pancreas
- Suspensory muscle of the duodenum (ligament of Trietz) (N 270): posterior to pancreas and splenic vein; muscle fibers from right crus of diaphragm that suspends ascending diaphragm from posterior ab wall
- Circular folds (N 279): folds in duodenum
- Greater duodenal papilla (N 279): main pancreatic and common bile duct empty; sphincter of Oddi; distal to lesser
- Lesser duodenal papilla (N 279): accessory pancreatic duct emptying point into duodenum

**Pancreas:** (N 298): digestive and endocrine gland,
- Head: attached to duodenum, includes uncinate process; rests on IVC, right renal artery/vein, left renal vein; C-shaped; right-most part of pancreas
- Neck: betw head and body, extends to left, overlies SMA, SMV (junction w/ splenic vein to form portal vein); posterior to pylorus
- Body: stretches to left from neck; splenic a. on superior bordery; splenic v. posterior; anterior to SMA, ab aorta, left adrenal gland, kidney, vessels; posterior to omental bursa
- Tail: somewhat mobile end of pancreas; lies w/in splenorenal ligament; anterior to splenic flexure and hilum of spleen
- Uncinate process: lowest part of pancreas (part of head); tip lies posterior to SMA/V
- Main pancreatic duct (N 294): drains tail, body and lower head; unites w/ common bile duct before emptying into greater duodenal papilla
- Accessory pancreatic duct: drains upper head of pancreas and empties into lesser duodenal papilla

**Liver:** (N 287)
- Porta hepatis: passage of portal v, hepatic a., hepatic bile ducts, lymphatics, nerves into liver on undersurface of liver
- Diaphragmatic surface: anterior and superior (and some of the posterior) parts are in contact with the diaphragm
- Visceral surface: most of the posterior and inferior surface area contact abdominal viscera
- Bare area: area surrounded by coronary vessels, in contact w/ diaphragm,
Lobes (N 289)
- Right: right, large lobe
- Left: left, large lobe

Quadrate: btwn gallbladder and ligamentum teres, square

Caudate: btwn IVC and ligamentum venosum, has a tail

Fissures (N 287): crack btwn right and left lobes w/ ligamentum

Biliary tract: (N 294)
- Right hepatic duct: drains right and part of caudate lobe of liver
- Left hepatic duct: drains left, part of caudate, quadrate lobes of liver
- Common hepatic duct: right and left ducts combine to form common hepatic duct
- Cystic duct: from gall bladder
- Common bile duct: cystic and common bile duct combined

Hepatopancreatic ampulla (N 297): part of greater duodenal papilla; pancreatic duct unites w/ common hepatic duct here

Gallbladder: (N 294)
- Fundus: expanded lower part; located near inner surface of anterior abdominal wall at junction of right 9th costal cartilage & right semilunar line
- Body: lies in bed of gall bladder between right & quadrate lobes of liver
- Neck: constricted upper part of gallbladder, continuous w/ cystic duct

Arteries:
- Common hepatic a. (N 300, 302): from celiac trunk to liver, an parts of duodenum, pancreas and stomach
  - Proper hepatic a.: liver, lesser curvature of stomach
    - Right gastric a. (seen previously): supplies lesser curvature of stomach
    - Right hepatic a.: supplies right lobe of liver, part of caudate lobe; supports liver parenchyma and stroma
    - Cystic a.: supplies gall bladder; arises from hepatic a. in 72% of cases; other possible origins are SMA, proper hepatic, left hepatic or gastroduodenal
    - Left hepatic a.: supplies left and quadrate lobes, part of caudate lobe
  - Gastroduodenal a.: supplies upper duodenum, upper part of head of pancreas, greater curvature of stomach on right
    - Posterior superior pancreaticoduodenal a. (posterior arcade) (N 304): gives off pancreatic and duodenal branches; spirals around common bile duct; anastomoses w/ posterior inferior pancreaticoduodenal a. in posterior pancreatic arcade
    - Anterior superior pancreaticoduodenal a. (anterior arcade) (N 304): anastomoses w/ anterior inferior pancreaticoduodenal in anterior pancreatic arcade
    - Right gastro-omental a. (seen previously) (N 300): supplies lower part of pyloric part of stomach, right part of greater curvature of stomach, greater omentum
  - Splenic a. (N 302): off celiac trunk; supplies pancreas, spleen, greater curvature of stomach
    - Dorsal pancreatic a.: supplies pancreas near neck; right branch anastomoses w/ anterior superior pancreaticoduodenal in prepancreatic arcade
    - Inferior pancreatic a.: from left br. Of dorsal pancreatic to supply lower part of body of pancreas
    - Prepancreatic arcade:
      - Pancreatic brs.: supplies pancreas
      - Great pancreatic a.: supplies body of pancreas
      - Caudal pancreatic brs.: supplies tail of pancreas
  - Superior mesenteric a. (N 301, 302, 304, 306): branches below
    - Inferior pancreaticoduodenal a.: gives off branches below to supply lower duodenum and head of pancreas
      - Anterior inferior pancreaticoduodenal a. (anterior arcade): anastomoses w/ anterior superior to form anterior arcade
      - Posterior inferior pancreaticoduodenal a. (posterior arcade): anastomoses w/ posterior superior to form posterior arcade
Arteriae rectae: straight arteries off arcades
Aberrant hepatic aa. (if present) (N 309): left comes off gastric, right off SMA

Veins:
Round ligament of the liver (ligamentum teres hepatis) (N 229,287): w/in falciform lig; connecting liver to umbilicus, remnant of umbilical v.
Ligamentum venosum (N 229,287): lies in attachment of hepatogastric lig to liver btwn caudate and left lobe; remnant of obliterated ductus venosus
Portal v. (N 312): union of SMV and splenic; right and left branches into liver sinusoids; connect w/ caval drainage at esophagus, rectum, umbilicus and retroperitoneal gut structures
Splenic v. (N 309,311,312): drains spleen
Inferior mesenteric v. (N 311,312): superior rectal, sigmoid and left colic veins; goes to splenic or SMV; drains gut distal from splenic flexure; courses lateral to 4th part of duodenum
Superior mesenteric v. (N 310,311,312): pancreaticoduodenal, jejunal, and right middle colic veins; drains gut proximal to splenic flexure
Portacaval anastomoses (N 312)
esophageal vv. (N 238): connects w/ esophageal brs of left gastric; forms potential portocaval anastomoses; esophageal varices when enlarged
Superior rectal vv. (N 387)
Paraumbilical vv. (N 256): drains falciform and round lig of liver; blood may pass retrograde into body wall veins near umbilicus forming caput medusa
Posterior body wall vv. (N 312):
Hepatic vv. (N 265)
Left: lateral segment and superior portion of medial segment of left lobe of liver
Middle: inferior portion of medial segment of left lobe & inferior part of anterior segment of right lobe
Right: posterior segment & superior portion of anterior segment of right lobe of liver
Inferior vena cava (N 265,274) yeah....

Clinical Terms:
Pancreatitis: acute or chronic inflammation of the pancreas, which may be asymptomatic or symptomatic; due to autodigestion of pancreatic tissue by its own enzymes; caused by alcoholism or biliary tract disease, less commonly associated with hyperlipemia, hyperparathyroidism, abdominal trauma, vasculitis or uremia
Pancreatic cancer: more than 90% are ductal adenocarcinomas w/ islet cell carcinomas making up the rest; ab pain, swelling, jaundice, weight loss and anorexia
Gall stones: concretion in gall bladder or a bile duct, composed chiefly of cholesterol crystals
Jaundice: yellow of skin and whites of eyes by bilirubin
Cholecystectomy: surgical removal of gall bladder, laparoscopic or traditional
Cirrhosis & portal hypertension: liver disease characterized by loss of normal microscopic lobular architecture, with fibrosis and nodular regeneration; leads to increase in portal venous pressure that can result in esophageal varices, hemorrhoids, enlarged veins on the anterior ab wall and ascites
Ascites: fluid within ab cavity
Kocher maneuver: reflecting duodenum and pancreas medially by cutting through fusion fascia along right side of descending part of duodenum
Duodenal stenosis/atrophy: narrowing of the duodenum/blind end (congenital, caused by failure of duodenum to recanalize, 70% have other malformations including Down's, cardiac or GI defects)