

# Complications of Ileal Pouch Anal Procedure: Prevention and Management

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## Abstract

Although the mortality following ileal pouch anal procedure (IPAA) has reduced to less than 1.5%, the morbidity continues to be high (13-58%). Intestinal obstruction is the most frequently reported complication with pelvic sepsis being the primary cause of pouch failure. Overall, the functional results are good and patient satisfaction is high. This review highlights the various measures needed to be undertaken in order to keep the complication rate at its lowest.

## Introduction

The conventional surgery for inflammatory bowel disease (IBD), viz., total abdominal proctocolectomy with ileo anal anastomosis, was fraught with faecal urgency, frequency and incontinence. Parks and Nicholls in 1978 reported an operation which combined an ileal pouch with preservation of sphincter mechanism<sup>[1, 2]</sup>. This operation included complete excision of the diseased bowel with an adequate faecal reservoir (about 400ml) that permitted voluntary transanal defecation, reasonable faecal continence all the while avoiding an ileostomy. There were reduced chances of damage to innervations of bladder and genitalia with the absence of a perineal wound. The other surgical procedures that were, and still are available for IBD, included total proctocolectomy with ileostomy (Brooke) or continent ileostomy (Koch Pouch), colectomy with ileorectostomy and subtotal colectomy with ileostomy. All these procedures have advantages and disadvantages, the choice depending on the timing and indication for surgery.

Proctocolectomy with IPAA has become the procedure of choice for many patients of ulcerative colitis (UC) who is well motivated, less than 50 years, with good sphincter function, no significant co-morbidity, and no perineal or low rectal disease<sup>[3]</sup>. The procedure is also indicated in familial adenomatous polyposis (FAP), tumours or fibromatosis of the bowel, and some cases of Hirschsprung's disease. The contraindications include Crohn's disease, low rectal cancer and perianal disease.

## Preoperative preparation

Since the Park's procedure is indicated only for elective indications, in order to reduce complications patient should be well prepared before surgery. It includes patient counseling and education, correction of nutritional deficiencies, withdrawal of steroids, aspirin compounds and immunosuppressant, along with prophylactic measures for thromboembolism. Conventional bowel preparation and antibiotics should also be used.

## Types of pouches

Various types of pouches are reported e.g. J, S, W, and H<sup>[4]</sup>. The J-shaped pouch is the most preferred and practiced as it is simple to construct, needs less intestine, takes less time, can be emptied spontaneously, and is associated with a low incidence of pouchitis. The clinical results are comparable with other reservoirs. While the S-shaped reservoir is made of 50cms of ileum and often needs catheterization for evacuation, J-pouches are associated with increased frequency because of a smaller reservoir capacity. These problems have been addressed by quadruple or W-shaped pouches. The lateral pouch technique somehow never gained popularity.

## Technical points

The complications of pouch surgery are related to technique. In order to reduce such complications, the following points need to be borne in mind while constructing a pouch:

- 1) Tension free anastomosis: Tension on the ileal mesentery is one of the critical precautions for the creation

of a tension free anastomosis<sup>[5]</sup>. The various technical points which need to be taken into consideration while performing the procedure are:

- I. The tip of the pouch should reach 6cms below the pubic symphysis for a tension free anastomosis at the dentate line
- II. The terminal ileum should be transected as close to caecum as possible.
- III. The mesentery should be mobilized right up to the transverse portion of duodenum and uncinata process of pancreas.
- IV. Parietal peritoneum of distal ileum may be incised. Division of visceral peritoneum along the right side of the superior mesenteric artery (SMA) allows further lengthening of the mesentery. To achieve further length multiple small vessels close to superior mesenteric, ileocolic arcade (below 1<sup>st</sup> and 2<sup>nd</sup> arcade) can be divided.
- V. SMA can be divided in its distal part at or proximal to beginning of ileocolic arcade (gain of further 1.5-2cms). While transecting big vessels use bulldog clamps to assess collateral circulation.
- VI. A window can be created still maintaining the blood supply to pouch.
- VII. If there is tension on the anastomosis (e.g. in obese patients), it is advisable to perform a distal rectal anastomosis.

2) The two limbs of the pouch are opened in the mid portion for firing staplers to facilitate ileo-anal anastomosis and to allow any modification according to the anal anatomy. Any residual septum (because distal 1.5cms of the stapler is non-cutting) is divided through rectum. Care must be taken to pull the mesentery away to avoid its incorporation in the staple line. The excess short limb of the J pouch should be resected<sup>[6]</sup>

3) In an S-shaped pouch, the outflow limb should be no longer than 2cms. Excess must be trimmed before anastomosis to prevent emptying difficulties.

4) Sometimes a J-pouch cannot be fashioned properly, in which case an S-shaped pouch should be made. Such a pouch should be anchored to the presacral fascia to prevent an axial twist.

5) For transecting the distal rectum, an incision should be made distal to the line of mucosectomy in the muscular tube. This opening is more appreciable than purse string suture on the mucosal tube or any instrument introduced per anum which may push the mucosal tube further proximally with spillage of colonic contents.

6) The omentum should be retained during the pouch procedure so as to reduce the chances of sepsis. It does not influence the frequency of postoperative bowel

obstruction.

Transanal manipulations for hand sewn anastomosis of anal canal including prolonged stretching, purse string, mucosectomy, and eversion of rectum all contribute to impaired bowel control. On the contrary, effortless pouch construction and tension-free anastomosis with precision and good blood supply is possible using stapling techniques. That is why, overwhelming majority of surgeons use this technique. The retained mucosa in the distal rectum and anal canal poses a risk of colitis, dysplasia, malignancy and needs continuous surveillance.

7) Damage to the hypogastric nerves can be reduced by dissecting close to the rectum. Ileo-anal anastomosis should be preferably made at the top of the anal canal as performance of the anastomosis at the dentate line is associated with suboptimal functional results.

8) Diverting loop ileostomy: In view of high complication rate, it is always wise to add a covering loop ileostomy which allows the anastomosis to heal thereby reducing chances of leakage, sepsis, stricture formation and pouch dysfunction<sup>[7]</sup>. It may be avoided in patients with a good general condition, no anastomotic tension, no blood loss<sup>[8]</sup>. The problem associated with ileostomy formation and closure can be prevented by using tube ileostomy or intraluminal bypass tube (Coloshield). Complications following the creation of an IPAA have been seen to occur in 44% patients with incomplete faecal diversion as compared to 14% in those with a complete diversion.

9) All staple line bleeding should be controlled before closing the abdomen.

#### Post operative management

Post-operative care is very important following an IPAA. It includes encouragement and counseling. Dietary advice should include advice on intake of a large quantity of oral fluids and avoidance of indigestible vegetable fibers (that may obstruct stoma or intestine) e.g. mushrooms, raw vegetable and raw fruits, nuts. The patient should also be advised to avoid foods which can exacerbate gastrointestinal symptoms such as coffee, chocolates, apple juices, popcorn, seeds, beans, corn, beer, milk and milk products and spices.

#### Early complications

The creation of an ileal pouch procedure carries a morbidity of 13-58%.

#### Small bowel obstruction

Obstruction is the most frequently reported complication (13-19%)<sup>[3]</sup>. The obstruction may arise secondary to

adhesions, internal herniation, reservoir angulations, and outlet problems or due to problems related to the loop ileostomy. Two cases of duodenal obstruction (SMA syndrome) have been reported<sup>[4]</sup>. 50% of these patients can be managed conservatively while the rest need re-exploration.

#### Septic Complications

The incidence of pelvic sepsis has come down from 11% to 3% (Mayo clinic series) because of technical advancements and improved nursing care. In a recent large series of 2002 patients Chapman reported pelvic sepsis in 7% of his cases<sup>[9]</sup>. The frequency remains greater in patients with indeterminate colitis. Cuff abscess used to be a frequent problem because of a long muscular sleeve. This complication is now less common because of restricting the length of mucosectomy. Patients with pelvic sepsis usually present with fever, pelvic or perineal pain, and leucocytosis. Confirmation is achieved by Computed Tomography (CT) scan. While phlegmons are successfully treated conservatively, an abscess needs a CT-guided trans-abdominal or trans-perineal drainage, or surgical drainage. Pelvic sepsis is the primary cause of pouch failure<sup>[10]</sup>. Of the patients who were re-explored for pelvic sepsis in Mayo clinic, only 41% lost their pouches. However, 92% patients in whom the septic episode was managed conservatively lost their pouches. Both, superficial and deep wound infections, occur in about 3% of the patients<sup>[11]</sup>.

#### Anastomotic leaks

This complication has been reported in 10-15% of patients and is almost always followed by subsequent development of a stricture; the causes include tension on the anastomotic line, ischemia and sepsis<sup>[4]</sup>. Diverting ileostomy, preservation of omentum, proper selection of the patients and stapling techniques have been found to reduce their incidence.

#### Perforation of pouch

It is a relatively unusual complication based on the currently employed techniques and is seen to account for only 1-4% complications. Even the terminal ileal appendage is known to perforate. This complication can be reduced by amputating excessive terminal ileum or securing it to the reservoir<sup>[6]</sup>.

#### Urinary dysfunction

5% of patients have transient urinary dysfunction while 2% need intermittent catheterization. However, none require permanent catheterization. Such complications are reduced by dissecting close to the rectum avoiding damage to the pelvic nerves.

#### Stoma-related complications

These include transient intestinal obstruction (9-13%), dehydration (20%), retraction (16%), ileostomy dysfunction (9%), prolapse, fistula and abscess formation<sup>[9, 12, 13]</sup>. Such problems can be eliminated by using an intraluminal bypass tube or tube ileostomies.

#### Fistulae

Fistula between the pouch and vagina has been reported in 7% of patients (probably because of trauma during dissection or Crohn's disease). The incidence of pouch-cutaneous (with perianal skin) fistulae is 5%, while fistulae with other sites are encountered in 4% cases<sup>[14]</sup>. The incidence is high in patients with indeterminate colitis (31%). The treatment options include repair (transanal, transvaginal and trans abdominal, advancement flaps, Seton divisions, faecal diversion and Gracilis muscle interposition). Sometimes reconstruction and excision of the pouch are needed.

#### Late complications

##### Anal Stricture

This complication has been reported in 8% (Toronto experience) and 14% (Mayo Clinic) of patients. Predisposing factors include sepsis, suture line tension, ischemia and anastomotic leaks. Treatment of strictures includes endoscopic dilatations or even ano plasty<sup>[15]</sup>.

##### Pouchitis

The reservoir ileitis is manifested by frequent stools, abdominal cramps, watery or bloody diarrhea, urgency, incontinence, fever, weakness and malaise. The incidence of this complication has been reported to be 18% at 1 year and 40% at 10 years following IPAA. Endoscopic findings include inflammation. Histology is not classical, with reports varying from normal to inflammatory pathology. The aetiopathogenesis of this condition includes:

- 1) Abnormal pouch motility leading to poor emptying and anaerobic bacterial overgrowth,
- 2) Immunological reaction to bacterial product,
- 3) Ischemic or reperfusion injury,
- 4) Chemical injury,
- 5) Novel manifestation of IBD (31% of patients with UC vs 6% of FAP were reported to develop pouchitis at 41 months in a series of 734 patients). Patients of UC with primary sclerosing cholangitis and extra intestinal manifestations have increased risk of pouchitis (63% and 39% respectively)<sup>[16]</sup>.

Treatment: 1) Metronidazole/ Ciprofloxacin

2) Enema (steroids/ salicylate derivatives)

If the disease is recurrent or intractable, one should rule out Crohn's disease.

### Malignancy

Chances of developing cancers are because of presence of residual mucosa or disease following IPAA. Although remote, such patients need to be kept under surveillance. Cancer has been reported following mucosectomy probably because of regeneration of rectal mucosa<sup>[17]</sup>.

### Recurrent disease

Recurrence of disease is usually because of an initial error in diagnosis (Crohn's).

### Pouch failure

The causes for pouch failure include pelvic sepsis, frequent stools, gross faecal incontinence at night and Crohn's disease. The incidence is 75% at 1 yr, 12% at 2 yrs and, this number drops to 9% at 10 yrs<sup>[18-21]</sup>. However, Blumberg et al.<sup>[22]</sup> have reported pouch failure in only 3% of their patients. These patients may need an excision of pouch and permanent ileostomy.

### Faecal incontinence

While day time incontinence is uncommon, night time spotting / soiling occurs in 20-30% of patients up to a year following IPAA. Patients with preoperative stool frequency have more chances of incontinence. Stool frequency has been reported to be 6/day and 1-2 times at night. It is more with double loop pouches than quadruple reservoirs who actually feel a sense of difficulty in spontaneous evacuation<sup>[22]</sup>. Such problems can be reduced by constructing appropriate sized pouches (18-22cm) in adults with distance between pouch and anastomosis being not more than 5cm.

### Sexual Function

In general, sexual activity increases after surgery probably because of increased improvement in general health. Post-operative sexual dysfunction is reported to be 11% in men and 12% in women. 1.5% males are impotent and 3% complaint of retrograde / lack of ejaculation. Dyspareunia occurs in 7% of women. 3% of patients complain of leakage of stools during intercourse. However, 49% of patients operated had pre-existing sexual dysfunction even prior to surgery. Although the ability to conceive is reduced because of adhesions but the patient can become pregnant and deliver safely after IPAA<sup>[23]</sup>.

### Skin irritation

This problem is related to frequent bowel motions and incontinence (10%)<sup>[4]</sup>. The treatment includes use of bulk-forming agents, Loperamide and topical application of cholestyramine ointment in polyethylene glycol base.

### Physiological results

The various physiological factors which are important for

faecal incontinence are anal sphincter functions, anorectal sensations, puborectal and anorectal angles, recto anal inhibitory reflex, distensibility and capacity of the pouch, pouch motility, ability to defecate, rapidity of transit through proximal bowel and quality and quantity of enteric contents following IPAA. 15% of patients are reported to have reduced resting pressures. Anorectal sensations are usually intact because of preservation of innervations and patient can differentiate between flatus and faeces. Distensibility and capacity of ileal pouch are identical to healthy individuals but contraction of pouch is increased such that the patient passes stools even after 100ml contents in the pouch. Faecal output and body content of water and ECF in patients with IPAA are similar to those with ileostomy. About 600-700ml of stool is passed in 5-6 motions/day<sup>[24]</sup>.

Dietary restrictions and use of bulk forming agents have little effect on volume extracted. Loperamide reduces transit, improves absorption and strengthens anal sphincter. Transit of chyme through the small intestine is reduced in IPAA and therefore, small bowel digestion and absorption are usually sufficient.

### Quality of life

IPAA has been found to improve the overall quality of life. While analysing the performance of this procedure (sexual activity, sports, social functions, recreation, family relationship, works around the home and travel), the ileal pouch outperformed those with Brooke ileostomy and continent ileostomy (Koch). Patients not only regain their health but are satisfied with the operation and perform daily activities in a normal or near normal way. A satisfaction rate of 96% has been reported by Delaney et al.<sup>[25]</sup>.

### Conclusion

With the various advances in surgical techniques, sterilization, anesthesia, availability of better broad spectrum antibiotics and proper selection of the patients, the mortality has been reduced to 0-1.5%<sup>[26]</sup>. In spite of the associated high morbidity, the overall consensus at present is that IPAA with its various modifications offers the best quality of life when compared to the other alternative procedures available today.

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