

Anatomy of the caecum, appendix and colon

Vishy Mahadevan

Abstract

For descriptive purposes the large intestine is divided, successively, into the caecum and appendix, colon, rectum and anal canal. The colon is further subdivided into ascending, transverse, descending and sigmoid segments. The sigmoid colon crosses the pelvic brim to enter the pelvic cavity where it becomes continuous with the rectum. Embryologically, the proximal half of the large intestine is derived from the midgut, while the distal half develops from the hindgut. This dual derivation is reflected in the proximal half of the large intestine being supplied by the superior mesenteric artery and the distal half by the inferior mesenteric artery; the arteries of the embryological midgut and hindgut respectively.

The principal physiological role of the large intestine is the absorption of water, sodium and chloride from the fairly large volume of liquid ileal contents delivered to the large intestine daily. The unabsorbed residue is excreted as faeces.

Fibreoptic colonoscopy and MRI and CT colonography allow detailed internal inspection of the large intestine with relative ease and speed and without subjecting the patient to too much discomfort.

This article emphasizes the clinically and surgically-relevant aspects of the anatomy of the caecum, appendix and colon.

Keywords Appendix; caecum; colon; colonic blood supply; lymphatic drainage; marginal artery; mesocolon

Commencing at the ileocaecal junction, the large intestine comprises successively, the caecum and appendix, colon, rectum and anal canal (Figure 1). The last two are described in detail elsewhere in this issue.

For descriptive purposes, the colon is further subdivided, in proximo-distal sequence, into ascending, transverse, descending and sigmoid segments (Figure 1). The sigmoid colon crosses the pelvic brim to enter the pelvic cavity where it becomes continuous with the rectum. The latter traverses the pelvic floor through the levator hiatus to enter the perineum where it becomes continuous with the anal canal. The large intestine is considerably less mobile than the small intestine owing to substantial lengths of the large intestine lying retroperitoneally and being adherent to the posterior abdominal wall.

Differences between large intestine and small intestine

The caecum and all parts of the colon are readily distinguishable from the small intestine by the presence on their outer surface of three longitudinal bands of muscle termed taeniae coli (Figures 1 and 2). Each of these bands is approximately 1.5 cm wide, and

represents a condensation of the longitudinal muscle fibres in the outer layer of the muscularis propria of the bowel wall. Taeniae coli are absent over the rectum and appendix. Another distinguishing feature of the colon is the presence on the serosal surface, of numerous small fat tags. These are termed appendices epiploicae (Figures 1 and 2). They are most abundant on the surface of the distal descending colon and sigmoid colon. Their function is unknown. Incidentally, appendices epiploicae are absent over the caecum, appendix and rectum. Other features which typify the large intestine and allow it to be distinguished from the small intestine are its greater calibre and its sacculated (haustrated) appearance.

Relationship of peritoneum to large intestine

The transverse colon and sigmoid colon are both completely ensleeved in peritoneum and suspended from the posterior abdominal wall by separate peritoneal mesenteries; the transverse and sigmoid mesocolons, respectively. The considerable mobility of the transverse and sigmoid colons within the abdominal cavity is due entirely to the presence of these suspensory mesenteries.

The greater omentum descends from the greater curvature of the stomach and overlaps the anterior aspect of the entire transverse colon. It is attached along the free border of the transverse colon. The strip of greater omentum extending between the greater curvature of stomach and the free border of the transverse colon is referred to as the gastrocolic omentum.

In contrast to the transverse and sigmoid colons, the ascending and descending colons are normally devoid of mesenteries and lie directly on the posterior abdominal wall. Both the ascending and descending segments of the colon are covered on their fronts and sides by the parietal peritoneum of the posterior abdominal wall. The adherence of the ascending and descending colons to the posterior abdominal wall is relatively avascular, and enables the surgeon to mobilize these segments of the large bowel relatively easily. (Note, however, that in 5–10% of individuals the ascending and/or descending colons may possess a sizeable mesentery. The explanation for this lies in embryology and is due to failure of the normal, partial dissolution of the dorsal mesentery of the midgut and hindgut that occurs during development.)

Unlike the ascending colon, the caecum is normally completely enveloped in peritoneum; a feature which affords the caecum a certain degree of mobility. The appendix usually hangs free on its own mesentery, although it may occasionally be tucked extraperitoneally behind the ascending colon or it may adhere to the back of the caecum.

General morphology and topographical relations of the caecum and colon (Figure 1)

The large intestine in the adult is about 1.5 m in length.

The caecum (which means a blind-ended pouch) lies in the right iliac fossa and projects downwards below the level of the ileocaecal junction. It is about 5–7 cm in length.

The three taeniae coli of the caecum (one on the anterior surface, one on the posterior surface and one on the medial aspect) converge on the base of the vermiform appendix.

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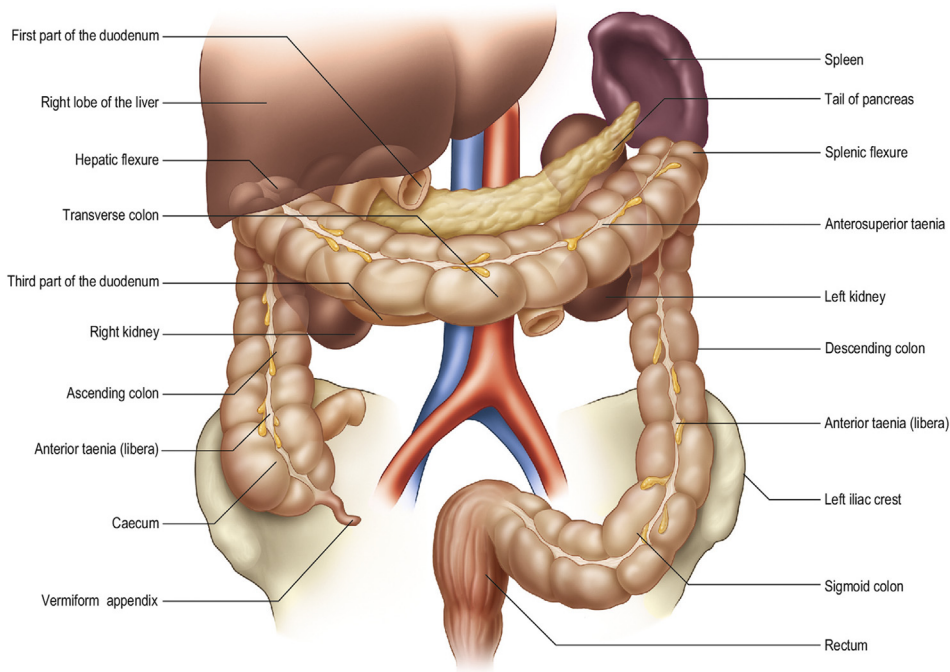


Figure 1 External features and subdivisions of large intestine.

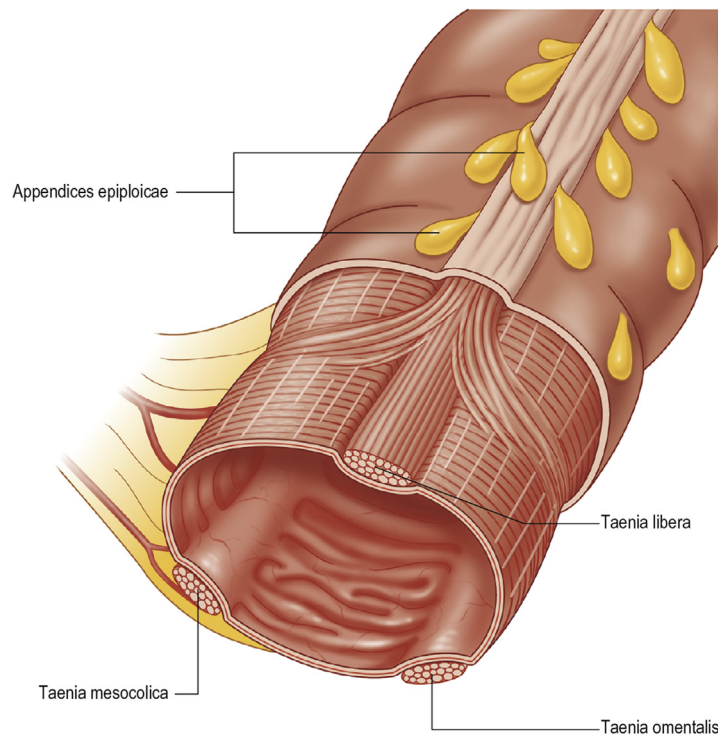


Figure 2 Colonic wall showing taeniae coli and appendices epiploicae.

The vermiform appendix is a blind diverticulum that arises from the posteromedial aspect of the caecum, about 2.5 cm inferior to the ileocaecal valve. Its length is, on average, 7–8 cm (range: 1–20 cm). The appendix is also highly variable in position. Most commonly it lies behind the caecum (retrocaecal), but a long appendix may extend behind the ascending colon and even about the lower pole of the right kidney or the duodenum. In

other instances it dangles in the subcaecal position (abdominal), hangs down into the pelvis (pelvic), or tucks itself behind the terminal ileum (retroileal).

The appendix derives its blood supply from the appendicular artery (Figure 4) which arises from the posterior caecal artery, in turn a branch of the ileocolic artery. The appendicular artery passes behind the terminal ileum to reach the appendix via the

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