Intestinal stomas

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Abstract

The formation of an intestinal stoma (usually ileostomy or colostomy) is an integral part of the surgical management of several pathologies of the gastrointestinal tract – in both emergency and elective patients. The basic underlying principle is that faecal flow is diverted from the site of the pathology by bringing the end or a loop of bowel through the anterior abdominal wall. A stoma may be created in a temporary or permanent role to reduce morbidity and mortality associated with several conditions of the gastrointestinal including perforation, inflammatory bowel disease, bowel obstruction and elective cancer operations. Early complications of stoma formation include ischaemic necrosis of the stoma, stomal retraction and obstruction with later potential complications of parastomal hernia formation, stomal prolapse and peristomal skin changes.

Keywords Colostomy; end stoma; ileostomy; loop stoma; mucous fistula; parastomal hernia

Introduction

The word stoma is derived from the Greek, meaning 'mouth'. It is defined as a communication, natural or artificial, between a body cavity and the external environment. Surgical procedures in which a stoma is created are given the suffix -ostomy. Stomas are most frequently formed in the gastrointestinal tract of which the ileostomy or colostomy are the most common.

History of intestinal stomas

In the pre-anaesthetic era the formation of intestinal stomas was uncommon. An early report from 1710 reports a patient who developed an intestinal stoma spontaneously secondary to a strangulated hernia.[1] The first demonstration of a surgically constructed stoma was performed by Littre who, in 1710, created a stoma on a deceased child with an imperforate anus,[2] although the first successful colostomy undertaken on a live patient was not performed until 1793.[3] The advent of anaesthetic techniques made intestinal stoma formation safer, practical and more common. The ileostomy was first advocated in ulcerative colitis in 1912 but only became widely used following the development of an everted ileostomy technique that protects the skin in 1952.[4,5]

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Types of intestinal stoma

Intestinal stomas can be temporary, diverting stomas designed to rest distal bowel, protect distal anastomoses (e.g. following low anterior resection) or to relieve obstruction.

Permanent stomas are indicated when primary anastomosis is not safe or possible due to the disease process (e.g. gross faecal contamination, poor blood supply or distal bowel resection precluding anastomosis as seen in abdomino-perineal resection (APER) when the anus is removed).

An intestinal stoma can be formed as an end or loop (Figure 1). A loop or double-barrelled stoma is formed by bringing a loop of bowel to the skin surface and creating a proximal and distal opening. The faecal flow discharges from the proximal opening into the stoma bag. The distal stoma limb remains adjacent to the proximal opening and facilitates closure at a later date by simple mobilization of the two ends which are then re-anastomosed and returned to the abdomen through the same opening. This is commonly performed between 3 and 6 months following the original operation. A loop stoma may be created using ileum, transverse colon or sigmoid colon and will often use a temporary plastic colostomy bridge to prevent early retraction which is removed approximately 5 days post-operatively. A loop stoma is commonly formed following distal colonic/rectal surgery in order to protect a distal anastomosis. This stoma may be a transverse loop colostomy but most surgeons favour a loop ileostomy formed from the terminal ileum. Williams et al. demonstrated that loop ileostomies produce fewer odours, require fewer appliance changes and were associated with a lower incidence of complications than a transverse loop colostomy.[6] There is also potential risk of damage to the marginal artery of the colon when reversing the colostomy that would compromise the blood supply to the distal bowel.[7]

End stomas are formed from the end of a proximal portion of divided bowel. An end colostomy is often formed using the sigmoid colon and positioned in the left iliac fossa. A common example of the end sigmoid colostomy is following emergency surgery and a Hartmann's procedure. This is performed following obstruction, perforation or ischaemia of the large bowel when the diseased segment is resected, it is not safe to form an anastomosis and the proximal healthy, well-perfused colon is used to form the end colostomy. The distal end of bowel is closed with a stapling device and/or sutures and is left in-situ in the peritoneal cavity. Electively, end colostomies are utilized when restoration of intestinal continuity in not possible, usually following resection of the anus in APER. End ileostomies are usually positioned in the right iliac fossa. They are formed from the most distal section of healthy ileum possible in order to maximize fluid and nutrient absorption. This reduces the risk of dehydration and electrolyte loss and produces a thicker faecal consistency allowing easier management of the ileostomy.

Reversal of end stomas is possible 3–4 months after the index operation. It is, however, a more complex operation when compared to loop stoma reversal and usually involves a laparotomy, although if expertise allows it may be performed by a laparoscopic approach. In reality, approximately 40% of end stomas following a Hartmann's procedure are never reversed.[8]

Following formation of an end colostomy the remaining distal portion of colon is closed and dropped back into the abdominal

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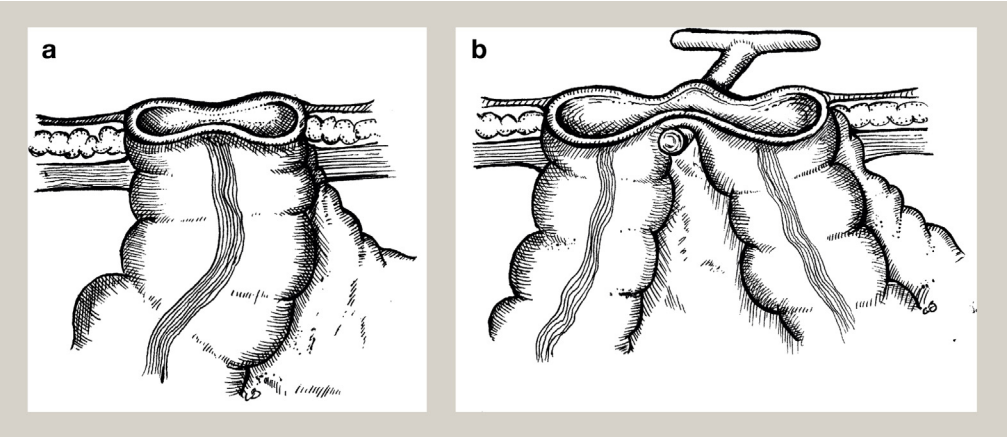

Figure 1 End colostomy (a) and loop colostomy (b).

cavity. If there is any concern that the distal stump closure may break down, releasing intestinal content into the peritoneal cavity and inducing faecal peritonitis it is advisable to bring the distal end to the skin as a mucous fistula (Figure 2). This can be through the same site as the proximal stoma, forming a double-barrelled stoma or a separate site (usually the lower end of the midline wound).

Advantages to this technique are that it reduces the risk of serious postoperative morbidity and makes for easier reversal, although the patient will have two stomas to deal with. As a compromise the closed distal end can be brought through the anterior sheath but the skin closed over the top. Should the stump leak, the contents will drain percutaneously. Trickett et al. (2005) reviewed rectal stump management following emergency colectomy in inflammatory bowel disease. They demonstrated that the subcutaneous placement of the stump, compared to intraperitoneal placement, resulted in a reduced incidence of pelvic sepsis and a significantly shorter postoperative stay.[9]

Unusual stomas

Less common intestinal stomas include caecostomy for decompression of colon, appendicostomy for administration of antegrade enemas (chronic constipation), and the use of small bowel as an ileal conduit for reconstruction of the urinary tract following cystectomy. Attempts have been made to create continent stomas using plastic valves (Koch 'continent' ileostomy). Results, however, have been poor and their use is limited. The surgical placement of a feeding tube into proximal jejunum for enteral feeding (feeding jejunostomy) is an important part of a surgeon's skill set.

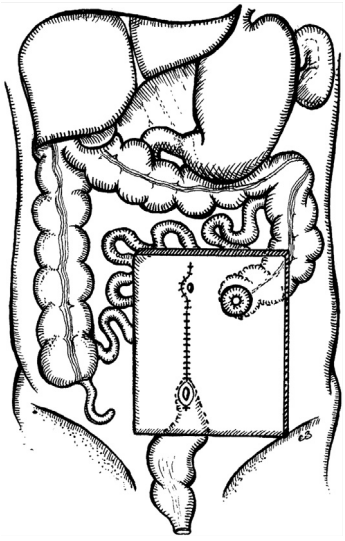

Figure 2 End colostomy and mucous fistula.

Indications for intestinal stomas

Ileostomy

The indications for the different forms of ileostomy are shown in Table 1.

Colostomy

The indications for the different forms of colostomy are shown in Table 2.

Indications for ileostomy

End ileostomy	Defunctioning loop ileostomy
• Total colectomy for hereditary bowel cancer – FAPC/HNPCC (with low rectal cancer)	• Protection of a distal rectal anastomosis (e.g. low anterior resection)
• Total colectomy for fulminant ulcerative colitis refractory to medical therapy	• Relieve distal obstruction (e.g. malignant/inflammatory stricture)
• Total colectomy for Crohn's disease	• Emergency management of anastomotic leak
	• To defunction an intestinal fistula
	• To defunction in the presence of severe perianal sepsis (e.g. Crohn's, Fournier's gangrene/ necrotizing fasciitis)
	• Rectal trauma/sphincteric injury
	• Faecal incontinence

FAPC, familial adenomatous polyposis; HNPCC, hereditary non-polyposis colorectal cancer.

Table 1

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