Vasculature of Abdomen



STUDENT COLLABORATIVE RESOURCES FOR UNDERSTANDING AND BRODY SUCCESS

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<u>Resources used</u> Coursepack Illustration Supplement - BSOM

Mission Statement

SCRUBS is a student-driven initiative that aims to develop supplemental resources for current and future cohorts that will pass through Brody. Members of SCRUBS participate in a variety of subcommittees working to create resources for students, by students. These resources aim to offer unique perspectives from students that have walked in the same shoes, developing resources that we wish we had been exposed to during our time in the course.

The hope is this organization will become a staple of the Brody student body, exemplifying the unique collaborative community that Brody offers. If this is a mission that aligns with your goals and you have the desire to help those that will come behind you, as well as a goal to leave your mark on Brody as a whole, we invite you to join the team!

Disclaimer

The resources that are included in this document are made by students and not the faculty. As such, there is the possibility for errors in our development, although this is mitigated via a team approach to development with multiple stages of vetting. If there is a contradiction with the coursework presented within your course, please go by the course documents. Additionally, SCRUBS aims to supply supplemental *resources*, however these are in no way replacements to the instruction of the Brody faculty. Use these resources as a supplement, but not as your primary source for course material.

Abdominal Aorta

- Aortic hiatus (T₁₂) to common iliac arteries (L₄)
- <u>Anterior</u> branches to GI tract
 - Celiac trunk
 - Superior mesenteric
 - Inferior mesenteric
- Branches to abdominal wall & glands
 - Inferior phrenic: diaphragm
 - Superior <u>suprarenal</u>
 - Middle suprarenal
 - Renal: kidneys
 - Inferior <u>suprarenal</u>
 - Lumbar: spinal cord, cauda equina, & spinal meninges
 - 4 posterior pairs
 - Gonadal
 - Median Sacral: <u>unpaired</u>, caudal



Celiac Trunk

- Was artery of embryonic foregut
- Stomach, esophagus, proximal duodenum, liver, gallbladder, pancreas, spleen

Branches

- <u>Left gastric</u>
- Common hepatic
 - Proper hepatic
 - Enters hepatoduodenal ligament of lesser omentum
 - Right gastric, L & R hepatic
 - Gastroduodenal
 - Superior pancreaticoduodenal & right gastro-omental
- <u>Splenic</u>
 - Enters splenorenal ligament
 - Short gastric branches
 - Splenic branches
 - Left gastro-omental



Superior Mesenteric Artery

- Was artery of embryonic **midgut** •
 - Small intestine (except proximal duodenum)
 - Large intestine (up to left colic flexure)
- **Overlays**: •
 - L renal vein, uncinate process, horiz. duodenum

artery

Right colic

artery

artery

Branches

- Inferior pancreaticoduodenal (splits ant. & post.)
 - Ant. & post. pancreaticoduodenal arcades
 - From anastomosis w superior pancreaticoduodenal a. (celiac trunk)
- Intestinal •
 - 15-18 Jejunal & ileal a.
 - Arterial arcades (ileum > jejunum)
 - Vasa recta
- lleocolic
- **Right colic**
- Middle colic



Inferior Mesenteric Artery

- Was artery of embryonic **hindgut**
 - Descending colon to proximal rectum
- Left of aorta

Branches

- Left colic
- Sigmoid: 2-4
- Superior rectal
 - Anastomose w internal iliac system
- "Marginal artery"



Inferior Vena Cava

- Formed by common iliac veins at L₅
- Generally same as arteries <u>EXCEPT</u> those that empty into hepatic portal vein:
 - Common iliac: Union of external & internal iliac
 - Lumbar: 4 pairs
 - Renal
 - L Receives L gonadal & L suprarenal
 - Right gonadal
 - Right suprarenal
 - Right inferior phrenic
 - Left inferior phrenic
 - Hepatic



No functionally competent valves

Portal Vein

- Receives all venous blood from GI tract
 - Except lower anal canal, pancreas, & spleen
- Formed by:
 - Splenic v.
 - Superior mesenteric v.
 - Inferior mesenteric v.
- Receives gastric v. & enters hepatoduodenal ligament
 - Posterior to proper hepatic a. & common bile duct
- Splits into L & R branches
- Communicates w caval venous system
 - GI tract blood still reaches heart in obstruction



Portal Vein

- Major portal-caval anastomoses:
 - Esophageal tributaries of L gastric v.
 - W/ esophageal v. of azygos system
 - Superior **rectal** v.
 - W/ middle & inferior rectal v.
 - Paraumbilical v. in falciform ligament
 - W/ superficial v. in anterolateral abd. wall
 - Tributaries of splenic & colic v.
 - W/ left renal v.

Portal hypertension

- From obstructed flow in portal vein
- Causes veins in anastomotic areas to dilate & become varicose



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Lymphatics

- Nodes around aorta (para-aortic nodes) receive lymph from
 - Kidneys
 - Suprarenal glands
 - Testes & Ovaries (embryo origin in abdomen)
 - Lower abdominal wall
 - Lower limbs
 - Most pelvic viscera
- Efferent vessels from these nodes unite to form L & R lumbar trunks
 - Converge to form cisterna chyli
 - Dilated distal thoracic duct
 - Receives intestinal trunk
 - Celiac & superior mesenteric nodes



Cisterna chyli (chyle cistern)

Abdominal aorta

Lymphatic drainage

Testis Scrotum

Clinical Anatomy

Resection of GI tract parts

- Identify & preserve peritoneal vessels
 - To retain GI tract blood supply

Occlusion of superior mesenteric a.

- Slow occurrence
 - Bowel nourished by blood from inferior mesenteric a. by "marginal a."

Venous emboli

 IVC is major pathway from lower extremity, pelvis, & perineum to right heart & lungs

"Nutcracker syndrome"

- Renal vein entrapment syndrome
- Compression of L renal vein b/w superior mesenteric a. & abd. aorta
- Symptoms: blood in urine & L abd. pain



Portal hypertension

- Varicosities of:
 - Rectal veins (hemorrhoids)
 - Cutaneous umbilicus veins (caput medusae)
- Esophageal varices
- Bleeding from esophageal varices
 - Often severe/fatal



| SITE OF ANASTOMOSIS | CLINICAL SIGN | $PORTAL \leftrightarrow SYSTEMIC$ | (3) |
|---------------------|--------------------|---|----------------|
| Esophagus | Esophageal varices | Left gastric ↔ esophageal (drains into azygos) | ⁻ |
| Umbilicus | Caput medusae | Paraumbilical ↔ small epigastric veins (branches of inferior and superficial epigastric veins) of the anterior abdominal wall | Epigastric vei |
| 3 Rectum | Anorectal varices | Superior rectal ↔ middle and inferior rectal | |

Varices of gut, butt, and caput (medusae) are commonly seen with portal hypertension.