

# Complications Related to J-Pouch Surgery

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**Abstract:** Restorative proctocolectomy with ileal pouch–anal anastomosis is the gold-standard surgical procedure for familial adenomatous polyposis, refractory ulcerative colitis, and colitis-associated dysplasia requiring colectomy. Numerous adverse sequelae are associated with J-pouch surgery, including anastomotic leak, stricture, and fistula formation, among other complications. Pouch failure due to structural, inflammatory, or functional complications represents a challenge to both physicians and patients. Symptom assessment should be combined with endoscopic, histologic, and radiographic examinations to make an accurate diagnosis of J-pouch–related complications.

Restorative proctocolectomy with ileal pouch–anal anastomosis is the gold-standard surgical procedure for familial adenomatous polyposis and inflammatory bowel disease, including refractory ulcerative colitis, ulcerative colitis with neoplasia, indeterminate colitis, and colitis-associated dysplasia.<sup>1</sup> Two commonly fashioned pouch configurations are J- and S- pouches. The J-pouch is created by using 2 loops of small intestine, each measuring approximately 15 to 18 cm in length. The pouch is typically stapled to the top of the anorectal ring in an area known as the rectal cuff or the anal transitional zone, as this area can contain colonic as well as anal canal lining tissue. The J-pouch is the most commonly constructed pelvic pouch because it can be connected with staples (vs being hand-sewn), and long-term efferent limb complications are less frequent compared with the S-pouch. Additionally, the J-pouch requires a shorter length of intestine, is efficient, and is easier to create. However, the J-pouch is also associated with a variety of structural, inflammatory, and functional complications. A classification system for ileal pouch disorders has been previously suggested (Table).<sup>2</sup> Postoperative surgical and inflammatory disorders include surgical site infection, anastomotic leak, stricture, fistula, pelvic abscess, small bowel obstruction, pouchitis, cuffitis, and Crohn's disease (CD) of the pouch. Less frequently reported complications include afferent limb syndrome, efferent limb syndrome, and pouch prolapse. Functional disorders include irritable pouch syndrome, incontinence, paradoxical contraction (also called anismus or dyssynergic defecation), impaired

## Keywords

Anastomotic leak, Crohn's disease of the pouch, floppy pouch complex, ileal pouch–anal anastomosis, J-pouch, stricture

**Table.** Classification System for Common Ileal Pouch Disorders<sup>2</sup>

<b>Surgical and Mechanical Disorders</b>	<ul style="list-style-type: none"> <li>• Pelvic sepsis and abscess</li> <li>• Pouch presacral sinus</li> <li>• Pouch fistula</li> <li>• Anastomotic stricture</li> <li>• Afferent limb syndrome</li> <li>• Efferent limb syndrome</li> <li>• Pouch prolapse and twisted pouch</li> <li>• Portal vein thrombosis</li> </ul>
<b>Inflammatory and Infectious Disorders</b>	<ul style="list-style-type: none"> <li>• Pouchitis</li> <li>• Cuffitis</li> <li>• Crohn's disease of the pouch</li> <li>• Proximal small-bowel bacterial overgrowth</li> <li>• Inflammatory polyp</li> </ul>
<b>Functional Disorders</b>	<ul style="list-style-type: none"> <li>• Irritable pouch syndrome</li> <li>• Paradoxical contraction</li> <li>• Gastrointestinal pouch inertia</li> <li>• Infertility and sexual dysfunction</li> </ul>

quality of life, infertility, and sexual dysfunction. Each complication has a unique pathophysiology and clinical presentation.

## Structural Complications

### *Anastomotic Stricture*

Anastomotic strictures occur in approximately 1 of 6 cases, and typically in the setting of pelvic sepsis, ischemia, or anastomotic tension.<sup>3</sup> These strictures are caused by fibrosis, followed by partial dehiscence of the ileal pouch–anal anastomosis or marginal anastomotic ischemia.<sup>4</sup> Over time, fibrous webs can result in stricture. These webs can be easily dilated by fingers or by dilators. Routine digital and endoscopic assessment and dilatation during the postoperative visit are recommended.<sup>4</sup> Digital examination may help to identify abnormal anatomy of the anal and perianal areas, such as anal fissure, fistula, abscess, distal pouch, and anal or anastomotic strictures. In addition, palpation of a stiff cuff in patients with a pre colectomy diagnosis of colitis-associated neoplasia is cause for an extensive evaluation, such as with pelvic imaging and deep endoscopic biopsy, to rule out malignancy. Endoscopy plays both diagnostic and therapeutic roles. Any stricture in the distal pouch, anastomosis, or anal canal should be routinely biopsied. Additionally, any symptomatic stricture, including web-like, inflammatory, mixed, or fibrotic stricture, should be treated with dilation with tools such as endoscopic balloon, endoscopic electroincision, or bougie dilation. Whether asymptomatic strictures warrant therapy

is controversial. Nonetheless, we recommend that all strictures, regardless of symptom, be treated, as there is a poor correlation between symptomatology and structural findings. Strictures are most likely to persist, and medical therapy typically has minimal impact on the mechanical stenosis. If a stricture becomes severe, it can cause evacuation difficulty, dilation of the pouch body or afferent limb, and bacterial overgrowth. Strictures seem to occur more often in patients with hand-sewn anastomosis than in patients with stapled anastomosis.<sup>5</sup> Strictures are diagnosed with endoscopy or gastrografin enema (GGE). The mainstays of stricture treatment are control of inflammation; endoscopic stricturotomy, strictureplasty, resection, or balloon dilation; and anastomosis.

### *Afferent Limb Syndrome*

Afferent limb syndrome is the sharp angulation in any segment of distal afferent limb, from the pouch inlet to the previous loop ileostomy site, in the absence of an intrinsic stricture. The complication has been described by Shen and colleagues as a distal small-bowel obstruction caused by acute angulation, prolapse, or intussusception of the afferent limb at the junction to the pouch.<sup>2</sup> Common symptoms include dyschezia, excessive straining, incomplete evacuation, recurrent intermittent abdominal pain, bloating, constipation, and perianal pain. Afferent limb syndrome can be diagnosed by pouchoscopy, water-contrasted pouchogram, barium defecography, or small bowel series. Conservative treatment includes the low-fermentable oligo-, di-, and monosaccharide and polyol diet and biofeedback therapy with concurrent dyscoordination and paradoxical contraction during defecation.<sup>6</sup> Surgical treatment options include resection of the angulated bowel with anastomosis, lysis of adhesions, surgical pexy of the pouch to the pelvic sidewall, pouch mobilization and small bowel fixation, mesh placements, and pouch excision with end ileostomy.<sup>6</sup>

### *Acute Anastomotic Leak*

Anastomotic tension and bowel ischemia are the 2 main risk factors of acute anastomotic leak. The reported leak rate following ileal pouch–anal anastomosis ranges between 5% and 18%.<sup>4</sup> Leaks may develop from the ileal pouch–anal anastomosis or from the tip of the J-pouch. Water-soluble contrast pouchogram, pelvic magnetic resonance imaging (MRI), and examination under anesthesia can help identify the location, feature, and depth of the leak. Immediate postoperative leak usually presents with similar symptoms as pelvic sepsis, such as pelvic pain, fever, or anal discharge.<sup>7</sup> The first-line treatment of a leak includes bowel rest, intravenous antibiotic therapy (with coverage including both aerobic

gram-negative and anaerobic organisms), and drainage. Sinuses or leaks that persist after treatment may be indicative of underlying CD. Some acute anastomotic leaks may evolve into the formation of chronic sinus cavity (ie, pouch presacral sinus). Although typical pouch presacral sinus results from chronic anastomosis or suture line leak, which can be treated with endoscopic sinusotomy, CD patients with sinus have shown to be poor responders to the endoscopic therapy.<sup>8</sup> Thus, in patients with persistent or recurrent pouch sinus, an evaluation of CD of the pouch is needed.

### ***Pelvic Abscess***

Pelvic abscess or sepsis occurs in approximately 25% of patients undergoing ileal pouch–anal anastomosis with J-pouch.<sup>9</sup> Pelvic abscess is reported to be associated with anastomotic leak in 34% of patients, with fistulas in 25% of patients, and with mortality in 3% of patients.<sup>7</sup> Patients with a pelvic abscess usually present with abdominal pain, fever, leukocytosis, and other signs of infection or sepsis.<sup>8</sup> Pelvic abscess is diagnosed with computed tomography (CT) or MRI of the abdomen and pelvis. Intra-abdominal abscesses require treatment with broad-spectrum antibiotics and drainage, either endoscopically, image-guided percutaneously, or surgically.<sup>8</sup>

### ***Pouch Fistula***

The most common forms of pouch fistula are pouch-vaginal fistula, perianal fistula, and enterocutaneous fistula. The etiology of pouch fistula can be technical (suture or anastomotic leak), cryptoglandular (in perianal fistulas), or related to CD. Risk factors include prolonged corticosteroid use, anemia, hypoalbuminemia, hypoxemia from cardiac or respiratory failure, tension on the anastomosis, and ischemia of the bowel ends.<sup>4</sup> Pouch-vaginal fistula is reported to be one of the main causes of pouch failure. Patients with pouch-bladder fistulas tend to develop recurrent urinary tract infections and pneumaturia. Nocturnal incontinence or spotting is common. The diagnosis of pouch fistula is often made by clinical history, endoscopy, MRI, CT, or GGE. Fistulas associated with CD should be managed with multidisciplinary approaches, including medical (eg, antibiotics, immunomodulators, biologic agents), endoscopic (eg, endoscopic fistulotomy), or surgical (eg, seton placement) therapy. Simple perianal fistulas are typically treated with fistulotomy or seton placement, whereas complicated fistulas require surgery with construction of a transanal-ileal advancement flap.<sup>4</sup> Untreated pouch fistula can lead to pelvic sepsis, CD of the pouch, or pouch failure. Surgical intervention may be needed in patients with generalized peritonitis or complex pouch-cutaneous fistulas.<sup>4</sup>

### ***Anastomotic Pouch Sinus***

Anastomotic pouch sinus is a relatively less common complication of J-pouch surgery. It is usually seen as a later presentation of an initial anastomotic leak. The reported frequency of anastomotic pouch sinus ranges from 2.8% to 8.0%.<sup>10</sup> Common clinical manifestations are low-grade fever, night sweat, failure to thrive, perianal pain, pelvic pressure or discomfort, or tailbone pain. Some patients may remain asymptomatic, whereas others can present with symptoms such as pelvic sepsis, CD of the pouch, pouchitis, or refractory cuffitis.<sup>11</sup> Anastomotic pouch sinus is most commonly located at the ileal pouch–anal anastomotic site, often in the presacral space. Anastomotic pouch sinus is usually diagnosed on water-contrasted pouchogram. Abnormal pouchogram findings include strictures, noncontained leaks, fistulas, and mucosal abnormalities.<sup>12</sup> Treatment modalities include observation, drainage, unroofing of the sinus, sinus closure, endoscopic sinusotomy,<sup>8</sup> and formation of a diverting ileostomy, depending on the severity of symptoms.<sup>9</sup>

### ***Floppy Pouch Complex***

Floppy pouch complex (FPC) is defined as the presence of pouch prolapse, afferent limb syndrome, redundant loop (ie, too-long intestinal loop proximal to the pouch inlet revealed by GGE or barium defecography), and folding pouch on pouchoscopy, GGE, or MRI defecography.<sup>6</sup> FPC represents a form of afferent limb syndrome, which may or may not cause obstruction. The main symptoms of FPC are dyschezia, incomplete evacuation, and bloating. The etiology and pathogenesis of FPC and its phenotypes are unclear. Each phenotype has different findings on endoscopy, radiography, and manometry, although there are overlapping clinical presentations and risk factors among the phenotypes of FPC. Recent studies have shown that risk factors include a lower body mass index, lower peripouch fat area, and female sex.<sup>13,14</sup> Management options include lifestyle modifications (eg, the avoidance of excessive toilet time and straining; women may apply vaginal maneuvers that push the posterior wall of the vagina backward during defecation); alterations in stool consistency; physical therapy retraining; and various medical, endoscopic, and surgical therapies.

### ***Pouch Septum***

Pouch septum may result in bleeding, tenesmus, anal pain, or evacuation difficulty. The complication is primarily diagnosed with pouchoscopy. A known treatment modality is an endoscopic technique that uses a laparoscopic stapler to divide the septum transanally. We recently introduced an endoscopic technique in which the mucosal bridge was successfully treated with complete septectomy utilizing a needle knife.<sup>15</sup>

## Inflammatory Complications

### *Pouchitis*

Pouchitis is the most common long-term complication of patients with a J-pouch. Clinical manifestations include abdominal cramping, increased stool frequency, urgency, incontinence, nocturnal seepage, pelvic discomfort, and arthralgia.<sup>5</sup> Similar symptoms can be seen in patients with CD of the pouch, cuffitis, pouch sinus, or irritable pouch syndrome. The severity of symptoms is not directly related to the degree of endoscopic or histologic inflammation of the pouch.<sup>16</sup> Endoscopy is the most reliable diagnostic tool. A combined assessment of symptoms and endoscopic and histologic features should be taken into account to diagnose pouchitis. The complication is primarily treated with antibiotics; pouchitis that is refractory to antibiotics should be treated with anti-inflammatory agents, immunomodulators, and biologic therapy.

### *Crohn's Disease of the Pouch*

CD of the pouch has 3 phenotypes: inflammatory, fibrostenotic, and fistulizing.<sup>2</sup> Each phenotype is associated with different risk factors and clinical presentations. The etiology and pathogenesis of CD of the pouch are unclear. Reported risk factors include a family history of CD, smoking, longer duration of pouch, preoperative diagnosis of indeterminate colitis, and seropositivity for anti-*Saccharomyces cerevisiae* antibodies immunoglobulin A.<sup>17-20</sup> Clinically, CD of the pouch can present as persistent abdominal pain, weight loss, nausea, anemia, failure to thrive, fever, or fistula drainage. A collaborative endoscopic evaluation, histologic assessment, radiographic imaging, and examination under anesthesia are often required for accurate diagnosis, disease classification, management, and prognosis.<sup>21</sup> Treatment with pharmaceutical agents for CD of the pouch includes infliximab (Remicade, Janssen),<sup>22</sup> budesonide,<sup>23</sup> adalimumab (Humira, AbbVie),<sup>23</sup> and vedolizumab (Entyvio, Takeda).<sup>24</sup> Despite aggressive medical therapy, approximately 10% to 48% of patients develop intractable CD in the ileal pouch, requiring excision of the pouch with a permanent end ileostomy.<sup>25-28</sup>

### *Cuffitis*

Cuffitis is common in patients with J-pouch, particularly in patients with stapled anastomosis without mucosectomy. Cuffitis can result from residual ulcerative colitis in the rectum, CD of the pouch, prolapse, or malignancy, and can cause symptoms mimicking pouchitis. Frequently reported symptoms include large-quantity bloody bowel movements, increased stool frequency, urgency, incontinence, pelvic discomfort, nocturnal

seepage, and abdominal cramping.<sup>10</sup> Cuffitis is diagnosed with a combination of clinical, endoscopic, and histologic examinations. Treatment modalities include mesalamine suppositories, topical lidocaine or corticosteroid agents, and occasional endoscopic injection of long-acting corticosteroids.<sup>10</sup>

## Functional Complications

### *Irritable Pouch Syndrome*

Irritable pouch syndrome is characterized by increased stool frequency, urgency, and abdominal pain, and is a syndrome of exclusion; the disorder is diagnosed in patients who do not meet the diagnostic criteria for cuffitis or pouchitis. The etiology and pathophysiology are unclear, but may be related to psychosocial factors,<sup>29</sup> visceral hypersensitivity as measured by electronic barostat,<sup>30</sup> and enterochromaffin cell hyperplasia of the pouch mucosa.<sup>31</sup> Treatment options include diet modification (eg, low-fat, low-carbohydrate diet; avoidance of dairy products) and therapeutic agents such as antidiarrheals, antispasmodics, tricyclic antidepressants, and oral or topical narcotic agents.<sup>10</sup> Pouch failure is uncommon with irritable pouch syndrome.

### *Paradoxical Contraction*

Paradoxical contraction may result in dyschezia or incomplete evacuation.<sup>32</sup> It is diagnosed by GGE, MRI or barium defecography, or manometry, and is typically treated with biofeedback therapy.

### *Gastrointestinal Pouch Inertia*

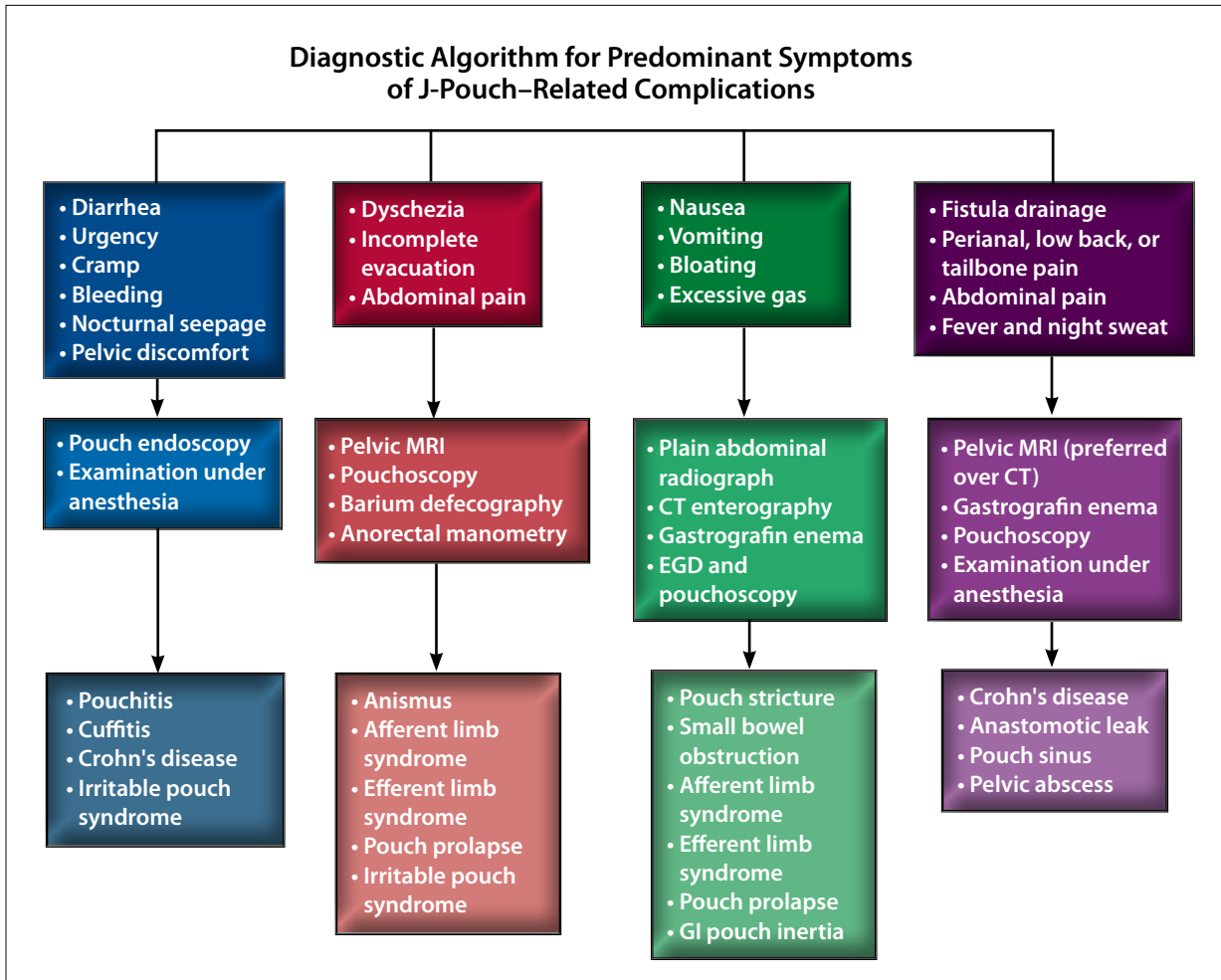
Gastrointestinal pouch inertia, or pseudo-obstruction, presents as nausea, vomiting, or bloating.<sup>31</sup> It is diagnosed by a kidney, ureter, and bladder radiograph; CT enterography; or GGE, and is managed with polyethylene glycol, lactulose, or surgery.

### *Poucholgia Phantom*

Poucholgia phantom is characterized by perianal pain and is identified by endoscopic probing or differential nerve block. The disorder is treated with albuterol inhaler, gabapentin or pregabalin (Lyrica, Pfizer), belladonna and opium suppository, or nerve ablation.<sup>31</sup>

### *Other Functional Complications*

Other, less common J-pouch-related functional complications include incontinence, sexual dysfunction, infertility, depression, anxiety, and poor quality of sleep. Combined endoscopic, manometric, imaging, and histologic evaluations are often needed. Treatment is still empiric. A close follow-up with a health care provider is important.



**Figure.** A diagnostic algorithm of J-pouch–related complications.

CT, computed tomography; EGD, esophagogastroduodenoscopy; GI, gastrointestinal; MRI, magnetic resonance imaging.

### Summary

Recognition and appropriate diagnosis of J-pouch–related complications are imperative for proper management and prognosis. Symptoms are not specific and may overlap. In order to make a correct diagnosis, symptom assessment should be combined with endoscopic, histologic, and radiographic examinations. Early intervention ensures pouch salvage and makes a positive impact on disease course, response to treatment, and, potentially, mortality. A diagnostic algorithm is proposed in the Figure.

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