Abdominal Approaches to Rectal Prolapse

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Abstract

Rectal prolapse is a debilitating condition with a complex etiology. Symptoms are most commonly prolapse of the rectum and pain with bowel movements or straining, with worsening fecal incontinence over time due to progressive stretching of the anal sphincters. Physical findings are fairly consistent from patient to patient—most notably diastasis of the levator ani muscles, deep pouch of Douglas, redundant sigmoid colon, a mobile mesorectum, and occasionally a solitary rectal ulcer. Evaluation includes a physical exam or imaging demonstrating the prolapse, and evaluating for other causes of pelvic floor dysfunction. Multiple surgical repairs are available, but treatment must be individualized based on patient symptoms and the presence or absence of constipation or other pelvic floor disorders. Mesh repairs have shown promising results, but carry the added risks of mesh erosion, infection, and mesh migration. The optimal repair has not been clearly demonstrated at this time.

Keywords

- rectal prolapse
- rectopexy
- mesh repair
- laparoscopy

In his 1890 description of operative repair of complete rectal prolapse, Caddy used the following words to describe the physical appearance of his patient's rectal prolapse: "A complete prolapse of the rectum, six inches in length, and eleven inches in circumference. The mucous membrane, which was in numerous circular folds, was covered with slimy mucus, and was bleeding slightly at several small points."¹ With that description, it is easy to see that rectal prolapse, or rectal procidentia, is a morbid condition characterized by protrusion of the rectal wall through the anus.²

Definition and Associations

True rectal prolapse is the protrusion of all rectal layers through the anal sphincters.³ The prolapse is classified by the degree of severity. The categories in order of decreasing severity include complete full-thickness rectal prolapse, mucosal prolapse, and internal or occult prolapse.⁴ The leading clinical sign is the protrusion itself, with additional symptoms including constipation, sensation of incomplete evacuation, rectal bleeding, rectal pain, incontinence, urgency, and tenesmus.⁵

Multiple associated findings on history and physical exam are seen in patients with rectal prolapse. A history of obstetric

trauma or previous anorectal surgery is often present. Other associated abnormalities include spina bifida, prior back injury or surgery, psychiatric illness, old age, and female gender. Symptoms of fecal incontinence and constipation are reported in up to 75% and 25–50%, respectively, of patients with prolapse.³ Patients often have other pelvic floor derangements including rectocele, cystocele, enterocele, and uterine prolapse, and a complete evaluation of constipation and prolapse should be performed.⁶ Solitary rectal ulcer syndrome is directly related to rectal prolapse and is caused by injury and ischemia of the mucosa after internal prolapse of the rectal wall.⁷

Etiology

The cause of rectal prolapse is not completely understood and, like many poorly understood diseases, many procedures (more than 100) have been described for its treatment. The two accepted theories regarding the etiology of rectal prolapse involve either a sliding hernia that protrudes through a defect in the pelvic floor⁷ or a circumferential intussusception of the upper rectum and rectosigmoid colon.⁶ These theories are based on the anatomic defects associated with rectal prolapse: diastasis of the levator ani muscles, deep pouch

of Douglas, redundant sigmoid colon, lack of normal fixation of the rectum with a mobile mesorectum, and a patulous anus.^{4,8} Additionally, connective tissue disorders and high parity are reported to be predisposing factors. Although it is commonly thought that rectal prolapse is a consequence of multiparity, approximately one-third of female patients with prolapse are nulliparous.

Demographics

Rectal prolapse occurs in both the pediatric and adult population. In adults, the peak incidence is after the fifth decade, and women are more commonly affected than men.⁶ Rectal prolapse is rare in patients younger than 50 years. While there is usually adequate levator ani muscle strength in this population, prolapse is most often seen in those patients who require chronic neuroleptics and antidepressants for psychiatric disease.⁹ The peak age of incidence is the seventh decade in women. Men commonly develop prolapse before the age of 40.

Clinical Workup

On physical exam, the prolapse may be easily visible or present with Valsalva. Concentric folds and a sulcus between the anus and prolapsed rectum are seen with full-thickness prolapse. Digital rectal exam is used to assess sphincter tone and lead point lesions. The presence of a cystocele or enterocele is assessed by vaginal exam.³ A colonoscopy should be performed to exclude lead point lesions or other associated pathology. In those with severe constipation, a colonic transit study should be performed to determine the etiology. If there are symptoms of obstructive defecation, magnetic resonance imaging (MRI) defecography may be used to determine anorectal angle, size of the hernia, and anal canal length; however, these values have little impact on clinical decision making.⁵ However, MRI can reveal additional pelvic floor abnormalities which may need to be addressed as well. Additionally, anal manometry, electromyography, and endoanal ultrasound may be used to evaluate for sphincter function, obstructed defecation, or dyssynergia.³

Treatment

Most of the treatment options for rectal prolapse are surgical. Dietary changes and correction of constipation, diarrhea, or improper stooling habits should always be recommended as a first-line therapy, but by the time complete prolapse is clinically evident, these measures are less likely to be ineffective. In fact, Cunin et al studied continence as an outcome for a subset of patients who were not offered surgery and compared this with those who were treated with surgery. In those who did not undergo operative intervention, their continence status rarely improved and often degraded. There was no chance of improvement in those patients who had prolapse symptoms for over 4 years.¹⁰ Some nonsurgical options continue to be explored, including anal plugs, which can be utilized safely with some symptomatic improvement.¹¹

Table 1 Surgical options for rectal prolapse

Perineal approaches
Anal encirclement (Thiersch procedure) ¹² Mucosal sleeve resection (deformed procedure) ¹² Perineal proctosigmoidectomy (Altemeier procedure) ^{14,15}
Abdominal approaches: open/laparoscopic
Suture rectopexy ¹⁶ Mesh rectopexy:
- Rectopexy with posterior fixation and anterior mesh sling ⁸ (Ripstein) - Rectopexy with posterior fixation and posterior mesh sling ¹⁷ (Wells) - Rectopexy with ventral fixation and double anterolateral mesh sling ¹⁸ and modified ventral rectopexy ¹⁹ (Orr-Loygue)
Resection rectopexy with or without mesh ²⁰

Surgical Options

There are numerous described surgical procedures for the correction of rectal prolapse, each with their own advantages and disadvantages. Most techniques have not gained widespread acceptance. In fact, many are performed only by the specialists who developed them. When considering surgical repair of rectal prolapse, the operation must be tailored to the patient's unique constellation of comorbidities and symptoms. Approaches to repair are either perineal or transabdominal (►Table 1).¹² Transabdominal approaches can be open, laparoscopic, or robotic.^{13,21} For low-risk patients, a transabdominal approach is preferred because of a lower recurrence rate. For higher-risk patients, a perineal approach can be utilized with satisfactory results and a low risk of morbidity.^{2,13}

Laparoscopy has been found to be safe and as effective as open surgery for many operations. Length of stay and postoperative pain are decreased in comparison to open approaches for rectal prolapse, which follows the current trend in outcomes for laparoscopy for benign and malignant colonic disease.²² Previous abdominal surgery, irreducible prolapse, and intolerance to pneumoperitoneum are relative contraindications to a minimally invasive transabdominal approach.

Perineal Approaches

Perineal approaches for the treatment of rectal prolapse are used in particular for those patients who are elderly or have multiple comorbid conditions.²³ The two most common approaches are the Delorme procedure and the perineal rectosigmoidectomy. Each of these is effective in select patient populations and is covered in detail in other sections.

Rectal Mobilization

The patient is initially placed in the modified lithotomy position. Regardless of the planned approach, once the abdomen is opened or laparoscopic ports are placed, the first goal

of the operation is adequate mobilization of the rectum from the sacral promontory to the pelvic floor. This is performed by incising the peritoneum bilaterally along the rectosigmoid colon and entering the anterior and posterior planes of the rectum. The posterior plane is developed to the level of the levator muscles, and the anterior plane is developed to the level of the vaginal vault in women and the seminal vesicles in men.^{20,24} More recent adaptations avoid division of the lateral stalks in attempt to preserve autonomic innervation and decrease postoperative constipation and sexual dysfunction.³ Speakman et al identified division of the lateral ligaments as a risk factor for postoperative constipation and they noted that rectal electrical sensory thresholds were increased in those who underwent ligament division.²⁵ Alternatively, Mollen et al studied rectal mobilization and lateral ligament division and noted no effect on postoperative functional outcome from division of the lateral ligaments. They did note that rectal mobilization itself doubled colonic transit time, but this was independent of ligamentous division.²⁶ Rectal mobilization is a key component in the transabdominal treatment of rectal prolapse and further additions have been sought to ensure repair durability. Rectal mobilization per se also helps in fixating the rectum to the sacrum due to postoperative pelvic adhesions.

Suture Rectopexy

Suture rectopexy was described by Cutait in 1959. After rectal mobilization, the lateral ligaments are fixed to the presacral fascia using nonabsorbable suture material. Two to three sutures are placed on either side of the rectum to provide fixation without creating rectal stenosis.¹⁶ Heah et al²⁷ described their experience using laparoscopic suture rectopexy without resection in 2000. There were no cases of recurrence in their 25 patients' case series, and none had worsening incontinence following the operation. In 2006, Hsu et al presented a similar study on 12 patients. There were no recurrences or complications, giving credence to the efficacy and safety of the operation.²⁸ Kessler et al reported similar results, but did elect for resection rectopexy in those patients who had a previous constipation history. Of their 32 patients, there were 2 recurrences and 3 postoperative bowel obstructions.²⁹ In 2008, Liyanage et al published their results of rectal mobilization with minimal dissection of the lateral rectal stalks. This was completed through a transverse left lower quadrant incision to perform a rectopexy without resection. There was a 7% recurrence rate and a 9% complication rate, with complications limited to urinary retention and wound infections.³⁰ Magruder et al published an analysis of National Surgical Quality Improvement Program (NSQIP) data on patients who underwent surgery for rectal prolapse. On the whole, patients who had a laparoscopic approach had a lower length of hospital stay and a lower rate of surgical site infections.³¹ A meta-analysis of six studies including 195 patients showed no significant difference in morbidity and recurrence between open and laparoscopic rectopexy. Operative time was significantly longer by approximately 60 minutes, whereas length of hospital stay was shorter by 3.5 days.³²

Resection Rectopexy

Sigmoid resection with rectopexy was described by Frykman in 1955. This procedure combines sigmoid resection with suture rectopexy. After rectal mobilization, the sigmoid colon is resected and a tension-free colorectal anastomosis is created.²⁰ As described earlier, the lateral stalks are fixed to the presacral fascia. Prior to placement of the sutures, the rectum is elevated as high as possible out of the pelvis. The sutures are placed prior to bowel resection and tied after the anastomosis.^{33,34} Resection rectopexy is recommended for patients with significant constipation and or preexisting diverticular disease that would warrant resection. Resection should be avoided in patients with preoperative fecal incontinence.³⁵ A 100 consecutive patient series was described by Stevenson et al where a laparoscopic approach was utilized for diverticular disease. There was a 5% wound infection rate and a 21% rate of overall complications.³⁶ Xynos et al conducted a similar study on laparoscopic versus open resection rectopexy for patients with only rectal prolapse. There was zero recurrence in their 10-patient laparoscopic group at 12-month follow-up, and recovery was quicker in the laparoscopic versus the laparotomy cohort.³⁷ Laubert et al described a 19-year experience of resection rectopexy in their 2012 publication. In it, they described results of 264 laparoscopic resection rectopexy procedures with an 82% improvement in rectal prolapse at 58-month mean follow-up. Four percent of patients had complications requiring reoperation and 19.8% had minor complications.³⁴ In an additional study with 5-year follow-up, resection rectopexy resulted in improved symptoms of obstructed defecation and with zero recurrence in any of the 27 patients.³⁸

Mesh Rectopexy

Anterior Sling Rectopexy

Ripstein and Lanther first described his operative approach to rectal prolapse in 1952 and later modified the procedure to a fascia lata graft and Teflon mesh in 1963. After mobilization of the rectum, the graft is placed around the anterior wall at the level of the peritoneal reflection. The graft is then secured to the presacral fascia with nonabsorbable material 1 cm from the midline on either side. The rectum is then sutured to the sling anteriorly with absorbable suture.⁸ Due to significant postoperative constipation, this procedure has been largely abandoned for those employing a posterior or ventral mesh placement.²³

Posterior Mesh Rectopexy

While the Ripstein procedure was being developed and utilized in the United States, a posterior mesh rectopexy, or Wells procedure, was being investigated in the United Kingdom. In this procedure, the rectum is mobilized as described earlier. A sheet of mesh is fixed to the sacrum with nonabsorbable sutures and wrapped on either side of the rectum with the anterior portion left uncovered. Originally, Ivalon sponge was used, but this is no longer commercially available.¹⁷ A modified Wells technique using other material such as polyester or polypropylene is used. A laparoscopic approach to Wells

rectopexy has been described, with durable results. In a 37-patient series, laparoscopy was successful in 36 of 37 cases. There were no recurrences and fecal incontinence resolved in 11 of 12 patients. In addition, significant constipation occurred in only 5% of patients postoperatively compared with 38% preoperatively.³⁹ This technique has also been described in conjunction with a sigmoid resection in the setting of rectal prolapse and a sigmoid mass. Miyo et al completed this operation through a single-incision laparoscopic approach with good results.⁴⁰

Orr-Loygue Procedure

The most recent development in fixation with mesh is via rectal suspension to the sacral promontory. The initial description of ventral rectopexy known as the Orr-Loygue procedure involved full mobilization of the rectum with mesh fixed to the anterolateral rectal wall and suspended to the sacrum.¹⁸ This procedure was modified by D'Hooe in 2004 to involve dissection of only Denonvillier fascia without posterior and lateral dissection and subsequent decreased risk for autonomic denervation. The mesh is sutured to the anterolateral aspect of the distal rectum and fixed to the sacral promontory. This procedure also offers the potential to address a concomitant genital prolapse. This is achieved by making a slit in the mesh and fixating the intact end to the sacral promontory. One limb is used for the anterior rectopexy and the other limb for a sacrocolpopexy.⁴¹ Douard et al described the results of 31 consecutive patients who underwent the Orr-Loygue rectopexy. There were zero recurrences, with a significant improvement in rates of continence for their patient population.⁴² A series of 73 patients treated with Orr-Loygue showed a 4.1% recurrence rate with 5.5% patient satisfaction failure rate, indicating the effectiveness of this operation.⁴³ The procedure has also been utilized in children with rectal prolapse, with zero recurrences in eight patients at 6-year follow-up.⁴⁴

Choice of Mesh

Current evidence supporting mesh rectopexy is mainly focused on the use of synthetic mesh. Polypropylene and polytetrafluoroethylene meshes have been routinely used. Prosthetic erosions and infection are challenging complications associated with the use of synthetic mesh. Biologic mesh is capable of soft-tissue remodeling and replacing native tissue. Franklin et al have described the use of porcine small intestinal submucosa as a biologic mesh for ventral hernias while operating in infected and contaminated fields. At 5-year follow-up, there were 7 recurrences in the 116 patient cohort.⁴⁵ The 2008 National Institute of Clinical Excellence (NICE) review of surgery for pelvic organ prolapse demonstrated that mesh complications are related to the type of mesh used and are a function of the follow-up time.⁴⁶ The report showed that erosion rate was zero for biologic mesh (xenografts), but rose to 7% for synthetic mesh and to 14% for combined synthetic/biologic mesh. There was a higher failure rate for biologic mesh compared with synthetic mesh (23 vs. 9%). Sileri et al aimed to evaluate surgical and functional results of an abdominal, minimally invasive, nerve-sparing technique using biologic mesh. Thirty-four patients in their study underwent laparoscopic ventral mesh rectopexy. Constipation and incontinence improved significantly for this patient population, but one patient did require a conversion to an open laparotomy. Two patients experienced prolapse recurrence or persistence with a mean follow-up of 12 months. No mesh-related complications were observed.⁴⁷ Ogilvie et al compared synthetic and biologic mesh products for laparoscopic ventral rectopexy. Results were comparable in a 29-patient case-matched series.⁴⁸ Superiority of one mesh over the other has not yet been demonstrated in the literature.⁴⁹

Comparison

Many studies exist comparing techniques for treatment of rectal prolapse. A selection of the available literature is presented in ► **Table 2**.

Table 2 Comparison of techniques for repair of rectal prolapse

Comparison	Authors	Efficacy
Laparoscopic sutured rectopexy vs. mesh rectopexy	Novell et al ⁵⁰	Both were equivalent with regard to recurrence and had similar complication rates
Rectopexy vs. no rectopexy after rectal mobilization	Karas et al ⁵¹	Rectopexy superior (1.5 vs. 8.6%) in preventing recurrence with no difference in complications
Mesh rectopexy vs. sutured rectopexy	Sahoo et al ⁵²	Surgical results are equivalent between sutured and mesh rectopexy
Laparoscopic rectopexy vs. perineal rectosigmoidectomy	Lee et al ⁵³	The approaches were equivalent with regard to recurrence (12.5 vs. 11.4%; $p = 1$)
Orr-Loygue procedure vs. Delorme procedure	Marchal et al ⁵⁴	Recurrence rate was improved by the Orr-Loygue procedure (4 vs. 23%), but with a higher complication rate (33 vs. 15%)
Robotic vs. laparoscopic ventral mesh rectopexy	Ramage et al ²¹	Recurrence rates and complication rates were equivalent

Complications

Most complications after mesh rectopexy are minor and include those such as urinary tract infection and ileus.^{41,55} The most feared complications after rectopexy are mesh-related complications. Mesh detachment, mesh infection, and mesh erosion are rare⁵⁶; however, pelvic abscess, fistula formation, and death due to mesh infection have occurred.^{43,54} Patients may present with anorectal discharge, fecal incontinence, constipation, pelvic sepsis, or abdominal or pelvic pain. The exact incidence of mesh migration is unknown and may be seen up to 10 years after the initial surgery.⁵⁶ Abdominal CT or pelvic MRI along with physical exam, anorectoscopy, or endorectal ultrasound is used for evaluation of mesh complications.⁵⁶ Repair of mesh-related complications has been performed from both a perineal and transabdominal approach. Mesh migration has been repaired via both local transanal excision and transabdominal approaches.^{56,57} Badrek-Amoudi et al utilize a laparoscopic transabdominal approach, which they described after their experience of mesh complications in a 45-patient series. All patients in their series had functional improvement.⁵⁷

Conclusion

Rectal prolapse continues to be a debilitating condition with many available options for repair. Laparoscopic ventral mesh rectopexy without posterior rectal mobilization and preservation of the lateral ligaments is becoming the preferred transabdominal procedure for rectal prolapse due to its lower recurrence rate, decreased rate of postoperative constipation, ability to address additional pelvic floor abnormalities, as well as avoidance of colonic anastomoses and the subsequent risk of anastomotic leak. The type of mesh used continues to be investigated with no clear evidence of superiority of one over the other. The choice of mesh should be based on a balance between the higher recurrence rate with biologic mesh versus the higher rate of infection and erosion with synthetic mesh. Mesh-related complications are rare but are challenging to correct. Surgery to correct these abnormalities should be undertaken by surgeons with considerable experience in dealing with these problems.

Ultimately, both perineal and transabdominal approaches should be learned and each operation tailored to the individual. Patient factors such as abdominal girth, constipation, incontinence, age, and fitness for surgery all affect the preferred approach.

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