Chapter 9: The abdominal alimentary tract

The alimentary tract, from lips to anus, has differing structure, shape and size according to the main local function. The histology of the basic alimentary tube structure is described below. Stratified squamous epithelium and stratified muscle are present in the oesophagus and the anal canal.

The abdominal oesophagus

This is about 3 cm long. It enters the abdomen on the left of the midline through fibres of the right crus of the diaphragm posterior to the central tendon and becomes continuous with the stomach at the cardiac orifice. It lies between the diaphragm and the left lobe of the liver and is covered anterolaterally by peritoneum. Gastric vessels and vagal nerves lie in its walls. Reflux of gastric contents is normally prevented by the lower oesophageal sphincter and the oblique angle of entry of the oesophagus into the stomach. If reflux does occur, inflammation of the lower oesophagus and subsequent stricture formation may result. Not infrequently, the oesophageal opening in the diaphragm becomes incompetent and a part of the stomach is allowed to slide into the mediastinum. This condition, known as a hiatus hernia, predisposes to the reflux of gastric contents.

The stomach

This is a dilatation of the alimentary canal between the oesophagus and the duodenum. Although variable in size, shape and position, it is usually J-shaped and situated in the left hypochondrium and epigastrium, its lower part extending to the level of the umbilicus. But it may be shorter and more horizontal (steer-horn stomach) or longer, drooping into the pelvis (fishhook stomach). Differences in the size, shape, motility and rate of emptying of the stomach can be demonstrated by radiographs after a barium meal. The pattern of the mucosal folds can also be seen and irregularities detected. The air in the fundus can often be seen on a plain radiograph. Changes in position and posture of the subject and states of nervous tension will alter markedly the appearance of the stomach. The activity of the pyloric sphincter is also very obvious.

The stomach is divided into a fundus, a body and a pyloric portion. It possesses anterior and posterior surfaces, both covered by peritoneum, and lesser (right) and greater (left) curvatures. The fundus is that part above the level of the oesophageal opening (cardiac orifice). The body extends from the fundus to the angular notch (the most dependent part of the lesser curvature) and the pyloric portion from the notch to the pyloric sphincter (pylorus) which separates the stomach from the duodenum. The pyloric part is subdivided into a proximal dilated pyloric antrum and a distal tubular pyloric canal. The lesser curvature is the upper right border and extends from the right of the oesophagus to the pylorus; to it is attached the lesser omentum. The angular notch is near its lower end. The greater curvature extends from the left of the oesophagus over the fundus to the pylorus, forming the left border of the stomach. It gives attachment to the gastrosplenic ligament and the greater omentum.
**Relations**

**Anterior** - the left lobe of the liver, diaphragm and anterior abdominal wall.

**Posterior** (stomach bed) - the omental bursa separates it from the diaphragm above; the pancreas, splenic artery, the left kidney and suprarenal gland, and the spleen from right to left across the middle; and the transverse mesocolon and colon below.

**Superior** - the lesser omentum and the gastric vessels.

**Inferior** - the greater omentum and the gastro-epiploic vessels.

**Blood supply**

The left and right gastric arteries supply the lesser curvature and adjacent surfaces; the left and right gastro-epiploic arteries supply the greater curvature, and the short gastric branches from the splenic artery supply the fundus. All these arteries are derived from the coeliac trunk. All the blood from the stomach passes to the portal vein. The right and left gastric veins enter it directly, the right gastro-epiploic vein drains to the superior mesenteric vein and the left gastro-epiploic vein and the short gastric veins drain to the splenic vein.

**Lymph drainage**

All lymph passes to the coeliac group of pre-aortic nodes. It flows from the lesser curvature via nodes along the left gastric artery which communicate with nodes at the porta hepatis; from the fundus, lymph drains to nodes along the splenic artery; from the rest of the greater curvature lymph passes to nodes around the gastro-epiploic, splenic and hepatic arteries.

**Histology**

The stomach wall has four coats:

(a) mucous - this is lined with columnar epithelium and limited externally by the muscularis mucosae. Three types of glands are found:

(i) cardiac glands - long ducts with mucus secreting cells found around the cardiac orifice.

(ii) gastric glands - short ducts and long straight alveoli lined with peptic (enzyme secreting) and oxyntic (acid secreting) cells; some mucous cells are found in the fundus and body. Endocrine cells are also found in the body.

(iii) pyloric glands - long ducts and short coiled alveoli with mucus (mainly) and gastric secreting cells in the pyloric part.

(b) submucous.
(c) muscular - three layers of fibres: innermost oblique, middle circular (which is thickest at the pyloric sphincter) and outer longitudinal.

(d) serous - peritoneal coat.

The pylorus

This sphincter is a thickening of the circular muscle coat and is found usually at the level of the upper border of the 1st lumbar vertebra. The sphincter regulates the flow of material between the stomach and the duodenum. Its position is marked on the anterior abdominal wall about 3 cm to the right of the midline on the transpyloric plane.

The diagnosis of all gastric and duodenal disease is aided by a barium meal. The oesophagus, stomach and duodenum may also be directly visualised by a gastroscope. In this technique biopsies can be taken from the mucosa, particularly of suspected abnormalities.

Gastric ulcers are usually situated along the lesser curve, particularly in the region of the angular notch. Malignant changes are more common along the greater curvature. Gastrectomy may be indicated for malignant and other gastric lesions. A part of the stomach is usually left and techniques are available to join up the remaining stomach to the duodenum or jejunum.

The small intestine

This narrow tube extends from the stomach to the colon. Its length (about 5 m) depends on the state of tone of its muscle wall. It consists of the duodenum, jejunum and ileum.

The duodenum

This lies on the posterior abdominal wall in the epigastric and umbilical regions. It is about 25 cm long, extends from the pylorus to the duodenojejunal flexure and embraces the head of the pancreas in a C-shaped curve which is open to the left. Near the pylorus and the duodenojejunal flexure, the surface is completely covered by peritoneum; the remainder of the tube is retroperitoneal and relatively immobile. For descriptive purposes it is divided into four parts which can be visualised radiographically. The part seen adjacent to the pylorus is called the duodenal cap.

The 1st part (5 cm long) passes from the pylorus upwards, backwards and to the right, and then turns downwards to join the 2nd part (8 cm long) which descends to the right side of the 3rd lumbar vertebra. The 3rd part (10 cm long) passes to the left across the posterior abdominal wall and turns upwards to become the 4th part (3 cm long) which ascends to the duodenojejunal flexure on the left side of the 2nd lumbar vertebra.

Relations

Superior (1st) part, the first 2 cm, has similar peritoneal relations to the stomach. The lesser omentum passes from the upper border and the greater omentum from the lower.
Posteriorly the omental bursa separates it from the pancreas, and anteriorly it is separated from the fundus of the gall bladder and the liver by the greater sac. The rest is retroperitoneal. Superiorly is the opening into the omental bursa and the free border of the lesser omentum; posteriorly is the bile duct, portal vein and gastroduodenal artery. Inferiorly it rests on the pancreas, and anteriorly the greater sac separates it from the liver and the neck of the gall bladder.

**Descending (2nd) part** is crossed anteriorly by the attachment of the transverse mesocolon, and posteriorly it is in contact with the right suprarenal gland, the hilus of the right kidney and the right psoas. Above the transverse colon and mesocolon it is in contact with the liver, and below with coils of small intestine. On its left lies the head of the pancreas, the bile duct and the pancreaticoduodenal vessels. The duodenal papilla, a common opening for the pancreatic and bile ducts, opens about halfway down its posteromedial wall.

**Horizontal (3rd) part** lies below the head and uncinate process of the pancreas and crosses, from right to left, the right ureter and right psoas, the gonadal vessels, the inferior vena cava, the inferior mesenteric artery and the aorta. It is crossed anteriorly by the superior mesenteric vessels and the root of the mesentery of the small intestine, and covered anteriorly and inferiorly by coils of small intestine.

**Ascending (4th) part** lies to the left of the vertebral column on the left psoas. The inferior mesenteric vein, the left ureter and the lower pole of the left kidney lie on its left side. The pancreas is medial to it and it is related anteriorly to the root of the mesentery and the coils of the small intestine.

**Histology**

The duodenum has a similar basic structure to that of the stomach but the mucous membrane shows numerous villi and some of the glands (duodenal mucous glands) extend through the muscularis mucosae into the submucous layer.

Duodenal ulcers are a common affliction and the vast majority occur in the superior aspect of the first part of the duodenum. When posteriorly situated, penetration by the ulcer may cause bleeding from the gastroduodenal artery or erosion into the head of the pancreas. Anterior ulcers are more frequently complicated by perforation into the general peritoneal cavity. Treatment of ulcers aims at reducing the amount of acid secreted by the stomach by pharmacological means, removal of part of the stomach (partial gastrectomy) or by denervation of the stomach (selective vagotomy).

**The duodenojejunal flexure**

This lies on the left of the 2nd lumbar vertebra and faces downwards and to the left. Small peritoneal recesses are sometimes found behind the left side of 4th part of the duodenum and behind the adjacent part of the inferior mesenteric vein.
The jejunum and ileum

These are the proximal and distal parts of the coiled small intestine, extending from the duodenum to the colon. They are suspended from the posterior abdominal wall by a mesentery and are situated below the transverse colon mainly in the central abdomen but parts may extend into the pelvis. They are covered with peritoneum except at their mesenteric attachment. The jejunum is wider and thicker-walled than the ileum; its mucous membrane is thrown into circular folds with many villi but it has fewer aggregations of lymphoid tissue in its wall and less fat in its mesentery than the ileum. The arrangement of blood vessels varies between the jejunum and ileum.

Relations

The shorter jejunum lies above and to the left of the ileum. The root of the mesentery passes downwards from the left side of the 2nd lumbar vertebra to the right sacro-iliac joint crossing in turn the left psoas, aorta, inferior vena cava, right gonadal vessels, right psoas and ureter.

The large intestine

This extends from the ileocolic junction to the anus and is about 1.5 m long. It consists of the caecum, the appendix, the ascending, transverse, descending and sigmoid colon, the rectum and the anal canal. The longitudinal muscle of the caecum and colon lies outside a continuous circular coat and is restricted to three bands, taeniae coli, which are shorter than the rest of the wall and cause it to be sacculated. Fatty tags, appendices epiploicae, project outwards from the wall of the large intestine and are covered by peritoneum. The mucous membrane has no villi but mucous cells are numerous.

The caecum

This blind sac (about 8 cm wide and 8 cm long) is continuous with the ascending colon. It is situated in the right iliac fossa, completely invested in peritoneum. The taeniae coli converge on the appendix which is attached to the posteromedial wall. The ileocolic orifice, an oval slit, opens on its medial wall and is surrounded by a thickening of the ileal circular muscle coat, the ileoceleal sphincter.

Relations

It lies on iliacus and spas and the lateral femoral cutaneous nerve; anteriorly are the small intestine and the anterior abdominal wall. The femoral nerve and external iliac vessels lie on its left side.

The vermiform appendix

This narrow diverticulum (about 8 cm long) arises from the posteromedial aspect of the caecum about 3 cm below the ileocolic orifice. It is clothed in peritoneum which connects it by a mesentery, the mesoappendix, to the terminal ileum. The appendicular artery lies within this fold. Aggregations of lymphoid tissue are found in the wall and may replace
the muscle coat in places. The appendix lies most commonly behind the caecum or within the pelvis. It is very mobile and its relations are variable. Inflammation of the appendix, usually following obstruction of its lumen by faeces, is a common condition and it may lead to peritonitis.

**The ascending colon**

This lies in the right lateral region and extends from the ileocaecal orifice to the under surface of the right lobe of the liver where it turns to the left, forming the right colic (hepatic) flexure. It is about 15 cm long; peritoneum covers it anteriorly and on both sides and fixes it to the posterior abdominal wall, thus forming a paracolic sulcus along its right side. At the upper end, this sulcus leads into a subphrenic space.

**Relations**

Posteriorly it lies on iliacus, quadratus lumborum and the lower pole of the right kidney. Its peritoneal surfaces are in contact with coils of small intestine.

**The transverse colon**

This extends upwards from the right to the left colic (splenic) flexure across the abdomen suspended by the transverse mesocolon. It is about 50 cm long.

**Relations**

Initially it lies directly on the descending part of the duodenum and the head of the pancreas, but in its subsequent course it is attached by its mesentery to the body of the pancreas and is related anterosuperiorly to the liver, gall bladder, stomach, greater omentum and spleen. Posteriorly it lies on the descending part of the duodenum, head of the pancreas, small intestine and the left kidney.

**The descending colon**

This is the narrowest part of the colon. It lies in the left lateral region and extends from the left colic flexure to the pelvic brim where it continues as the sigmoid colon. It is about 30 cm long. Peritoneum covers it anteriorly and on both sides, fixing it to the posterior abdominal wall and forming a paracolic sulcus on its left side. The left colic flexure lies higher than the right and is attached to the diaphragm by a fold of peritoneum, the phrenicocolic ligament.

**Relations**

Posteriorly it lies on the lower pole of the left kidney and the diaphragm, quadratus lumborum, iliacus and psoas. Its peritoneal surfaces are in contact with coils of small intestine.
The sigmoid colon

This lies in the left iliac region and extends from the pelvic brim to the front of the 3rd sacral segment where it becomes continuous with the rectum. Its length (usually about 40 cm) and position are variable. It is attached to \(^{\wedge}\)-shaped mesentery, the sigmoid mesocolon, to the pelvic wall. The apex of the \(^{\wedge}\) overlies the left ureter anterior to the bifurcation of the left common iliac artery and the left sacroiliac joint.

Relations

Posteriorly it lies on the left ureter and common iliac vessels; superiorly it is covered by coils of small intestine and inferiorly it lies on the bladder in the male or the uterus and bladder in the female.

The rectum and anal canal are described below.

Cancer of the large intestine arises from mucosal epithelial cells and invades the deeper layers of the wall, eventually reaching the peritoneum. Spread occurs to lymph vessels and nodes, and via the portal venous system to the liver.

Arterial supply of the gastrointestinal tract

This is from the coeliac, the superior mesenteric and the inferior mesenteric arteries, each arising from the front of the aorta and supplying respectively the abdominal foregut, the midgut and the hindgut and their derivatives.

The coeliac trunk

This short trunk arises just above the pancreas. It passes anteriorly for 2 cm and divides into left gastric, common hepatic and splenic arteries. It is surrounded by the coeliac plexus of nerves and the coeliac group of lymph nodes.

Left gastric artery

This passes upwards and to the left behind the omental bursa to the oesophagus where it turns into the lesser omentum. It anastomoses with the right gastric artery on the lesser curvature of the stomach and supplies the lower third of the oesophagus and some of the stomach.

Common hepatic artery

This passes to the right towards the superior part of the duodenum and then turns into the lesser omentum in which it ascends in front of the portal vein. It divides into right and left terminal branches at the porta hepatis.
Branches

(i) **right gastric artery** - runs along the lesser curvature of the stomach to anastomose with the left gastric artery in the lesser omentum.

(ii) **gastroduodenal artery** - descends behind the duodenum and divides into the **right gastro-epiploic** and **superior pancreaticoduodenal arteries**. The former passes along the greater curvature to anastomose with the left gastro-epiploic; the latter descends in the groove between the duodenum and the head of the pancreas, and supplies both these structures.

(iii) **right** and **left hepatic arteries** - ramify in the liver; the right gives a small **cystic artery** to the gall bladder. Variations in the pattern of these vessels are important in surgery of the gall bladder.

Splenic artery

This runs a tortuous course to the left along the upper border of the pancreas and passes in the lienorenal ligament to the hilus of the spleen where it divides into terminal branches. It lies behind the omental bursa and crosses the left crus of the diaphragm, left psoas and the left suprarenal gland and kidney.

Branches

(i) **pancreatic arteries** - several.

(ii) **short gastric arteries** - several, pass in the gastrosplenic ligament to the fundus of the stomach.

(iii) **left gastro-epiploic artery** - runs in the gastrosplenic ligament to the greater curvature of the stomach and anastomoses with the right gastro-epiploic artery.

The superior mesenteric artery

This arises just below the coeliac trunk, descends to the right behind the body of the pancreas and over its uncinate process. It crosses the horizontal part of the duodenum and enters the root of the mesentery of the small intestine. In the mesentery it supplies the small intestine and ends in the right iliac fossa by dividing into ileocolic and right colic arteries.

Relations

Its origin is surrounded by the superior mesenteric plexus of nerves and pre-aortic lymph nodes, and lies behind the pancreas and splenic vein. It passes downwards on the left renal vein, the uncinate process, and the horizontal part of the duodenum, covered above by the body of the pancreas and below by the peritoneum. Its vein lies on its right side. Within the mesentery, accompanied by veins, lymph vessels and nerves, it crosses over in turn the inferior vena cava, the right psoas, the right ureter and the right gonadal vessels.
Branches

(i) **inferior pancreaticoduodenal artery** - runs to the right between the pancreas and the duodenum to anastomose with the superior pancreaticoduodenal artery. It supplies the pancreas and duodenum.

(ii) **jejunal and ileal arteries** - 15-20 in number, arise from the left side of the artery within the mesentery. By repeated divisions and side-to-side anastomoses two to five tiers of arterial arcades are formed whose terminal branches enter the small intestine.

(iii) **ileocolic artery** - descends to the right and divides into ascending and descending branches; the former supplies the lower part of the ascending colon and anastomoses with the right colic artery; the latter gives anterior and posterior caecal branches. The appendicular artery is a branch of the posterior caecal artery.

(iv) **right colic artery** - descends to the right behind the peritoneum of the posterior abdominal wall, across the right psoas and ureter, and divides into ascending and descending branches. It supplies the ascending colon and anastomoses with the ileocolic and middle colic arteries.

(v) **middle colic artery** - passes upwards on the body of the pancreas to reach the mesocolon within which its branches supply the right two-thirds of the transverse colon.

The _inferior mesenteric artery_

This arises behind the duodenum and descends to the left across the posterior abdominal wall. It continues beyond the brim of the pelvis as the superior rectal artery.

Relations

It is covered by the peritoneum of the posterior abdominal wall and crosses the left psoas and the common iliac vessels. Its vein and the left ureter are on its left side.

Branches

(i) **left colic artery** - ascends to the left across the left psoas and ureter as far as the left colic flexure. Its branches supply the transverse and descending colons and anastomose with the middle colic and sigmoid arteries.

(ii) **sigmoid arteries** - enter the sigmoid mesocolon and supply the sigmoid colon and the lower descending colon.

(iii) **superior rectal artery** - is the continuation of the inferior mesenteric artery in the pelvis. It descends in the lower part of the sigmoid mesocolon and reaches the back of the rectum. It supplies the rectum and proximal two-thirds of the anal canal and anastomoses with the inferior rectal branch of the internal pudendal artery.
The terminal arteries supplying the gut form a continuous anastomotic arcade, the marginal artery, along the mesenteric border of the small intestine and the concavity of the large intestine. The ileal and colic vessels are usually embedded in fat.

**Venous drainage of the gastrointestinal tract (The hepatic portal system)**

**The portal vein**

The gastrointestinal tract from the lower end of the oesophagus to the upper part of the anal canal, the spleen, pancreas and gall bladder drain into the liver via the portal vein which is formed by the union of the splenic and superior mesenteric veins behind the neck of the pancreas. It ascends in the free edge of the lesser omentum to the porta hepatis where it divides into right and left branches.

**Relations**

At its origin it lies in front of the inferior vena cava, behind the neck of the pancreas, and below and then behind the superior part of the duodenum. In the free edge of the lesser omentum it lies behind the common hepatic artery on the left, and the bile duct on the right, and is separated from the inferior vena cava by the opening into the omental bursa.

**Tributaries**

(i) **right** and **left gastric veins** - draining the lesser curvature of the stomach.

(ii) **superior pancreaticoduodenal vein**.

(iii) **para-umbilical veins** - pass in the falciform ligament to the left branch of the portal vein.

**The superior mesenteric vein**

This is formed in the mesentery in the right iliac fossa. It ascends on the right of its artery to the root of the mesentery, crosses anterior to the horizontal part of the duodenum and uncinate process of the pancreas and joins the splenic vein behind the neck of the pancreas. Its tributaries correspond to the branches of its artery and it also receives the right gastro-epiploic vein.

**The splenic vein**

This is formed in the hilus of the spleen by the union of tributaries from the organ, the left gastro-epiploic and short gastric veins. It passes to the right behind the tail and body of the pancreas to join the superior mesenteric vein behind the neck of the pancreas.
Relations

Within the lienorenal ligament it is accompanied by its artery and the tail of the pancreas, and it crosses the left kidney, the left psoas and the aorta. The splenic artery lies above it.

Tributaries

(i) **short gastric veins** - draining the fundus of the stomach.

(ii) **left gastro-epiploic vein** - draining the left side of the greater curvature. Both these veins lie in the gastrosplenic ligament.

(iii) **inferior mesenteric vein** - the continuation of the superior rectal vein above the pelvic brim. It ascends on the posterior abdominal wall, to the left of its artery and of the duodenojejunal flexure. It passes behind the body of the pancreas and enters the splenic vein.

(iv) numerous **pancreatic veins** entering along its course.

Portal-systemic anastomoses

The portal system may anastomose with the systemic venous system in the following situations:

(i) the lower end of the oesophagus - between the left gastric and the azygos veins.

(ii) the lower part of the anal canal - between the superior and inferior rectal veins.

(iii) the umbilical region of the anterior abdominal wall - between the epigastric veins and the para-umbilical veins in the falciform ligament of the liver.

(iv) the bare areas of the gastrointestinal tract and its related organs, eg veins between the bare area of the liver and the diaphragm.

When the portal vein is obstructed by a thrombus, or the venous flow through the liver is impeded by fibrosis (cirrhosis), these portal-systemic communications enlarge. Severe haemorrhage may then occur especially from the dilated lower oesophageal veins (varices).

Lymph drainage of the intestinal tract

The intestinal mucosa is richly supplied with lymph vessels which drain via submucosal and subserous plexuses to nodes on the surface of the viscus. These drain into intermediate groups of nodes arranged along arteries (in the mesentery or on the abdominal wall) which in turn drain to one of three groups of **preaortic nodes** arranged about the origins of the coeliac, superior and inferior mesenteric arteries.

The **inferior mesenteric group** drains the distal one-third of the transverse colon, the descending and the sigmoid colon and the upper part of the rectum.
The **superior mesenteric group** drains the distal half of the duodenum, the jejunum, ileum, caecum and appendix, and the ascending and proximal transverse colon.

The **coeliac group** drains the stomach and proximal duodenum, the liver, spleen and pancreas. It also drains the superior and inferior mesenteric groups of nodes. Efferent vessels pass to the cisterna chyli.

**Histology of the intestinal tract**

The walls of the intestinal tract possess three coats: an inner mucous membrane, a muscular layer and an outer serous (peritoneal) layer.

The mucous membrane contains numerous lymph nodules. It is divided by the muscularis mucosa, a layer of smooth muscle, into the mucosa and the submucosa. The mucosa is lined by columnar epithelium with numerous goblet cells. It is invaginated to form simple intestinal glands and in the small intestine forms numerous finger like projections, the villi, which contain blood and lymph vessels. As well as digestive enzymes, the cells of the mucosa produce mucus, and certain hormones such as gastrin, secretin and CCK-PZ from endocrine cells. The submucosa consists of loose areolar tissue containing blood vessels and the submucous (Meissner's) nerve plexus.

The muscular coat is in two layers, an inner circular and an outer longitudinal, between which lies the myenteric (Auerbach's) nerve plexus.

The serous (peritoneal) layer is lined by flattened mesothelium derived from the lining of the coelomic cavity of the embryo.

**Regional variations**

The duodenum has mucous glands (Brunner's) whose coiled pits extend into the submucosa.

The jejunum and ileum: the villi of the jejunum are longer and more numerous than those of the ileum. The lymph tissue of the ileum is aggregated to form well-marked nodules (Peyer's patches).

The appendix has a mucous membrane containing many large lymphoid follicles.

The large intestine has no villi. Intestinal glands are well developed and contain many goblet cells. The longitudinal muscle layer as far as the rectum forms three discrete bundles of fibres, the taeniae coli, and the remaining intervening wall is sacculated.

**Embryology**

Some aspects of the development of the gut and its rotation are described previously.

The small and large intestine are subject to a number of inflammatory and malignant conditions. The treatment of these conditions and their complications may require removal of
segments of gut with subsequent end-to-end anastomosis of the proximal and distal cut ends. Healing of these unions is usually satisfactory but it depends on the presence of a good blood supply to each end.

The inflammatory process may extend into the peritoneum producing peritonitis and the greater omentum migrates to such an area in an attempt to localise the condition. Segments of bowel may enter hernial orifices and in these circumstances may give rise to intestinal obstruction. As the obstruction progresses the vessels supplying the trapped bowel may become compressed producing ischaemic bowel, a condition termed strangulation.

Cancer of the gastrointestinal tract occurs most commonly in the colon and the stomach. It spreads by lymphatic vessels to related lymph nodes and by the blood stream via the portal vein to the liver.