

Ileal Pouch Anal Anastomosis.

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Abstract: In the last three decades, pouch surgery has undergone many modifications and improvements with various pouch configurations and surgical techniques and has now become the treatment of choice for ulcerative colitis and familial adenomatous polyposis of the colon. Here we have given an overview about the indications, patient selection, controversies like pouch configuration, staging of pouch or mucosectomy, and the outcome after pouch surgery. Currently, the J pouch with a stapled IPAA in two stages, is the most widely practiced method. Though pouchitis remains a challenge, IPAA is now a durable procedure that offers cure of the disease and a reasonable quality of life. **Key words:** IPAA, Ulcerative colitis, Familial adenomatous polyposis, pouch

INTRODUCTION

Restorative proctocolectomy with ileal pouch anal anastomosis (IPAA) was first described in 1978, by Parks and Nicholls in an S configuration that was handsewn to the anus following distal rectal mucosectomy¹. Utsunomiya devised the simpler J pouch configuration which was later accepted as the standard technique because of ease of construction and efficacy of evacuation^{2,3}. In the last three decades pouch surgery has undergone many modifications and improvements with various pouch configurations and surgical techniques and has now become the treatment of choice for most patients with ulcerative colitis (UC) and familial adenomatous polyposis of the colon (FAP)⁴.

INDICATIONS FOR IPAA

IPAA is now commonly performed for patients with ulcerative colitis in whom medical therapy fails or who develop dysplasia as well as for patients with familial adenomatous polyposis who will develop colonic carcinoma later. About 30% of patients with UC will need a colectomy at some point in their disease course, despite adequate medical therapy. At present, Crohn's disease is still an absolute contraindication to IPAA though IPAA may also be performed in rare group of patients with Crohn's disease who have no small bowel or perianal disease. About 10-15% of patients with inflammatory bowel disease (IBD) cannot be classified either as UC or Crohn's disease. These are considered to have "indeterminate colitis"⁵⁻⁷. The outcome after IPAA for indeterminate colitis has been addressed by two large studies from the Mayo and Cleveland clinics which showed that 85% of pouches constructed in these patients were retained at 10 years of follow up. Hence IPAA can be performed in indeterminate colitis, provided the patients are fully informed about the risks involved^{8,9}. IPAA is also indicated in few selected patients with refractory constipation due to colonic or rectal inertia and Hirschprung's disease^{10,11}. The advantages of IPAA surgery are that it removes almost all the diseased colon but also retains a normal defaecatory passage with an overall improvement in the quality of life.

PREOPERATIVE ASSESSMENT

The IBD diagnosis should be definite before proceeding with IPAA and if there is an equivocal picture following colonic biopsy, subtotal colectomy is advisable to maximize the chance of making a definitive

diagnosis before a pouch operation. It is important to carefully evaluate the anal sphincter before operation. In patients with tumours or multifocal dysplasia, the lower third rectum should also be carefully evaluated and these patients should be considered for an anal mucosectomy and a hand sewn IPAA. Patients who have received steroids in the last 6 months should be supported with perioperative steroid therapy. IPAA is preferably avoided in patients on high immunosuppression or those who are malnourished and have a poor general condition. Perioperative anticoagulation and other anti-thrombotic measures helps in prophylaxis against deep vein thrombosis. The extent of surgery and the risks involved should be explained to the patient in detail during the time of obtaining consent for ileostomy and marking of the stoma site.

OPERATIVE TECHNIQUE

Overview

With the patient in modified lithotomy position and 15 degree hip flexion, the abdomen and perineum are scrubbed with povidone iodine and pressure points are protected with foam pads. The procedure is performed in two stages³. First the total proctocolectomy is performed wherein the cecum, colon and rectum are mobilized and removed. Care is taken to preserve the pelvic nerves by maintaining the dissection in the 'holy' plane described by Heald. The ileum is preserved in its entirety. An ileal pouch is constructed from the terminal 30-45 cm of the ileum and anastomosed to the anal canal at or just above the dentate line. IPAA can be performed with sutures or staplers, with or without transanal rectal mucosectomy and diversion ileostomy. (Figure 1 & 2)



Figure:1 Stapled J pouch

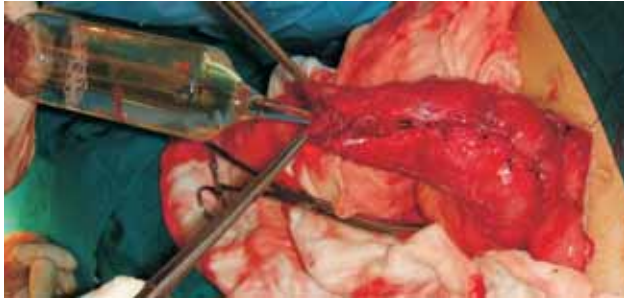


Figure: 2 Completed J pouch checked for haemostasis

Pouch configuration

Parks and Nicholls first designed a triple-limb S-shaped pouch which was relatively complicated to construct and associated with a suboptimal functional outcome¹. Several alternative pouch designs have been tried in the last three decades like the J, H and W pouches, before the J configuration has been accepted as the standard operative technique. There is an inverse relationship between the volume of the reservoir and the frequency of bowel movements. Lewis et al studied the effect of pouch configuration on the functional outcome. Out of 100 patients, 57 attained perfect anal continence and the remainder experienced episodes of minor incontinence. Compliance of the ileal reservoir, a good anal sphincter, and intact anal reflexes were correlated with good outcomes, whereas the pouch design had no effect¹³.

Comparative studies have shown that W pouches have some benefits in terms of capacity, compliance, and evacuation, but prospective randomized studies have not shown any significant differences in functional outcome¹⁴. The J pouch has therefore been widely accepted as the configuration of choice.

Mucosectomy versus double stapling

Stripping the columnar mucosa above the dentate line was initially performed to prevent the recurrence of UC or dysplasia, because all the diseased mucosa was removed thereby eliminating the risk of malignancy in the residual mucosa. After the rectum has been fully mobilized to the pelvic floor, the surgeon moves to the perineum. The retraction hooks of the Lone Star retractor are placed circumferentially into the dentate line to splay the anal canal mucosa. The submucosal plane is infiltrated with 1:1,00,000 adrenaline and the mucosa is dissected of the rectal wall upto the pelvic floor where the muscularis is incised and the presacral space entered. Mucosectomy is followed by a per-anal hand sewn anastomosis. During this procedure, the anal canal remain dilated for an average of 20 minutes (range 14-44 min) which might be detrimental to the sphincter complex¹⁵. Mucosectomy also involves excision of the anal transition zone (ATZ), the area of cuboidal transitional epithelium that separates the columnar and squamous epithelia within the anal canal. The ATZ being richly innervated by sensory nerve endings, mediates the anal sampling reflexes i.e., the ability to discriminate solids and liquids from gases. The double-stapled technique preserves the ATZ area with no requirement for prolonged anal dilation. Michelassi et al, concluded in a large prospectively evaluated study that complete day and night time continence was achieved more commonly by a stapled rather than a hand sewn anastomosis¹⁶.

However, four randomized controlled trials and one case controlled study, failed to show a difference between the two techniques related to complication rates, anal physiology, and pouch function¹⁵⁻²⁰. In a double-stapled IPAA, 1.5 to 2.0 cm cuff of columnar epithelium lies above this area. Cuffitis i.e., recurrent UC within this columnar cuff can cause discomfort, urgency, bloody discharge and increased stool frequency with a prevalence varying between 9% and 22%^{21,22}. Dysplasia or malignancy can also arise from this columnar cuff²³⁻²⁸. Coull et al conducted annual endoscopic surveillance of the columnar cuff in 135 UC patients with no dysplasia or carcinoma in their resected specimen, with a median follow-up of 5 years²⁹. No dysplasia or neoplastic changes occurred during the follow-up and they concluded that routine surveillance of the anal canal was not necessary in the first 10 years following IPAA if there was no dysplasia in the proctocolectomy specimen. These findings are similar to two others reports, each of more than 100 patients with a median follow-up of 30 months^{30,31}. In the Cleveland clinic study where 178 patients were subjected to endoscopic surveillance and biopsy for a period of 10 years, only 8 patients developed dysplasia, of which only 2 were high grade. Hence they concluded that routine mucosectomy was unnecessary in the absence of rectal carcinoma or proven dysplasia within 8 cm of the anal verge.

In large institutional studies, double-stapled technique has been associated with significantly less pelvic sepsis. To conclude, most surgeons favor the double-stapled technique because of the ease of its construction, even in difficult circumstances such as obese patients or those with a short mesentery³². The transverse stapling instrument should be positioned 2-3 cm above the anal margin. Mucosectomy should be considered in patients with rectal dysplasia or malignancy¹⁶⁻¹⁸.

TWO STAGE VERSUS SINGLE STAGE IPAA

Though IPAA can be performed even in three stages, it has generally been performed as a two stage procedure with the defunctioning loop ileostomy along with pouch construction. Preoperative steroids have been associated with an increased anastomotic leak rate without diversion³³⁻³⁶. The clinical impact of an anastomotic leak is reduced by diversion ileostomy³⁷. The studies from the Cleveland Clinic has shown that anastomotic dehiscence occurred in 5.3% of 1965 IPAA patients, although it was 14% in single stage IPAA^{35,38}. The overall complication rate following ileostomy closures in these cases was 11.4%. The Cleveland study concluded that ileostomy closure is associated with less morbidity than a single stage IPAA^{39,40}.

Although the evidence is increasing in favor of single stage IPAA, anastomotic leaks are as high as 12-15%⁴², but can be reduced to 4.3% if the patients are carefully selected⁴¹. Thus a single stage IPAA is probably suitable for well nourished patients who are not immunosuppressed, provided they are informed about the possible requirement for postoperative diversion.

COMPLICATIONS

1. Haemorrhage

Haemorrhage can be primary, reactionary or secondary and has an overall incidence of 3-4%. If bleeding is noted at the time of pouch construction, the pouch should be inverted and inspected for bleeding points and haemostasis secured. Reactionary hemorrhage, is mostly

from the suture or staple lines and gets controlled in 80% of the cases with pouch irrigation using a 1:10000 adrenaline solution. Secondary haemorrhage usually indicates pouch sepsis, and needs examination of the pouch under anaesthesia with special attention to dehiscence at the anastomosis. Bleeding that is not controlled by a trans-anal approach, might need a laparotomy. Intra abdominal haemorrhage that is not related to the pouch may be from the colonic bed, the lateral pelvic walls or the slipped ligatures from the mesenteric vessels. In rare circumstances, detachment of the pouch might be necessary to inspect the lower pelvis. The pouch might be exteriorized as the mucus fistula, if primary anastomosis is considered to be unsafe. Uncontrolled haemorrhage requires packing, with a second look after 48 hours.

2. Small bowel obstruction (SBO)

Small bowel obstruction is the most common complication after IPAA with a reported incidence of between 15 to 40%⁴³. Most cases are due to adhesions and respond to conservative management and only about 5% require laparotomy. Early SBO did not predispose to late SBO⁴⁴. Occasionally, the afferent limb to the pouch may be the site of obstruction either due to adhesions in the pelvis or by herniating behind the pouch. Reports from the Cleveland, Mayo and Lahey clinics, document SBO rates of 25%, 17% and 20% respectively with follow-ups of 2 to 3 years, with operative intervention needed in only 7% of cases^{44,45}. SBO can be due to the ileostomy because of torsion of the loop, lateral space obstruction, an inadequate opening or adhesions after stoma closure, which are managed according to the cause.

3. Pelvic sepsis

The rate of pelvic sepsis is much higher for patients with UC than those with FAP undergoing IPAA^{46,47}. Pelvic sepsis occurs in 25% of patients and is likely due to anastomotic dehiscence or an infected pelvic haematoma⁴⁸. Fever in the post operative period should raise the suspicion of pelvic sepsis which can be due to intra abdominal abscess or anastomotic cuff abscess. On digital rectal examination there might be localized tenderness overlying the abscess or the anastomotic dehiscence. Computed tomography will confirm the presence of abscess and the treatment may be tailored accordingly like drainage under radiologic guidance. Examination under anaesthesia will reveal whether the collection is due to dehiscence of ileoanal anastomosis or disruption of the pouch itself. An abscess associated with dehiscence is best drained through the suture line because of the high incidence of fistula in ano or pouch vaginal fistula, if drained through the perineum or the vaginal vault. Re-laparotomy is reserved for cases in which CT guided drainage or minor surgery has failed.

In the Mayo clinic series, 40 out of 73 patients (55%) were primarily treated by laparotomy; 14 pouches were excised immediately for severe sepsis⁴⁹. In a study from Heidelberg, laparotomy was required in 74 out of 131 cases (56%)⁵⁰. Exteriorisation of the pouch should be done if complete anastomotic disruption has occurred. Pelvic sepsis if not treated adequately will result in a stiff, noncompliant pouch and the ultimate functional result is likely to be poor, with a high rate (40%) of pouch excision. In contrast, more than 90% of patients who are treated appropriately and in whom no reoperation is required might have a satisfactory outcome.

4. Pouch vaginal fistula

Fistula from the pouch to the vagina may occur due to pelvic sepsis or a technical error during the application of staplers, which places the posterior vaginal wall at risk. A small low fistula requires adequate drainage and transanal or a transvaginal mucosal advancement flap. Large high fistula tracts, especially if there has been faulty stapler application, require reconstruction or disconnection of IPAA.

5. Pouchitis

The incidence of pouchitis varies from 11% to 34% depending upon the criteria used for diagnosis and the incidence increases with time after surgery^{51,52}. Pouchitis significantly affects the patient's quality of life and long term surgical outcome⁵³. Approximately 50% of patients who have undergone IPAA surgery for UC develop at least 1 episode of pouchitis. Pouchitis is associated with increased stool frequency, urgency and bleeding, anorexia, abdominal cramps and a low grade fever. The aetiology remains unclear and the probable cause might be mucosal ischemia, immune deficiency, pouch stasis, bacterial imbalance or recurrent UC or Crohn's disease. Patients with extra intestinal manifestations of UC especially primary sclerosing cholangitis are at ten fold increased risk for pouchitis. (48% versus 4.6%, $p=0.01$)⁵⁴. Pouchitis can be classified based on disease course as acute, acute relapsing or chronic pouchitis and based on aetiology as idiopathic or secondary pouchitis i.e., due to clostridium difficile or cytomegalovirus infection, NSAID induced, ischaemic or autoimmune causes.

Pouchitis Disease Activity Index (PDAI) developed by Sandborn et al frequently used to diagnose pouchitis, includes three 6 point scales for clinical, endoscopic and histologic findings. An index of 7 or higher is used to diagnose pouchitis. (Table: 1). The differential diagnoses are cuffitis and the irritable pouch syndrome. This syndrome is characterized by increased stool frequency, urgency and abdominal pain mimicking pouchitis but with normal endoscopic and histologic findings.

Table :1 Pouch Disease Activity Index (PDAI)

CRITERIA	SCORE
Clinical	
<i>Post operative stool frequency</i>	
Usual	0
1 or 2 stools/day more than usual	1
>3 stools/day more than usual	2
<i>Rectal bleeding</i>	
None or rare	0
Present daily	1
<i>Fecal urgency or abdominal cramps</i>	
None	0
Occasional	1
Usual	2
<i>Fever (>100 F)</i>	
Absent	0
Present	1
Endoscopic	
Edema	1
Granularity	1
Friability	1
Loss of vascular pattern	1
Mucoid exudate	1
Ulceration	1
Histologic	
<i>Leucocyte infiltration</i>	
None	0
Mild	1
Moderate + crypt abscess	2
Severe + crypt abscess	3
<i>Percent of ulcerated mucosa per low power field</i>	
< 25	1
25-50	2
>50	3

Because most pouchitis is caused by bacteria, antibiotics are the best form of therapy. The first line therapy includes a course of metronidazole (15-20 mg/kg/day) or ciprofloxacin (1000 mg/day)⁵⁵. Anti-inflammatory agents, immunomodulators, diet restrictions and biological therapy have been used to treat pouchitis. Probiotics like VSL-3 can be used as both a prophylactic or therapeutic agent. At 1 year, 10% of VSL-3 patients had experienced pouchitis versus 40% of those receiving placebo⁵⁶. Patients who fails to respond to above treatment should be offered oral or rectal corticosteroids⁵⁷. Oral or topical mesalazine may be used. The gut specific non-absorbable antibiotic, rifaximin, can be used for maintenance therapy in patients who need long term antibiotics⁵⁸. Hence management of pouchitis and other pouch disorders can be difficult and therefore a multidisciplinary approach has been advocated⁵⁹.

OUTCOMES AFTER IPAA

The perfect pouch is yet to be defined. The functional outcome of a successful IPAA in most patients constitute bowel action between 4 to 7 times per day with one nocturnal evacuation and they will experience a normal urge to defaecate with an ability to control defaecation and to discriminate between flatus and faeces. The overall psychometric sexual function in males will be better because of enhanced general health. In females, there is an increased incidence of dyspareunia and fertility is adversely affected, likely because of pelvic adhesions. The effect of the aging process on functional outcome was studied by the Mayo Clinic group, with functional and quality of life outcomes being assessed at 5,10 and 15 years. Incontinence to flatus and stool increased from 1% to 10% during the day and from 2% to 24% at night over a 15 year period. But even after 15 years, more than 90% of patients were showing an overall improved quality of life with no deterioration over time⁶⁰.

CONCLUSION

IPAA is a safe and successful procedure and has led to improvement in the surgical treatment of UC and FAP. The majority of patients, if carefully selected, will have an improved quality of life after an IPAA compared to those with a permanent ileostomy. Two factors are critical for good outcomes - a good anal sphincter mechanism and a properly constructed pouch of adequate capacity. Currently, the J pouch with a stapled IPAA in two stages, is the most widely practiced method. Though pouchitis remains a challenge, IPAA is now a durable procedure that offers cure of disease and a reasonable quality of life.

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