Overview of Common Complications in Inflammatory Bowel Disease Surgery

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KEYWORDS

• Anastomotic bleeding • Anastomotic leak • Anastomotic stricture • Crohn disease
• Inflammatory bowel disease • Postoperative complications • Ulcerative colitis

KEY POINTS

- Surgery for inflammatory bowel disease is associated with a high risk of complications.
- Complications can occur early or late after surgery.
- Careful attention to preoperative planning, intraoperative execution, and postoperative care, together with prompt management of complications, helps reduce this risk.

INTRODUCTION

Crohn disease (CD) and ulcerative colitis (UC) are chronic disease processes with a high incidence of surgery in a patient's lifetime. Although surgery may be curative in the UC patient population, it is not among CD patients. Because medical treatment is the mainstay in the management of both conditions, indications for surgery can be classified as the failure of medical treatment, complications of disease, complications of medication, poor quality of life despite appropriate medical treatment, and patient choice. The goal or final result is bowel preservation, reduction of symptoms caused by disease complications, and improving quality of life while preserving function. The complication rate after surgery in patients with inflammatory bowel disease (IBD) is higher than in other patients undergoing abdominal surgery. This is likely related to inherent malnutrition, chronic corticosteroid, immunomodulator use, and the type and urgency of the procedures needed for patients within a milieu of an increased inflammatory state where the physiology is compromised, thus being

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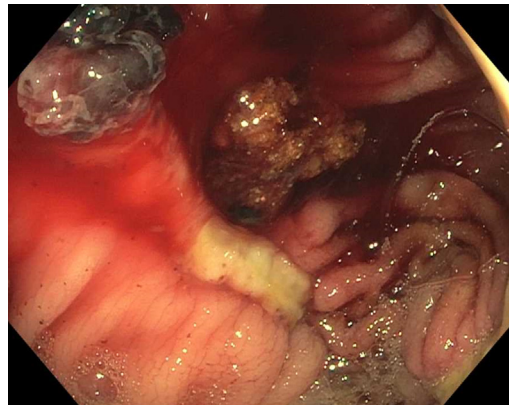

Fig. 1. Bleeding at ileocolonic anastomosis after ileocolonic resection for Crohn disease. (*Courtesy of* Bo Shen, MD, New York.)

associated with reduced healing and an increased risk of infections. In CD, a high complication rate ranging between 20% and 30% has been reported. In UC, similarly, the complication rate is high, with the extent of surgery and complexity of reconstruction, ileoanal pouch, or continent ileostomy creation further determining these results. Several of the complications after surgery are similar for CD and UC, while some are specific to the diagnosis given the differences in disease pattern and extent and hence the complexity of the surgery. For ease of discussion, the common complications for the 2 conditions are initially discussed together with a further emphasis on complications for specific procedures later in the article. The immediate postoperative complications include bleeding, anastomotic leak, abscess, surgical site infections (SSIs), and venous thromboembolism (VTE).

IMMEDIATE POSTOPERATIVE COMPLICATIONS

Bleeding

Postoperative bleeding can occur in the peritoneal cavity because of inadequate hemostasis from the raw, inflamed tissues and the aftermath of surgery extent. The mesentery in CD can be a particular surgical challenge, as it is often thickened, inflamed, and friable. There is a risk of free bleeding from the cut edges and the development of mesenteric hematomas. Intraperitoneal bleeding not adequately controlled with conservative measures might need re-exploration with peritoneal wash-out and control of bleeding. Intraluminal bleeding from the cut surfaces of the anastomosis can also occur after any bowel surgery, and particularly in IBD, and manifests as lower gastrointestinal (GI) bleeding in the postoperative period (Fig. 1). Initial management is conservative, with observation, blood transfusion, and withholding of any blood thinners and anticoagulants. Persistent bleeding can be managed by endoscopy with cautery or clipping of any anastomotic bleeders. Surgery is a last resort in cases of troublesome bleeding unresponsive to other measures and when there is hemodynamic compromise. Oversewing of the anastomosis, partial reopening of the anastomosis with suture ligation, redoing of the anastomosis, or resection with re-anastomosis may be needed depending on the circumstance.

Obstruction

An obstruction can be caused by an intrinsic luminal source or extrinsic compression of the small bowel. The most common cause of the prolonged recovery of bowel

function after surgery is, however, an ileus that presents like an obstruction. Ileus can be classified as primary or secondary. Secondary ileus is caused by extrinsic causes such as an abscess, intraperitoneal hematoma, anastomotic leak, and general causes such as pneumonia, urinary tract infection, and electrolyte imbalance. The duration of primary or intrinsic ileus, which is likely a response to the trauma of surgery, edema of the bowel, or early postoperative adhesions, can be reduced by such factors as expeditious surgery with minimal intraoperative setbacks or complications and gentle handling of tissues together with the use of enhanced recovery after surgery (ERAS) pathways, which minimize the use of opiates and promote early restitution of diet and activity. Early postoperative small bowel obstruction can mimic ileus and also resolves spontaneously in most instances. Anastomotic edema or narrowing and anatomic factors such as the orientation of the anastomosed bowel might also predispose to obstruction in the early postoperative period. In patients with an ostomy, edema of the bowel segment leading to the ostomy and pressure on that segment from the fascial edges are additional factors that might manifest as delayed return of GI function or frank obstructive symptoms. However, the possibility of a twist of the intestine at the level of the ostomy leading to abnormal orientation predisposing to obstruction must always be considered and ruled out.

The diagnosis of obstruction is based on clinical symptoms and endoscopic and radiologic signs. In the acute setting, a patient will commonly present with nausea and vomiting, cramping, abdominal pain, and decreased bowel function. On physical examination, there may be abdominal distension with point tenderness. Endoscopy is a valuable to assess anastomotic stricture (**Fig. 2**). An upright abdominal radiograph may show dilated loops of the small bowel and/or air-fluid levels. This should be followed by a computerized tomography (CT) scan of the abdomen and pelvis to better characterize the severity and location of the obstruction. In patients who have chronic symptoms of intermittent obstruction, magnetic resonance enterography (MRE) has the advantage of using high soft-tissue contrast resolution that produces more detailed images of the small bowel. A small bowel follow-through offers a functional evaluation, as the passage of contrast is followed through the small intestine in serial radiographs. A water-soluble contrast medium is used in the immediate postoperative period to prevent the conversion of partial obstruction to complete obstruction or the risk of peritonitis that can occur with barium in the setting of an associated anastomotic leak.

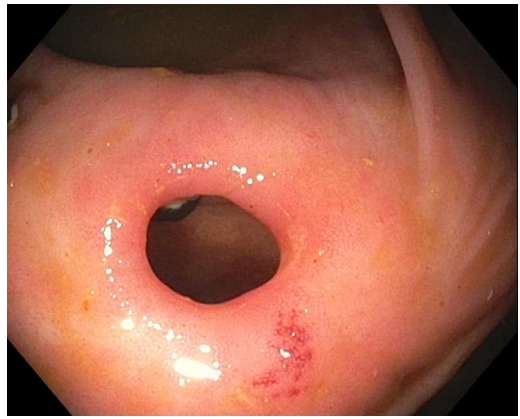

Fig. 2. Stricture at ileocolonic anastomosis after ileocolonic resection for Crohn disease. (*Courtesy of* Bo Shen, MD, New York.)

The management of obstruction depends on its severity and presentation. In the acute setting, bowel rest with nasogastric decompression and intravenous hydration is the first step in medical management. For adhesive disease, a response is typically seen within 24 to 48 hours. Surgery is reserved for those patients who do not respond to medical management and have a persistent fixed area of obstruction demonstrated on imaging. Stoma site stenosis often responds to bowel rest or stomal intubation that allows the stoma-related edema to settle. Surgery is rarely needed, particularly if there is tight stenosis of the stoma or there is a concern for a twist of the small bowel at the level of the ostomy. In some patients in whom a fixed area of obstruction is not demonstrated on imaging and who still have persistent symptoms of obstruction or a general failure to thrive, the use of total parental nutrition (TPN) with a percutaneous endoscopic gastrostomy (PEG) tube (**Fig. 3**) to act as a vent that prevents vomiting might be an option, during which time the bowel often recovers, and the obstructive symptoms resolve. Surgery is rarely indicated for early postoperative intestinal obstruction.

Anastomotic Leak

Anastomotic leak is a dreaded complication of any intestinal surgery, the incidence of which depends on the general state of the patient; the strength of the tissues; the site of the anastomosis, with the more distal having a greater risk for a leak; and surgical technique including blood supply, tissue tension, and handling. Patients with IBD have specific features predisposing to a leak because of immunosuppressive medication and steroids, inflammatory state, associated abscess, friability of the inflamed tissues, and the need for reconstruction in extenuating circumstances. The risk for the leak in CD also depends on whether the anastomosis is in the small intestine or colon or instead in the rectum (**Fig. 4**). The risk of anastomotic leak in CD varies from 3% to 20%. In UC, an ileal pouch anal anastomosis has specific constructional characteristics, and anastomosis at the level of the very distal rectum determines the risk for a leak. A continent ileostomy similarly has specific considerations because of the multiple suture lines, creation of the nipple valve, and the high pressure generated in the reservoir. Anastomotic leaks may be completely asymptomatic without any clinical evidence or might present with general symptoms and failure of the patient to progress in the postoperative course. Some leaks present with an abscess. Free leaks with peritonitis might also occur and might lead to rapid deterioration of the patient's clinical

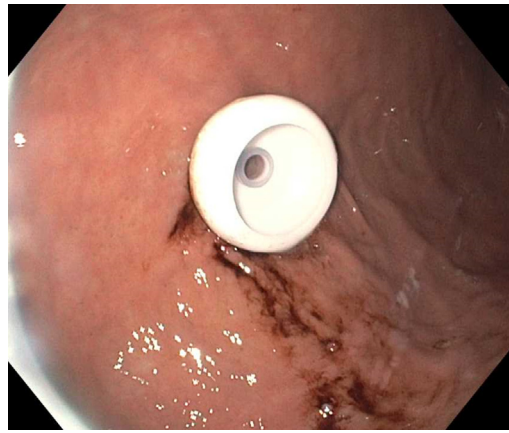

Fig. 3. Placement of percutaneous endoscopic gastrostomy for decompression of refractory postoperative ileus. (*Courtesy of* Bo Shen, MD, New York.)

Fig. 4. A leak at ileocolonic anastomosis for Crohn disease. (*Courtesy of* Bo Shen, MD, New York.)

condition. Although leaks can be diagnosed on clinical grounds, correlation with laboratory parameters such as elevated white cell count and radiology including a CT scan abdomen/pelvis with intravenous and oral contrast or contrast studies such as a gastrografin follow-through or enema helps ascertain the diagnosis. The management of anastomotic leaks is determined by the effect on the patient. They can be managed with broad-spectrum antibiotics, drain placement into any associated abscesses, and bowel rest, In specific circumstances, endoscopic management techniques with an expert endoscopist well versed not only with interventional endoscopy procedures but also with IBD (interventional IBD gastroenterologist) may be feasible.[1,2] Surgery might be needed for persistent infection, failure to thrive, or sepsis that cannot be managed with or is unresponsive to nonsurgical measures. When surgery is needed, options include drainage and washout, the creation of a proximal defunctioning ostomy to divert the fecal stream, or in some cases, takedown of the anastomosis with an end ostomy creation that can then be reversed later. Anastomotic leaks related to the pouch are described later.

Intra-abdominal Abscess and Other Infections

The combination of the patient, disease, medical treatment, and surgical complexity predispose IBD patients to a greater risk of healing and infectious complications after abdominal surgery. Intra-abdominal abscess or organ space SSI is hence more common in IBD. Abscesses present either early or late after surgery and usually manifest with fever, elevated white cell count, generalized symptoms, failure to progress, and a reduced response to suppressive medication for CD. Contamination of the peritoneal cavity with intestinal contents during surgery, pre-existing infection caused by abscess, or the development of a clinical or subclinical leak are the usual causes for an intra-abdominal abscess. Small abscesses and those that do not have a well-defined matured wall can be managed with oral or intravenous antibiotics. Larger abscesses greater than 6 cm and those that do not respond to antibiotics can be drained percutaneously with interventional radiology techniques. Surgery by a laparoscopic or open approach may rarely be needed to drain persistent abscesses and those not accessible percutaneously. Intra-abdominal abscesses are occasionally associated with an anastomotic leak. Abscesses after an ileoanal pouch creation, which can occur in the presacral area, are associated with specific characteristics and are discussed later.

Superficial Surgical Site Infection

Colorectal surgery is associated with the highest rates of SSI among surgical procedures, with reported rates between 5% and 30%. The US Centers for Disease Control and Prevention have developed criteria that define SSI as infection related to an operative procedure that occurs at or near the surgical incision within 30 days of the procedure or within a year if prosthetic material is implanted at surgery.[3] SSI in colorectal surgery is associated with significant resources and costs and can be reduced with preoperative, intraoperative, and postoperative measures. Preoperative measures include addressing malnutrition or any active infection, smoking cessation, avoidance of prolonged preoperative hospitalization when feasible, preoperative cleansing of the surgical site with antiseptic soap, and the use of combined mechanical bowel preparation with oral antibiotics. Intraoperative measures for the prevention of SSIs include the use of prophylactic antibiotics, the timing of their administration to optimize tissue concentration at the time of surgery, and appropriate antibiotic selection. In prolonged procedures, antibiotics need to be dosed a second time to ensure adequate tissue concentration. Preoperative hair removal, especially when razors are used for shaving, have been associated with an increased rate of SSIs in most studies and should be thus avoided. If necessary, hair removal can be performed with clippers or depilatory agents just before incision. Routine application of antiseptic solutions to the skin should be performed before surgery to reduce the burden of skin flora. Chlorhexidine may be superior to iodine, because chlorhexidine is not inactivated by blood or serum. Surgical hand hygiene, technique, and the use of minimally invasive surgery also likely influence SSI rates. Minimizing tissue injury during surgery, ensuring adequate hemostasis, and gentle handling of the tissues including at the incision and within the abdomen are believed to be important in preventing SSIs. Steroid use, length of operation, prior radiation, creation of an ostomy, and intraoperative blood transfusion have all been identified as technical or intraoperative risk factors for SSIs. The use of wound protectors and wound irrigation also likely reducea the risk of wound infection. Some prior evidence recommends the use of supplemental oxygen during surgery and preservation of normothermia as important factors that might reduce the risk of SSI. Postoperative measures to prevent SSI include strict glucose control, judicious use of antibiotics, and appropriate wound care.

Venous Thromboembolism

Patients with IBD are at a greater risk for thromboembolism, particularly after surgery, because of their general inflammatory state, often compromised physiologic state, and prolonged or complicated surgery, particularly when pelvic dissection is needed. The use of central venous lines for TPN may also predispose to VTE. In addition to superficial and deep vein thrombosis of the extremities, thrombosis of the portomesenteric venous system can occur, which is particularly associated with ileoanal pouch surgery in UC patients.[4] Early ambulation and perioperative prophylaxis with blood thinners and anticoagulants reduce the risk of VTE.

LATE COMPLICATIONS AND THOSE RELATED TO SPECIFIC PROCEDURES

Specific problems may be related to the more extensive and specialized procedures such as proctocolectomy, ileoanal pouch, and continent ileostomy.

Ileostomy or Colostomy

Stoma-related complications include complications related to the ileostomy such as recurrence of CD, recession, fistula, stricture (**Fig. 5**), prolapse, parastomal hernia,

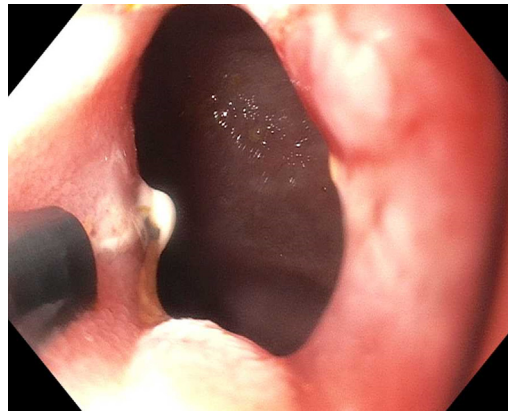

Fig. 5. Stoma site stricture undergoing endoscopic stricturotomy therapy. (*Courtesy of* Bo Shen, MD, New York.)

ischemic necrosis, paraileostomy ulcers, internal hernia or volvulus, and peristomal dermatitis.

Total Proctocolectomy

Sexual and bladder dysfunction and problems with the healing of the perineal wound are other complications. Perianal complications may range from small sinuses to more extensive findings and are further described.

Perineal Wound Complications

After proctocolectomy with end ileostomy or proctectomy with an abdominoperineal approach, problems with perineal wound healing can occur, which can particularly be a problem in IBD. Given the poor blood supply to the perineum, the difficulty in avoiding pressure on the area, and the frequent coexisting sepsis or perineal dermatitis in CD, UC, and pouch dysfunction, the perineal area tends to heal slowly. This can manifest as a perineal abscess, wound disruption, or delayed healing and a persistent perineal sinus that continues to drain (**Fig. 6**). Control of sepsis before surgery with antibiotics, drainage, and seton placement, and considerations during proctectomy of an intersphincteric, extrasphincteric, or low Hartmann type approach to managing the perineum based on the specific circumstances can reduce the risk of these various perineal complications. Up to 34% of patients may have an unhealed perianal wound compared with 11% of patients with UC.[5] Wounds may be managed by wound curettage and cautery, skin grafting, or vascularized pedicle muscle grafts such as gracilis, semimembranosus, rectus abdominis, or omentum. The inferior gluteal myocutaneous graft has also been used. Failure rates continue to remain high despite these procedures. Endoscopic procedures to open the sinus can also be attempted.

Stricturoplasty

The common complications after stricturoplasty include anastomotic bleeding (**Fig. 7**), leak, obstruction, and disease recurrence. Septic complications occur in 3% to 49% of patients after conventional resection for CD and 5% to 14% of patients after stricturoplasty. The operative mortality for resection in CD ranges from 0.3% to 3.2%,[6,7] but is perhaps lower in stricturoplasty.

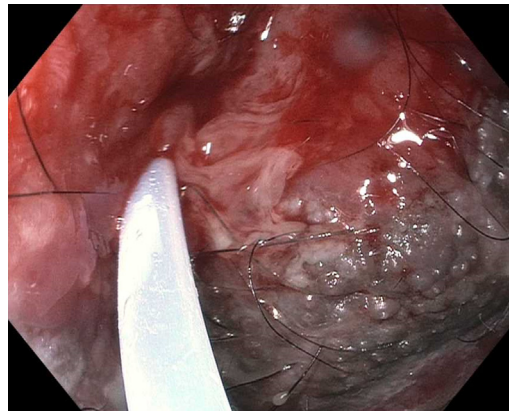

Fig. 6. Persistent perineal sinus after proctectomy for Crohn disease. (*Courtesy of* Bo Shen, MD, New York.)

Short Bowel Syndrome

Short bowel syndrome is a potential problem in patients with CD who undergo multiple resections and in patients with UC who need multiple reoperations with bowel resection because of pouch dysfunction, obstructions, or septic complications. Short gut syndrome during long-term follow-up after resection can be seen in 1.5% to 12.6% of CD patients.

Nutritional Problems

Malabsorption of vitamins including B12 and folate and bile acids and fluid and electrolyte disturbances may also occur after intestinal resection.

Disease Recurrence and Stricture

These complications are particularly associated with CD, and after surgery, may be associated with technical factors in addition to patient, disease, and treatment-related factors**.** Restricture or new stricture or perforative disease was seen in 5%

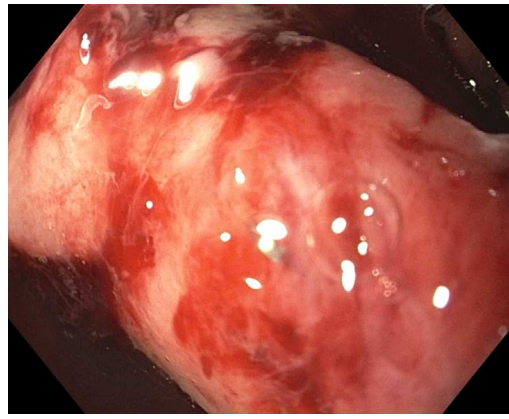

Fig. 7. Bleeding at the site of surgical strictureplasty. (*Courtesy of* Bo Shen, MD, New York.)

and 17% of patients, respectively, during a 42-month median follow-up period in 1 study.[8] In a postoperative patient, strictures develop at the site of a bowel anastomosis. In the setting of obstruction with stricture, medical therapy can have a therapeutic role. The judicious use of intravenous corticosteroids to decrease the acute inflammatory reaction occurring within the presumed area of narrowing can be attempted. If there is no response, then other interventions need to be considered. Endoscopic balloon dilation or endoscopic stricturotomy is a procedure that has been shown to be effective and safe in the management of small bowel strictures.[9–11] It can ultimately avoid or delay surgery over the long term. It is reserved for endoscopically accessible strictures that are less than 5 cm in length. Although patients eventually develop recurrences that may require surgical intervention, endoscopic therapy is repeatable and may achieve long-term success for short strictures. Adverse effects of this procedure include perforation and bleeding. For long (>5 cm in length) and multifocal strictures, and those associated with internal fistulae, surgical intervention is the likely next step in management. This can include either a stricturoplasty or a small bowel resection. A stricturoplasty is a bowel-sparing option and minimizes the risk of short bowel syndrome, which may occur with extensive resections.

COMPLICATIONS SPECIFIC TO POUCH PROCEDURES

Intraoperative complications specifically related to pouch creation include bleeding, difficulty with the reach of the pouch, and pouch ischemia caused by tension or a tenuous blood supply from extrazealous attempts at vascular division to allow an ileoanal pouch to reach the residual anal canal. Commonly employed options with regards to pouch configuration and anastomosis include a J or S pouch and a stapled or hand-sewn anastomosis. During ileoanal pouch creation, close attention needs to be directed toward the avoidance of anastomotic tension, maintenance of appropriate orientation and blood supply of the pouch and the residual anorectum, and the avoidance of the incorporation of the vagina or prostate and seminal vesicles in the staple line. Problems associated with the anastomosis and stapler misfire can occur in the operating room, but the situation is usually salvageable. For small anastomotic dehiscence that is identified on air testing, the creation of a defunctioning ostomy alone or in addition to suture approximation of the defect by the abdominal or perineal approach may be all that is required. When there is a major disruption, the anastomosis may have to be redone by a perineal or abdominoperineal approach.

There are various short-, and long-term postoperative complications associated with pouch surgery.[12]

Postoperative Bleeding from the Pouch

The long suture or staple line within the pouch may predispose patients to perioperative bleeding, which usually presents as rectal bleeding or blood from the ostomy. Oversewing of the back row of staples along the mesentery of the small bowel at the time of pouch creation reduces this risk. Pouchoscopy with cauterization of any identified bleeding points, hemostatic clips, or injection of epinephrine usually controls bleeding. With diffuse oozing, ice-cold saline with epinephrine placed in the pouch may allow control.

Postoperative Pouch Leak

A leak can occur from ileal pouch-anal anastomosis (IPAA), pouch body, or tip of the J-pouch. A pouch leak can be acute, resulting in severe pelvic sepsis, or have a more indolent course presenting with persistent ileus or failure to progress after surgery,

with the development of an abdominopelvic abscess. In acute IPAA leak, after fluid resuscitation and intravenous broad-spectrum antibiotics, surgery may be needed. Unstable patients require emergent exploration with peritoneal washout and diverting loop ileostomy or conversion of a loop to an end ileostomy to completely divert the pouch when patients already have a loop ileostomy. For the stable patient with an abdominopelvic abscess, percutaneous drainage allows control of sepsis and may minimize the long-term consequences of sepsis to the pouch.[13] Perineal transanastomotic drainage is another option. When the IPAA is intact, percutaneous CT-guided drainage (either transabdominal or transgluteal) may be preferable, and this strategy allows for prompt drainage of the abscess with minimal risk of extrasphincteric fistula formation.[14]

The tip of the J pouch (open end of the terminal ileum) is also susceptible to leakage (**Fig. 8**). A leak from the tip of the J is difficult to detect, as manifestations are variable, and the course is often indolent with a subtle and variable presentation. Endoscopy may occasionally detect a leak from the blind limb, or an imaging study may demonstrate a contrast leak from the tip of the J; however, this is not consistent. Thus, a high degree of suspicion is required for its diagnosis. A tip of the J leak may also be associated with a leak from the pouch body or IPAA. Endoscopic treatment can be successful.[15] Salvage surgery is often possible and requires resection of the tip of the J or a stapled or suture repair of the defect, pouch repair, pouch revision, or pouch resection with repeat IPAA with or without a proximal ostomy. Salvage surgery is associated with a high rate of pouch survival and good long-term functional outcomes and quality of life.[16]

Postoperative Pelvis Sepsis

Ileoanal pouch-related pelvic sepsis can be of varying degrees of severity, and apart from leading to adverse outcomes over the short and intermediate term, may predispose to pouch failure. Even when successful treatment can be achieved, patients may have impaired long-term functional outcomes and quality of life.[17] Pre- and intraoperative planning to reduce its risk is hence important. Pelvic sepsis may occur in conjunction with or separate from anastomotic dehiscence and usually presents with fever, leukocytosis, tachycardia, and pelvic or lower back pain, although the symptoms are sometimes nonspecific. CT scan of the abdomen and pelvis with oral, intravenous, and rectal contrast is useful in identifying a peri-pouch abscess

Fig. 8. A leak at the tip of the "J" in ileal pouch-anal anastomosis. (*Courtesy of* Bo Shen, MD, New York.)

Fig. 9. Pouch vaginal fistula. (*Courtesy of* Bo Shen, MD, New York.)

and its communication with any anastomotic leak. A chronic leak and associated abscess may present with pelvic pain, failure to thrive, poor pouch function, and perianal sepsis that mimics CD. This is usually managed with drainage, antibiotics, and creation of a diverting stoma as a first step. In some cases, pouch excision with end ileostomy or a redo pouch creation or conversion to a continent ileostomy may be needed.

Pouch Dysfunction

Most patients with an ileoanal pouch have 6 to 8 bowel movements over a 24-hour period, do not need to wear pads, and do not have episodes of urgency or incontinence. Quality of life is high, and most patients deny physical, social, work-related, or sexual restrictions.[18] Pouch dysfunction can occur because of problems with the pouch, sphincter mechanism, or small bowel proximal to the pouch and requires a thorough evaluation.

Pouch-Perineal and Pouch-Vaginal Fistula

Pouch-perineal and pouch-vaginal fistulas can occur because of septic complications after pouch creation or because of an initially missed or subsequent diagnosis of CD. Clinical history and examination, endoscopy, and imaging together with an examination under anesthesia help assess the physical state of the pouch, anal canal, vagina, and small bowel proximal to the pouch. Examination under anesthesia with drainage of any collection and seton placement to control sepsis may initially be needed. Options thereafter include leaving the seton in for a prolonged time, or definitive repair of the pouch-vaginal or pouch-perineal fistula. Antibiotics, anti-inflammatory agents, and anti-Crohn disease medication may be helpful with or without initial ostomy creation that defunctions the pouch. Some patients with pouch-perineal and vaginal fistulae (**Fig. 9**) are candidates for perineal procedures including pouch or vaginal advancement flap repairs, perineal pouch advancement, fistula glue or plugs, and gracilis flap repair or interposition of a biologic mesh.[19] An ileostomy to divert the fecal stream either before or concomitantly at the local repair of a pouch-vaginal fistula or as a first step to control sepsis before definitive repair of the fistula or redo pouch procedure may be needed. A redo IPAA is also an option when CD has been excluded.[19] There is, however, a relatively high risk for pouch failure for patients with a pouch-vaginal fistula. Pouch excision with end ileostomy or conversion of the J pouch to a K pouch is another option.

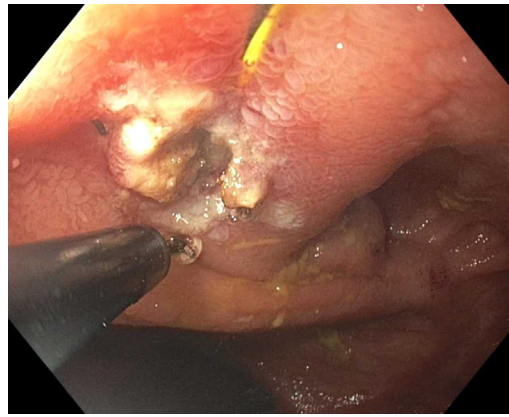

Fig. 10. Prescral sinus undergoing treatment with endoscopic sinusotomy over a guide wire. (*Courtesy of* Bo Shen, MD, New York.)

Pouch Sinus

Pouch sinus occurs in 2.8% to 8% of patients after IPAA and is caused by a chronic anastomotic leak (**Fig. 10**).[20] The sinus tract may be incidentally detected in imaging studies or symptomatic with sepsis, pelvic pain, pouch dysfunction, and ultimately pouch failure. Surgical options include debridement, unroofing, occlusive treatment with fibrin glue, pouch revision, and redo pouch or conversion of the pouch to a continent ileostomy. However, endoscopic sinusotomy is the best initial less invasive option that is associated with good healing.[21]

Pouch Prolapse

Pouch prolapse is rare, occurring in 0.3% of pouch patients. Patients may present with tissue prolapse or outlet dysfunction, and clinical examination, manometry, and pouchoscopy may suggest the diagnosis (**Fig. 11**). Stool bulking agents and biofeedback are initial measures for mucosal prolapse. When symptoms persist, a local perineal procedure with pouch advancement after the excision of redundant mucosal tissue can be considered. Patients with full-thickness pouch prolapse may best be treated with definitive transabdominal surgery. Pouchpexy using a transabdominal approach, with fixation of the pouch to the sacrum using nonabsorbable sutures, is a reasonable option. Pouchoscopy with banding ligation may be attempted before the surgery.[22]

Pouchitis and Cuffitis

Pouchitis and cuffitis relate to inflammation of the pouch or the lining of the residual anal canal and are diagnosed at pouchoscopy and biopsy. Treatment is primarily medical.[23] Small areas of cuff inflammation may be approached through ablative or excisional means. However, a defunctioning ostomy or pouch excision with an end ileostomy may be required for recalcitrant pouchitis or cuffitis unresponsive to medical treatment. Corrective surgery or redo IPAA may also be required for the management of pouchitis secondary to complications of the pouch such as chronic presacral abscess, pouch sinus, small pouch size, or obstruction caused by stricture or pouch prolapse, and also for persistent cuffitis secondary to a long segment of the anal canal and rectal remnant retained at the time of IPAA.

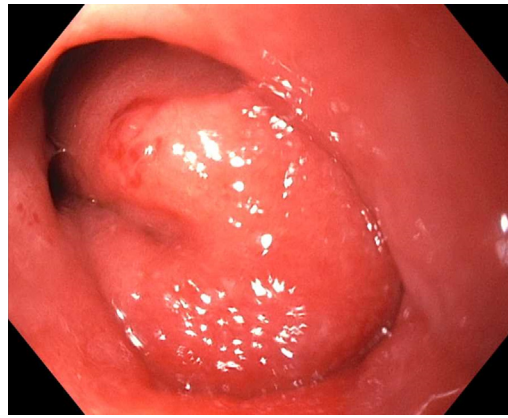

Fig. 11. Distal pouch prolapse. (*Courtesy of* Bo Shen, MD, New York.)

Crohn Disease of the Pouch

Crohn disease may affect the body, afferent limb, pouch-anal anastomosis, perineum, or small intestine proximal to the pouch. Medical management includes steroids, immunomodulators, and biologic agents.[19] Endoscopic intervention including dilatation and stricturotomy may be used for isolated short-segment strictures of the pouch-anal anastomosis, pouch body, or afferent limb. Surgical treatment with stricturoplasty or small bowel resection combined with pouch revision may be required for strictures not amenable to or with failure of endoscopic therapy. More extensive disease involving the pouch may necessitate pouch excision or permanent dysfunction. Perianal disease may be managed with a drain or seton placement for drainage of loculated abscesses or fistulae in combination with medical treatment.

Cancer of the Pouch

Cancer of the pouch is rare and may be in the pouch or anal transitional zone. Mucosectomy with a hand-sewn anastomosis does not eliminate the risk of cancer, because some mucosal islands remain that are then overlapped by the pouch. A stapled ileal pouch-anal anastomosis may facilitate surveillance of the pouch and anal transitional zone, but patients are at risk for cancer after both types of anastomoses.[24,25]

Fertility, Sexual Problems, and Obstetric Outcome

IPAA is associated with reduced fertility. Sexual dysfunction can also occur after the procedure; however, the incidence of serious sexual dysfunction such as impotence (<1%) and retrograde ejaculation (<5%) is low. In women, a significant increase in vaginal dryness and dyspareunia without any change in sexual desire, arousal, or frequency of intercourse can occur. Although there is some controversy relating to whether pouch patients should undergo vaginal delivery or Cesarean section, vaginal delivery appears to be safe and associated with good quality of life even when there has been some deterioration of pouch function.[11]

Postoperative Complications After Redo Ileal Pouch-Anal Anastomosis and Continent Ileostomy Procedures

With a redo IPAA, there are specific complications related to the surgical complexity of surgery secondary to adhesiolysis, the need for exploration in the reoperative pelvis,

and the difficulty of reconstruction. These risks include bowel injury, sepsis, SSI, damage to pelvic structures and nerves, anastomotic leak, and short gut in some circumstances. A continent ileostomy procedure has similar risks, with bowel leak and SSI being particular problems because of the multiple suture and staple lines and the pressure created on the reservoir. Conversion of a J pouch to a continent ileostomy is associated with cumulative complications related to both procedures.[26]

SUMMARY AND RECOMMENDATIONS

Surgery is common for patients with IBD and is associated with potentially immediate and long-term complications. Patients with IBD present a group that is often physiologically, immunologically and nutritionally compromised. The specific inflammatory characteristics of CD versus UC, the pattern of disease, and associated complications together with the medical treatment and chosen surgical strategy determine the particular immediate and distant outcomes and hence functional results and quality of life. A multidisciplinary approach to the management of IBD with close collaboration of the patient, gastroenterologist, and surgeon is crucial to ensuring appropriate and durable management. Careful preoperative planning, intraoperative technique, and awareness of postoperative complications depending on the patient, diagnosis, and surgery performed are needed so that issues can be promptly and effectively addressed .

CLINICS CARE POINTS

- Surgery in IBD is associated with multiple complications.
- Because IBD is a chronic condition, immediate and intermediate complications after surgery determine long-term outcomes including disease control, recurrence, functional outcomes, and quality of life
- Careful perioperative decision making and planning help improve outcomes.
- Awareness of complications and prompt and appropriate management prevent long-term sequelae.
- Immediate complications including postoperative bleeding, infection, and thromboembolism are common. These can be minimized with preoperative optimization and intraoperative technique and strategy.
- Specific complications are related to the particular procedure, and more extensive resections and surgery in patients with complicated disease are associated with a greater risk of complications.
- The ileoanal pouch and continent ileostomy are specialized procedures, and greater experience with these is associated with better outcomes.

DISCLOSURE

The authors have no disclosures.

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