Complications of the Ileal Pouch

Daniel L. Feingold and P. Ravi Kiran

Key Concepts

• Pelvic sepsis after pouch surgery is associated with worse function and risks pouch failure. However, prompt management of early postoperative septic complications can preserve pouch function and increase pouch retention rates.

• Technical challenges during pouch surgery include ensuring tension-free reach, preserving adequate blood flow to the pouch, and creating an appropriate diverting ileostomy.

• A three-stage approach is recommended for patients who are malnourished, have severe active colitis, or are under treatment with larger doses of steroids or immunosuppressive medications in order to reduce pouch-related complications.

• The potential diagnosis of Crohn’s disease should be considered in any patient presenting with fistulizing disease after pouch surgery as this affects management and prognosis.

• Repeat ileal pouch-anal anastomosis using a revised pouch or a new pouch is a reasonable option for selected patients with pouch failure.

• Mucosectomy at the time of a pouch-anal anastomosis does not prevent future dysplasia or cancer as islands of rectal mucosa may persist.

• Women with ulcerative colitis who undergo total proctocolectomy have a higher rate of infertility than women treated non-operatively, although a laparoscopic approach may reduce this risk.

Introduction

Ileal pouch-anal anastomosis (IPAA) is the preferred method for restoring gastrointestinal tract continuity after total proctocolectomy. While the majority of patients recover uneventfully from this operation, a proportion of patients develop complications that are unique to this procedure and deserve specific consideration. Complications after pouch surgery can be grouped into septic versus non-septic-related complications (including mechanical issues); alternatively, IPAA complications can be conceptualized as intraoperative, early postoperative, and late postoperative (Table 51-1).

Pouch-related complications can significantly affect functional outcomes and patients’ quality of life, require multiple corrective procedures, and result, ultimately, in pouch failure [1]. Understanding the possible pouch-related complications and consideration of these complications in the operating room during pouch creation can reduce the incidence of these adverse events. In the postoperative setting, it is important to promptly address complications to better preserve pouch function and to reduce the risk of pouch failure which may be defined as the need for construction of a permanent stoma with or without excision of the pouch [2].

Modifying risk factors and focusing on preoperative planning details can potentially reduce the incidence of complications after pouch surgery and hence facilitate pouch function and preservation. Preoperative risk factors associated with pouch failure include type of resection (performing a completion proctectomy rather than total proctocolectomy), type of anastomosis (hand-sewn rather than stapled), diagnosis of Crohn’s disease, and comorbidities [3].

Modifying risk factors to minimize risk of pouch failure should include appropriate medical management leading up to pouch surgery, expeditious surgical management to avoid needing urgent total abdominal colectomy with subsequent completion proctectomy, and medical optimization of comorbidities. Body mass index greater than 30 is also associated with septic complications after IPAA and obese patients should be counseled appropriately in advance of pouch surgery [4]. In fact, it may be reasonable to perform an initial abdominal colectomy to allow control of disease and achieve weight loss prior to proctectomy and IPAA.

In an effort to minimize the complications after a pouch procedure, it is important to individualize the operative plan to each patient. Deciding whether or not to operate in stages is one such
consideration that may impact the risk of complications. While well-nourished patients of average build with mild colitis who are not maintained on immunosuppressive medications may be candidates for single-stage procedures, this option is rarely utilized as a leak from an unprotected IPAA can have devastating complications including loss of the pouch. The vast majority of IPAA patients who do not undergo a three-stage procedure will undergo a two-stage procedure whereby the pouch is defunctionalized by a loop ileostomy (Figure 51-1). Patients who are malnourished, have severe active colitis, or are under treatment with larger doses of steroids or immunosuppressive agents are recommended to undergo a three-stage procedure in an effort to reduce the risk of complications. When the type of colitis based on colonoscopic biopsy is unclear preoperatively, an initial subtotal colectomy may help ascertain the diagnosis of Crohn’s disease and determine the suitability of a pouch at the subsequent operation.

Another factor to consider when individualizing patient care in anticipation of an IPAA deals with the use of biologics. The findings of single-institution studies, confirmed by meta-analysis, demonstrate that patients with ulcerative colitis receiving infliximab, an antitumor necrosis factor-α antibody, are at particular risk for developing post-IPAA septic complications; a planned three-stage approach needs to be considered in this situation [5, 6]. This is especially true if the patient had experienced poor control of the disease despite aggressive medical management with these agents.

Another potential modifiable factor related to pouch complications deals with the use of radiotherapy prior to IPAA. Preoperative pelvic radiation in the setting of colitis-associated cancer is associated with an increased risk of subsequent pouch failure [7]. Oncologic benefits and anticipated pouch function should be carefully considered before proceeding with neoadjuvant radiotherapy in patients planning restorative proctocolectomy.

Intraoperative Complications

The two most common configurations currently used for IPAA are the “J” and “S” pouches which can be anastomosed via stapled or hand-sewn technique (Figure 51-2). While most primary ileoanal pouches are constructed in “J” fashion (20 cm long) and are stapled to the IPAA, the decisions to use one configuration over another and to staple or hand-sew are based on personal preference and unique patient factors [9]. The option of a planned mucosectomy with a hand-sewn IPAA is, in general, reserved for patients undergoing redo IPAA, with high-grade dysplasia or cancer involving the distal rectum, or those with familial adenomatous polyposis with polyps carpeting the distal rectum. In cases where a mucosectomy and hand-sewn IPAA are planned, an “S” configuration may fit through the pelvic floor anatomy better than a “J” pouch which can become distorted, especially in men with a long anal canal [10]. When creating the IPAA, it is critically important to avoid tension across the anastomosis, to maintain correct orientation of the pouch coming down to the low pelvis, to preserve the blood supply to the pouch and the residual anorectum, and to avoid incorporating nearby pelvic structures like the vagina, prostate, and seminal vesicles into the anastomosis.
Problems with Reach of the Pouch

Ensuring adequate reach of the pouch to the pelvic floor can be difficult and represents one of the more technically challenging aspects of a pouch procedure that can jeopardize the ability to create an IPAA and can directly impact the risk of postoperative complications. Tall patients, those with a high BMI, and patients with extensive previous abdominal or pelvic operations are particularly at risk for encountering a problem with reach. Weight loss in anticipation of surgery may be helpful. Maneuvers in the operating room that are routinely employed to facilitate reach include high ligation of the ileocolic vessels, complete release of the small bowel mesentery from the retroperitoneum, mobilization of the duodenum, and excision of the redundant mesenteric tissue lateral to the superior mesenteric vessels (“jib-sail”). Releasing incisions across the mesentery perpendicular to the small bowel mesenteric vessels supplying the pouch can also provide added reach (Figure 51-3). While sacrificing branches of the SMA or even the main trunk of the SMA may be required to improve reach, these maneuvers can compromise the blood flow to the pouch and are rarely required.

Difficulty with reach of the pouch can be anticipated before rectal transection by using a long Babcock forceps to simulate the reach of the most dependent part of the bowel to be used in the creation of the pouch and delivering this bowel down into the pelvis (Figure 51-4). Manual palpation through the anal canal helps determine the anticipated reach of the mobilized bowel. This exercise, best done prior to completing the proctectomy, can alert the surgeon that there may be a reach issue and the operation can be modified to increase the chance of a successful IPAA. In cases where reach remains a problem despite implementing the maneuvers described above, it may be helpful to orient the pouch coming down to the IPAA with

Figure 51-2. The “J” and “S” pouch configurations used in stapled and hand-sewn anal anastomoses.
its mesentery oriented anteriorly as this can release tension across the tissues. In certain circumstances, and where the pathology permits, the rectal stump may intentionally be left slightly longer in order to minimize tension at the IPAA. If a “J” pouch cannot reach appropriately, changing to an “S” configuration may be advisable as this adds approximately 2 cm of extra reach to the IPAA. In rare cases where a pouch is created and insufficient reach cannot be remedied, it is recommended to secure the closed pouch to the pelvis and create a defunctioning ileostomy; this maneuver may allow the pouch to lengthen over time in anticipation of repeat attempt at IPAA.

**Pouch Ischemia**

In an effort to provide reach, care should be taken to avoid overzealous skeletonization of vessels within the small bowel mesentery which can result in ischemia. The pouch blood supply can also be injured by direct trauma while scoring the mesentery or by creating a traction injury across the mesentery by creating an IPAA with excessive tension. Twisting the pouch around its mesentery as it is brought down to the IPAA can affect arterial inflow and venous outflow causing ischemia or bowel obstruction and should be avoided. Confirming correct orientation of the pouch by following the cut edge of the ileal mesentery from the mobilized duodenum to the IPAA can help prevent twisting of the pouch. Pouch ischemia requires pouch excision and an attempt at creating another pouch.

**Problems with Stoma Creation**

Creating a defunctioning loop ileostomy for an IPAA patient can be challenging especially in patients with difficult reach or a high BMI because the ileal mesentery is fixed at the root of the SMA and at the low pelvis and this can restrict the surgeon’s ability to exteriorize the bowel. One possible option available to facilitate stoma creation and minimize tension across the IPAA is to defunctionalize using a more proximal segment of the bowel. Patients diverted in this fashion need to be monitored for high ostomy output. Anticipating diversion difficulties and discussing potential strategies to address these with the patient allows for setting more realistic expectations and highlights the importance of individualized operative planning requisite for pouch surgery. These strategies may include...
mandating weight loss prior to surgery, trading off the ideal stoma location for one that is functionally better, and instituting a medical regimen early on to preempt high output stoma issues.

**Problems with Staplers and Creating the Anastomosis**

Once the pouch has been created and prior to bringing the pouch down to the pelvis, insufflating the opened, distal end of the pouch with an air-filled bulb syringe as a leak test will alert the surgeon to any structural issues that need to be addressed. Prior to firing the circular stapler, it is important to exclude nearby pelvic structures from being incorporated into the stapler mechanism. This requires a combination of careful assessment of the field through the abdomen and also a digital exam from below confirming the vagina is free. When performing a stapled IPAA, like any low pelvic anastomosis, mechanical circular staplers are prone to misfire; an on-table pouchoscopy after creating the IPAA is needed to check the integrity of the anastomosis and the health of the pouch [11]. Although a misfiring is disheartening, the situation is usually salvageable.

When a defect in the anastomosis is detected, adequate assistance to facilitate the necessary retraction and exposure allowing access to the field from the abdomen and the perineum is needed. The specific management in this situation depends on the location, size, and cause of the staple line defect. For a small dehiscence, a defunctioning stoma may be sufficient to allow healing. In this situation, attempt at suture closure through an abdominal or trans-anal approach should be considered. In the case of a major dehiscence due to stapler misfiring or possibly from a breach in the cuff staple line from inserting the circular stapler too far, the IPAA may have to be taken down and redone. In this situation, once the pouch is brought up from the pelvis, an assessment of the structure and reach of the pouch as well as of the length and condition of the anal canal is performed. In some situations it may be possible to place a purse string to close the remaining rectal cuff to allow repeat stapling, but typically a mucosectomy with hand-sewn IPAA will be required.

**Early Postoperative Complications**

Complications related to the anastomosis and pelvic sepsis can affect the long-term function of the pouch. Prompt diagnosis and management of these complications is required to preserve pouch function.

**Anastomotic Leak and Pelvic Sepsis**

Pelvic sepsis related to pouch surgery is loosely defined as an abdominopelvic or perianal infectious process detected by clinical, radiologic, or operative means within 3 months of IPAA creation or within 3 months of stoma reversal. Depending on the manifestations and severity of the infection, this can be a significant complication associated with worse functional outcomes, diminished quality of life, and, potentially, pouch failure [1].

An anastomotic disruption may be an isolated finding discovered incidentally on pre-stoma reversal evaluation or can present clinically with pelvic sepsis. While patients with a pelvic abscess usually exhibit the expected signs and symptoms of infection, some IPAA patients have a more indolent presentation with persistent ileus or fail to meet expected recovery milestones after the surgery. Patients with hemodynamic instability and peritonitis require operative exploration to evaluate the anatomy, washout the field, and effect drainage (Figure 51-5). Patients with less impressive clinical
findings can undergo cross-sectional imaging to guide management. CT scan of the abdomen and pelvis with intravenous and water-soluble oral and trans-anal contrast is helpful to diagnose an abscess and an associated leak. In patients with an abscess amenable to percutaneous drainage, prompt drainage and broad-spectrum IV antibiotic administration may allow for control of the sepsis and may minimize the long-term consequences to the pouch.

Whether abscess drainage should be performed trans-anally or percutaneously is a matter of debate due to concerns over the development of an extra-sphincteric fistula related to percutaneous drainage. When a break in anastomotic integrity is demonstrated coexistent with an abscess, trans-anal drainage through the anastomosis is preferable; however, when the anastomosis is intact, percutaneous CT-guided drainage is preferable. This strategy allows prompt drainage of abscesses while minimizing the risk of an extra-sphincteric fistula.

**Bleeding from the Pouch**

This low-frequency complication can be further minimized by performing a dedicated inspection of the back row of staples along the mesentery of the small intestine after pouch construction and before IPAA creation and over-sewing any bleeding sites. Postoperative pouch bleeding may manifest as bleeding through the anus or up through the loop ileostomy. Pouchoscopy with cautery, clip application, or epinephrine injection usually controls the bleeding. In patients with generalized ooze, instilling ice-cold saline with dilute epinephrine into the pouch facilitates hemostasis [12].

**Late Postoperative Complications**

Due to the defunctioning nature of the loop ileostomy, some pouch-related complications do not manifest clinically until after stoma reversal. Pre-stomal reversal pouch imaging with water-soluble contrast (done by fluoroscopy or CT scan) and flexible pouchoscopy are routinely performed but do not eliminate the occurrence of late complications.

**Pouch-Vaginal Fistula**

Pouch-vaginal fistula (PVF) is a potentially disabling complication that can cause significantly diminished quality of life. The overall risk of PVF ranges from 4 to 16 % with pouch failure occurring in as many of 30 % of these patients [13]. Common symptoms include discomfort, irritation, incontinence, and recurrent vaginal and urinary tract infection. In order to tailor the most effective treatment to each patient, the size, nature, and location of the fistula, the state of the perineum and sphincter mechanism, and the configuration, size, and health of the pouch need to be assessed. While exam under anesthesia is considered the gold standard to evaluate PVF, imaging studies are relied on to provide additional information and include water-soluble pouchogram, vaginogram, and pelvic MRI (Figure 51-6). CT or MR enterography can be useful as well to delineate the anatomy above the pouch.

The potential diagnosis of underlying Crohn’s disease should be considered in any patient presenting with fistulizing disease after IPAA ostensibly performed for ulcerative colitis as this affects PVF management and prognosis. In practice, differentiating septic complications from Crohn’s disease is difficult especially when pathognomonic clinical and histopathological features of Crohn’s disease are absent. In general, PVF occurring in a colitis patient within 1 year of stoma reversal is likely due to a septic complication of the IPAA while fistulas presenting beyond the first year should raise the specter of Crohn’s disease [14]. A thorough review of the history and medical records pertaining to the IPAA surgery and the postoperative course may provide insight into the potential etiology of the PVF and review of the pathology from the pouch surgery and even from preoperative biopsies may prove helpful.

The recommended treatment for a patient with PVF depends on the severity of the symptoms and their effect on the patient’s quality of life and on the specific anatomic and pathologic details that are elucidated on a case-by-case basis. Examination under anesthesia allows for assessment of the fistula tract and the associated tissues. Active inflammation with induration of the tract and surrounding tissues may respond to drainage and...
seton placement which may restore the elasticity and tensile strength of the tissues to be used in future definitive repair of the PVF. Medical treatment with antibiotics, anti-inflammatories, and Crohn’s disease medications may be required to reduce inflammation in anticipation of a repair procedure. Although there is a risk of ultimate pouch failure for patients with PVF, up to 85% of these fistulas can heal using a variety of surgical approaches in combination with medical optimization [13].

Treatment Options for PVF

Advancement Flap Repair

This is a local repair that may be considered in patients with a low, simple PVF without excessive inflammation. Prone jackknife positioning with general anesthesia provides the best exposure to the field. Placing four quadrant effacement sutures or using a Lone Star™ retractor (Cooper Surgical Inc., Trumbull, CT) further improves exposure. Using appropriately sized Hill-Ferguson retractors in both the vagina and anal canal allows for visualization of the fistula so that a fistula probe can be passed to identify the actual tract. In the absence of smoldering infection and if the tissues are supple and healthy, consideration may be given to creating a flap for repair.

The fistula opening in the pouch is circumscribed and, after the infiltration of 0.25% Bupivacaine with epinephrine, a U-shaped broad-based flap is raised, mobilizing mucosa and submucosa with the fistula opening at the apex of the flap. The fistula tract is dissected within the pouch-vaginal septum and is excised and the resulting defect is approximated using #2-0 Vicryl suture. The flap is secured to the pouch-rectal mucosa with sutures incorporating the adjoining sphincter mechanism ensuring a tension-free repair. If the defect on the vaginal aspect is small, it may be left alone. However, when large, the edges of the defect are freshened and the defect is approximated with interrupted absorbable sutures. Patients are kept on strict bedrest for 24 h and the bladder catheter is removed after 48 h.

The success of an advancement flap in the setting of PVF is influenced by the underlying etiology of the fistula, the quality of the tissues involving the fistula, and technical considerations at the time of the repair. Flap ischemia, bleeding under the flap, and tension across the flap risk failure of this procedure are to be avoided. Patients with a failed advancement flap may be candidates for a redo flap procedure provided any residual local sepsis or ongoing inflammation is addressed and the tissues allow for a redo flap [15, 16].

Trans-vaginal Repair

This can occasionally be attempted when poor access, as with a mild stenosis of the IPAA, impedes repair via the pouch. A vaginal advancement flap repair is performed using similar principles as described above.

Fibrin Glue, Fistula Plug, Biologic Mesh Repair, and Gracilis Muscle Interposition

These perineal procedures have been described for the management of PVF and, given the variable success rates associated with these procedures, will not be reviewed in further detail [17–19].

Perineal Pouch Advancement

This can be performed through a perineal approach. The anterior half of the IPAA is disconnected from the anal canal and the pouch is mobilized down from the vagina and is re-approximated to the anal canal after freshening and repairing the tissue surrounding the defect in the rectovaginal septum. If the defect on the vaginal aspect is large, the edges are freshened and the tissue is approximated with interrupted absorbable sutures. The degree of mobilization obtainable through this technique is often limited given the constraints of operating trans-anally.

Redo IPAA

Redo IPAA is the definitive treatment option for patients with PVF who have failed prior attempts at repair and desire restoration of the continuity of the intestine. Patients with an otherwise healthy perineum, adequate sphincter mechanism, and a low suspicion of having Crohn’s disease may be considered for a redo IPAA.

Redo IPAA is performed via a combined abdominoperineal approach so that the pouch can be disconnected from the prior anastomosis. These operations are usually technically challenging and preoperative planning should consider the placement of ureteral stents to avoid ureteric injury. After pouch-rectal disconnection, the fistula is excised and debrided to prepare the pouch for repeat IPAA if the existing pouch is salvageable. The pouch may be augmented or refashioned, as required, based on intraoperative evaluation of the health and capacity of the pouch. The length of remaining small intestine and anticipated challenges with reach influence whether or not the pouch is revised or excised and created anew. If the status of the pouch is not sufficient, a neoileal pouch may be required. Once the pouch is prepared and the vaginal defect is repaired, mucosectomy and repeat IPAA are completed in hand-sewn fashion followed by a protecting loop ileostomy. If the greater omentum is available and can be mobilized to reach the low pelvis, an omental pedicle flap is used as an interposition between the pouch and the vagina to potentially reduce recurrent fistulization.

Redo pouch surgery is a reasonable option for selected patients with pouch failure due to a variety of conditions besides PVF including anastomotic leak, pelvic abscess, fistula, stricture, and pouch dysfunction from other causes [20–26]. While these salvage procedures are associated with acceptable
functional outcomes and quality of life, these outcomes are typically inferior to the results experienced with successful primary IPAA [27, 28]. Sphincter injury due to repeat operative trauma, mucosectomy with hand-sewn anastomosis, shortened length of remaining small intestine, and decreased compliance of a revised pouch may each contribute to worse functional outcomes after redo pouch surgery. The decision to proceed with redo IPAA requires consideration of anticipated function as well as the individual patient’s conviction regarding the importance of long-term stoma avoidance.

Proximal Diversion
A defunctioning ileostomy is often considered as a temporizing measure to control symptoms and improve the quality of the tissues in anticipation of a local PVF repair or may be performed concomitantly with the repair. In certain cases pouch excision with permanent, conventional end ileostomy creation may be recommended; alternatively, conversion of the pouch to a continent ileostomy may be considered in select, highly motivated patients. The “K” pouch procedure is complex and risks additional complications due to the technical challenges inherent in creating the nipple valve mechanism and the continent ileostomy reservoir. Patients who undergo the procedure are, however, extremely satisfied with the operation [29]. Patients with pouch failure who are not candidates for another restorative procedure are generally recommended to undergo pouch excision as leaving the pouch in situ can cause long-term problems with seepage, anal pain, and overall decreased quality of life [30].

Pouch-Perineal Fistula
This is another potential septic complication after pouch surgery that may arise due to tracking of infection or may be due to undiagnosed Crohn’s disease. The evaluation, management, and surgical options for pouch-perineal fistula are similar to those for pouch-vaginal fistula. Figure 51-7 illustrates the steps for an advancement flap repair for this kind of fistula.

Figure 51-7. Technique for advancement flap repair of a pouch-perineal fistula.
Pouch Sinus

A pouch sinus, generally considered an anastomotic leak confined to a blind-ending tract, occurs in 2–8% of patients after IPAA [31–34]. While these tracts may be asymptomatic and incidentally discovered, some patients present with symptoms ranging from minor inflammation to pelvic sepsis, pain, pouch dysfunction, and pouch failure. In terms of treatment, debridement, unroofing, fibrin glue injection, pouch revision, and redo pouch have all been described with variable rates of healing. Symptomatic presentation is a significant predictor for low healing rates and is associated with a high risk of pouch failure. Management is individualized to each patient and depends on the presenting symptoms, size, and location of the sinus as well as other factors such as whether or not the patient is diverted. Observation is recommended over intervention, when permitted by clinical circumstances, as these sinuses can resolve spontaneously.

Sinuses detected incidentally in patients without an ostomy are usually best left alone. Patients with a sinus detected incidentally on routine evaluation before stoma reversal are usually recommended to delay reversal for a few months until repeat evaluation demonstrates the sinus has healed (Figure 51-8). Patients with a symptomatic sinus or a non-resolving tract may be managed by trans-anal debridement with drainage, unroofing of the sinus, or glue injection. Proceeding with ileostomy reversal may be considered in selected asymptomatic patients with a persistent small tract who have failed attempts at resolving the sinus. Symptomatic patients who fail local attempts to resolve their sinus may go on to require diversion, pouch revision, or redo pouch surgery.

Crohn’s Disease After Pouch Surgery

In general, patients with Crohn’s disease are not considered good candidates for IPAA because of the high rates of pouch complications, including failure, in this group of patients [35–37]. However, even with a histologic diagnosis of Crohn’s colitis, a highly select subset of patients with disease entirely confined to the colon and rectum and in whom the small intestine and anoperineum are spared may be candidates for an IPAA provided patients are thoroughly counseled regarding the higher risks of long-term pouch loss [36].

Pouch patients with presumptive ulcerative colitis or indeterminate colitis may, after developing complications, ultimately be diagnosed with Crohn’s disease. The diagnosis of Crohn’s disease after pouch surgery is usually based on the presence of perianal fistulas unrelated to the surgery, non-necrotizing granulomas on histopathology, or inflammation and ulceration in the afferent limb or in the small intestine on endoscopy in the absence of nonsteroidal anti-inflammatory use [38]. Confirming the diagnosis of Crohn’s disease after pouch surgery can be challenging. In the early postoperative period after restorative proctocolectomy, septic complications related to the pouch may manifest with findings similar to Crohn’s disease as reviewed earlier in this chapter. In terms of long-term effects after pouch surgery, Crohn’s disease may interfere with pouch function by affecting the body, afferent limb, or anastomosis of the pouch, the perineum, or the proximal small intestine.

Management depends on the disease manifestations (inflammatory, fibrostenosing, fistulizing) and the resulting symptoms. Pouch-related complications in the setting of Crohn’s disease are more difficult to resolve compared with complications in patients without Crohn’s disease and have a higher rate, ultimately, of pouch failure [3, 39]. Treatment relies on a combination of conventional medical therapy for Crohn’s disease and surgical intervention tailored to the specific complication at hand. Endoscopic balloon dilation may be used for isolated short-segment strictures preserving surgery for strictureing disease not amenable or responsive to through-the-scope interventions. Bowel-preserving stricturoplasty, a cornerstone of Crohn’s disease management, if appropriate, is preferred over bowel resection in these cases. In the presence of localized disease at these sites, stricturoplasty of the pouch-anal anastomosis, pouch body, and small bowel proximal to the pouch with or without a defunctioning...
ileostomy may help control symptoms and salvage the pouch. Perianal disease may be managed with drainage and medical therapy in anticipation of future surgical intervention. Extensive or refractory Crohn’s disease may require diversion and possible pouch excision.

Incontinence

Functional issues after undergoing IPAA can significantly impact quality of life. Patients may present with varying degrees of urgency, seepage, pad dependence, nocturnal leakage, and incontinence [9, 40]. Patients over 50 years of age at the time of IPAA have higher rates of postoperative incontinence and this dysfunction can become more pronounced with longer post-IPAA follow-up [41]. Control issues may be due to pouch abnormalities like pouchitis, cuffitis, presacral sinus, or a chronic presacral cavity related to an anastomotic leak. Another contributing factor can be weakness of the sphincter mechanism that may have preexisted the IPAA or may be postsurgical in nature from mucosectomy or other operative trauma [42]. Evaluation of the pouch, anal canal, and sphincter mechanism can usually elucidate the etiology of these symptoms and treatment is tailored to the underlying problem.

Outlet Obstruction

Problems with pouch evacuation may be due to a mechanical or anatomic cause like IPAA stricture, pouch prolapse, or kinking of the outflow of the pouch which can occur in patients with an “S” pouch with a long efferent limb (Figure 51-9). A functional pouch evacuation disorder can be due to paradoxical, non-relaxation of the puborectalis muscle which can present similar to chronic post-IPAA bowel obstruction [43]. Treatment of IPAA outlet dysfunction depends on the underlying cause of the symptoms. Biofeedback with pelvic floor retraining may be helpful for some patients without a mechanical cause of the symptoms. Enemas and intermittent self-intubation to vent or to irrigate the pouch may be useful for patients with obstruction from either anatomic or functional causes.

Pouchitis and Cuffitis

Pouchitis and cuffitis are distinct post-IPAA entities that have similar presentations and treatment options. These conditions relate to poorly understood, nonspecific inflammation of the pouch or of the retained rectal columnar mucosa above the anal transition zone that causes bleeding, cramping abdominal pain, anal discharge, tenesmus, urgency, and increased frequency. Pouchitis is the most common complication requiring medical treatment after IPAA and occurs much more commonly in pouch patients with ulcerative colitis as compared with pouch patients with polyposis [35]. An estimated 40 % of ulcerative colitis patients develop pouchitis after IPAA and some patients develop a chronic pouchitis condition [2, 44]. Patients are diagnosed by pouchoscopy and biopsy (Figures 51-10 and 51-11).

Treatment for pouchitis and cuffitis is primary medical and often includes antibiotics, probiotics, anti-inflammatories, and steroids that can be administered orally or trans-anally. Patients who exhaust medical therapy and remain symptomatic may benefit from a diverting ileostomy, pouch excision, and possible redo pouch surgery. Small focal areas of cuff inflammation may be addressed with ablation. Recalcitrant cuffitis may be treated with mucosectomy and pouch advancement or may require redo IPAA if the cuffitis is due to a longer segment of retained rectum at the time of the original IPAA.

Pouch Prolapse

This is a rare complication occurring in less than 1 % of patients after IPAA [45]. Patients have been reported to present with mucosal prolapse or full-thickness prolapse. Diagnosis is usually based on symptoms and physical examination and initial treatment relies on dietary manipulation, bulking agents, and avoidance of straining. Biofeedback may be useful, as well. Patients with symptomatic mucosal prolapse may undergo definitive treatment with excision of the redundant mucosa. Patients with full-thickness prolapse may require an abdominal approach with fixation of the pouch to the sacrum [46]. Volvulus of the pouch is extremely rare and will not be discussed in detail.
Leak from the Tip of the “J”

Leak from the tip of the “J” is less common than anastomotic leak after IPAA and occurs in less than 1% of pouch patients [47] (Figure 51-12). Since the tip of the “J” is formed by the terminal portion of the small intestine, care must be taken to ensure adequacy of blood supply to the segment when this is stapled. Over-sewing of the staple line is also prudent. Patients present with variable and often nonspecific symptoms of abdominal pain, fever, and changes in pouch output and some patients develop an abscess or fistula. These leaks can be difficult to discover on routine pre-stoma reversal evaluation and may not become symptomatic until after the ileostomy is taken down. The indolent course associated with this particular pouch complication may explain why some patients are not diagnosed until the time of reoperation. Salvage surgery may involve suture repair of the pouch or excision of the tip of the “J” (Figure 51-13).

Dysplasia and Cancer After Pouch Surgery

Dysplasia and cancer can develop in the ileal pouch, in retained rectal mucosa, or in the anal transition zone after IPAA and has been reported to occur in patients with ulcerative colitis and familial adenomatous polyposis. Mucosectomy at the time of IPAA does not prevent future dysplasia as islands of rectal mucosa may persist even after “complete” mucosectomy at the time of IPAA [48]. The development of dysplasia or neoplasia within the pouch of ulcerative colitis patients is extremely rare such that routine surveillance of the pouch is not warranted [49]. Ulcerative colitis patients, whether stapled or hand-sewn after mucosectomy, should be counseled about the future risk of malignant degeneration in or near the anal transition zone and can be offered periodic surveillance. Prior colorectal dysplasia or cancer and chronic pouchitis are risk factors for developing
pouch neoplasia; these patients may benefit from a more targeted pouch surveillance program [50]. Pouch patients with familial adenomatous polyposis are at risk for developing future polyps or cancer and should undergo annual surveillance with pouchoscopy and biopsies [51]. Pouch patients with focal dysplasia are recommended to undergo ablation or excision and surveillance. Patients with cancer will most likely require radical surgery with pouch excision.

**Small Bowel Obstruction**

SBO is one of the most common long-term complications after IPAA occurring in as many as 25 % of patients [2, 52]. Obstruction above the level of the pouch, most commonly due to adhesions, may also be due to volvulus, internal hernia, or stenosis at the site of stoma reversal. Laparoscopy, generally thought to reduce the formation of adhesions as compared with open surgery, has not been shown to reduce the long-term incidence of SBO in pouch patients [53, 54]. Adhesion barriers have been studied in the setting of pouch surgery but are not used routinely in practice [55]. Adhesive SBO in pouch patients is treated in the same fashion as SBO after other abdominal operations with bowel rest, decompression, and exploration with adhesiolysis, if necessary. The rate of requiring adhesiolysis appears to be higher in patients with SBO after pouch surgery compared with patients who have had other types of abdominal surgery.

**Sexual Dysfunction**

Historically underappreciated and underreported, sexual dysfunction after total proctocolectomy with IPAA may affect up to 20 % or more of patients [56, 57]. Men may
develop erectile dysfunction and retrograde ejaculation and women can experience alterations in sexual desire, arousal, and satisfaction and can suffer from dyspareunia [58]. The etiology of sexual dysfunction after IPAA is multifactorial and may involve nerve injury, altered pelvic anatomy, issues related to body image, presence of an ileostomy, and pouch dysfunction. In a large retrospective review of sexual function after IPAA, including 762 men and 692 women, 56% of patients reported no change in function, 25% reported having improved function, and 19% had worse function postoperatively [41]. The seemingly paradoxical improvement in function may be attributed to improved quality of life experienced by patients after pouch surgery.

Hyogastric nerve injury during pelvic dissection should be avoided in order to reduce the incidence of sexual dysfunction. Performing close rectal dissection rather than total mesorectal excision has been studied and does not appear to improve preservation of sexual function [59]. Similarly, laparoscopic pouch surgery, as compared with open surgery, does not influence the risk of sexual dysfunction [60, 61].

Infertility

Women with ulcerative colitis have decreased fertility rates after total proctocolectomy compared with women who are managed non-operatively. A meta-analysis estimated that these patients have a threefold increased risk of infertility [62]. The differences in fecundity are thought to be due to adhesions and occlusive scarring of the fallopian tubes resulting from the pelvic dissection [58]. The higher rate of fertility described after laparoscopic pouch surgery compared with open procedures is thought to be due to decreased pelvic adhesions in this setting [63, 64]. Women contemplating pouch surgery should be counseled appropriately regarding the risk of future infertility and the possible impact of the laparoscopic approach.

Conclusion

While the ileal pouch remains a common operation, unfortunately pouch-related complications may occur and can impact quality of life, require multiple repeat interventions, and result in poor function or even loss of the pouch. Modifying patients’ risk factors and considering the range of pouch-specific complications before, during, and after pouch surgery can potentially reduce the risk of these adverse events. Any healthcare provider managing these patients should have a thorough understanding of the potential complications and things to watch for in order to maximize quality outcomes for these patients.


