The Failed J Pouch

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Abstract

The development and refinement of proctectomy with ileal pouch-anal anastomosis (IPAA) since its introduction in the 1970s has made it the optimal procedure of choice in patients with chronic ulcerative colitis and patients with familial adenomatous polyposis. However, it is a procedure that can be associated with significant morbidity. Pouch failure due to infection, mechanical, or functional disability represents a challenge to both surgeon and patient. Practicing surgeons who deal with revisional pouch surgery face a variety of intraoperative, postoperative, and reoperative challenges. Success requires a strategy that includes critical planning, preparation, specialized surgical techniques, and experience to achieve long-term success, minimize the adverse consequences of IPAA-related complications, and ensure solutions and hope to patients.

Keywords
- pouch
- failure
- IPAA
- revision

Restorative proctocolectomy with an ileal pouch-anal anastomosis (IPAA) was first described by Parks and Nicholls in 1978.[1] In their first description, IPAA was performed along with a mucosal proctectomy and a hand-sewn anastomosis, with the ileal reservoir created in a triple-loop (S) pouch configuration. Since that time, the technique has been further developed and refined. In the current era, mucosectomy has been largely abandoned and the most commonly performed IPAA procedure is the creation of a double loop stapled "J-shaped" pouch, with the creation of a stapled anastomosis between the reservoir and the rectum.[2,3] IPAA nowadays remains the optimal surgical procedure for patients with chronic ulcerative colitis (UC) and patients with familial adenomatous polyposis. This operation offers excellent quality of life for the majority of patients with a durable surgical and functional result, avoiding the need for a permanent ileostomy with its attendant potential effects on social, physical, psychological, and sexual areas.

Nevertheless, IPAA is associated with several pouch-related complications that challenge both surgeon and patient. Reasons for pouch failure include infection, mechanical or functional difficulties, and complications of Crohn disease (CD) when this develops. Therefore, it is critical that thoughtful consideration and judgment be utilized in preparing, planning, and performing IPAA surgery to achieve optimal results.

The aim of this review is to provide a structured approach to the challenges that surgeons and physicians encounter in the management of intraoperative, postoperative, and reoperative problems associated with IPAA surgery so as to minimize the occurrence of pouch failure and also to discuss the management of the poorly functioning or failed pouch.

Intraoperative Challenges

The first hurdle to overcome in IPAA surgery revolves around the need to surmount certain intraoperative difficulties such as the failure of the pouch to reach and the technical aspects of performing the IPAA.

Failure of the Pouch to Reach

The critical factor in IPAA operations is the length of the superior mesenteric artery (SMA). The pouch must reach close to the dentate line and have adequate blood supply. The pouch will be able to reach without difficulty if the tip is able to lie approximately 6 cm below the symphysis pubis.[4] The inability to reach the level required to fashion the anastomosis during IPAA surgery is more commonly seen when a hand-sewn anastomosis is performed.[5] The following suggestions can be considered to achieve adequate reach: mobilizing the posterior attachment of the small bowel mesentery in the right lower quadrant toward the third portion of the duodenum and pancreas, constructing

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mesenteric windows in a stepladder fashion in the anterior and posterior peritoneum overlying the SMA (may add 1–2 cm of length), transillumination of the mesentery with division of vascular branches between the primary and secondary arcades that are under tension (may add an additional 2–5 cm), dividing the ileocolic artery at its origin, or, in rare instances, using an interposition vein graft to the SMA to facilitate an adequate length.[6–8] Anterior (rather than posterior) positioning of the pouch mesentery during anastomosis may also occasionally allow the pouch to reach the anal canal.

Stapler Failure

The most popular technique in IPAA surgery is the double-stapled technique using a linear stapler to divide the rectum and a circular end-to-end stapler to construct the pouch-anal anastomosis.[9–11]

Failure of the stapler to seal the anal/rectal stump may be due to staple misfire or the inability of the stapler to approximate thick tissue. Options for management include the placement of a purse string transabdominally, applying a stapler for a second time, or transanal insertion of a purse–string suture. The latter can be facilitated by using a Lone Star retractor (Lone Star Retractor System, Cooper Surgical, Trumbull, CT) or eversion sutures that efface the anus and thus provide adequate exposure.

Incomplete donuts, a staple-line defect evident upon proctoscopy, or a positive leak test necessitate further investigation. In many instances, it may be possible to place sutures transabdominally to reinforce the defect or area of weakness. In a narrow pelvis, placing sutures transanally, taking care to avoid incorporating the vaginal wall, with the help of a transanal retractor may repair the defect.

Incorporation of Vaginal Wall into the Anastomosis

In female patients, one must always be aware of the risk of incorporating the vaginal wall during creation of the pouch-anal anastomosis as the posterior wall of the vagina may fall into the circular stapler as it is being closed. The perineal operator must always check the vagina digitally to be clear before employing the end-to-end stapler. If inspection of the anastomotic donuts after firing the stapler reveals a third portion of tissue, it is necessary to take down the anastomosis, repair the vaginal defect, and redo the pouch anastomosis.

Postoperative Challenges

Postoperative Hemorrhage

The pouch should be examined intraoperatively after its creation, and bleeding points should be stopped either with cautery or sutures. Postoperative pouch bleeding can be initially managed with the placement of a 28-Fr Foley catheter into the pouch and irrigation with cold saline or water. Persistent postoperative bleeding from the pouch should be evaluated with an examination under anesthesia. Pouch endoscopy and irrigation with cold saline or epinephrine solutions is often successful at stopping the bleeding and evacuating the clots.[12] The use of cautery at pouchoscopy helps secure pinpoint bleeders from the staple line. It is important to bear in mind that postoperative bleeding may be due to a disrupted suture line of the anastomosis and that, if caught early and repaired with transanal sutures, it can be controlled before the onset of sepsis. If the bleeding cannot be controlled transanally despite irrigation, injection of enemas, or placement of sutures, laparotomy is indicated.

Small Bowel Obstruction

Small bowel obstruction (SBO) is a common complication after IPAA surgery with an incidence ranging between 10 and 25%.[13,14] Most episodes respond to conservative management with nasogastric tube decompression, intravenous fluids, and bowel rest, whereas approximately 25% will require an operation.[14] Patients who are treated nonoperatively are more likely to have a higher number of total bowel movements in a day compared with patients without postoperative SBO or those treated surgically.[13] Most cases of SBO after IPAA are related to adhesions.[14,15] If an operative adhesiolysis is indicated, care must be taken to avoid damage to the pouch, which could lead to pelvic sepsis if not recognized intraoperatively.

Occasionally, SBO following IPAA surgery can occur secondary to acute angulation or prolapse of the afferent limb at the pouch inlet—a condition called afferent limb syndrome (ALS), which can be diagnosed by careful pouchoscopy and/or abdominal imaging.[16] Empiric balloon dilatation of the afferent limb is sometimes successful, although repeated dilatations may be necessary. Surgical options to correct ALS include resection of the angulated small bowel, fixation of the pouch and small bowel to the abdominal wall, or pouch excision.

Intra-abdominal and Peripouch Abscesses

Pelvic sepsis may develop in up to 25% of patients after IPAA and is most likely due to anastomotic disruption of the pouch-anal anastomosis, or less commonly due to the disruption of the staple line at the tip of the J pouch or the body of the pouch.[17] It is the most common cause of pouch failure. Patients with a pelvic abscess usually present with abdominal pain, fever, leukocytosis, and other signs of infection or sepsis. However, the presentation may sometimes be indolent and manifest as a persistent ileus or prolonged and incomplete recovery during the postoperative period. A computed tomography (CT) scan of the abdomen and pelvis will confirm the presence of the abscess and any associated anastomotic leak. Intra-abdominal abscesses require drainage, either endoscopically, percutaneously (image-guided), or surgically, along with broad-spectrum antibiotics. Initial management includes examination under anesthesia and catheterization of the pouch for decompression and drainage of the abscess. Drainage can be accomplished through the anastomosis using a mushroom catheter or by the transabdominal or transsacral approach by CT guidance. Drainage through the perineum or vagina should be avoided as these can lead to formation of chronic fistulas. When a leak from the tip of the J pouch is detected endoscopically or radiographically, management depends upon the condition of the patient, nature and degree of the defect, and the presence of any associated abscesses. Options include endoscopic drainage, fibrin glue injection, or

salvage surgery with pouch repair of the leak site with sutures or via a stapler, or ultimately pouch resection and redo IPAA. Abscesses may also drain spontaneously into the IPAA, which may subsequently lead to the formation of a stricture or fistula. Early recognition and prompt treatment of patients with pelvic abscesses is likely to result in preservation of the pouch with functional results similar to those for patients who did not have sepsis (75–90% preservation), whereas delayed treatment leads to formation of a scarred, noncompliant pouch and is associated with a high likelihood for pouch excision.[17] Hemodynamic instability and peritonitis of patients with pelvic sepsis mandate an exploratory laparotomy with peritoneal washout and the creation of an ostomy if the pouch was not defunctioned at IPAA. Patients who require laparotomy have a high rate of pouch excision (>40%) and a low rate of ileostomy closure.[18]

Pouch Sinus

Sinuses adjacent to the IPAA are known to occur in 2 to 8% of patients and are related to an anastomotic leak that has been confined to a blind-ending track.[19–22] They can be asymptomatic, found incidentally on imaging studies or pouch endoscopy, or they may be associated with symptoms ranging from pelvic pain and pouch dysfunction to sepsis and pouch failure. The majority of them will heal by a watchful approach and by delaying ileostomy reversal, especially if the patient is asymptomatic.[20,23] If spontaneous healing does not occur, available treatment options include debridement of the sinus and unroofing of the tract, or injection of fibrin glue.[19,22] In a minority of patients with persisting sinuses, revisional IPAA surgery may be considered, especially if symptoms have failed to resolve with alternative measures.

Cuffitis and Pouchitis

Symptomatic inflammation of the rectal remnant cuff may occur in 2 to 6% of patients with UC after stapled IPAA as the technique leaves 1 to 2 cm of anal transitional zone or rectal cuff, which is susceptible to recurrence of residual UC.[24,25] A significant correlation has been noted between pouchitis and cuffitis, with pouchitis being seen significantly more commonly in the cases with cuffitis than in those without cuffitis.[26] Although cuffitis may respond to topical steroid enemas, suppositories, or aminosalicylate (5-ASA) drugs, it sometimes proves refractory and necessitates operative intervention.[27] The residual rectal mucosa can be dissected via a sphincter-preserving transanal mucosectomy, provided that the initially stapled anastomosis is within 3 to 4 cm of the dentate line.[28] This technique can be challenging if there is extensive fibrosis and scarring. Lack of mobility of the pouch may prevent construction of a tension-free anastomosis. In cases of severely symptomatic cuffitis, redo IPAA is an option.

Nonspecific inflammation of the ileal-anal pouch in the absence of local complications such as anastomotic stricture or abscess, termed pouchitis, is the most common long-term complication after IPAA and occurs in 40 to 70% of patients.[29–32] The incidence increases with the duration of follow-up. The etiology and pathogenesis of pouchitis are unknown. Reported risk factors for the development of pouchitis include extensive UC, backwash ileitis, extraintestinal manifestations, especially primary sclerosing cholangitis, the presence of perinuclear antineutrophil cytoplasmic antibodies, being a nonsmoker, and nonsteroidal anti-inflammatory drug use.[32–34] There are no universally accepted diagnostic criteria for pouchitis, and diagnosis depends on a triad of clinical symptoms, endoscopic appearance, and histologic features. Symptoms include increased frequency of loose bowel movements, tenesmus, rectal bleeding, lower abdominal cramping, pelvic pain, and malaise. Features of pouchitis on endoscopy include a friable, ulcerated mucosa that bleeds easily, nodularity, or presence of exudates.[35] Biopsies may reveal increased villous atrophy, acute and/or chronic inflammatory infiltrates, crypt abscesses, and ulceration.[36] The Pouchitis Disease Activity Index is the most commonly used diagnostic scoring system for pouchitis, quantitating clinical findings, endoscopic and histologic features.[37] As pouchitis is the most common problem after IPAA, diagnosis is often made by clinicians empirically based on clinical grounds, with endoscopy performed if the diagnosis is not clear or if the disease persists. Patients with pouchitis generally respond to oral antibiotics such as ciprofloxacin (250 mg twice daily) or metronidazole (500 mg three times daily) for 2 to 4 weeks. Clinical improvement is usually seen within 3 to 4 days. Patients with recurrent or persisting disease should be considered for a longer duration of antibiotic treatment, use of amoxicillin/clavulanic acid, oral corticosteroids, allopurinol, 5-ASA, or steroid enemas.[38] The use of probiotics has been shown to be beneficial in the primary prevention of pouchitis; however, these treatments are expensive and the long-term benefit is yet unknown.[39,40] In approximately 40% of cases, acute pouchitis will present as a single episode without recurrence. However, in 60% of patients, acute pouchitis will follow a relapsing course after the first episode, and 10 to 30% of patients will develop a chronic, unremitting form of refractory pouchitis.[41,42] Fortunately, the majority of these patients can be controlled with chronic ciprofloxacin use, and a smaller proportion with chronic steroids, immunosuppressive therapy, or use of biologic agents.[36,43,44] A small minority of patients with treatment-resistant pouchitis may require pouch excision or redo IPAA.

Inflammation in the loop of small bowel immediately proximal to the pouch has also been described and is termed prepouch ileitis (PPI).[45] PPI is uncommon (1–4% of IPAA patients) and often responds to combination antibiotic therapy of ciprofloxacin and metronidazole for 4 to 6 weeks. Patients in whom treatment fails, a short course of steroids or use of biologics may induce symptomatic remission.[44]

Irritable Pouch Syndrome

Irritable pouch syndrome (IPS) is a rare functional disorder resembling irritable bowel syndrome in patients with IPAA.[25] It is characterized by increased stool frequency, urgency, and abdominal pain in patients who do not meet the diagnostic criteria for either pouchitis or cuffitis and is a diagnosis of exclusion. "Red-flag" symptoms and signs such as nausea, vomiting, weight loss, fever, bloody bowel movements, or anemia are not consistent with IPS. Treatment of IPS is empiric and consists of diet modification (low-fat, low-carbohydrate diet, avoidance of dairy products), antibiotic therapy, antispasmodic

agents (e.g., hyoscyamine, dicyclomine), antidiarrheal agents (e.g., diphenoxylate, loperamide, cholestyramine), or tricyclic antidepressants (amitriptyline).[46]

Pouch-Anal Anastomotic Stricture

Strictures after IPAA are seen in 10 to 17% of patients and take 6 to 9 months to develop.[47,48] Hand-sewn anastomosis is associated with a higher rate of stricture formation.[48] With stapled IPAA, the incidence of stricture is similar after use of 28 to 29 mm versus 31 to 33 mm staplers.[49] Nonfibrotic strictures respond well to anal dilation, whereas fibrotic strictures are more commonly associated with intraoperative or postoperative complications such as pelvic abscess or fistula that lead to dense scarring and a tight stricture, often necessitating surgical therapy to salvage pouch function. Strictures after a stapled IPAA are usually web-like, whereas after a hand-sewn anastomosis with mucosectomy, they tend to be long and narrow. It is important to bear in mind that strictures that develop within the body of the pouch may be the result of a delayed diagnosis of CD.

Soft strictures may yield to daily self-dilatation with an anal dilator by patients or to endoscopic balloon dilatation.[50] Refractory or fibrotic strictures may necessitate excision of the strictured segment with an advancement of a flap over the excised area of the stricture, transanal disconnection, and advancement of the pouch with the construction of a new pouch-anal anastomosis.[51] A transanal stricturoplasty using the Heineke–Mikulicz technique may also be effective in treating rectal strictures that failed dilatation.[52] Uncommonly, excision of the pouch and permanent ileostomy is necessary. Daily self-intubation of the pouch to facilitate evacuation is also an option worth considering.

Pouch Prolapse

Pouch prolapse is rare (0.3%), and there are no obvious predisposing factors.[53] Most occur within 2 years of the original procedure.[54] Patients may present with a sense of obstructed defecation, seepage, pain, or overt external prolapse of tissue. If suspected, examination of the perineum during straining and defecation may identify the problem. Mucosal prolapse may be treated by stool bulking or a local mucosal excision. Full thickness prolapse requires definitive abdominal surgery and pouchpexy, with or without the use of a mesh.[55]

Pouch–Vaginal Fistula

A fistula between the pouch and the vagina (pouch–vaginal fistula, or PVF) is an uncommon complication (3.3–15.8%) following IPAA and may occur as a result of separation of the anastomosis due to hematoma, abscess, and pelvic sepsis, due to occurrence of CD in the pouch, or due to technical error.[56–58] Common presenting symptoms include discomfort, recurrent vaginal and urinary infections, or fecaluria. Assessment of PVFs requires investigation with examination under anesthesia, pouchoscopy, and a vaginal examination. Visualization can be facilitated by filling the vagina with warm water and insufflating the pouch, while paying attention to the presence of air bubbles in the vagina, or injection of methylene blue solution or hydrogen peroxide. Water-soluble contrast studies via the vagina or pouch can sometimes help delineate the fistulous tract, although low tracts can be missed if the catheter used in the study is placed above the level of the fistula (►**Fig. 1**). Magnetic resonance imaging (MRI) of the pelvis may also help delineate the fistula tract and the anatomy of the pouch. Management depends on the level of the fistula, the amount of pelvic scar tissue, and previous treatments. Fistulas that present several years after stapled IPAA are often short and arise on the anterior aspect of the staple line from slow erosion by the staples.[59] A short, low fistula with healthy surrounding tissue and no inflammation may be managed with a mucosal advancement flap, by either a transanal or a transvaginal approach. If there is evidence of active inflammation, induration, or an abscess cavity, drainage and placement of a seton may allow resolution of the infection and normalization of the tissues so that a better assessment of the area may subsequently be feasible. Additionally, medical treatment with antibiotics, or biologics in case of CD, may be required to reduce inflammation before the consideration for a definitive repair. In recent years, ligation of intersphincteric fistula tract is being used for PVFs. Collagen plugs have also been used for PVFs, albeit with disappointing results. The chances of success of local perineal procedures may be enhanced by use of a covering loop ileostomy, although this is debatable.[59] Redo IPAA, although associated with a relatively high risk for pouch failure, may be an option for selected patients. Approximately half of the patients with a PVF undergo successful initial closure without recurrence, whereas in the rest of patients, PVFs can persist and recur indefinitely even after repeated repairs necessitating pouch excision or permanent stoma formation.[60,61]

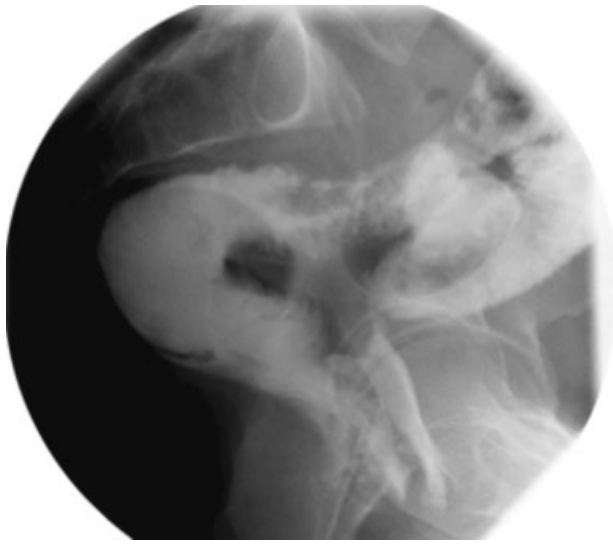

Fig. 1 Pouch–vaginal fistula demonstrated on contrast study. (This image is provided Courtesy of David E. Beck, MD.)

Diagnosis of Crohn Disease

A small cohort of patients after IPAA may be eventually diagnosed with CD rather than UC. CD may affect the small intestine proximal to the pouch, the pouch itself, or the perineum. CD is an independent predictor of pouch failure.[62] The principal cause of

ultimate pouch failure in these cases appears to be CD or CD-related complications. A late diagnosis of CD after IPAA does not necessarily condemn the patient to a permanent stoma or excision of the pouch.[63] Multidisciplinary management of CD with appropriate use of immunosuppressives and biologicals may save the pouch and maintain acceptable pouch function. Both infliximab and adalimumab seem well tolerated and efficacious in treating pouch-related CD.[44,64]

Cancer in the Pouch

Cancer may occur in the pouch or the anal transitional zone. This is a rare phenomenon, with less than 50 cases reported in the literature.[65] Mucosectomy with a hand-sewn anastomosis does not eliminate the risk of cancer. Increasing reports of these cancers are concerning as most patients present with advanced disease. Patients with a previous history of dysplasia or cancer may be at increased risk.[66] Presumed evolution from dysplasia might offer a time window for cancer prevention. Pouch excision and, in some instances, pelvic exenteration may be necessary to achieve local control in these patients.

Revisional Surgery

In a small proportion (2–5%) of IPAA patients, the long-term functional outcome of the pouch may be poor.[67] Indications for pouch reconstruction can be divided into mechanical and infectious/inflammatory. Mechanical causes include an excessively long efferent limb, a small pouch, a mobile afferent limb causing outflow pouch obstruction, a long stenosis caused by partial separation or retraction of the pouch, twisted pouch, or intussusception of bowel within the pouch. Infectious or inflammatory causes include partial separation, sinus formation, significant residual rectum with cuffitis, or stenosis. In most cases, pouch failure is related to chronic pouchitis refractory to medical management or to sequelae of postoperative pelvic sepsis. Prior to consideration of pouch revision, a thoughtful evaluation with accurate history taking and physical examination with inspection and palpation of the anastomosis, imaging (CT, MRI, small bowel contrast study, especially if CD is suspected), manometry of the anal sphincter and pouch, and endoscopy with multiple biopsies are required. The patients need to be fully counseled about the risks, alternatives, benefits, and goals of the procedure, as well as the possibility that the pouch may not be salvaged with a permanent ileostomy as the end result. Intraoperative ureteral stents are often necessary. Adhesiolysis is performed and the ileal pouch identified and dissected out with a combination of electrocautery and sharp dissection. Mobilization of the pouch should be achieved without entering the lumen of bowel. The pouch can be disconnected from the anastomosis either transabdominally or with the help of a transanal dissection. Transanal mucosectomy should be performed if residual rectal mucosa is present, taking care to identify and preserve the anal sphincters. The pouch is then revised depending on the nature of the original problem. The new or modified pouch is then anastomosed to the anal canal. A hand-sewn anastomosis is usually necessary in revisional surgery. A diverting ileostomy is almost always performed. Revisional IPAA surgery can be safely performed with good results in carefully selected patients.[68]

Continent Ileostomy

A continent ileostomy (Kock pouch) remains a reasonable alternative for patients with a failed IPAA. In these cases, the ileoanal pouch, if otherwise healthy, can be used to form the reservoir portion of the continent ileostomy ("J" to "K" conversion). In a series of 64 patients with IPAA failure, most of the patients were highly satisfied with their choice of continent ileostomy, with a 95.3% retention rate.[69] There was significant morbidity, however, with a 30-day complication rate of 31.3%, a long-term dysfunction rate of 50%, and a revision rate of 45%.

Pouch In Situ

In some circumstances, the ileoanal pouch may be defunctioned with an ileostomy with the pouch left in situ.[70] This strategy avoids the potential complications of reoperation in the pelvis, reduces the operative insult in some patients who are otherwise moribund, and immediately restores health and quality of life in some instances. This may allow the option of planning for definitive surgery at a future date. The asymptomatic defunctioned pouch may be left in situ for a prolonged period in some individuals, although periodic surveillance with pouchoscopy is essential in these circumstances to ensure the early detection of any silent neoplastic transformation of the pouch or residual anorectum.

Conclusion

In conclusion, knowledge of the nuances of surgical decision-making and technique, as this relates to pouch surgery, is important and maximizes successful outcomes after pouch creation. The early detection of complications and their prompt management ensures pouch salvage. Reoperative surgery for pouch complications is possible with a relatively high degree of success. When pouch dysfunction or failure develops, pouch salvage requires significant experience, judgment, and meticulous technique. It is critical that surgeon and patient understand the potential medical and surgical alternatives for pouch failure, the likely consequences of reoperative surgery, and the long-term likelihood of success.

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