JEJUNUM AND ILEUM

I. INTRODUCTION

The jejunum and ileum extend from the duodenojejunal flexure to the ileocaecal junction. The jejunum constitutes the upper two fifths of small intestine and the ileum the lower three fifths. They are situated in the infracolic compartment of the peritoneal cavity and play a major role in digestion of aliments and absorption of nutriments. They both belong to the midgut and represent the mobile portion of the intestine.

II. DESCRIPTIVE ANATOMY

A- GENERAL ASPECT

The jejunum and ileum are very mobile fifteen to sixteen coils hanging free on the mesentery.

The jejunum is wider-bored and thicker-walled than the ileum. The wall of the jejunum is thick and double while the wall of the ileum is thin and single. This distinction can be made by rolling the wall of the intestine gently between finger and thumb. The lower reaches of the ileum are distinguished by the presence on the antimesenteric border of elongated whitish plaques in the mucous membrane, usually but not always visible through the muscle wall.

Each coil is U-shaped, concave towards mid-line, the branches are in contact with each other.

B- DIMENSIONS

The jejunum ileum are five to six meters long. It corresponds to the length of the free margin of mesentery. The root of mesentery is fifteen centimetres long. The internal diameter of jejunum is about four centimetres when of the ileum is two and half.

C- SHAPE

The jejunum and ileum are hollow columnar coiled tubes.

Each coil has two convex faces and two borders. The anterior border is the antimesenteric free border and the posterior border corresponds to the intestinal border of the mesentery and constitutes the point of reflection of the serous coat of intestine forming the mesentery. An ileal (Meckel's) diverticulum is present in two percent of individuals, sixty centimetres from the caecum and is five centimetre long. Its blind end may contain gastric mucosa or liver or pancreatic tissue. It represents the intestinal end of the vitellointestinal duct, and its apex may be adherent to the umbilicus or connected thereto by a fibrous cord, a further remnant of the duct. Ulceration and perforation of the tip can occur.

III. STRUCTURE

The wall of jejunum and ileum is formed of four layers. The serous coat is the outer layer, it covers the anterior board and convex faces of each coil, continues up behind and is reflected downwards to the floor of posterior abdominal wall. The muscle layer is made of one longitudinal outer layer and one circular inner layer and contains the myenteric plexus of

Auerbach. The submucosa is a loose areolar connective tissue that contains the submucous plexus of Meissner.

The mucosa is a simple columnar epithelium, it contains the glandular crypts of Liberkuhn made of enterocytes and a muscularis mucosae. Its macroscopic aspect is formed of semilunar folds and, microscopically, the epithelium covers finger-like connective-tissue cores of lamina propria called villi. These villi contain capillaries when intestinal absorption occurs.

In the distal reaches of ileum, lymphoid follicles aggregate in the lamina propria and form Peyer's patches.

One physiological feature about these last reaches is that they represent the unique portion of the gastrointestinal tract that holds the intrinsic factor receptor without which vitamin B12 cannot be absorbed which exposes to a myriad of pathological phenomena.

IV. MESENTERY

The mesentery is a two layers peritoneal fold adhering to the posterior parietal peritoneum that covers the jejunum and ileum as they constitute the free mobile portion of the intestine. The root of mesentery passes down from left to right at an angle of about 45°. It begins on the left at the duodenojejunal junction, crosses the third part of the duodenum where the superior mesenteric vessels enter between its two layers, and then continues downwards across

the aorta, inferior vena cava, right psoas muscle and ureter to the right iliac fossa. It ends in its intestinal border at the mesenteric border of each coil.

The mesentery is highly folded and its depth (from root to gut) is about fifteen centimetres, it supports the blood supply and lymph drainage of the jejunum, ileum and large intestine.

V. ANATOMICAL RELATIONS

A- PERITONEAL

The infracolic compartment is divided into two by the attachment of the root of the mesentery, the upper part is right and the lower part is left and contains the major part of the small intestine.

B- VISCERAL

Backwards, the jejunum and ileum are in contact with the retroperitoneal organs through the posterior parietal peritoneum and mesentery.

Laterally, on the right, the ileum lies next to the caecum, ascending colon and the lateral abdominal wall and, on the left, the jejunum next to the descending colon and the left lateral abdominal wall.

Forwards, they are covered by the great omentum and the anterior abdominal wall.

At the top, they are overlied by the transverse colon and mesocolon.

At the bottom, they overlie the sigmoid colon, rectum and pelvic organs.

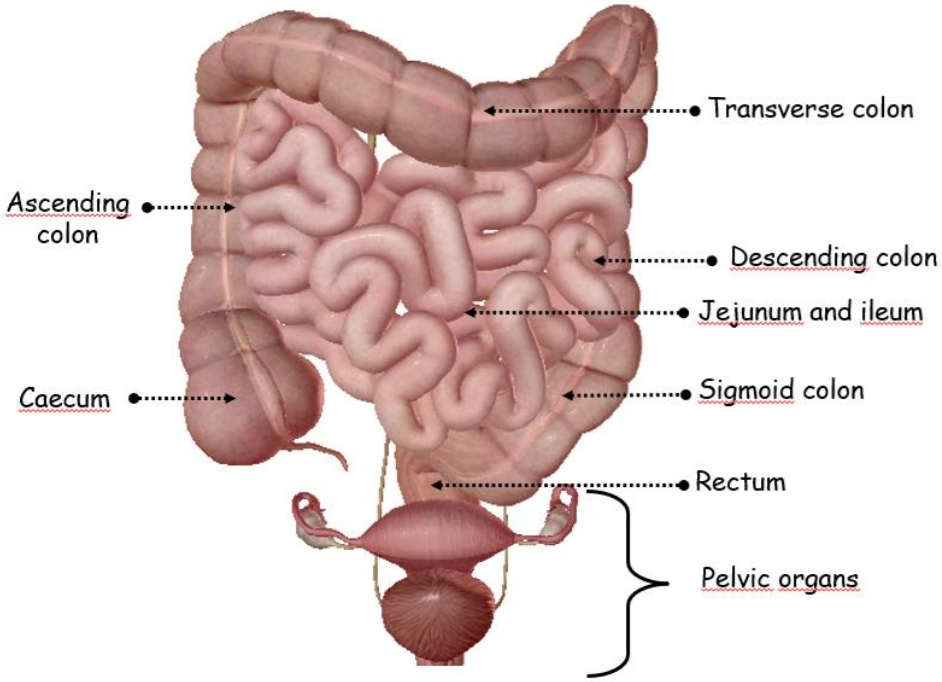

Figure 1: Anterior view of the infracolic compartment

VI. BLOOD SUPPLY, LYMPH DRAINAGE AND NERVE SUPPLY

A- ARTERIES

Numerous jejunal and ileal branches arise from the left side of the superior mesenteric artery and enter the mesentery by passing between the two layers of the root. The jejunal branches join each other in a series of anastomosing loops to form arterial arcades — single for

the upper jejunum and double lower down. From the arcades, straight arteries pass to the mesenteric border of the gut. These vessels are long and close together, forming high narrow 'windows' in the intestinal border of the mesentery, visible because the mesenteric fat does not reach thus far. The straight vessels pass to one or other side of the jejunum and sink into its wall. Occlusion of a straight artery may lead to infarction of the segment supplied because these are end arteries, but occlusion of arcade vessels is usually without effect due to their numerous anastomotic connexions.

The ileal arteries are similar but form a larger series of arcades — three to five, the most distal lying near the ileal wall so that the straight vessels branching off the arcades are shorter. There is more fat in this part of the mesentery, so the windows characteristic of the jejunal part are not seen — a useful feature in identifying loops of bowel. The end of the superior mesenteric artery itself supplies the region of the ileal diverticulum (if present), and anastomoses with the arcades and with the ileocolic branch to supply the terminal ileum.

B- VEINS

The veins all correspond to the arteries and thus drain to the superior mesenteric.

C- LYMPH DRAINAGE

The lymph drainage of the jejunum and ileum passes back along the arteries to lymph nodes that lie in front of the aorta at the origins of the arteries Series of lymph node filters lie between

the mucous membrane of the gut and the cisterna chyli and are juxtaintestinal nodes, superior mesenteric nodes and other preaortic nodes.

D- NERVES

The parasympathetic vagal supply of the small intestine reaches the intestinal wall with its blood vessels and normally augments peristaltic activity. There are many afferent fibres whose function is unknown; they do not transmit pain impulses which, as with the stomach and other viscera, use sympathetic pathways.

The sympathetic supply, which is vasoconstrictor and normally inhibits peristalsis, is from the lateral horn cells of spinal segments T9 and 10; small intestinal pain is usually felt in the umbilical region of the abdomen.

They, both, have influence on the intrinsic nervous system of the gut reprensented by the plexuses of Auerbach and Meissner.

VII. CONCLUSION

The jejunum and ileum constitute the longest part of the gastrointestinal tract.

It occupies the infracolic compartment of abdominal cavity. They constitute two parts with similarities and particularities. They are very mobile in the mesentery and are supplied by a rich anastomotic blood supply. Lymph drainage is ensured mainly by the preaortic nodes.