SMALL INTESINAL FISTULAS

ESSAY

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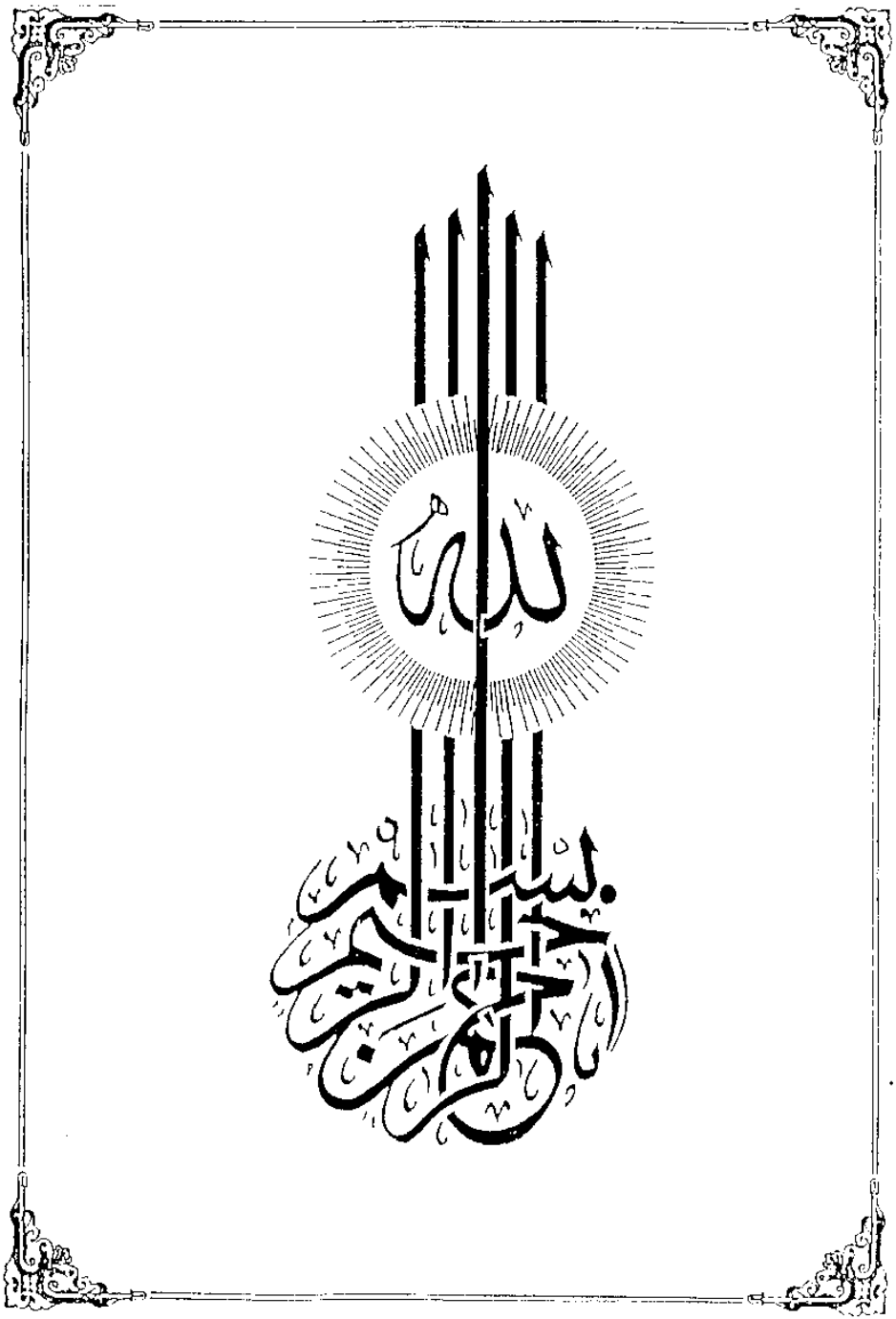

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INTRODUCTION

In this essay on small intestinal fistulas we should discuse different types of small intestinal fistulas, which may be internal or external fistulas .

Internal fistulas may connect any part of the small intestine with any part of the alimentary tract, the urinary tract, the biliary tract, the female genital system or with the aorta.

External alimentary fistulas continue to cause significant morbidity and mortality even though many factors are important to their management are known .

Although many causes of small intetinal fistulas are enlisted in the published reports, yet the exciting cause of this condition is almost always same, i.e. complication of surgery, Spontaneous fistulas are rare. Inflammatory diseases, intestinal obstruction, malignancy and trauma may cause fistulas spontaneously or after surgical interference.

These fistulas produce serious complications which, if untreated, will contribute to multiple organs failure and death. The most serious one are fluid and electrolyte imbalance, malnutrition and sepsis. All these problems will be discussed in detail.

The introduction of total parentral nutrition has greatly facilitated the management of such fistulas whether expected to close spontaneausly or during preparation for surgery.

The choice of therapy whether medical or surgical needs the consideration of many factors.

BLOOD SUPPLY OF SMALL INTESTINE

The small intestine, the longest part of the alimentary tract, is divided into three regions, the duodenum, the jejunum and ileum.

The artery of the midgut is the superior mesenteric artery which arises from the front of the aorta 1/2 inch below the coeliac axis, at the level of the first lumbar vertebra. It is directed steeply downwards behind the splenic vein and the neck of the pancreas. With the superior mesenteric vein on its right side it lies on the left renal vein, then on the uncinate process, then on the third part of the duodenum. Here the two vessels enter the upper end of the small intestine. They pass down to the right along the root of the mesentry and end at the ileum 2 feet proximal to the caecum.

The jejunal arteries arise from the left of the main trunk and pass forwards between the two layer of mesentry. They join each other in a series of anastomosing loops which form single arterial arcades for the upper part of the jejunum, double arcades further down, from the arcades straight arteries pass to the mesenteric border of the jejunum. These arteries are long and close together, forming high narrow "windows" in the intestinal border of the mesentry, visible because the mesenteric fat does not reach far into

the mesentry . The straight vessels pass to one or other side of the jejunum and sink into its wall. They posses no pre-capillary anastomosis with each other [i.e. they are end arteries].

The ileal arteries enter the mesentry and form a series of arterial arcades. Four or five of such arcades are so produced, the most distal one lying near the ileum. Straight vessels [Vas a recta] pass to the mesentric border of the ileum and sink into one or other wall. With no anastomosis between them. They are shorter and further apart than the vasa recta of the jujenum; the low broad "windows" they produce in the intestinal edge of the mesentry are, however, usually hidden from the view by mesenteric fat, which extend through the mesentry to its ileal attachment. The arcades of the terminal ileal branch anastomose freely with those of the terminal part of the main trunk of the superior mesenteric artery.

The ileo-colic artery arises from the right side of the superior mesenteric trunk low down in the base of the mesentry. It runs there into the ileo-colic junction, where it gives off an ileal branch which anastomoses with the terminal branch of the superior mesenteric artery; it also give a colic branch.

VENOUS DRAINAGE :

Each branch of the superior mesenteric artery is accompanied by a vein. All these veins flow into the superior mesenteric vein, a large trunk which lies to the right of the artery. It crosses the third part of the duodenum, runs between the uncinate process and the neck of the pancreas and pass straight up, as the portal vein, behind the first part of the duodenum. It is named the portal vein above and the superior mesenteric vein below the level of entery of the splenic vein, but the two represent a single continuous venous trunk.

Blood supply of the duodenum :

The arterial supply of the upper half of the duodenum is the superior pancreatico duodenal artery. The lower half is supplied by the inferior pancreaticoduodenal artery, a branch of the superior mesenteric artery.

The corrosponding veins of the duodenum drain into the portal circulation, the superior vein joining the portal vein directly, and the inferior vein joining the superior mesentenic vein. The vessels lie between the concavity of the duodenumand the head of the pancreas .

AETIOLOGICAL FACTORS OF SMALL BOWEL FISTULAS

Most fistulas of the small bowel result from operative trauma, other possible causes indude inflammatory lesions such as regional enteritis, blunt or penetrating trauma to the abdomin, neoplasm, foreign body and irradiation damage. [Hardy 1983] .

A broad classification based on the aetiology is often useful from the diagnostic point of view [Chlastery 1980] which can be shown as the following :

1. Congenital fistulas.
2. Acquired fistulas.
   a. Traumatic : either external or internel penetrating wounds.
   b. Iatrogenic :
      - Bowel injury at operation
      - Anastomotic leakage
      - By pass operation
      - Irradiation
3. Inflammatory fistulas :
   a. Inflammatory diseases of the intestine:
      - Crohn's disease
      - Tuberculosis
   b. Secondarily affecting intestine via colon :
      - Diverticulosis
      - Ulcerative colitis
      - Actinomycosis
4. Neoplastic fistulas.

1. CONGENITAL FISTULAS :

Failure of the normal maturation of embriological processes can give rise to fistulas between gastrointestinal viscera at different levels and other viscera. Such fistulas may present in immediate post-natal life or later, even in adult life. Despite the relatively common occurance of meckel's diverticulum [a remenant of vitellointestinal duct], patent vitello-intestinal duct with fistula formation is rare, occuring only once in every 15000 births. Although it usually presents as a faecal discharge at the time the umbilical cord sloughs it may not become apparent until adult life, when its appearance is precipitated by the development of distal obstruction [Williams and Irving 1982].

2. ACQUIRED FISTULAS :

I. Traumatic fistulas :

Penetrating trauma of the abdomen carries with it the risk of both internal and external fistula formation. The greatest example as seen after gunshot wounds in which many viscera may be damaged at several points . Closed abdominal injury also carries with it the risk of external fistula. Retroperitoneal rupture of the duodenal loop is well recogenized example in which ,if treatment is delayed, fistula will result [Willams and Irving 1982]. The clinical records of 100 consecutive patients with penetrating duodenal injuries treated at the lincoln medical

and mental health centre from 1972 to 1984. There were 93 men and 7 women [age 20-74 years]. Thirty patients were stabbed and 70 individuals sustained missile wounds [69 gunshot, 1 shotgan] [Ivatury et al., 1985]. Foreign body can also be responsible for perforation of the gut wall and fistula formation. Ingested bone fragments, needles, hair-pins etc. Can lead to a local abscess formation at the site of perforation with consequent internal or external fistulation.

An unusual cause of fistula formation is that following chemical contamination of the peritoneum [Williams and Irving 1982].

II. Iatrogenic fistulas :

A. Operative fistulas :

Almost any operative maneuver within the abdomen may give rise to a small bowel fistula, but perhaps the most common circumstances is when the bowel is injuried during the course of dissection in an operation performed for small bowel obstruction. In other cirumstances, gut may have been denuded or inadvertently opened leaks following closure, or an anastomosis that had been made may leak postoperatively [Hardy 1983] . And so the postoperative intestinal fistulas almost always follows leakage, although they can result from penetration of the bowel by an

abscess or an inadvertentely placed deep tension sutures [Irving Miles 1983]. Over 90% of enterocutaneous fistulas follow a surgical operation, frequentely an emerency procedure or reoperation [Shields Robert 1985].

The commonest reason of an external fistulas [enterocutaneous fistulas] after any abdominal operation is, of course, breakdown of an anastamosis. This may follow tension on suture lines, ischaemia, associated sepsis, distal obstruction or involvement of the bowel wall with malignant disease. In some cases the fistula arise because inadvertently injury to the bowel is not recogenized. Injury to the duodenum during nephrectomy is a well-decumented example of this type of problem.Certain surgical procedures are prone to the complications; Lysis of adhesions, closure of the duodenal stump after billroth II gastrectomy, drainage of intraperitoneal abscesses and appendicectomy are all regularly associated with fistula formation [Williams and Irving 1982].

B. Post irradiation fistulas :

Radiation necrosis or enteritis occurs following irradiation for the treatment of a malignant disease. It usually involves the loops of small bowel lying in the pelvis and can be responsible for both internal and external fistula. Morgenstern et al. reported 17 cases of fistula

in their review of 50 patients with radiation entropathy [Williams and Irving 1982]. Primary aortoduodenal fistula following high energy radiation therapy is a well example of this type of fistula [Estrado et al., 1983] 1983].

3.INFLAMMATORY FISTULAS

- Inflammation, the major cause of internal fistula, is rarely the cause of an external fistula with prior surgical intervention. Common examples are an anastomotic ulcer after gastrectomy of gastrojejunostomy invading the colon and an impacted gall stone in Hartman's pouch eroding into the duodenoum [Williams and Irving 1982].
- Tuberculous peritonitis is a frequent cause of enterocutaneous fistula, in the dry form of the disease fistula usually follow operative intervention due to intestinal obstruction while in ascitic vareity, laparotomy, evaculation of fluid and biopsy of the peritoneum carry a little risk of fistulization. However most authors believe that non operative management of both types of the disease is to be preferred when the diagnosis has been established [Robert and Macbeth 1978].

- Crohn's disease of small intestine is a well established cause of enterocutaneous fistula-between 6% and 40% of crohn's disease cases develop fistulas. Usually entero-enternal but frequently enterocutaneous. Stone et al., in a long term follow up on 74 cases of Crohn's disease of small bowel, found a 30% incidence of internal fistula [Williams and Irving 1982].

Glass R.E. [1985] during the treatment of 59 patients with an internal fistulas, found that fifty-five patients were known to have Crohn's disease before the fistula was identified, and in four a fistula was identified when the diagnosis of Crohn's disease was first made. He enlisted the type and the number of 83 patients with an internal fistulas in 59 patients with Crohn's as shown from the following table :

Table [1] classification of 83 internal fistulas in 59 patients with crohn's disease. [Glass R.E. 1985].

Type of fistula	Number of patients
ileum to segmoid colon or rectum	46
ileum to ileum or jejumum	11
ileum to stomach	1
ileum to duodenum	1
ileum to bladder	10
colon to colon or rectum	3
colon to duodenum	5
colon or rectum to bladder	6
8 patients had an associated an enterocutaneous fistulas	