Rectal Prolapse: A 10-Year Experience

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ABSTRACT

Purpose: To compare perineal to abdominal procedures for rectal prolapse over a 10-year period at a single tertiary care institution.

Methods: Between May 1, 1995, and January 1, 2005, 75 patients underwent surgical intervention for primary rectal prolapse at a tertiary referral center. Surgical techniques included perineal-based repairs (Altemeier and Delorme procedures) and abdominal procedures (open and laparoscopic resection and/or rectopexy). Medical records were abstracted for data pertaining to patient characteristics, signs and symptoms at presentation, surgical procedure, postoperative length of hospitalization, morbidity and mortality, and recurrence of rectal prolapse.

Results: Seventy-five patients underwent surgical intervention for rectal prolapse during the study period. The average patient age was 60.8 years. Sixty-two patients (82.7%) underwent perineal-based repair (Altemeier n = 48, Delorme n = 14); eight patients (10.7%) underwent open abdominal procedures (resection and rectopexy n = 4, rectopexy only n = 4); and five patients (6.7%) underwent laparoscopic repair (laparoscopic LAR n = 3, laparoscopic resection and rectopexy n = 2). Average hospitalization was shorter with perineal procedures (2.6 days) than with abdominal procedures (4.8 days) ($p < 0.0031$). Postoperative complications were observed in 13.3% of cases. With a median follow-up of 39 months (range 6-123 months), there was no mortality for primary repair, a postoperative morbidity occurred in 13% of patients, and the overall rate of recurrent prolapse was 16% (16.1% for perineal-based repairs, 15.4% for abdominal procedures).

Conclusion: Perineal resections were more common, performed in significantly older patients, and resulted in a shorter hospital stay. Their minimal morbidity and similar recurrence rates make perineal procedures the preferred option.

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Rectal prolapse, or procidentia, is a relatively uncommon clinical entity characterized by protrusion of full-thickness rectal wall through the anal orifice. Although prolapse has been recorded as early as the ancient Egyptians (Ebers papyrus, c. 1500 BC), the exact incidence of prolapse is not known (1). Despite its infrequency, a plethora of surgical options exist to treat rectal prolapse. These include perineal approaches (Altemeier and Delorme procedures) and abdominal approaches (rectopexy with or without resection). Laparoscopic techniques can be applied in appropriate cases. Despite this extensive surgical armamentarium, postoperative recurrence of rectal prolapse is reported in 10-20% of cases (2). This article reviews our experience over a 10-year period and outlines the current understanding of the causes of prolapse, the evaluation of the patient with prolapse, and the more commonly used surgical alternatives.

PATIENTS AND METHODS

After institutional IRB approval, a retrospective analysis of patients who underwent surgical repair of rectal prolapse at a single tertiary care institution (Ochsner Clinic Foundation, New Orleans, LA) between May 1, 1995, and January 1, 2005, was performed. All surgical interventions were performed by staff surgeons in the Department of Colon and Rectal Surgery.

A comprehensive review of clinic and hospital records was performed, with abstraction of data pertaining to patient age, gender, symptoms at time of clinical presentation, type of surgical procedure performed, postoperative length of hospitalization, morbidity and mortality, and recurrence of prolapse during the follow-up period. The time to recurrence, when applicable, was calculated between the date of the initial operation and the date of clinical presentation with signs and symptoms of recurrent prolapse.

Mean length of stay was compared using an unpaired t-test with $p < 0.05$ considered significant.

RESULTS

Over a 10-year period, 75 patients underwent surgical repair of primary rectal prolapse. Sixty-eight patients (91%) were female, and seven (9%) were male. The average patient age was 60.8 ± 19.9 years. The most frequent complaint at the time of clinical presentation was the sensation of a protruding rectal mass (n = 74, 98.7%). Additional symptoms and clinical findings included painful defecation (n = 27, 36%), fecal incontinence (n = 29, 38.7%), rectal bleeding (n = 19, 25.3%), constipation (n = 19, 25.3%), and rectal ulcer (n = 6, 8%).

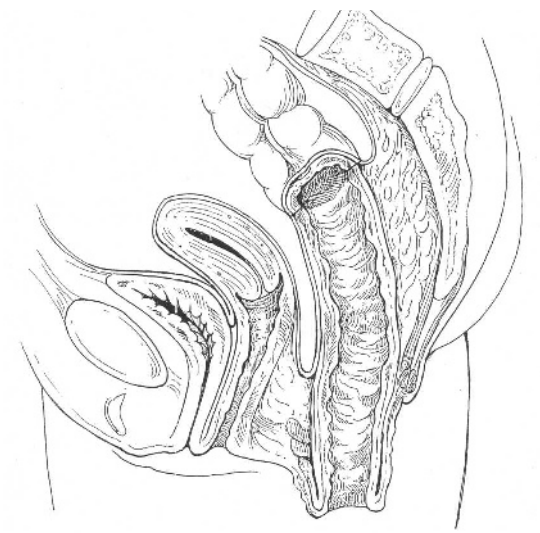
The surgical procedures were performed by surgical trainees (colorectal fellows and senior general surgery residents) under the immediate supervision of six staff colon and rectal surgeons. Surgical procedures were selected based on the discretion of the evaluating surgeon. Sixty-two patients (82.7%) underwent perineal-based repair (Altemeir n = 48, Delorme n = 14), eight patients (10.7%) underwent open abdominal procedures (resection and rectopexy n = 4, rectopexy only n = 4), and five patients (6.7%) underwent laparoscopic repair (laparoscopic LAR n = 3, laparoscopic resection and rectopexy n = 2).

The average length of hospital stay for all procedures was 3 ± 2.5 days. Patients who underwent perineal-based procedures were hospitalized for a shorter duration (2.6 ± 2.5 days) than those with open abdominal (4.2 ± 0.75 days) and laparoscopic (5.3 ± 2.1 days) repairs ($p < 0.0031$).

Postoperative complications were observed in 10 cases (13.3%). These events included anastomotic leaks (n = 3), postoperative hemorrhage (n = 2), mucosal dehiscence (n = 1), postoperative fecal impaction (n = 1), anastomotic stricture (n = 1), perianastomotic fistula (n = 1), and incisional hernia (n = 1). There were no mortalities related to the 75 index surgical procedures. One mortality occurred during the study period, the result of an anastomotic leak in an 81-year-old patient who underwent multiple procedures for recurrent prolapse.

Of the 75 patients who underwent surgical intervention for full-thickness rectal prolapse, 12 (16%) presented to clinic with recurrent prolapse during the study period. The median follow-up time was 39 months (range 6-123 months). This group included 10 who initially underwent perineal procedures (Altemeier n = 8, Delorme n = 2), one who underwent laparoscopic LAR, and one who underwent open resection with rectopexy.

Figure 1. Sagittal view of full-thickness rectal prolapse. (From Beck DE, Whitlow CB. Rectal prolapse and intussusception. In Beck DE, ed. Handbook of Colorectal Surgery, 2nd ed. New York: Marcel Dekker, 2003:301-324. With permission.)



DISCUSSION

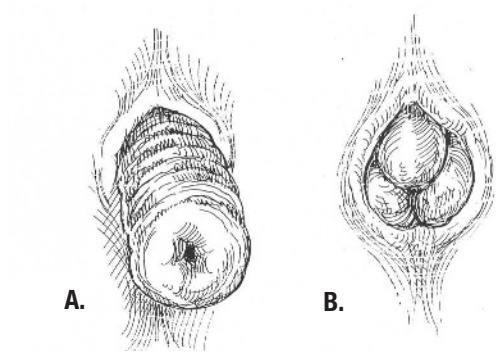
The pathophysiology of rectal prolapse remains a matter of debate. Etiologic factors may be congenital or acquired, and include poor bowel habits, neurologic diseases, female gender, nulliparity, and previous anorectal surgical procedures. Anatomic features associated with rectal prolapse include a deep pouch of Douglas, rectosigmoid redundancy, levator ani diastasis, lack of fixation of the rectum to the sacrum, and weakness of the internal sphincter (3-5).

In adults, rectal prolapse is much more common in women than in men. The peak incidence in women is in their seventh decade, whereas in men the incidence drops after the fifth decade (6). In children, prolapse is distributed equally between the sexes and most often presents by three years of age (7). Clinical factors associated with prolapse include straining at bowel movements, neurologic diseases (such as cauda equina lesions and multiple sclerosis), and mental illness (8-9). The role of parity is unclear.

Patients with prolapse most frequently complain of protrusion of the rectum during defecation. This may reduce spontaneously or require manual reduction. As the condition progresses, the protrusion may occur with any event that results in increased intraabdominal pressure. Patients frequently complain of constipation and tenesmus. Incontinence is a major complaint of more than half of patients (10). Less frequent presenting symptoms include bleeding, pain, mucous discharge, and pruritus.

Spontaneous prolapse is obvious on inspection (Fig. 1). Some patients may require straining to produce the prolapse, and the straining patient is best examined in the squatting or sitting position. The patient can be examined while he or she is on the toilet by having

Figure 2. Physical examination. A. Concentric folds of prolapsed rectum. B. Radial folds of hemorrhoids (mucosal prolapse). (From Beck DE, Whitlow CB. Rectal prolapse and intussusception. In Beck DE, ed. Handbook of Colorectal Surgery, 2nd ed. New York: Marcel Dekker, 2003:301-324. With permission.)



the patient lean forward or using a long rod to which a mirror is attached placed between the patient's legs to view the prolapse. Another option is to place a flexible endoscope into the toilet with the viewing end pointed toward the perineum.

Full-thickness prolapse is distinguished by its concentric rings and grooves as opposed to the radially oriented grooves associated with mucosal prolapse (Fig. 2). Inspection should also include examining the perianal skin for any maceration or excoriations. A thorough digital rectal examination is important to detect concomitant anal pathology and to determine adequacy of resting tone and squeeze pressure of the anal sphincters and function of the puborectalis muscle.

All patients with rectal prolapse should have endoscopic examination of the colon and rectum. The entire colon should be evaluated prior to any surgery on that organ by colonoscopy or by the combination of sigmoidoscopy and an air contrast barium enema. A biopsy should be performed for any abnormalities. Proctitis, colitis cystica profunda, and solitary rectal ulceration are conditions found in patients with prolapse that may require biopsy to differentiate them from rectal neoplasms or inflammatory bowel disease (11).

In patients who present with significant constipation in addition to prolapse, a colonic transit marker study is indicated. After the patient ingests a capsule containing 24 radiopaque rings, a plain abdominal radiograph is obtained within 24 hours of ingestion and again at one, three and five days later. Normal patients should have no more than four rings remaining at five days. At seven days, no rings should remain. Abnormal results fall into one of two patterns: pancolonic slow transit (colonic inertia) with rings distributed throughout the colon, or pelvic outlet obstruction with clustering of the remaining rings in the rectosigmoid. Either pattern may be seen in patients with prolapse (12).

Occult rectal prolapse should be suspected in patients with symptoms of tenesmus, incomplete evacuation, fecal impaction, or unexplained constipation, or those found to have the solitary rectal ulcer syndrome. Defecography should be performed to confirm this diagnosis (13). Sigmoidorectal intussusception, puborectalis function, and perineal descent may be evaluated using this technique. A standard caulking gun is used to instill 200 ml of barium paste into the rectum. The patient sits on a radiolucent commode, and defecation is recorded with cineradiography or fluoroscopy with video recording.

Variable amounts of sphincter dysfunction have been found in patients with rectal prolapse using anorectal manometry. In two studies, resting and squeeze pressures were shown to be lower in prolapse patients than in control subjects (14,15). In addition, Metcalf and Loenig-Baucke (14) found that patients with prolapse had decreased rectal capacity, as measured by decreased critical volume (mean rectal volume producing a lasting urge to defecate), decreased volume to produce constant relaxation, and decreased volume on the saline incontinence test. These findings, along with the decreased sphincter pressures, may explain why many prolapse patients experience incontinence before the sensation of the urge to defecate. Two studies have failed to show a return to normal of resting or squeeze pressures following repair of prolapse by rectopexy (16,17). Pudendal nerve terminal motor latency is also lengthened in patients with rectal prolapse, suggesting that nerve stretch contributes to sphincter dysfunction (18).

The studies described play an important role in our understanding of the causes of prolapse and incontinence associated with prolapse. Few studies have thoroughly evaluated treatment options based on the results of preoperative and postoperative physiologic testing.

Treatment

The choice of surgical treatment for rectal prolapse depends on the condition of the patient, preoperative anatomic and physiologic testing, presence of incontinence or constipation, prior prolapse repairs, and the surgeon's preference. Over 50 surgical procedures for the correction of rectal prolapse have been described (3,5). Control of prolapse and restoration of the underlying anatomic support mechanisms are the objectives of surgical intervention. These objectives can be achieved by resection and/or fixation of the

Table 1. Treatment options.

Treatment	Advantages	Disadvantages
Abdominal		
Anterior resection	Low recurrence	Resection required
Ripstein mesh sling	No resection	Impaction, constipation, foreign body
Well's Ivalon sponge	No resection	Constipation persists, foreign body
Orr-Loygue	No resection	Constipation persists
Sigmoid colectomy with suture rectopexy	Low recurrence	Resection required
Perineal		
Altemeier (perineal rectosigmoidectomy)	Low morbidity/mortality, low recurrence	General/regional anesthesia, continued incontinence, anastomosis
Altemeier with levatorplasty	Low morbidity/mortality, low recurrence, incontinence improved	General/regional anesthesia, anastomosis
Delorme procedure	Low morbidity/mortality, local anesthesia	High recurrence rates, continued incontinence
Thiersch anal encirclement	Low morbidity/mortality, local anesthesia	Fecal impaction, infection, wire breakage, erosion

rectum to the sacrum. Surgical repair of full-thickness rectal prolapse can be accomplished by perineal or transabdominal techniques. Perineal approaches have less morbidity associated with them, but in general have high recurrence rates, and have therefore been typically reserved for high-risk elderly patients.

Comparison of results from various series in patients with prolapse can be confusing. Some series record recurrence only in patients with full-thickness prolapse, whereas others include both full-thickness and mucosal prolapse. Length of follow-up differs from one report to another; those with longer follow-up report recurrences as late as 16 years postoperatively (19). Incontinence and constipation may be improved or worsened by most procedures. When comparing the effects of a procedure on bowel or sphincter function, it is important to note the preoperative status of patients. This is often omitted or recorded with different endpoints, making comparison between series impossible.

Preoperative preparation was the same for most prolapse operations: a mechanical and antibiotic bowel preparation the day before surgery and perioperative broad-spectrum intravenous antibiotics. Patients undergoing an abdominal procedure were placed in the supine modified lithotomy position. Perineal procedures were performed in the prone-jackknife, lithotomy, or left lateral positions. A Foley catheter should be placed in all patients before the operation begins.

Operative treatment options, along with their respective advantages and disadvantages, are summarized in Table 1.

Abdominal Procedures

Abdominal procedures for rectal prolapse are an excellent option for patients who are fit to undergo laparotomy. Surgical techniques may include mobilization and resection of the rectosigmoid colon, fixation of the rectum to the sacrum, or a combination of these procedures. Rectopexy alone can be performed using suture material or prosthetic mesh. Suture rectopexy involves thorough rectal mobilization to the level of the levators, followed by upward suture fixation of the rectum to the presacral fascia.

Posterior mesh rectopexy (Wells procedure, Fig. 3) utilizes prosthetic material, such as polypropylene or Marlex mesh, to augment rectal fixation to the sacral promontory (20).

An alternative technique, the anterior sling

Figure 3. Ivalon sponge rectopexy (Wells). A. Ivalon sponge being fixed to the sacrum. B Sponge in place before fixation to the rectum. C. Incomplete encirclement of the rectum anteriorly with the sponge sutured in place. (From Beck DE, Whitlow CB. Rectal prolapse and intussusception. In Beck DE, ed. Handbook of Colorectal Surgery, 2nd ed. New York: Marcel Dekker, 2003:301-324. With permission.)

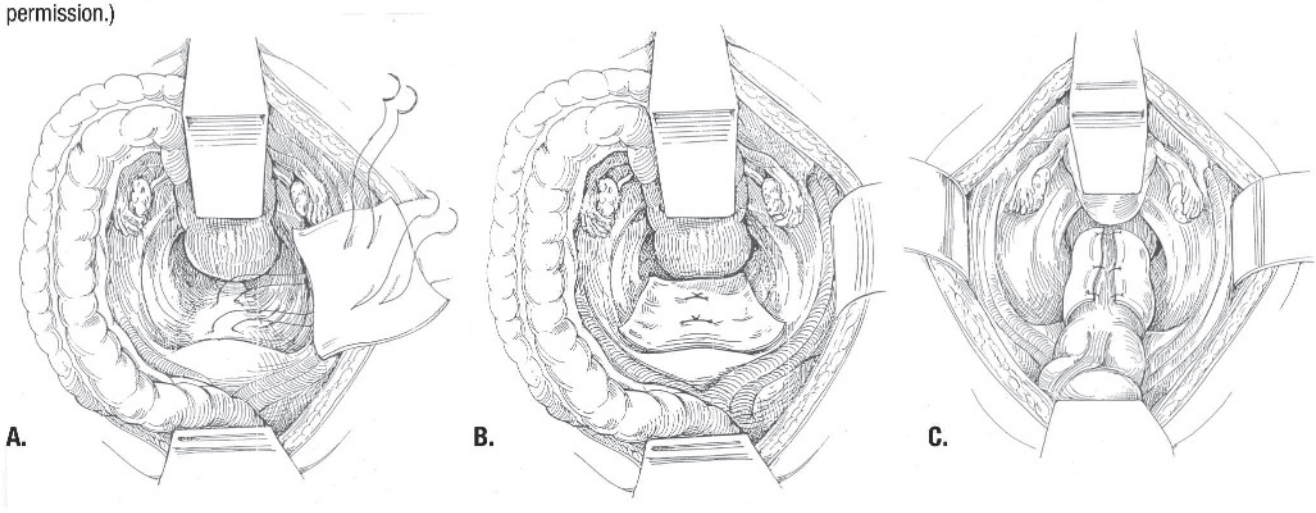
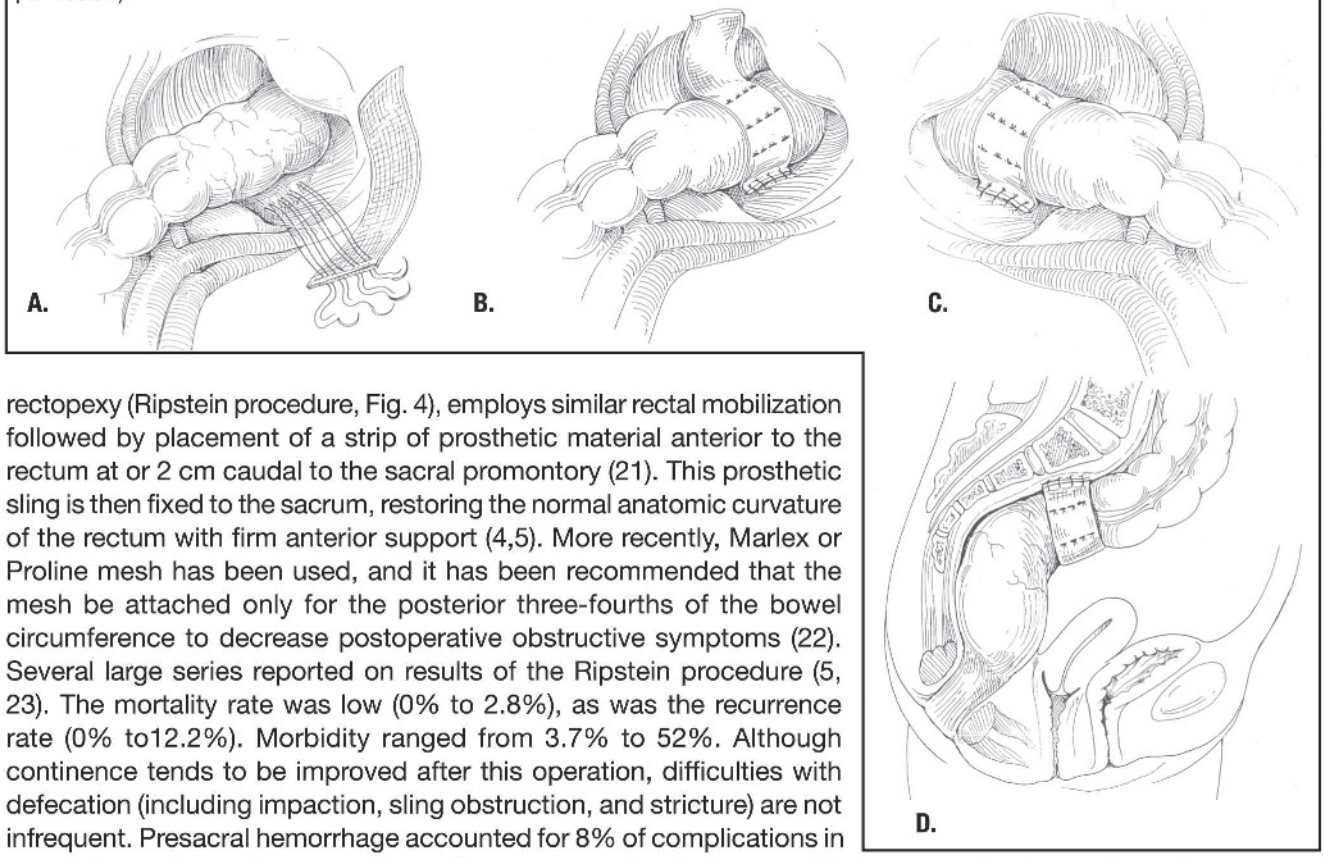
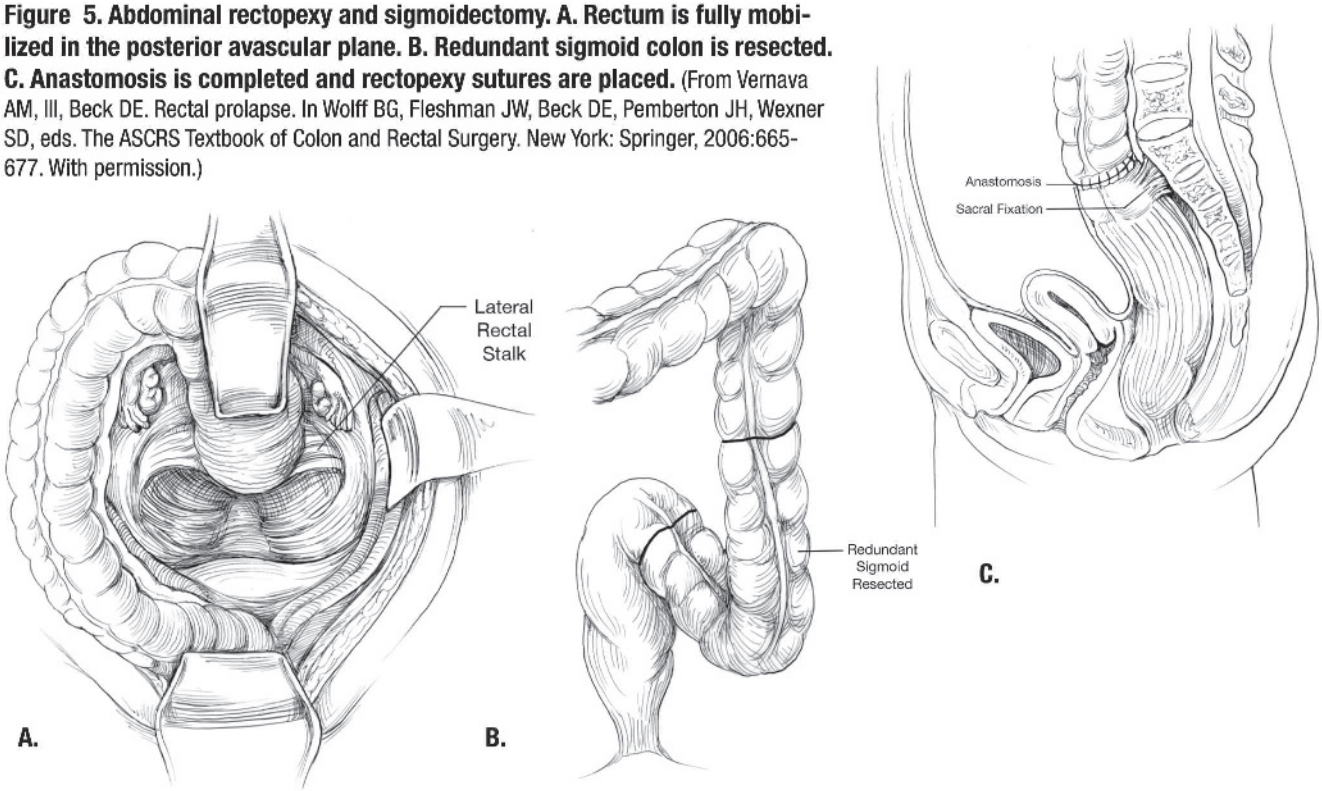


Figure 4. Mesh rectopexy (Ripstein). A. Posterior fixation of sling on one side. B. Sling brought anteriorly around mobilized rectum. C. Sling fixed posteriorly on the opposite side. D. Sagittal view of the completed rectopexy. (From Beck DE, Whitlow CB. Rectal prolapse and intussusception. In Beck DE, ed. Handbook of Colorectal Surgery, 2nd ed. New York: Marcel Dekker, 2003:301-324. With permission.)



rectopexy (Ripstein procedure, Fig. 4), employs similar rectal mobilization followed by placement of a strip of prosthetic material anterior to the rectum at or 2 cm caudal to the sacral promontory (21). This prosthetic sling is then fixed to the sacrum, restoring the normal anatomic curvature of the rectum with firm anterior support (4,5). More recently, Marlex or Proline mesh has been used, and it has been recommended that the mesh be attached only for the posterior three-fourths of the bowel circumference to decrease postoperative obstructive symptoms (22). Several large series reported on results of the Ripstein procedure (5, 23). The mortality rate was low (0% to 2.8%), as was the recurrence rate (0% to12.2%). Morbidity ranged from 3.7% to 52%. Although continence tends to be improved after this operation, difficulties with defecation (including impaction, sling obstruction, and stricture) are not infrequent. Presacral hemorrhage accounted for 8% of complications in one series and was the second most frequent complication reported in a survey of colon and rectal surgeons (23). Infrequent complications include colocutaneous fistula, erosion of mesh into the rectum, pelvic abscess, and impotence. Disadvantages of mesh rectopexy techniques include the inherent risk of infection associated with foreign body insertion. In addition, constipation symptoms may increase due to exaggerated redundancy of the rectosigmoid colon (5).

Figure 5. Abdominal rectopexy and sigmoidectomy. A. Rectum is fully mobilized in the posterior avascular plane. B. Redundant sigmoid colon is resected. C. Anastomosis is completed and rectopexy sutures are placed. (From Vernava AM, III, Beck DE. Rectal prolapse. In Wolff BG, Fleshman JW, Beck DE, Pemberton JH, Wexner SD, eds. The ASCRS Textbook of Colon and Rectal Surgery. New York: Springer, 2006:665-677. With permission.)



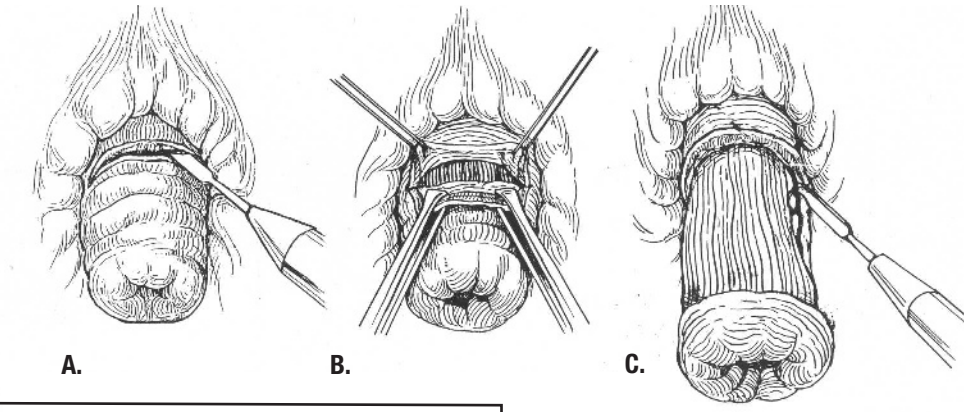
Anterior or sigmoid resection offers the advantage of eliminating rectosigmoid redundancy. Posterior fixation to the sacrum results from a dense fibrotic reaction to the anastomotic suture line. The inclusion of suture rectopexy may augment this process. The major disadvantage of resection procedures is the added potential for anastomotic leak (24).

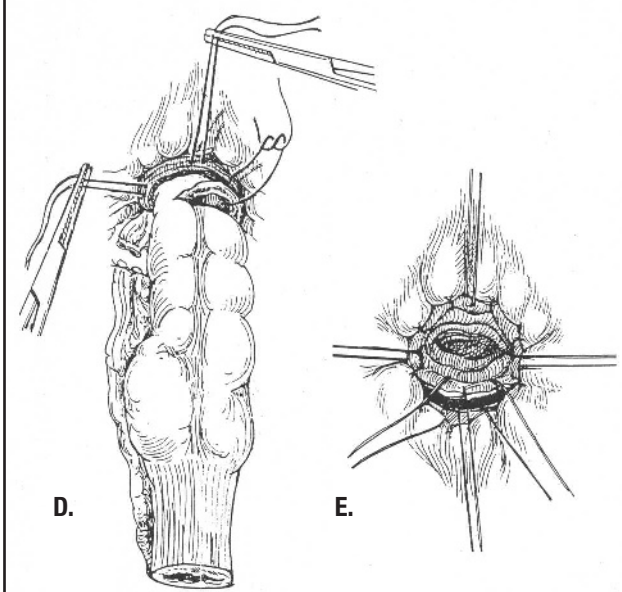
Recurrence rates following abdominal procedures for rectal prolapse have been examined in a recent meta-analysis from the Rectal Prolapse Recurrence Study Group (25). Pooled data from patients who underwent abdominal procedures (mobilization only, mobilization with suture or mesh rectopexy, or mobilization with resection ± rectopexy) at 15 centers were evaluated. The overall recurrence rates at one, five, and 10 years were 1.06%, 6.61%, and 28.9%, respectively. No significant association between recurrence and age, gender, surgical technique, means of access (laparoscopic vs. open), or rectopexy method was observed (25). The results of our series are comparable to these findings, with recurrent prolapse observed at 10 years in two of 13 patients (15.4%) who underwent open or laparoscopic abdominal procedures.

Suture rectopexy has been used alone or, more commonly, in combination with sigmoid resection (Frykman-Goldberg procedure, Fig. 5) (26). After complete mobilization of the rectum, the lateral stalks of the rectum are sutured posteriorly to the presacral fascia. The use of suture eliminates the 2% overall risk of infection related to the use of the previously mentioned foreign materials and is effective at repairing prolapse (27). The benefit of adding colon resection is not completely resolved. Those who support it believe the functional results are improved over suture rectopexy alone. Recurrence rates for resection rectopexy are 1.9% to 9% (10,28,29). Mortality rates have been low. Morbidity includes anastomotic leak, small bowel and colonic obstruction, and presacral hemorrhage. Constipation improved in 50% to 75% of patients, and rates of incontinence improved in 38% to 94%. In a randomized prospective trial, McKee et al reported no recurrence at 20 months for patients undergoing suture rectopexy with or without sigmoidectomy (30). Constipation was reduced in patients who underwent sigmoidectomy in addition to suture rectopexy.

Mesh rectopexy and rectosigmoid resection have been performed with laparoscopic assistance (31-34). Recent reports have documented that resectional and fixation procedures can be performed with the same efficacy as traditional open approaches with short term follow-up (33,34). Additional randomized studies with long term follow-up will be needed to substantiate recurrence rates and morbidity.

Figure 6. Perineal rectosigmoidectomy (Altemeier). A, B. Incision of rectal wall. C. Division of vessel adjacent to bowel wall. D. Mesenteric vessels ligated. Stay sutures previously placed in distal edge of outer cylinder are placed in cut edge of inner cylinder. E. Anastomosis of distal aspect of remaining colon to the short rectal stump. (From Beck DE, Whitlow CB. Rectal prolapse and intussusception. In Beck DE, ed. Handbook of Colorectal Surgery, 2nd ed. New York: Marcel Dekker, 2003:301-324. With permission.)





Perineal Procedures

In the late 19th and early 20th centuries, several perineal procedures for the treatment of prolapse were described (24). Their use declined as abdominal surgery under general anesthesia became safe and it became clear that recurrence rates were lower with abdominal repairs. However, these procedures still play a role for the elderly with significant medical problems, for whom a major abdominal procedure carries a prohibitive risk. In addition, modern trends toward minimizing invasiveness and outpatient management have led to an increasing number of these procedures being performed in young and low-risk patients.

The two most commonly performed perineal-based procedures are the Altemeier procedure and the Delorme procedure. Both procedures may be performed under general, spinal, or local anesthesia with the patient in prone-jackknife, lithotomy, or left lateral decubitus positions.

The Altemeier technique (perineal rectosigmoidectomy) requires exteriorization of the prolapse followed by a circumferential incision through all layers of the rectal wall 1-2 cm cephalad to the dentate line (Fig. 6). The rectum is further delivered using gentle downward traction, and circumferential dissection with division and ligation of the mesentery is continued until no additional intestinal prolapse can be achieved. If the pouch of Douglas is encountered anteriorly, the hernia sac is opened and a high ligation may be performed. A levator repair can be performed anterior and/or posterior to the rectum. At this point, the bowel is divided and an anastomosis is created between the cut end and the rectal stump with sutures or staples (35,36). A regular diet is allowed on postoperative day 1, and the Foley catheter is generally removed by postoperative day 1 or 2.

Mortality in several series has been extremely low, and morbidity ranged from 0% to 25%. Complications are mostly medical but have included anastomotic dehiscence and bleeding. Recurrence rates have been reported between 0% and 10%. Incontinence has improved in a large percentage of patients in series in which levatorplasty has been used (36).

A randomized trial by Deen et al compared abdominal resection and rectopexy with perineal rectosigmoidectomy with pelvic floor repair in patients older than 50 years of age (37). There were no deaths or anastomotic leaks. One patient developed an anastomotic stricture following perineal rectosigmoidectomy. There was one recurrence in the perineal group, and none in the abdominal group, at a median follow-up of 17 months. More patients who underwent perineal rectosigmoidectomy experienced fecal soiling (six, versus two in the abdominal

resection group). Maximal resting and maximal squeeze pressure decreased postoperatively after perineal repair. These pressures increased after abdominal repair. The advantage of perineal rectosigmoidectomy was a shorter hospital stay (mean 5 days versus 11 days, $p < 0.05$).

Delorme's procedure is performed in a similar manner, except that only the mucosa and submucosal layers are dissected off the muscularis, divided, and excised. The muscular bowel wall remains intact and is plicated within interrupted sutures, reapproximating the cut edges of mucosa (35,36). The mucosa edges are then sutured together (Fig. 7). The Delorme procedure has also been used for internal prolapse.

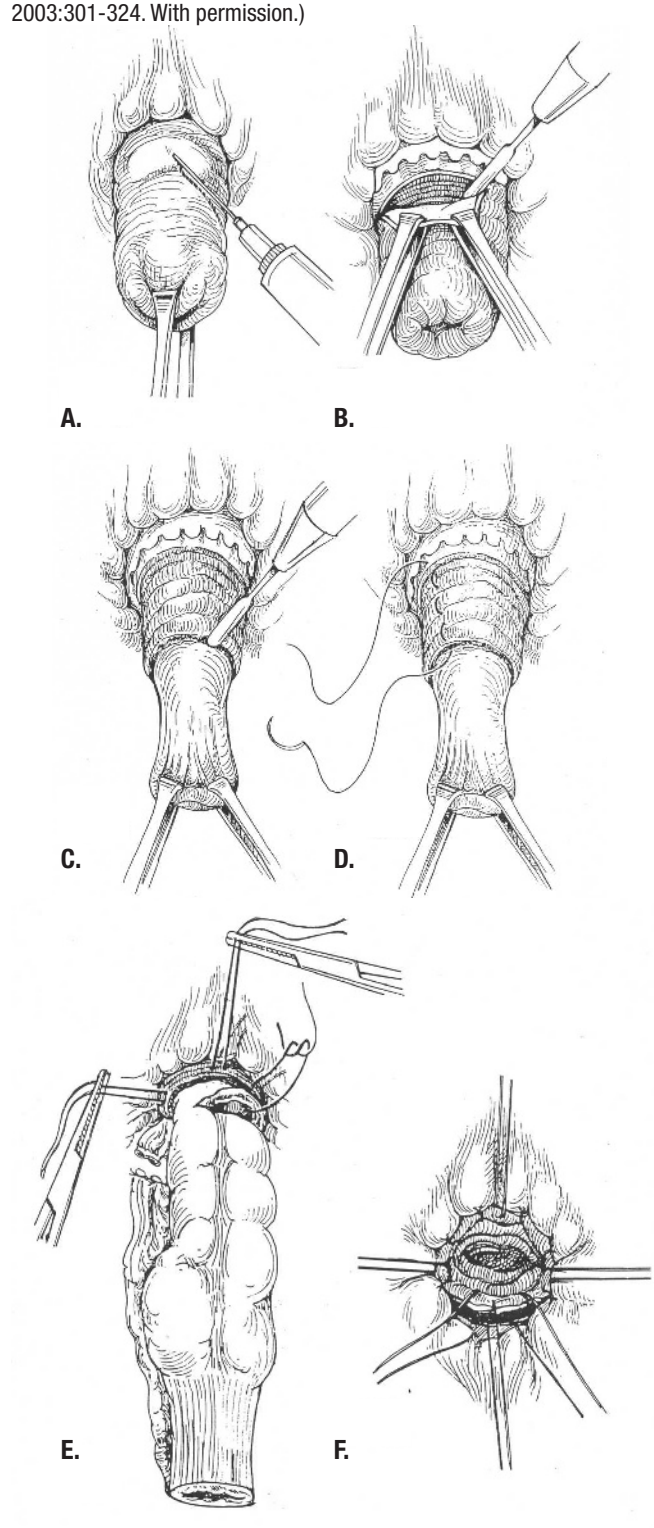
Recent series have shown a mortality rate for the Delorme procedure of 0% to 2.5% when it is performed on elderly patients who have significant medical problems (24). Morbidity (4% to 33%) has included bleeding, anastomotic dehiscence, stricture, diarrhea, and urinary retention. Recurrence rates have ranged from 7% to 22%, and recurrences have frequently been treated with a repeat Delorme procedure. Incontinence improved in 40% to 50% of patients who were incontinent preoperatively, and generally incontinence was not worsened by the procedure. Constipation was not a problem in most series.

The postoperative convalescence following perineal procedures for rectal prolapse is typically shorter than that which should be expected following a laparatomy. Patients are permitted to ambulate and begin a regular diet on postoperative day 1, and are discharged within 2 to 3 days, as demonstrated in our current series. The major disadvantage of these techniques is a higher rate of recurrent prolapse (0%-16% for Altemeier, 4%-38% for Delorme) (35-38). Similar results were demonstrated by our current series, with an overall 10-year recurrence rate of 16% (16.7% for Altemeier, 14.3% for Delorme) observed.

CONCLUSION

Rectal prolapse and intussusception are infrequently encountered problems. The causes of prolapse, as well as its ideal treatment, remain uncertain. Selection of the best procedure for a given patient depends on the patient's medical condition, the presence of incontinence or constipation, and prior surgery for prolapse. The surgeon weighs these factors, along with a knowledge of the available surgical options, to arrive at a treatment decision. Our group has demonstrated proficiency in the surgical management of rectal prolapse over the past 10 years, with recurrence rates for abdominal and perineal-based procedures comparable to those previously reported in the surgical literature.

Figure 7. Mucosal proctectomy (Delorme). A. Subcutaneous infiltration of dilute epinephrine solution. B. Circumferential mucosal incision. C. Dissection of mucosa off muscular layer. D. Plicating stitch approximating cut edge of mucosa, muscular wall, and mucosa just proximal to dentate line. E. Plicating stitch tied. F. Completed anastomosis. (From Beck DE, Whitlow CB. Rectal prolapse and intussusception. In Beck DE, ed. Handbook of Colorectal Surgery, 2nd ed. New York: Marcel Dekker, 2003:301-324. With permission.)



Perineal resections were more common, were performed in significantly older patients, and resulted in a shorter hospital stay. Their minimal morbidity and similar recurrence rates make perineal procedures the preferred option.

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