



Mechanical issues of the pelvic ileal pouch

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ABSTRACT

Mechanical complications of the ileal pouch can be created or acquired. This chapter describes the common and clinically relevant mechanical complications of ileal pouch operations. Diagnostic and therapeutic recommendations are provided.

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Introduction

Mechanical complications of ileal J pouches can occur as intraoperative technical complications or become acquired over the ensuing years. Meticulous attention to the technical aspects of pouch creation is critical to minimize the risk of avoidable mechanical issues. Some patient and disease characteristics may inform risk stratification of those who acquire mechanical complications. More important, however, is for the clinician to remain attuned to the signs and symptoms of these conditions so appropriate diagnostic and therapeutic interventions can be implemented.

Mechanical J pouch complications can range in severity from asymptomatic to disabling. In addition to the physical impact of these conditions, there is a substantial emotional burden. Many patients take on the risk of operative management for inflammatory bowel disease to rid themselves of the very symptoms they experience when these complications develop.

The presentations of these mechanical problems can manifest through a variety of signs and symptoms.¹ Accurate diagnosis relies on careful attention to the patient's symptoms as well as imaging and endoscopy. The appropriate imaging modality should be tailored to symptoms but may include CT, static MRI, cine MRI defecography, anorectal manometry and contrast enema studies.² Endoscopy should thoroughly evaluate all aspects of the pouch, including the afferent limb, to assure pathology is not missed. Anorectal examination under anesthesia may be necessary to appropriately evaluate the pouch-anal anastomosis, rectal cuff and anus distal to the dentate line.

Anal stricture

Anal stricture, not necessarily at the pouch-anal anastomosis, may develop in as many as 44% of patients after creation of an ileal J pouch.³ The vast majority of these will develop while the fecal stream is diverted. This seems to be related to the absence of stool flow to maintain a widely patent anastomosis. Most patients are asymptomatic as the stricture tends not to be complete and is wide enough to allow mucous drainage from the pouch, which is typically seen in a diverted patient. In the majority of cases, this diagnosis is readily made and the stricture is easily treated with gentle digital dilation. It is critically important, however, that a digital examination of the pouch-anal anastomosis be performed at the time of ileostomy closure in the operating room. This will identify and treat any stricturing and avoid leaving a distal obstruction in place after ileostomy closure. This could lead to anastomotic leak at the ileostomy closure site or significant symptoms caused by dysfunctional pouch evacuation. The routine contrast study obtained to assess the pouch prior to ileostomy closure will frequently fail to identify this stricture which can be mistaken for a normal anal canal or an artifact caused by the contrast enema delivery system.

Even patients who did not have a pouch-anal anastomotic stricture at the time of ileostomy reversal may develop one in the later post-operative period. Delayed pouch-anal anastomotic stricture occurs in approximately 11% of patients undergoing a J pouch for ulcerative colitis or familial adenomatous polyposis syndrome.⁴ The majority of these strictures are also amenable to dilation in the clinic or operating room. Patients tend to report a change in pouch function with more frequent, lower volume stools, worsening pelvic pressure or pain improved with defecation, or sometimes a higher velocity

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fecal stream. Complete obstruction is also possible and requires urgent intervention.

Delayed strictures can be related to inappropriate surgical technique, ischemia, concurrent use of nonsteroidal anti-inflammatory drugs (NSAIDs), infectious complications at or near the pouch-anal anastomosis, sequela of radiation exposure, cuffitis or Crohn's disease.^{1,5} Up to 15% of patients with a J pouch, initially diagnosed with ulcerative colitis, will eventually have their diagnosis changed to Crohn's disease.⁶ The rate of anal strictures is also higher in morbidly obese patients.⁷

Treatment of anal strictures should follow a stepwise approach.⁸ Those not amenable to dilation in the clinic due to patient discomfort should be undertaken in the operating room with anesthesia. If digital dilation is not effective, Hegar or similar mechanical dilators may be sequentially inserted until a suitable lumen is achieved (typically about 22 mm). Endoscopic balloon dilation and endoscopic needle-knife procedures can also be effective.⁹ In rare cases, mechanical dilation is ineffective, or recurrence becomes so frequent that pouch advancement is necessary.¹⁰

Pouch bar

Pouch bar is an intra-operative technical complication of ileal J pouch creation. Multiple approaches to J pouch formation have been described, but the two most commonly in practice involve stapling the two limbs of the pouch together. The stapler can be passed from the apex of the pouch (curved part of the J), at the planned pouch-anal anastomosis, or from the tip of the J and afferent limb, moving distally towards the apex. An important step of the latter approach is passing an instrument or finger through the apex of the pouch to assure separation of the two limbs occurred throughout the entirety of the pouch.¹¹ If a bridge of tissue remains, this is a "pouch bar." If the bar is small, it may be of little clinical consequence and only discovered on surveillance pouchoscopy. However, if the remaining tissue is of significant size it can result in mechanical pouch dysfunction due to outlet obstruction. The tissue may also become friable and bleed.

Treatment of pouch bar involves dividing the bar. For those that are short, where both the proximal and distal extent of the bar are visible, this can be accomplished with hand-held cautery through an anoscope in the office or operating room. Larger bars can be divided with a stapler or endoscopically with the needle-knife.

Pouch twist and volvulus

Pouch twisting differs from volvulus in that twisting is an intra-operative complication of pouch formation whereas volvulus can occur even in the pouch that was originally properly aligned. When twisting results in occlusion of the mesentery, the result is readily apparent shortly post-operatively as the pouch will become ischemic and ultimately necrotic. However, twisting or rotation of the ileal pouch can be created in such a manner that the mesentery is not compromised, while the bowel becomes obstructed.¹²

Twisting, not significantly involving the mesentery, may not result in clinical consequences and only be identified on imaging.¹³ Alternatively, patients may present with obstructive symptoms leading to a radiographic or endoscopic diagnosis. Management of symptomatic pouch twisting requires operative repair. Two approaches have been described for this. The preferred management, particularly when there is significant tension on the mesentery, is to disconnect the pouch at the pouch-anal anastomosis, reduce the twist and repeat the pouch-anal anastomosis.¹⁴ This technique is preferable in that it assures the pouch mesentery is not compromised after reduction.

An alternative operation has been proposed for pouch twist that may be desirable when the mesentery is not significantly twisted and there is concern for sphincter function after revisional pouch-anal

anastomosis such as in the setting of a prior mucosectomy or marginal pre-operative continence. In this approach, the small bowel is divided proximal to the afferent limb, the twist reduced, and an end-to-end anastomosis to the pouch recreated.¹²

Volvulus has been described after creation of ileal pouch using either J and S pouch configurations.^{15,16} Patients will typically present with acute onset of lower pelvic pain with obstructive symptoms. Often the pouch will feel normal to digital examination as the point of rotation is higher than can be reached. Plain abdominal radiograph may show dilated bowel. CT may reveal a point of obstruction or swirling of the mesentery leading to the pouch. Contrast enema may be diagnostic and therapeutic, showing a point of narrowing within the pouch and significant dilation proximally.

Flexible endoscopy is an important tool in the management of pouch volvulus. Endoscopic decompression and reduction of the volvulus may be feasible, though recurrence has been reported.¹⁷ If endoscopic reduction of the volvulus is successful, it may allow placement of a decompression tube for optimization prior to definitive operative management. An initial endoscopic decompression may also facilitate a minimally invasive approach. Endoscopic evaluation is also important to assure pouch viability as mesenteric volvulus may be associated with intestinal volvulus.

Operative management of pouch volvulus depends on the viability of the pouch. If necrotic, pouch excision is necessary. Recreation of an ileal pouch may be considered, but should be avoided in the acutely inflamed and septic field. If the pouch is viable, however, detorsion and pexy have been described with satisfactory results.¹⁷

Afferent limb syndrome

This term refers to a distal small bowel obstruction in a patient with ileal pouch anal anastomosis (IPAA) caused by acute angulation, prolapse or intussusception of the afferent limb at the junction to the pouch.¹⁸ Its original presentation is attributed to Read and colleagues, who described in 1997 a mechanical obstruction occurring in the afferent limb at the pouch inlet due to acute angulation requiring laparotomy after IPAA.¹⁹ At the time, the authors recommended a side-to-side bypass (enteroenterostomy) as the procedure of choice to minimize the risk of mesenteric damage in case of an angulated afferent limb located posteriorly to the pouch and deep in the pelvis.

Afferent limb syndrome should be suspected in any patient presenting with recurrent episodes of small bowel obstruction. The ultimate diagnosis is based on a combination of endoscopic and radiological assessment. A pouchoscopy is indicated to assess the exact location of the stricture and to assess the condition of the pouch mucosa, especially to rule out Crohn's disease of the J pouch. A Gastrografin enema can be helpful to assess the relationship between the stricture and the proximal bowel to determine if the proximal bowel is dilated, which is usually the case, and clarify the location relative to the pouch. In some cases it is critical to perform a defecography because only during defecation the specific site of mechanical obstruction becomes visible. A CT or MR enterography is helpful in assessing the condition of the remaining small bowel and ruling out abdominopelvic abscesses which might be related to perforating inflammatory bowel disease. The differential diagnosis includes Crohn's disease but more frequently is related to adhesive disease and other mechanical disorders of the ileal pouch including efferent limb syndrome or a pouch dysmotility syndrome such as paradox.

The management of afferent limb syndrome is variable. Endoscopic balloon dilatation can be considered depending on the anatomy of the stricture and the experience of the endoscopist. However, in case of endoscopic dilatation failure, surgery should be considered. There are also clinical presentations of afferent limb syndrome which are not technically amenable to endoscopic dilatation based on radiographic or endoscopic evaluation, and these patients should undergo operative management. The patient should be aware that any

revisionary pouch surgery can be complicated by intraoperative pouch ischemia or other ileal pouch injury potentially requiring pouch excision and permanent ileostomy. In some cases, the patient may prefer having a permanent ileostomy with or without pouch excision instead of embarking upon an additional major surgical procedure with its inherent risks and uncertainties particularly among those with an extensive personal surgical history. In a series of 18 patients, 9 underwent initial balloon endoscopic balloon dilatation. The size of the balloon used was 20 mm. The number of endoscopic dilatation sessions ranged between 1 and 4, and 4 patients required repeated dilatations. Eight patients from the same series needed surgery including resection of the angulated bowel in 3, pexy of the pouch in 2, pouch excision with end ileostomy in 2 and mobilization of the pouch with enteropexy at the time of stoma closure in 1. After exclusion of patients undergoing pouch excision, the remaining 6 patients remained free from afferent limb syndrome recurrence after a median follow-up of 2.7 years.²⁰

Efferent limb syndrome

This term describes a dysfunctional or excessively long efferent limb, which partially obstructs the outlet of the pouch. The traditional presentation of efferent limb syndrome involves a patient with an S-pouch where an excessively long distal ileal spout was left at the time of pouch construction. The initial description of efferent limb syndrome reported that more than 50% of patients with S-pouch required catheterization of their reservoir to foster evacuation, primarily because of the length of the efferent limb.²¹ It is therefore recommended that the length of the efferent spout of an S-pouch should not exceed 2–2.5 cm. However, it is also accepted that the efferent spout can become elongated over time. The elongated efferent limb can then develop a kink leading to outlet obstruction.

Another subset of patients who can develop efferent limb syndrome includes individuals with an excessively long rectal stump resulting in an ileal pouch-rectal anastomosis rather than a pouch-anal anastomosis. Possible symptoms include bloating, dyschezia, abdominal pain and a sense of incomplete evacuation. Patients with mechanical efferent limb syndrome more frequently present with dyschezia and a sense of incomplete evacuation. Those with pouch-rectal anastomosis,²² are more likely to have symptoms of persistent inflammatory bowel disease. It is also possible that efferent limb syndrome is a component rather than the single cause of pouch failure. In a series of 26 patients with efferent limb syndrome 19 had concurrent pouch complications including afferent limb syndrome, pouchitis, cuffitis or pouch stricture.²²

Similar to the case of afferent limb syndrome, the diagnosis of efferent limb syndrome is established based on a combination of endoscopy, contrast study of the pouch, defecography, manometry and CT or MR enterography. In the majority of cases surgical correction through an abdominal approach is preferable. Most series have small numbers, which makes it difficult to elaborate the specific operation for the individual case. In general, revision using the original pouch is preferable and the creation of a new ileal pouch should be considered only when the original pouch is not usable. A diverting ileostomy is an inherent component of revisionary pouch surgery. Sometimes an initial diverting loop ileostomy is created a few months before pouch revision to improve quality of life and possibly facilitate pelvic dissection. In the largest series of transabdominal redo ileal pouch surgery for failed restorative proctocolectomy, 116 out of 502 patients were operated for obstruction associated with the ileal pouch. Separate outcomes were not reported for this subset of patients but the overall redo pouch success rate defined as continued anal function after a mean follow-up of 7 years was 80%. Independent factors associated with redo pouch failure were onset of any postoperative complications and postoperative pelvic sepsis which increased the probability of pouch failure by a hazard ratio of 3.7.²³ In

another series of 117 abdominal pouch salvage operations, there were 73 cases of non-septic indications for revisionary pouch surgery, either alone or in combination with other causes of pouch dysfunction, which were associated with a 5-year pouch survival of 85%. In particular, there were 5 pouch failures out of 41 cases of revisionary pouch surgery due to retained rectal stump, and one failure out of 16 cases of S-pouch revision.²⁴ In another series on surgical management of efferent limb syndrome, 7 out of 8 patients had functioning IPAA after a mean follow-up of 3.4 years.²²

Paradox

Failure of puborectalis muscle relaxation is possible after restorative proctocolectomy and can cause dyschezia or difficult evacuation. The condition replicates what has been described in individuals with an intact gastrointestinal tract as paradoxical puborectalis contraction, nonrelaxing puborectalis, anismus or paradox. Patients with dyschezia after IPAA should be investigated with anorectal physiology testing.²⁵ In particular, they should undergo pressure studies (mean resting pressures and mean squeeze pressures), volume studies (rectal inhibitory reflex, sensation volume, urge volume, maximum tolerated volume and compliance) and defecometry studies (intrapouch pressure, anal canal pressure, and electromyographic tracing during squeezing and straining). Paradox is diagnosed when the anal canal pressures are equal to or greater than the intraluminal pouch pressures during straining on defecometry studies. Paradox after IPAA is a rare diagnosis requiring a high index of suspicion. In the largest case-series to date, 15 out of 40 patients (38%) received an initial diagnosis of small bowel obstruction, resulting in at least one laparotomy with lysis of adhesions in 8 patients, where intraoperative findings indicated diffusely dilated small bowel and dilated pouch without detection of a specific transition point, which is suggestive of paradox.²⁶ Clinicians should have a low threshold to perform anorectal testing in patients presenting with symptoms suggestive of small bowel obstruction whose imaging studies indicate small bowel dilatation in the presence of a dilated ileal pouch. This may help avoid an unnecessary laparotomy. The treatment of paradox after IPAA should not be surgical and frequently resolves with pelvic floor physical therapy. In an earlier series, biofeedback was associated with paradox resolution and return to baseline defecation pattern in 9 out of 11 treated patients.²⁷

Conclusions

Mechanical complications following IPAA are generally difficult to diagnose but can be treated and often times resolved or improved. In the properly selected patient, revisionary pouch surgery is associated with an approximately 80% success rate. Paradox should be considered in the differential diagnosis of the patient presenting with small bowel obstruction and preferentially treated with pelvic floor physical therapy.

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