



The Surgical Management of Rectal Prolapse

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Published online: 8 February 2020
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Abstract

Rectal prolapse is a debilitating condition predominant in the elderly female population. Etiological factors include age, multiparity, and anorexia. The diagnosis is clinical but a full assessment of pelvic floor function and the exclusion of organic disease are essential prior to operative intervention. As concomitant urogynecological disorders are present in a third of patients, discussion in a pelvic floor multidisciplinary team forum is mandated. Surgical correction can be performed using a perineal or an abdominal approach. The heterogeneity of trial design in the current literature makes direct comparison of the techniques difficult. Perineal approaches are generally preferred in high-risk, elderly patients as they can often be performed under regional anesthesia. The evidence surrounding the technical aspects of abdominal rectopexy, such as the need to perform a colectomy or the decision to preserve/divide the lateral ligaments, is examined in this review. In abdominal surgery, the use of minimally invasive laparoscopic techniques and enhanced recovery protocols are recommended.

Keywords Rectal prolapse · Delormes' procedure · Altemeier procedure · Ventral rectopexy

Introduction

Epidemiology

Rectal prolapse, or anal procidentia, is the protrusion of the rectal mucosa (mucosal prolapse) or the entire rectal wall (complete rectal prolapse) through the anal canal. Studies report an incidence of 2.5 cases per 100,000 population per year, but this is likely to be an underestimate as many mild cases are not reported [1]. The condition peaks in the fourth and seventh decades of life has a strong female preponderance, with only 10–20% of cases occurring in men. Etiological factors include age, multiparity, vaginal delivery, prior pelvic surgery, chronic defecatory disorders, neurological/psychiatric conditions, pelvic floor dysfunction (e.g., paradoxical puborectalis contraction), pelvic floor anatomic defects (e.g., rectocele, cystocele, enterocele), connective tissue disorders, and anorexia nervosa [2–5]. Although rectal prolapse is more common in multiparous women, a third of cases occur in nulliparous females.

Surgically Relevant Anatomy and Physiology

The complex pelvic floor anatomy relating to rectal prolapse is beyond the scope of this review but has been extensively described elsewhere [6–8]. It is important for the surgeon to appreciate the peritoneal relationship of the rectum, with the upper third of the rectum covered on the anterior and lateral sides, the middle third covered on the anterior aspect, whilst the lower third is completely extra-peritoneal. The surgical anal canal is approximately 4-cm long, starting where the rectum passes through the pelvic floor and ends at the anal verge. The lateral rectal ligaments connect the extra-peritoneal rectum to the lateral pelvic wall and contain a neurovascular bundle. These become attenuated in the presence of rectal prolapse and the preservation or division of this structure during abdominal rectopexy is a source of contention which is considered later in this paper [9].

The mechanism of fecal incontinence in the setting of rectal prolapse is multifactorial. The physical presence of the prolapse through the anal canal causes continuous stimulation of the rectoanal inhibitory reflex, bypasses the normal sphincter complex, and results in stretching of the sphincter muscle fibers, further reducing resting anal tone. Pudendal neuropathy has also been demonstrated in up to 50% of patients with prolapse and may be responsible for denervation-related atrophy of the external sphincter musculature [10]. The end result is a patulous anus which remains open at rest. Although none

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of the prolapse operations directly correct sphincter dysfunction, they frequently improve patient incontinence scores.

Clinical Presentation and Diagnosis

Rectal prolapse is a progressive process which occurs initially during straining at evacuation but eventually can occur when rising to a standing position [11]. Proctidentia rarely presents as a surgical emergency, when the prolapse becomes irreducible, ischemic, and “strangulated.” In most cases, the transition from minor mucosal prolapse to full-thickness disease is slow, with many patients reporting years of defecatory dysfunction and the use of digital maneuvers to help expel feces. Incontinence is reported in over 75% of cases. Other common presentations include painful defecation (27%), rectal bleeding (25%), mucous discharge, incomplete evacuation, and soilage. Women may also complain of symptoms relating to anterior pelvic organ prolapse (15–30%) and/or urinary incontinence (20–50%). These patients should be discussed in a dedicated multidisciplinary forum with urogynecologists before any surgical repair as the conditions should be dealt with simultaneously [12].

The most common sign at physical examination is the full-thickness protrusion of the rectum with the pathognomonic concentric rings (“stacked coins”) which differentiate it from prolapsed grade IV hemorrhoids (Fig. 1). If rectal prolapse is intermittent, it can be elicited with the patient in squatting position and a use of a mirror or sitting on the commode. Administration of an enema might facilitate reproduction of prolapse in cases where simple straining on the commode does not. In the era of smart phones, the patient might be asked to take a digital photo at home. Digital examination shows a patulous anus with low sphincter tone and usual coexisting pelvic floor pathology such as rectocele, cystocele, or uterine prolapse. The patient should be asked to tighten and relax the anal sphincter to assess proper contraction and relaxation of the pelvic floor musculature. It is important to assess the perineum clinically as up to one-third of patients with rectal prolapse will have a concomitant pelvic floor disorder. The presence of other pelvic floor abnormalities can significantly alter the operative approach from procedures addressing solely the rectal prolapse to complex pelvic floor repairs which are beyond the scope of this text [13].

Differential Diagnosis

The main differential diagnoses are prolapsed internal hemorrhoids, rectal mucosal prolapse, solitary rectal ulcer syndrome, and recto-rectal intussusception. There

has been much interest in the pathophysiology of rectal intussusception and the development of full rectal prolapse. Intuitively, one would think that intussusception is the precursor to the disease. In clinical studies, however, very few women with proven obstructed defecation and intussusceptions progress to develop a full prolapse in their lifetime [7, 14].

Investigations

Organic disease, including malignancy and colitis, must be excluded with a colonoscopy prior to surgery. Defecography is an essential part of the preoperative work up as it can detect additional pelvic floor abnormalities (e.g., rectocele and enterocele) and abnormal pelvic floor descent, both of which may influence the surgical approach and perioperative care. Dynamic MR defecography is likely to supersede the classic barium studies in the future as it limits patient irradiation and provides optimal assessment of the anterior and middle pelvic compartments, detecting subtle abnormalities that can be missed with fluoroscopic defecography [15, 16]. One limitation of the technique is that it cannot be performed in patients who are claustrophobic or have non-MR compatible metallic implants.

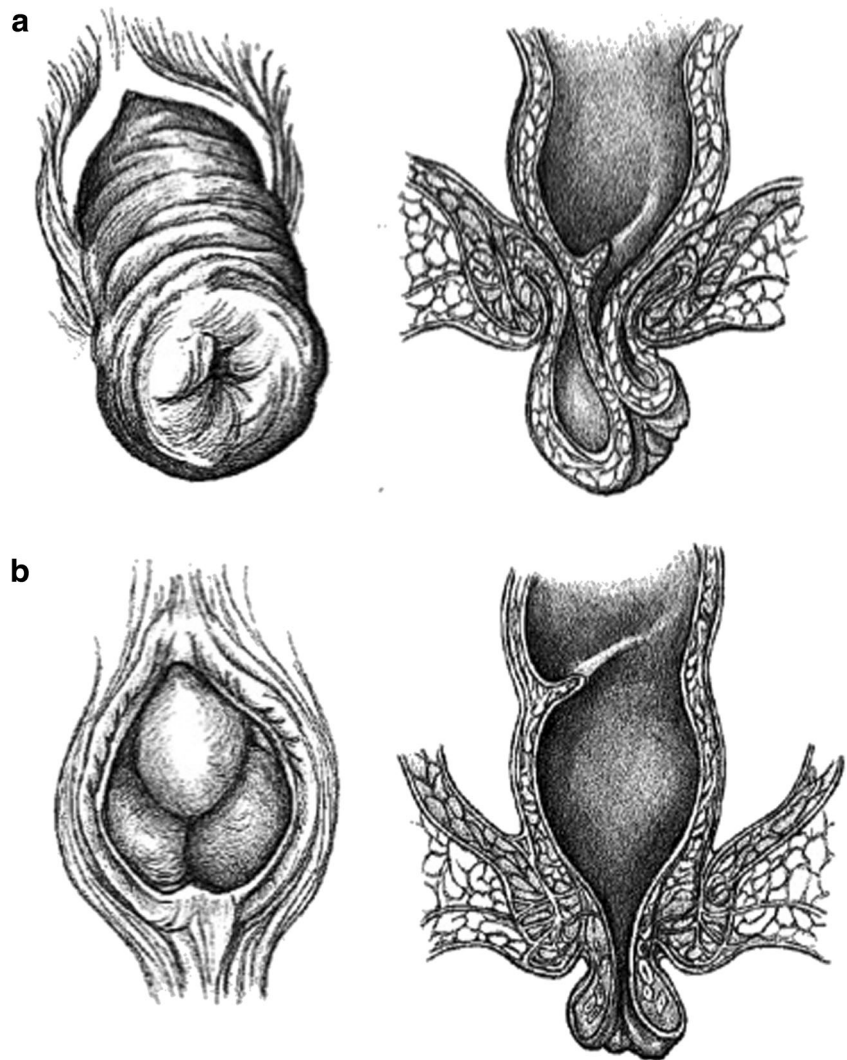
Anal sphincter morphology and physiology may be assessed preoperatively with transrectal ultrasound (TRUS) and anal manometry. In the setting of a large prolapse, manometry results can be difficult to interpret and they rarely change management [17, 18]. TRUS is highly accurate and can detect associated sphincter injuries which may help predict the incidence of postoperative incontinence and identify those who may require further intervention following prolapse surgery [19, 20]. Colonic transit studies should be considered in patients with severe constipation as they may benefit from sigmoid resection in combination with their prolapse procedure.

The Management of Rectal Prolapse

Conservative Measures

Where possible, patients with complete rectal prolapse should be offered corrective surgery as the long-term results of conservative management are poor [21]. Non-surgical interventions, which aim to relieve constipation and regulate bowel function, are useful in the frail patient or as an adjunct to treatment in the operative candidate. Biofeedback as a single modality will not improve incontinence or constipation in patients with rectal prolapse. This technique, however, may be useful in the postoperative rehabilitation of those with evidence of coexisting pelvic floor dyssynergia (paradoxical contraction or inadequate relaxation of the abdominal, rectal puborectalis and anal sphincter muscles) [22, 23].

Fig. 1 **a** Full-thickness rectal prolapse; concentric mucosal folds. **b** Mucosal/hemorrhoidal prolapse; radial folds



Surgery

Patient Factors

Operations for rectal prolapse have been traditionally divided into perineal and abdominal categories, as determined by the main surgical approach. The most commonly performed perineal procedures are Delorme's procedure (rectal mucosa sleeve resection) and Altemeier's procedure (perineal rectosigmoidectomy). Abdominal procedures (laparoscopic or open) are aimed at either fixing the rectum to the sacrum (rectopexy) using a variety of techniques or can involve resection of the bowel. Patient factors significantly influence the choice of procedure. In high-risk, elderly patients, perineal procedures are often chosen as they can be safely performed under regional anesthesia. In males, the risk of postoperative erectile dysfunction from rectal mobilization may deter a patient from an abdominal approach. In healthy adults, the presence of constipation may sway the decision toward a

resectional procedure. Ultimately, the decision to have a perineal approach versus an abdominal approach may be influenced by the expertise and preference of the operating surgeon, but a full and frank discussion of the risks and benefits of each technique is mandatory to obtain informed consent.

Perineal Approaches

Delorme's procedure is optimally performed with the patient in the prone jackknife position as this provides excellent exposure but, in frail patient, the lithotomy position will suffice. The procedure, first described at the beginning of the twentieth century by a French military surgeon, entails stripping of the rectal mucosa, plication of the muscularis propria, and anastomosis of the mucosal edges. Access to the anal canal is facilitated by the use of a lone star retractor placed at the anal verge. The rectum is prolapsed and a dilute solution of adrenaline and saline is injected in the submucosal plane to raise the mucosa. Stripping of the mucosa starts at

approximately 1 cm from the dentate line and is continued until the apex of the prolapse is reached (Fig. 2). At this stage, the redundant mucosa is excised and the muscularis propria is plicated at 1-cm intervals from the apex of the prolapse to the dentate line. The mucosal edges are then sutured marking the end of the procedure [24]. The most common complications of this procedure are hemorrhage, hematoma, dehiscence, and stenosis [23].

Altemeier's procedure is essentially a perineal rectosigmoidectomy. With the patient in the prone position, the rectum is prolapsed and a full-thickness incision is made circumferentially around the rectal wall 1–2 cm from the dentate line. The rectum is retracted and mobilized until the peritoneum is entered. At this stage, careful division of the mesentery is performed until the full loop of redundant sigmoid can be resected. A hand-sewn or stapled anastomosis completes the operation. Possible complications are bleeding, anastomotic leak, and pelvic collections. "Thiersch's wire" operation, where a subcutaneous suture is used to purse-string the anal canal, has almost disappeared from modern practice due to the high failure rate [25].

For many years, perineal procedures for rectal prolapse were confined to the elderly as the recurrence rates were felt to be higher than abdominal operations. Recent evidence from randomized clinical trials suggests that this is not the case and that perineal operations may also be suitable in the younger adult. In the seminal paper by Senapati et al. (the PROSPER trial), 213 perineal procedures were compared with 78 abdominal procedures. No significant difference in recurrence rates was detected, although the recurrence rate (13–31%) in all the groups were higher than anticipated [26]. In 2009, a retrospective study of patients who underwent Delorme's procedure and patients less than 50 years of age were found to have very acceptable long-term recurrence rates (< 8%) with a mean follow-up of 4 years [27]. In addition, the Cochrane review of rectal prolapse has demonstrated comparable functional

outcomes and complication rates with perineal procedures compared with abdominal surgery, making them an acceptable option for a wide variety of patient groups [28] (Tables 1 and 2).

Abdominal Approaches

There are a number of abdominal operations commonly performed for prolapse utilizing open, laparoscopic, or robotic techniques. In the past, low anterior resection was considered a first-line treatment, but high rates of morbidity and poor functional outcome make this an unsuitable option for the majority of patients [31]. Simple mobilization of the rectum with no fixation has been shown to be inferior to rectopexy (fixation of the rectum) in a multicenter study performed by Karas et al. in 2011 [32]. Suture rectopexy involves posterior mobilization to raise the rectum upwards and fix it in position through the placement of sutures to the presacral fascia and the subsequent fibrotic reaction. There have been more than ten separate studies of this technique which demonstrate low mortality rates with acceptable short-term recurrence rates of < 10%. Further interpretation in relation to the longevity of the procedure is difficult as sample sizes were small and follow-up duration limited [28, 33]. In order to create a more intense fibrotic reaction to aid rectal fixation, the placement of posterior meshes between the rectum and sacrum became popularized. This was associated with good long-term recurrence rates (0–6%) but was associated with pelvic sepsis in 2–16% of patients [28, 34]. Although rectopexy improves incontinence scores in most patients, the technique can exacerbate symptoms of constipation [30].

Resection rectopexy is usually considered for patients with constipation or coexisting diverticular disease which would warrant resection. There is evidence that this procedure improves constipation symptoms but comes with the additional risk of anastomotic leak. In the recent study by Laubert et al.,

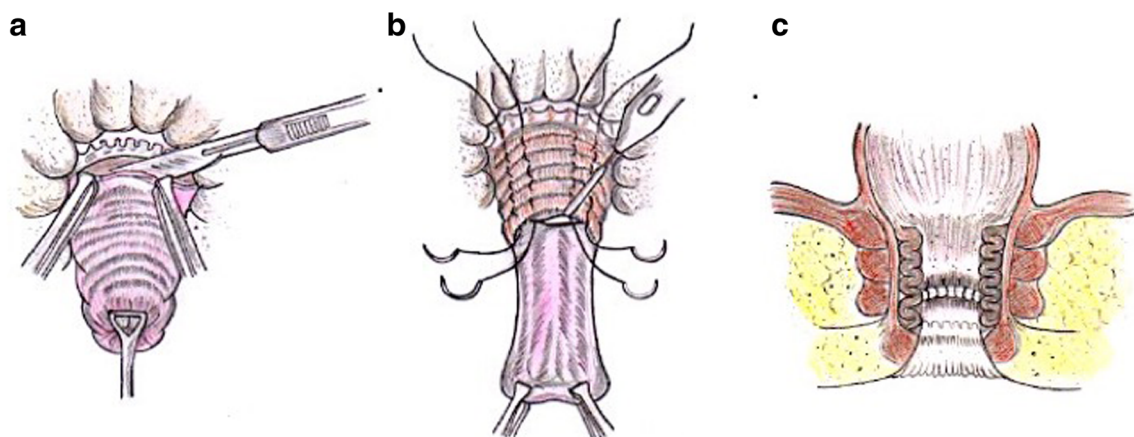


Fig. 2 Delorme's procedure. **a** Stripping of the mucosa starts at approximately 1 cm from the dentate line and is continued until the apex of the prolapse. **b** Excision of the redundant mucosa and the

muscularis propria is plicated at 1-cm intervals from the apex of the prolapse to the dentate line. **c** The mucosal edges are sutured

Table 1 Results of the most significant studies reporting outcomes after rectal prolapse surgery

Author/year	N	Procedures	Follow-up	Recurrence	Comments
Elagili F et al. 2015 [10]	53	Delorme	13 months	16%	Shorter hospital stay and lower morbidity for Delorme's
	22	Altemeier		9%	
Watkins BP et al. 2003 [29]	52	Delorme	61.4 months	6% at 5 years	Preoperative incontinence improved in most of the cases after surgery
Lieberth M et al. 2009 [24]	76	Delorme	3.6 years	14.5%	Younger patients had lower recurrence rates (8% for patients under 50 year)
Kimmins M et al. 2001 [22]	63	Altemeier	20.8 months	6.4%	Quality of life improved in 87% of the cases
Senapati A et al. 2013 [30]	99	Delorme	36 months	31%	Improvement in incontinence and bowel function was noted for most patients with no significant differences between abdominal and perineal procedures
	102	Altemeier		24%	
	32	Resection rectopexy		13%	
	35	Suture rectopexy		26%	
Karas et al. 2011 [19]	136	Rectal mobilization + rectopexy	5 years	1.5%	Patients required resection in the non-rectopexy group more than the rectopexy group
	116	Rectal mobilization, no rectopexy		8.6%	
Consten EC et al. 2015 [6]	242	Laparoscopic ventral mesh rectopexy	33.9 months	6.2%	Incontinence and constipation improved postoperatively
Foppa C et al. 2014 [14]	172	Laparoscopic suture rectopexy	10 years	6% at 5 years, 20% at 10 years	Incontinence improved, constipation remained at similar levels

264 patients underwent laparoscopic resection rectopexy with a mean follow-up of 58 months. Eighty-two percent of the patients experienced improvement in their rectal prolapse but 4% needed reoperation due to complications [26, 35]. Much controversy surrounds the technical aspects of rectopexy and whether the lateral ligaments should be preserved or divided. There is limited evidence that division may be associated with less recurrence as full mobilization

of the rectum is achieved but at the expense of increased constipation, possibly related to rectal denervation [36, 37].

Laparoscopic ventral rectopexy represents the most recent advancement in prolapse surgery, and it involves anchoring a mesh to the anterior rectal wall and to the sacral promontory. The main advantage of this procedure is that it avoids posterior and lateral mobilization of the rectum and thus autonomic denervation and postoperative constipation. It is particularly

Table 2 Results of the most significant studies reporting outcomes after rectal prolapse surgery

Author/year	N	Procedures	Follow-up	Recurrence	Comments
Elagili F et al. 2015 [10]	53	Delorme	13 months	16%	Shorter hospital stay and lower morbidity for Delorme's
	22	Altemeier		9%	
Watkins BP et al. 2003 [29]	52	Delorme	61.4 months	6% at 5 years	Preoperative incontinence improved in most of the cases after surgery
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useful in patients who have evidence of posterior and middle compartment prolapse. In 2010, a systematic review of 728 patients showed recurrence rate of 3.4% with a postoperative constipation rate of 23% [38]. The trend to perform abdominal rectal prolapse surgery laparoscopically has been supported by the large retrospective review of the American College of Surgeons NSQIP database of rectal prolapse surgery performed between 2005 and 2011. Over 3000 cases were reviewed which demonstrated comparable morbidity rates between laparoscopic abdominal procedures and perineal procedures [39].

The use of pelvic mesh in the treatment of rectal prolapse and urinary stress incontinence surgery has been subject to recent FDA warning and has temporarily been banned in a number of countries, including Scotland. In a multicenter review of laparoscopic ventral rectopexy, mesh erosion occurred in 45/2203 (2%) of patients, the majority of patients presenting within 3 years of mesh insertion. Mesh erosion was more common with synthetic meshes than biological meshes and further operative intervention was required in most of the patients [40].

Conclusion

The recent controversy surrounding the use of mesh in rectal prolapse surgery will undoubtedly impact on the uptake and choice of procedures performed for this debilitating condition. Despite this, conservative management has a very limited role and surgical intervention should be offered where possible. A full pelvic floor assessment should be performed prior to surgical intervention and discussion in a pelvic floor MDT is mandated. The type of approach depends on coexisting patient factors and on the technical expertise of the operative surgeon. Perineal approaches are useful in the frail elderly as they can be performed under regional anesthesia, but are also an option for the younger patient. Transabdominal procedures should be performed laparoscopically where possible as they are associated with lower rates of morbidity and mortality. If mesh is to be used, the patient must be carefully counseled as to the risks of pelvic sepsis and the potential consequences of mesh erosion.

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