Clinical Anatomy of the Portal System in the Context of Portal Hypertension

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Portal System

- Conducts venous return from gut and associated organs to the liver
- Much of the system is retroperitoneal but some tributaries are within mesentery
Portal System (extrahepatic tributaries)

Portal vein
- Superior mesenteric V.
  - Intestinal veins
  - Ileocolic vein
  - Right colic vein
  - Middle colic vein
  - Inferior pancreaticoduodenal
  - Right gastroepiploic vein
- Splenic vein
  - Inferior mesenteric vein
    - Left colic vein
    - Sigmoid veins
    - Superior hemorrhoidal veins
  - Pancreatic veins
  - Left gastroepiploic vein
  - Short gastric veins
- Coronary vein
- Cystic vein
- Paraumbilical veins

from Netter 1957
Portal System

variations

- Variations are relatively rare
- Length of main portal stem: 55-80 mm
- Diameter: 11 mm, more in cirrhosis
- Main variations involve connections of gastric coronary vein and IMV

anomalies

- Anomalies are rare
- Anterior position of portal vein relative to pancreas and duodenum
- Portal vein bypassing liver and draining into IVC

from Netter 1957
Portal Hypertension
Etiology

- Classification systems
  - Presinusoidal, sinusoidal, postsinusoid.
  - Extrahepatic vs. intrahepatic
  - Suprahepatic, intrahepatic, infrahepatic
  - Suprahepatic (outflow obstruction)
    - Right-side heart failure, constrictive pericarditis, Budd-Chiari syndrome
  - Often portal hypertension is matched by systemic (caval) hypertensions
- Intrahepatic (90% of cases)
  - Cirrhosis most common but others too
  - Typical pathologic anatomical findings
- Infrahepatic
  - Obstruction of extrahepatic portal system
  - Portal (or splenic) v. thrombosis
  - Cavernomatous transformation of portal vein
  - Tumor, infection, compression
  - Typical pathologic anatomical findings

from Netter 1957
Vascular Changes in Cirrhosis Leading to Portal Hypertension

- Compression of hepatic veins
- Regen. nodules and connective tissue septa compress veins
- Decreased outflow, increased upstream portal pressure
- Formation of portahepatic AVAs
- Direct anastomoses between hepatic a. branches and portal vein tributaries
- Increased flow into portal system via AVAs increases portal hypertension

from Netter 1957
Pathological Anatomy
Associated with Portal Hypertension

- Esophageal varices
- Splenomegaly
- Caput medusae
- Ascites

from Netter 1957
Portacaval Anastomoses

- Esophageal anastomosis: azygos (caval) — coronary or short gastric (portal)
- Paraumbilical anastomosis: paraumbilical vv. (portal) — epigastric vv. (caval)
- Rectal anastomosis: sup. hemorrhoidal (portal) — inf. & middle hemorrhoidal vv. (caval)
- Retroperitoneal anastomosis: visceral vv. of Retzius (portal) — parietal vv. (caval)
Rectal Anastomosis:
Hemorrhoids in Portal Hypertension?

Sup. hemorrh. vv. (portal) — inf. & mid. hemorrh. vv. (caval)
Paraumbilical Anastomosis: 
Caput medusae

Paraumbilical vv. (portal) —
Superficial, superior, & inferior epigastric vv. (caval)
Retroperitoneal Anastomosis: Ascites

Visceral vv. of Retzius (portal) —
Retroperitoneal parietal vv. (caval)

From Moore & Dalley 2006

from Netter 1957
Esophagogastric Anastomosis: Varices
Azygos (caval) — Coronary or short gastric (portal)