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Transabdominal Surgical Management for Pouch Failure

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Restorative proctocolectomy with ileal pouch-anal anastomosis restores intestinal continuity and generally provides excellent long-term functional outcomes. However, 5–15% of patients experience pouch failure, most commonly due to septic, mechanical, or inflammatory complications. Surgical management of pouch failure is technically demanding and requires a multidisciplinary approach in high-volume, specialized centers. This narrative review synthesizes contemporary evidence on the transabdominal surgical management of pouch failure, with an emphasis on standardized preoperative evaluation, nomenclature. Key topics include predictors of failure, differentiation of Crohn's-like disease from mechanical etiologies, and technical considerations for pouch reconstruction. The review also emphasizes the importance of a unified team for revisional pouch surgery, involving specialized colorectal surgeons, gastroenterologists, radiologists, physician assistants, dietitians, IBD-specialized psychologists, wound-ostomy nurses, and patient support personnel.

INTRODUCTION

Restorative proctocolectomy with ileal pouch-anal (RP/IPAA) is frequently the surgical treatment of choice for ulcerative colitis, familial adenomatous polyposis, indeterminate colitis, and select patients with Crohn's disease (CD).[1] The concept of an ileal reservoir anastomosed to the anal transition zone, first described by Parks and Nicholls[2] represented a major advancement in colorectal surgery. Among pouch configurations, the "J" pouch with a double-stapled anastomosis is the most commonly used technique in RP/IPAA.[3] IPAA restores intestinal continuity and is associated with favorable quality of life (QoL) and functional outcomes in most patients.[4]

Despite these benefits, a subset of patients develop complications that may ultimately result in pouch failure. Ileal pouch failure is commonly defined as permanent diversion, revision, or excision of the pouch—a devastating outcome, particularly for patients strongly opposed to a permanent ileostomy.[5] Reported long-term pouch failure rates range from 5.3% to 15.5%.[6-9] Etiologies include septic, mechanical, functional, and inflammatory causes, which often overlap and may sometimes be related to CD.

Surgical management of pouch failure can restore durable function and acceptable QoL in selected patients, especially highly motivated individuals wishing to avoid a permanent stoma.[10-13] This requires a thorough informed consent process, as reoperative pouch surgery is technically complex and often necessitates a multi-stage approach. A systematic review by Carpenter et al.[14] highlighted significant heterogeneity in nomenclature for revisional pouch surgery, with terms such as revision, redo, refashion, reconstruction, and salvage used inconsistently. These findings underscore the importance of careful patient selection and standardized terminology in revisional pouch surgery.

This narrative review summarizes contemporary transabdominal surgical management of ileal pouch failure, with a focus on standardized terminology, the Remzi classification for reoperative pouch surgery, indications and patient selection, preoperative evaluation, operative technique, and postoperative follow-up. The review aims to provide a structured framework to support clinical decision-making and promote consistent reporting in future studies.

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Indications and patient selection

Historically, predictors of pouch failure include pelvic sepsis (fistula, abscess, chronic anastomotic leak), anastomotic stricture, the presence of CD or CD-related complications, pouch ischemia, and poor function, such as chronic pouchitis.[15,16] One study further indicated that female sex was associated with a 39% increased risk of pouch failure, with fistula formation and poor function also contributing to risk.[17] Commonly reported preoperative and perioperative risk factors for pouch failure include hand-sewn anastomosis,[18] tension on the anastomosis, and pouch construction without a diverting loop ileostomy.[19] CD-related fistulae, abscesses, and sepsis more often present as late-onset causes of failure.[20]

Pouch failure may be misdiagnosed as CD when the underlying etiology is mechanical or technical. In such cases, the timing of fistula formation is critical: fistulae arising more than 12 months after IPAA raise greater concern for CD rather than a purely postoperative complication. In patients with suspected CD, pelvic magnetic resonance imaging (MRI) and pouchoscopy with biopsy are recommended. When imaging demonstrates pouch ischemia or transmural inflammation, or histology confirms CD, a three-stage approach to revisional pouch surgery under biologic therapy may be considered for appropriately selected patients. Thus, accurately distinguishing the underlying etiology is crucial, although it is not always possible.

Indications for redo pouch surgery in patients with correctable mechanical complications in their index IPAA include the absence of jejunoileal or perianal CD and severe sphincter insufficiency. Although these factors may overlap, causes of pouch failure can be broadly categorized into four groups:

- **Septic causes:** Anastomotic leak, pelvic abscess, pouch-vaginal or pouch-vesical fistula, and presacral sinus are among the most common indications for redo pouch surgery (Figure 1). Pelvic sepsis is the most frequent cause of pouch dysfunction and subsequent failure.[4] Preoperative risk factors for pelvic sepsis include high body mass index (> 30 kg/m²), diagnosis of indeterminate colitis or CD, and the use of steroids or antitumor necrosis factor agents at the time of IPAA.[21-23] Although ileal pouch excision can be safely performed in obese patients with outcomes comparable to those of non-obese patients, preoperative weight optimization is generally recommended prior to revisional pouch surgery to reduce the risk of deep surgical site infection and other complications.[24]
- **Mechanical causes:** A long rectal cuff (> 2 cm) or retained rectum can lead to ongoing proctitis, urgency, and anastomotic stricture. Similarly, a remnant mesorectum may prevent the pouch from properly distending or filling, both of which are associated with pouch failure.[25] Twisted pouches and strictures can mimic obstructive symptoms, such as abdominal pain, distention, and food intolerance, resulting in incomplete pouch emptying and pouch dysfunction.[26]
- **Functional causes:** Poor pouch compliance and refractory evacuation dysfunction in the absence of an anatomical defect can also lead to pouch failure. While these conditions are often managed conservatively, select cases may require redoing the IPAA, including creation of a new pouch or salvage procedures.
- **Inflammatory causes:** Concurrent anorectal pathologies, such as CD, severe or chronic pouchitis, and cuffitis, can also contribute to pouch failure. Patients with CD involving the pouch should be approached cautiously due to their increased risk of surgical complications, which may result in poor functional outcomes.[27,28]

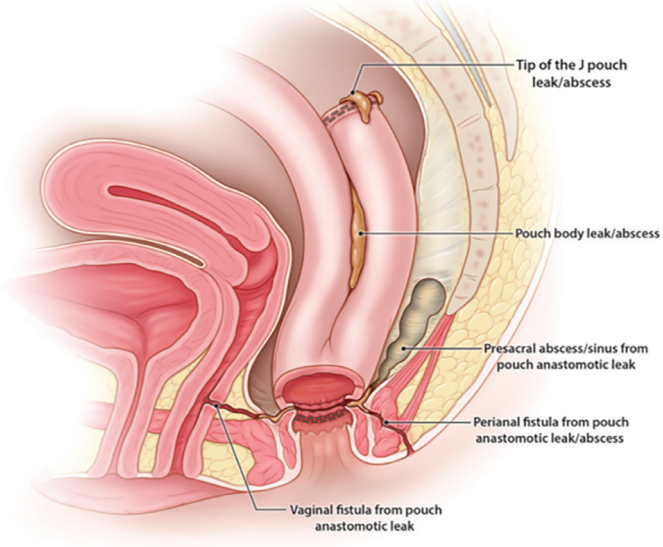

FIG. 1. Pelvic sepsis presentations.

Definition of redo IPAA and pouch salvage

The nomenclature for redo IPAA surgery is heterogeneous in the literature, often described as pouch salvage, pouch revision, or redo IPAA. Redo IPAA specifically refers to take-down of the existing IPAA with re-anastomosis and is termed a "redo" only when a new anastomosis is created. The Remzi classification for redo IPAA is as follows:[29]

1. Redo IPAA alone: Performed when the index pouch is viable but additional mechanical issues need correction, such as remnant mesorectum, long cuff, twist, or stricture. In these cases, the pouch is disconnected and re-anastomosed after addressing mechanical problems. Repair following an anastomotic leak also falls under this category.
2. Redo IPAA with pouch revision: Involves disconnection and re-anastomosis of the pouch combined with a pouch revision, such as tip-of-the-J repair, augmentation, or pouchpexy.
3. Redo IPAA with creation of a new pouch: Indicated when the original pouch is non-functional, necessitating creation of a new pouch.

Pouch revision alone refers to repair of the existing pouch without dismantling the index anastomosis. Examples include tip-of-the-J repair or pouchpexy.

Pouch salvage refers to any reoperative pouch surgery in which the existing pouch is deemed salvageable. It is an umbrella term encompassing redo IPAA procedures where the primary pouch is used, with or without pouch revision as well as standalone pouch revisions. Thus, the term applies to any surgery in which the original pouch is utilized, regardless of whether a revision is performed.

Figure 2 summarizes the classification system for pouch failure surgery based on new pouch creation. If the primary pouch is viable, the operation is classified as pouch salvage. Outcomes following the creation of a new pouch in the reoperative setting are comparable to those achieved with salvage of the original pouch.[30] However, we advocate salvage whenever feasible to preserve small bowel length.[10] Utilizing the Remzi classification based on new pouch creation is important to ensure standardized reporting and facilitate future research.

Preoperative evaluation

Prior to redo pouch surgery, patients undergo a comprehensive clinical evaluation. This begins with a detailed review of symptoms and medical and surgical history. Previous radiologic studies, pathology reports, endoscopic findings, exam-under-anesthesia (EUA) findings, and operative details of the index IPAA—including surgical approach, staging, interval between stages, pouch configuration, and anastomosis type—are carefully examined.

Findings suggestive of underlying CD are thoroughly assessed. In cases of suspected CD, biologic therapy is considered following discussion with the patient and their gastroenterologist. Our experience demonstrates that biologic coverage supports successful revisional pouch surgery in patients with CD-like features, such as fistula formation from the pouch or afferent limb, strictures or stenoses in the pouch body, pouch inlet, or afferent limb, and/or pre-pouch ileitis. This approach offers an alternative to pouch excision and end ileostomy in motivated patients.[31]

All patients undergo EUA and flexible pouchoscopy to evaluate the pouch and guide operative planning. Mechanical issues, such as long rectal cuff, remnant mesorectum, small pouch, tip-of-

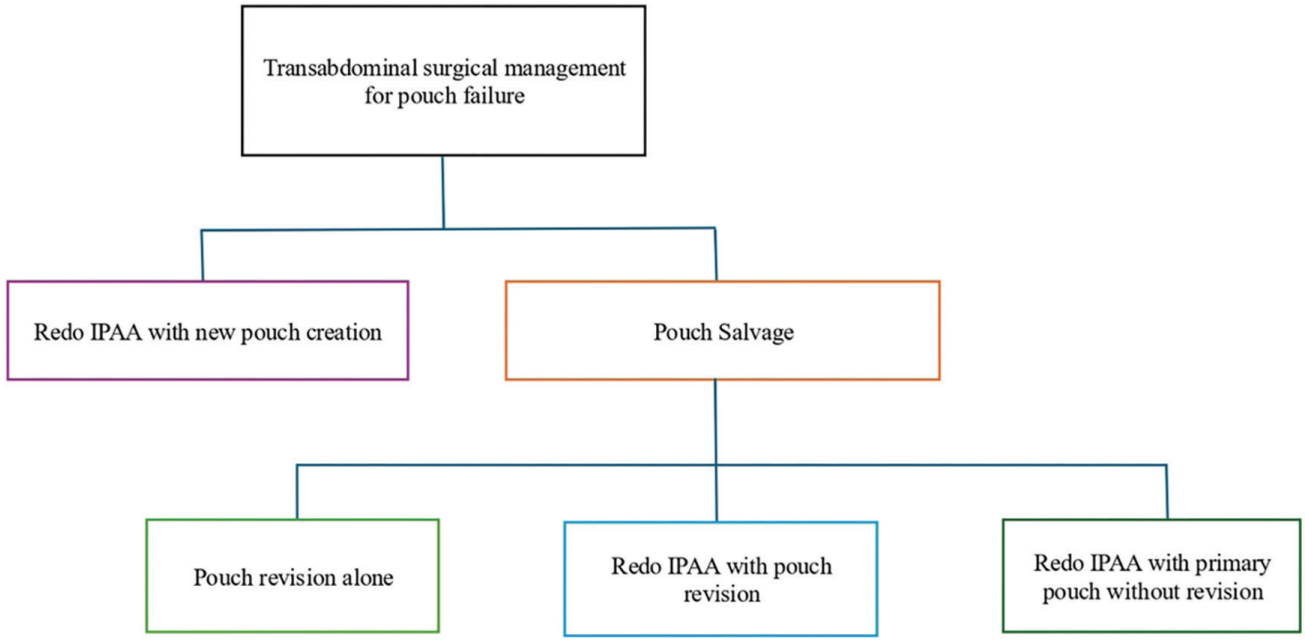

FIG. 2. Remzi classification of reoperative pouch surgery.[29]
IPAA, ileal pouch-anal anastomosis.

the-J length, and pouch twist as well as septic complications, are assessed. Additional imaging may be performed depending on the clinical presentation and can include gastrografin enema, pouch-directed pelvic MRI, magnetic resonance enterography, computed tomography (CT), or CT enterography.

Collaboration with specialized radiologists and the use of a synoptic MRI report for ileal pouch evaluation are critical (Figure 3). A structured reporting template provides a comprehensive and standardized assessment of the index IPAA, including the anastomosis/suture line, rectal cuff/anal transition zone, pouch body, pouch inlet/outlet, pouch twist, and peri-pouch mesentery.[32]

Revisional pouch surgeries, whether involving new pouch creation or salvage, are most commonly performed in three stages and less frequently in two. The standard three-stage process includes:

1. Diverting loop ileostomy: Created for approximately six months to prepare the patient for major surgery and allow for healing, if not already diverted.
2. Revisional pouch surgery: Performed with a diverting loop ileostomy in place.
3. Ileostomy reversal: Conducted after roughly three months, once intestinal continuity is secured.

Construction of a "thoughtful ileostomy"

In select cases, revisional pouch surgery may be performed as a two-stage procedure, consisting of redo IPAA with diverting loop ileostomy, followed by ileostomy reversal after three months. Typical indications for a two-stage approach include dysplasia or cancer of the pouch. However, patients with pouch failure are often malnourished and deconditioned, making them high-risk candidates for a major two-stage operation, which may increase the likelihood of recurrent pouch failure.

For this reason, we advocate creating an initial proximal diverting loop ileostomy for six months to allow for nutritional and functional optimization prior to major reoperative surgery. The location of the ileostomy is critical to maximize small bowel length in case a new pouch is needed at stage two. We therefore construct the ileostomy approximately 20 cm proximal to the old pouch (Figure 4).[33]

This strategy is referred to as a "thoughtful ileostomy." It allows the stoma site to be incorporated as the apex of a new ileal pouch and later become the ileal-anal anastomosis when the new pouch is constructed, while minimizing additional small bowel loss.

Technique for transabdominal surgical management of pouch failure

Revisional pouch surgeries should ideally be scheduled as the first case of the day or early in the morning, rather than late afternoon. Pre-incision preparations in the operating room include selective epidural catheter placement, arterial access for intraoperative monitoring, cystoscopy with bilateral ureteral stent placement, administration of antibiotics, and deep venous thrombosis prophylaxis.[34]

The procedure begins with the patient positioned in the modified Lloyd-Davis position, with arms tucked to allow optimal access to the abdomen and perineum.[35] The abdomen is accessed via a midline laparotomy extending to the pubic bone, and a wound retractor is used to maximize exposure after the ileostomy is removed.

FINDINGS:

Anastomosis/suture line assessment:

IPAA anastomosis: Anastomosis
Tip of J suture line: Suture Line
Pouch body anastomosis: Pouch Body

Rectal cuff/Anal Transitional zone (ATZ):

Length (if ring shaped staple line at IPAA seen): lengthLength:cm/Unable to determine cuff length.
Cuffitis: Cuffitis:Yes./No.

Pouch body:

Size: Size:Normal./Dilated./Small.
Pouchitis: Pouchitis:No./Yes.
Stricture:Stricture:No./If yes, describe location of stricture within the pouch (proximal, mid or distal).

Pouch inlet/outlet:

Pouch inlet and pre-pouch ileum: inlet
Pouch outlet stricture: Stricture:Yes/No

Peripouch Mesentery:

Position of mesentery relative to pouch: Position of mesentery:Anterior/Posterior/Right Lateral/Left Lateral
Mesentery vessel twist: Twist:Yes/No

Pelvic abscess or perianal fistula *NOT* related to anastomosis or suture line: Other:None./Yes. Describe

Pelvic Lymph Nodes: Field 10:.../No lymphadenopathy./No enlarged lymph nodes.

Skeletal: Field 15:.../No aggressive lesions./Degenerative changes in the spine. No aggressive lesion.

Other Findings: Other findings

FIG. 3. Structured MRI template.[32]
MRI, magnetic resonance imaging.

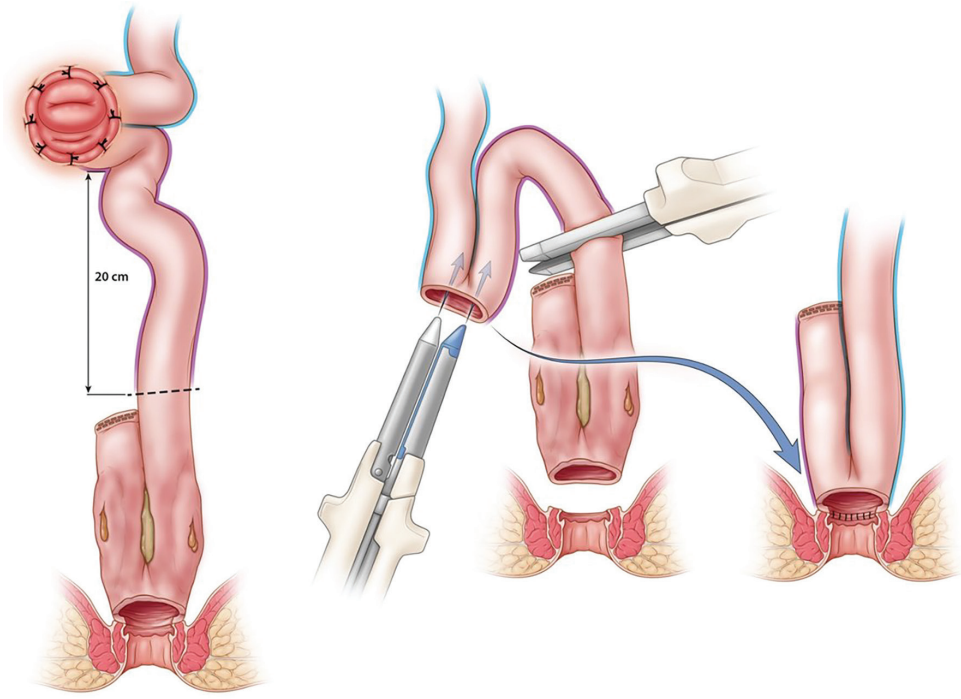

FIG. 4. "Thoughtful ileostomy" approximately 20 cm upstream of pouch.

Full lysis of adhesions is performed from the ligament of Treitz to the pouch. The pouch is fully mobilized, and dissection is carried down to the pelvic floor.[36] Identification of the existing anastomosis is crucial, as the decision to perform a new double-stapled anastomosis versus a mucosectomy with a hand-sewn anastomosis depends on it. If no residual rectum remains, the IPAA is disconnected from the anorectal stump, and a mucosectomy is subsequently performed via a trans-anal approach. If residual rectum is present, a completion proctectomy, including the remnant mesorectum, is performed. Transection is executed with a 30-mm TA non-cutting stapler with 4.8 mm staple height at the level of the anal transition zone.

Once the pouch is disconnected, its viability is carefully evaluated. Despite thorough preoperative planning, mechanical issues, such as pouch twisting, may only be identified and corrected intraoperatively. In cases of pelvic sepsis, thorough debridement with cautery and excision of phlegmon is performed to optimize surgical outcomes.[34]

To salvage the existing pouch or create a new pouch?

The condition of the pouch after disconnecting the index IPAA must be thoroughly evaluated. The intraoperative decision to salvage the existing pouch or create a *de novo* pouch depends on the pouch's viability and overall condition. Salvage of the existing pouch is preferred if it is undamaged after pelvic dissection and no mechanical issues, such as a small pouch, are present.

If the index pouch is inflamed, small, ischemic, or injured during dissection, creation of a new pouch is usually indicated. Outcomes following creation of a new pouch in the revisional setting are comparable to those achieved with salvage of the existing pouch. However, daytime and nighttime pad usage as well as daytime seepage, are more common in the new pouch group, likely reflecting the adaptation period of the new pouch and sphincter function.[37]

Creation of a new pouch may result in approximately 40 cm of small bowel loss; nevertheless, parenteral nutrition dependence appears uncommon in contemporary series.[37]

Pouch configurations

The key to successful pouch outcomes is the creation of a tension-free anastomosis. The pouch configurations used in revisional pouch surgery with new pouch creation include J, S, and H pouches. In most reoperative series, the J pouch is the predominant configuration, with over 95% of new pouches constructed in this fashion.[10] J pouches are typically created by folding two ileal segments measuring 15–20 cm each.[3]

When pelvic reach is limited, an S pouch may be preferred. S pouches allow 2–4 cm greater reach compared to the J pouch.[38] The S pouch is constructed using three ileal limbs of 12–15 cm each, with a 2-cm exit conduit (Figure 5). The length of the exit conduit should be minimized to prevent subsequent evacuation issues.

A reversed lower-case H pouch, although rarely used, is a suitable alternative when S- and J-configurations cannot be employed due to prior resections or ileostomy closure–related alterations of small bowel anatomy.[39] It is typically used when diversion was performed with an end ileostomy rather than a loop ileostomy and can help preserve small bowel length.

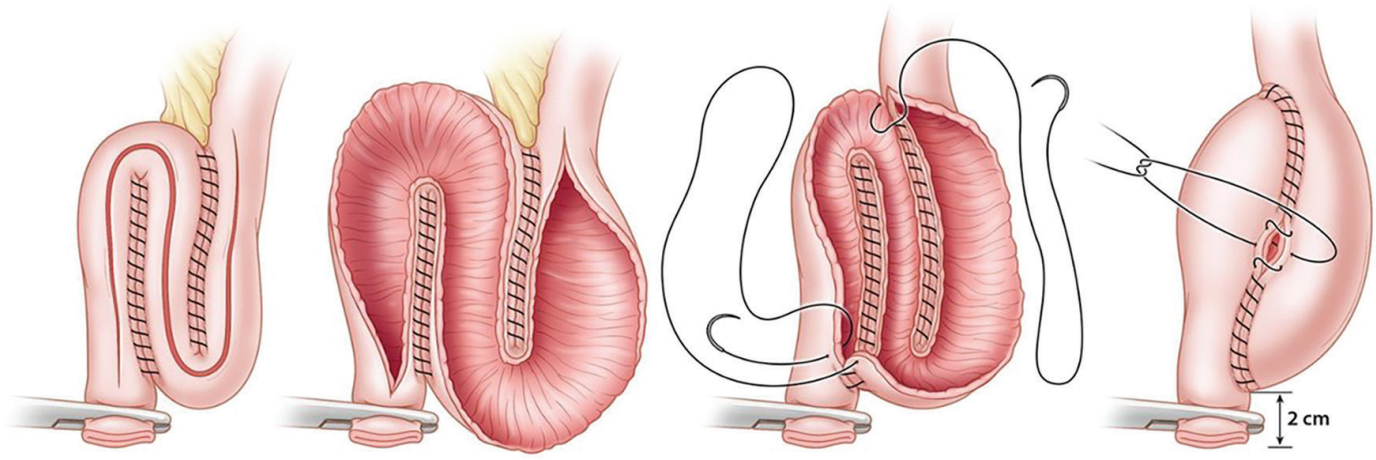

FIG. 5. S pouch allows 2-4 cm additional reach.

Stapled or hand-sewn anastomosis

In patients with pouch failure, re-anastomosis can be performed either using a hand-sewn technique (often with mucosectomy) or a stapled technique. Mucosectomy with hand-sewn anastomosis is performed in approximately 75% of patients undergoing transabdominal surgical management of pouch failure.[10,18,30] Our technique for anastomosis creation has been previously described.[30]

When a long rectal cuff remains, a double-stapled anastomosis is performed. A linear stapler is first applied below the IPAA, followed by the creation of a double-stapled anastomosis using an endoluminal stapling device.

Hand-sewn and stapled anastomoses in the redo IPAA setting yield similar QoL outcomes, except that daytime seepage is more common with hand-sewn anastomosis. Nighttime seepage is comparable in both groups, and patients report similar satisfaction with functional outcomes, providing equivalent QoL scores for both techniques.[30]

Hand-sewn anastomosis with mucosectomy is commonly performed in revisional pouch procedures where a new pouch is created.[35] After completing the anastomosis, a new diverting loop ileostomy is fashioned. It is crucial to avoid tension on the pouch mesentery when exteriorizing the ileostomy; therefore, proximal extension is performed when necessary. Although this may result in high ostomy output and the need for daily intravenous fluids or total parenteral nutrition, these risks are balanced against achieving optimal functional outcomes after ileostomy closure.

Ileostomy reversal

Approximately three months after stage 2, a water-soluble contrast enema and pelvic MRI are performed to evaluate the anastomosis. Ileostomy reversal is undertaken only after healing is confirmed and there is no evidence of an anastomotic leak or sinus.

Pouch excision

In cases of severe sphincter insufficiency or existing/potential short gut syndrome, pouch excision may be considered as an alternative. Pouch excision has been associated with higher QoL scores compared to pouch preservation with permanent diversion.[40] Some patients may choose a permanent ileostomy rather than undergo surgical management of pouch failure. However, it is important to counsel patients that revisional pouch surgery yields excellent outcomes in highly specialized centers for appropriately selected and motivated individuals.

Postoperative course

After ileostomy reversal, patients are followed regularly by a multidisciplinary team, including colorectal surgeons, gastroenterologists, physician assistants, registered dietitians, wound and ostomy nurses, specialized IBD psychologists, and patient support personnel. In the absence of new concerns, annual EUAs are performed to assess pouch health. QoL is evaluated using validated pouch follow-up questionnaires and the Cleveland Global QoL index.[41] Overall, more than 90% of patients who undergo revisional pouch surgery recommend the procedure to others and would undergo it again if needed.[10]

Re-redo IPAA with new pouch creation or salvage

Revisional pouch surgery, whether involving new pouch creation or salvage, has a pouch survival rate of 90% at 5 years and 82% at 10 years after redo surgery.[10] Nevertheless, 20–40% of patients may experience subsequent pouch failure.[10,42] For patients with a strong aversion to a permanent stoma, re-redo IPAA is a viable option. Re-redo IPAA has been associated with good QoL at 12 months after ileostomy closure in carefully selected patients; however, these procedures should be performed in experienced centers.[43]

CONCLUSION

Pouch failure is a serious complication after RP or IPAA, with substantial impact on QoL. Transabdominal surgical management of pouch failure is complex but can provide favorable long-term outcomes in selected, motivated, and well-counseled patients who strongly prefer to avoid life with a stoma. Pouch failure is not

the end of the road. Careful etiologic assessment and structured decision-making at the time of reoperation are essential. The decision to create a new pouch or proceed with a revision should be made intraoperatively based on pouch and patient factors. The Remzi classification provides a practical framework for surgical management of pouch failure, improving consistency in reporting and decision-making. Given the technical complexity and perioperative risks, these procedures are best performed in high-volume, multidisciplinary centers with dedicated expertise in pouch surgery.

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