Lecture -6-

Anatomy of large intestine

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- The large intestine, also known as the large bowel, represents the last part of the gastrointestinal tract .,
- it has a length of approximately 1.5 meters,
- extending from the ileocecal junction to the anus.
- Most of the large intestine is located inside the abdominal cavity, with the last portion residing within the pelvic cavity.
- Some parts of it are intraperitoneal while others are retroperitoneal.

- Features specific to the large intestine
- 1) Omental or epiploic appendages are fat filled pouches of peritonium_ that are attached externally to the walls of the large intestine.
- 2) Teniae coli are three longitudinal bands of smooth muscel located underneath the peritoneum that extend along certain sections of the large intestine. Their contractions facilitate the peristaltic action of the large intestine, propelling the fecal matter and forming the haustra.
- 3) Haustra are sacculations that occur along the large intestine, providing it with its characteristic 'baggy' aspect. They are created by semilunar folds on the internal surface of the large intestine.

- The large intestine consists of eight parts; the cecum, appendix, ascending colon, transverse colon, descending colon, sigmoid colon, rectum and anal canal
- The middle four sections (ascending to sigmoid parts) form the <u>colon</u>.



Cecum

- The cecum is the first part of the large intestine, lying in the right iliac fossa of the abdomen
- Shape blind pouch 3 inch in length
- The cecum is intraperitoneal with various folds and pockets (retrocecal peritoneal recesses) surrounding it
- The terminal ileum joins the cecum at the ileocolic junction.



Appendix

- The vermiform appendix is a blind lymphoid pouch located in the right iliac fossa which arises from the cecum.
- Size ¹/₂ -9 inch average 4 inch it's the narrowest part of GIT
- connected by the meso-appendix.
- The appendix has a role in the maintenance of gut flora and mucosal immunity.
- It open in to the cecum at posteromedial aspect of cecum, 1inch below iliocecal junction

- Posiotions of appendix
- 1-retrocecal ..most common
- 2-pelvic
- 3-subcecal
- 4-perilial
- 5-post ilial ..least common





Surface anatomy

- The base of appendix is marked by McBurneys point : a point at the junction of lateral 1/3 and medial 2/3 of a line traced from RT anterior superior iliac spine to umbilicus
- Importance :tenderness and rebound at this point is suggestive of appendicitis



Ascending colon

• The portion of the large intestine located between the cecum and rectum is termed the colon. It consists of four parts; ascending, transverse, descending, and sigmoid.



- The ascending colon travels through the right iliac fossa, Right flank, and Right hypochondrial region
- It ends at the right colic (hepatic) flexure.
- The ascending colon is retroperitoneal and it is connected to the posterior abdominal wall by the Toldt's fascia.
- A deep vertical groove or recess (right paracolic gutter) lies between the ascending colon and the lateral abdominal wall.

Transverse colon

- The transverse colon is the second major part of the colon.
- It extends between the right and left colic (splenic) flexures, spanning the right hypochondriac , epigastric_ and left hypochondriac regions of the abdomen.
- The greater curvature of the <u>stomach</u> and <u>gastrocolic ligamnet</u> are superior to the transverse colon, while the <u>greater</u> <u>omentum</u> hangs over and extends inferiorly to it.
- The transverse colon is intraperitoneal. A peritoneal mesentery (transverse mesocolon) attaches it to the posterior wall



Descending colon

- The descending colon extends between the left colic flexure and sigmoid colon.
- It travels through the left hypochondriac region, left flank and left iliac fossa.
- The left paracolic gutter is located between the descending colon and the lateral abdominal wall.
- This part of the colon is retroperitoneal . Toldt's fascia fixes the descending colon to the posterior abdominal wall.



Sigmoid colon

- The S-shaped sigmoid_travels from the left iliac fossa until the third sacral vertebra (rectosigmoid junction).
- This part of the colon is intraperitoneal. It is connected to the pelvic wall by the sigmoid mesocolon.



Rectum

The rectu<u>m</u> stretches between the rectosigmoid junction and the anal canal. The typical characteristics of the large intestine (taenia coli, haustra, epiploic appendages) change or even terminate at the rectum.

The rectum has a characteristic S-shape marked by several bends or turns; sacral, anorectal and lateral flexures. The latter correspond with three infoldings called transverse rectal folds.

The rectum ends at a dilated ampulla.



- The rectum is partially intraperitoneal since the inferior third is subperitoneal.
- The peritoneum reflects from the rectum towards the bladder in males (rectovesical pouch) and the vaginal fornix in females (recto-uterine pouch or pouch of Douglas).
- The spaces around the rectum are potential spaces for infections, abscess formation, and many other pathologies.

Anal canal

The anal can<u>al</u> forms the terminal part of the gastrointestinal tract.

It extends from the anorectal junction to the anus.

The anus represents the external orifice of the entire digestive system.

the pectinate line / dentate makes the distinction between the superior and inferior parts of the anal canal. They differ in terms of neurovascular supply and lymphatic drainage





 The internal and <u>external anal</u> <u>sphincters</u> surround the anal canal. Respectively, they involuntarily and voluntarily control the release of stool. Both sphincters are tonically contracted to prevent the uncontrolled release of fecal matter or flatus.

Peritoneal covering Parts with mesentery : 1-transverse colon 2-sigmoid colon 3-appendix 4-cecum retroperitoneal parts 1-ascending colon 2-descending colon 3-upper 2/3 of rectum

Parts devoid of peritoneal covering :

- 1-lower 1/3 of the rectum
- 2-anal canal

Relations of cecum , ascending and decsending colons

Anterior

- 1-greater omentum
- 2-coils of small intestine
- 3-anteror abdominal wall

Posterior relations

- Cecum ..psoas major and iliacus
- Ascending colon ...iliacus ,quadratous lumborium and Right kidney
- Descending colon ...Left kidney , quadratous lumborium , iliacus , psoas major

Relations of transverse colon

Anterior ...greater omentum and anterior abdominal wall

Posterior ...second part of duedenum , pancreas, superior mesentric vesseles

Superior ..liver ,gall bladder ,stomach

Inferior ... coils of small intestine

Relations of rectum Anteriorly ..

- Male ...seminal vesicle , posterior surface of urinary bladder and prostate gland
- Female ...posaterior wall of the vagina Posteriorly In both male and female
- Sacrum ,sacral plexus and coccyx

ArterialBlood supply

The large intestine receives arterial blood predominantly from the <u>superior</u> and <u>inferior</u> <u>mesenteric arteries</u>.

The SMA supplies the midgut derivatives, such as the cecum, appendix, ascending colon and the proximal two-thirds of the transverse colon via three main branches: ileocolic, <u>right colic</u>, and middle colic arteries

- The inferior mesenteric artery supplies the hindgut derivates, namely the posterior third of the transverse colon, descending colon, sigmoid, colon, rectum and the upper part of the anal canal via three branches: <u>left colic</u>, sigmoid, and <u>superior rectal arteries</u>.
- The middle and <u>inferior rectal arteries</u>, which stem from the <u>internal iliac artery</u>, also supply hindgut derivates

Cecum	Iliocolic artery
Appendix	Appendicular artery
Ascending colon	Ileocolic and right colic arteries
Transverse colon	Middle colic artery and LT colic artery
Descending colon	Left colic artery
Sigmoid colon	Sigmoid artery
Rectum	Superior part: superior rectal artery Middle & inferior parts: middle rectal artery
Anal canal	Superior to pectineal line: superior rectal artery Inferior to pectineal line: inferior rectal artery

Venous drainage

- The midgut derivates drain first into the colic veins, which in turn empty into the <u>superior</u> <u>mesenteric vein</u>.
- Hindgut derivates flow directly into the inferior mesenteric vein.
- The rectum has a special venous drainage. Middle rectal and inferior rectal veins drain this part of the gastrointestinal tract into the internal iliac and internal pudendal veins, respectively.

Cecum	Ileocolic vein
Appendix	Ileocolic vein
Ascending colon	Right colic vein
Transverse colon	Superior mesenteric vein
Descending colon	Inferior mesenteric vein
Sigmoid colon	Inferior mesenteric vein
Rectum	Superior, middle, inferior rectal veins
Anal canal	Superior to pectinate line: superior rectal vein Pectinate line: internal rectal venous plexus Inferior to pectinate line: inferior rectal vein

Nerve supply

Parasympathetic innervation

- The <u>vagus nerve (CNX)</u> provide parasympathetic innervation to the large intestines.
- The <u>pelvic splanchnic nerves</u> (S2-4) also contribute to the large intestines' parasympathetic supply.
- The vagus nerve fulfils this role in the gut to the point of the transverse colon, while the pelvic splanchnic nerves carry on this function from the left colic flexure down wards.

Sympathetic innervation

• The T10-L2 thoracolumbar outflow of <u>sympathetic</u> fibers They form synapses at the superior and inferior mesenteric, and the inferior hypogastric plexuses.

The superior mesenteric plexus provides sympathetic innervation to the cecum, appendix, ascending and transverse colon (near to the left colic flexure),

- while the inferior mesenteric plexus innervates the colon from the left colic flexure to the <u>rectum</u>.
- The inferior hypogastric plexus also innervates the rectum

Lymphatic drainage

- Throughout the large intestines, the lymph nodes are arranged in four general groups.
- The first group is epicolic nodes that rest on the outer surface of the intestinal wall.
- The second is paracolic nodes that lie along the intestinal margin.
- Thirdly, there are intermediate nodes that lie along (and conveniently take the names of) the arterial branches of the superior and inferior mesenteric arteries.
- Finally, there are the preaortic nodes that are found at the branching point of the coeliac trunk and the superior and inferior mesenteric arteries.

