MANAGEMENT OF INTESTINAL FISTULAE

Essay

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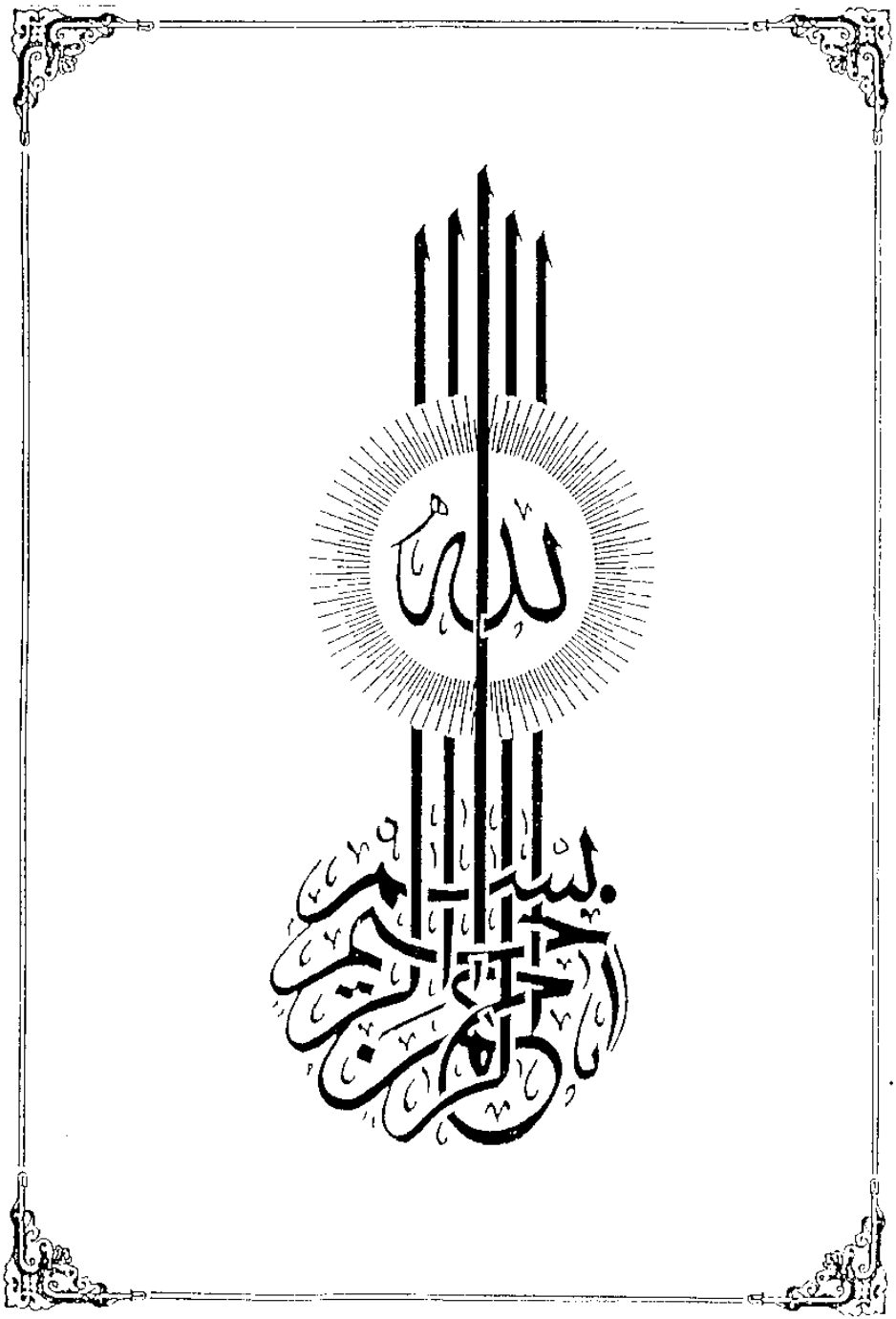

THIS WORK IS DEDICATED TO

MY PARENTS

MY FUTURE WIFE.

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HISTORY

Until comparatively recently, fistulae, both traumatic and spontaneous, in general had a poor prognosis. Sepsis and infection were the principal causes of this morbidity; the highmorbidity rate, coupled with the inconveniences of the leaking wound encouraged surgeons to undertaken operative interventions although even with operation the prognosis was grave. John Hunter adapted a more conservative approach and with great prescience observed that fistulae tended to close spontaneously, "in such cases nothing is to be done but dressing the wound superficially, and when the contents of the wounded viscus become less, we may hope for a cure" (John Alexander et al., 1982).

In the 1950's and 1960's, despite the introduction of fluid and electrolyte replacement and antibiotic therapy, the mortality rate from alimentary tract fistula remained high. Sheldon et al. in 1971 reported a mortality rate of 16% with high-output fistulae, and Goligher in the same year reported a mortality rate of 1 of 10 treated patients. Goligher advocated surgical intervention with exteriorization of the damaged intestine.

Skin care improved dramatically with the introduction of karaya gum as a protective agent in ileostomy care in the 1960's. The next breakthrough was in 1971 when stomahesive became available (John Alexander et al., 1982).

Essentially the management of intestinal fistulae nowadays is derived from 3 concepts: (a) importance of nutritional support, (b) the importance of local management of the fistula and its adjacent skin, and (c) the importance of maintaining the morale of the patient (John Alexander et al., 1982).

ANATOMY

The small intestine is that portion of the alimentary tract which extends from the pylorus to the caecum. Its major function is absorption, which depends upon amazingly complex integration of structural, physiologic, and chemical factors. The neurohormonal regulation of gastric, biliary, pancreatic, and intestinal secretion and of motor function provides the appropriate luminal milieu for complete digestion of foodstuffs and presentation of the products of digestion to the specialized intestinal epithelium for absorption (Isidore Cohn, 1986).

The length of the alimentary tract in normal humans is best estimated by means of small polyethylene catheters passed through the intestine via the nose. The average distance from the nose to the anus is 453 cm. The duodenum is approximately 109 cm long, the combined length of the jejunum and ileum is 261 cm or about three fifths of the entire canal, or eight fifths of body hight. The duodenum begins at the pylorus and ends at the duodenal-jejunal junction just to the left of the second lumber vertebra. The duodenum is divided into

four portions: superior, descending, transverse, and ascending. The majority of the first portion is occupied by the slightly dilated duodenal bulb whose mucosa is charachterized by lack of plicae circularis. The common bile duct enters the pancreas immediately posterior to the duodenal bulb and lies within the head of the pancreas. It and the main pancreatic duct open into the medial wall of the midportion of the second part of the duodenum at the duodenal papilla (ampulla of Vater).

The superior mesenteric vessel emerge from behind the pancreas to cross over the third part of the duodenum. The fourth part ascends to the duodeno-jejunal flexure, which is suspended from the posterior body wall by the ligament of Treitz.

The jejunum begins at the duodeno-jejunal angle, which is supported by the ligament of Treitz. The proximal two fifths of the small intestine is called the jejunum and the distal three fifths is the ileum; however, this distinction is arbitrary, since there is no clear demarcation between jejunum and ileum. The small intestinal tube, which decreases in luminal diameter as it proceeds distally, is convoluted or folded upon

itself and occupies the central and lower part of the abdominal cavity; it is enlosed laterally and superiorly by the colon (Isidore Cohn, 1986).

The mesentry:

The small intestine is suspended from the posterior abdominal wall by a large fold of peritoneium, the mesentry, which is attached to the posterior abdominal wall to the left of the second lumbar vertebra, passing obliquely to the right and inferiorly to the right sacroiliac joint. The mesentry contains blood vessels, nerves, lymphatics, and lymph nodes, as well as considerable fat. It is attached to the small intestine along the lenght of one side, the mesentric border, leaving the remainder of the surface of the bowel covered by its visceral peritoneum, the serosa. The relationship of the mesentry to the small bowel is important, since the broad-based attachment of the mesentric root stablizes the small bowel and prevents it from twisting upon its blood supply (Isidore Cohn, 1986).

Blood supply:

The small intestine receives its blood supply from the superior mesenteric artery, the second large branch

of the abdominal aorta. The superior mesentric artery courses anterior to the uncinate process of the pancreas and the third portion of the duodenum, where it divides to supply the pancreas, duodenum, and entire small intestine as well as the ascending and transverse colon. The intestinal arteries branch within the mesentery to unite with adjacent arteries to form a series of arterial arcades before sending small straight arteries to the small intestine. The intestinal arteries contact the small intestine on the mesenteric border where they pass toward the antemesenteric border, sending small branches into the layers of the intestine. The veins of the small intestine drain into the superior mesenteric vein, a major tributary to the portalvein. The unique relationship of the small intestine and its blood supply enables surgical mobilization of long segments of intestine (Isidore Cohn, 1986).

Lymphatics:

There are aggregate lymphatic nodules, peyer's patches, in the submucosa of the small intestine.These lymphatic nodules are most abundant in the ileum, but are present in the jejunum. The lymphatic drainage from the small intestine passes into three sets of

mesenteric nodes: The first set is close to the wall of the small intestine, the second set is adjacent to the mesenteric arcades, and the third set is along the trunk of the superior mesenteric artery. The superior mesenteric preaortic group drains into the intestinal trunk, which drains into the cisterna chyli. The lymphatic drainage of the small intestine is the major route by which absorbed liquid is transported into the circulation (Isidore Cohn, 1986).

Innervation:

The efferent nerve supply to the small intestine is from the parasympathetic and sympathetic divisions of the autonomic nervous system . The parasympathetic innervation is via preganglionic fibers passing through the vagus nerves to synapse with neurones of the intrinsic plexuses of the intestine. The sympathetic innervation of the small intestine is from preganglionic fibers arising from the ninth and tenth thoracic segment of the spinal cord, passing to synapse in the superior mesenteric ganglion . The postganglionic sympathetic fibers pass along the branches of the superior mesenteric artery to the intestine. Pain from the intestine is mediated through thoracic visceral afferents and not vagal afferents, although the vagus does contain large numbers of afferent fibers (Isidore Cohn, 1986).

ANATOMY OF LARGE INTESTINE

The large intestine extends about 1.5 meters from the ileocecal valve to the anus, and is approximately one fifth the length of the entire gastrointestinal tract. Since it comes into contact with almost every organ in the peritoneal and retroperitoneal spaces,its diseases and complications may be manifested by symptoms related to any of these organs or areas.

The internal diameter of the colon is largest in the cecum, where it averages from 7.5 to 8.5 cm and it diminishes in size progressively to an average of 2-5 cm., in the sigmoid. The narow lumen of the sigmoid, with its bulky and more solid contents, explains how relatively small lesions can create significant amounts of obstruction, while lesions of the same size in the cecum with its large diameter and liquid contents often produce no symptoms detectable by the patient or even by the unwarry clinician. The large size of the cecum also explains why it is the first part of the bowel to rupture in the presence of unrelieved distal obstruction (Isidore Cohn, 1986).

Certain gross characteristics help distinguish the colon (1) The taenia coli are the three strips of

longitudinal muscle distributed around the circumference of the colon. Thus the outer longitudinal muscle layer of the gut is incomplete in the colon. The three bands converge on the appendix and may be used as a means of locating it in difficult cases. (2) The haustra are sacculations about the bowel that are the result of the outpouchings of bowel wall between the taeniae. The haustra are separated by the plicae semilunares or cresentic folds of bowel wall, which give the colon its charachteristic x-ray appearance when filled with either barium or air. (3) The appendices epiploicae, or fatty appendages along the bowel, have no function but are often useful in helping to protect a suture line or closure of a perforation in the colon. (4) The relative fixation of most of the colon is related to the retroperitoneal location of the ascending and descending portions of the bowel. The intraperitoneal transverse colon is comparatively free, but it is marked by a relatively constant location and by the attachment of the omentum to its anterior superior edge. The fixation of the ascending and descending colon in the lateral peritoneal gutters eliminates these areas from the problem of volvolus, which is most