J Biochem Technol (2022) 13(4): 35-39
https://doi.org/10.51847/0uGsUcjQYD
ISSN: 0974-2328

# Comparative Study of Surgical Treatment with Abdominal and Perineal Approaches in Patients with Rectal Prolapse

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Received: 02 September 2022 / Received in revised form: 29 November 2022, Accepted: 04 December 2022, Published online: 18 December 2022

## Abstract

The article presents a comparative study of the results of surgical treatment with abdominal and perineal approaches in patients with rectal prolapse. In 83 patients of both sexes (52 women) aged 16-85 years (median in women 46.5 ± 1.1, in men 48.2 ± 1.7 years) with rectal prolapse, abdominal or perineal fixation surgeries with and without resection of the prolapsed part of the rectum and minimally invasive surgeries were performed. After the abdominal or perineal procedures, including minimally invasive procedures, stable and successful results were obtained in 80 patients (96.4%). Recurrences occurred only in 2 cases, and mortality in 1 case. Local complications developed in the form of wound infection (6), and feeling of a foreign body during mesh rectopexy (3); general complications included sepsis (1) and constipation (3). No major complications were requiring repeated surgery. In rectal prolapse surgery, abdominal procedures are ideal for young patients, and perineal procedures are ideal for elderly and senile patients with severe concomitant pathology. Suture rectopexy is characterized by adequate treatment, while mesh rectopexy is not superior to suture rectopexy. However, meshes as a foreign body increase the risk of local infection. Both rectopexy options are popular with many surgeons and the choice depends on the experience and preference of the surgeon. Laparoscopic rectopexy has results that are equivalent to or better than open pexy. It is preferred because it is simple and easy to perform. The results of perianal rectosigmoidectomy are much better than Delorme procedures, especially when the posterior levatoroplasty is added to it.

**Keywords:** Rectal prolapse, Rectopexy, Rectosigmoidal resection, Proctosigmoidectomy, Circular mucosal resection, Sclerotherapy

## Introduction

Rectal prolapse is a violation of the anatomical position of the rectum, in which its distal part is displaced beyond the anal sphincter. It may be accompanied by pain, incontinence of intestinal contents, mucous and bloody discharge, the sensation of a foreign body in the anus, and the false urge to defecate. Prolapse can be either complete when the entire rectal wall protrudes through the anal canal or incomplete when the rectal wall has fallen out but does not protrude through the back passage. Also, experts identify prolapse of only the mucous membrane of the rectum or anal canal (Xiao *et al*., 2018; Kulikovsky *et al*., 2019; Trompetto *et al*., 2019; Rao & Tetangco, 2020; Gramellini *et al*., 2021).

The development of RP is caused by the presence of an abnormally deep Douglas space (Petros, 2018; Petros, 2022), weakness of the pelvic floor and anal canal due to muscle atrophy (Amiri *et al*., 2015; Madbouly & Mohii, 2019; Bodnar *et al*., 2021), weakness of the internal and external sphincter muscles, neuropathy of the pudendal nerve (Jorge *et al*., 2022) and the absence of normal rectum fixation (Alketbi *et al*., 2021), with mobile mesorectum and weak lateral ligaments (Joubert & Laryea, 2017). In this case, the mobile small intestine, which lies opposite the anterior wall of the rectum, can push it out through the anal canal.

RP occurs more often in adult women (Madbouly & Mohii, 2019; Rao & Tetangco, 2020). In the adult population, the peak incidence occurs in the fifth decade and is more common in women (80-90%) (Madbouly & Mohii, 2019; Rao & Tetangco, 2020). In RP, an impaired adaptation of the rectum to stretching can contribute to anal incontinence, and more than half of patients have concomitant urinary incontinence (Alkatrani & Basrah, 2021; Brown *et al*., 2022; D'Hoore, 2022). Constipation is associated with prolapse in 15-65% of patients (Alwahid *et al*., 2019), excessive stress can lead to a strengthening of the anterior wall of the upper part of the rectum into the anal canal (Alwahid *et al*., 2019), possibly causing a solitary ulcer due to chronic mucosal trauma (Pescatori *et al*., 1998).

*Purpose of the Study*

A comparative study of the results of surgical treatment with abdominal and perineal approaches in patients with RP.

## Materials and Methods

This work was carried out from 2012-2019 in the educational and surgical clinic of the Azerbaijan Medical University (AzMedUniversity) in 83 patients (52 women; 63.5%) aged 16-85 years (median in women 46.5 ± 1.1, in men 48.2 ± 1.7 years) with RP of varying severity. 32 women (61.5%) indicated a history of severe traumatic childbirth (from 2 to 5). The mean follow-up period was 16.1 ± 2.6 months (4 to 21.9 months) ($p > 0.05$).

Mathematical results were processed with version Inc.20.0 of the Statistical Package for the Social Sciences (SPSS) Statistics package. The indicators in the groups were allocated according to the variation series; for each series, the average value (M), its standard deviation (m), maximum (max), and minimum (min) values were calculated. The difference between quantitative variables was studied using Pearson $\chi^2$ tests. The statistical significance of the differences was assessed using the Student t-

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test and the Wilcoxon U-test (Mann-Whitney). Differences in estimates $p < 0.05$ were considered significant.

Numerous abdominal or perineal techniques are used to treat RP: Until now, many procedures have been developed in the abdominal cavity, differing only in the degree and level of rectum mobilization, and the methods used for rectum fixation with and without resection.

*Suture Rectopexy*

The essence of this surgery is the mobilization and fixation with sutures of the rectum to the presacral fascia. Subsequent fibro-adhesive healing, as a rule, leads to reliable fixation of the organ in an elevated position.

*Prosthetic (Mesh) Rectopexy*

Ivolon sponge rectopexy, first described by Wells in 1959, involves inserting it between the sacrum and rectum and suturing both structures to the mesh (Wells, 1959). The use of foreign material (autologous tissue, biological materials, and polymer meshes) during rectopexy is usually performed with the aim of even greater, firm, and reliable formation of connective tissue at the site of rectum attachment in comparison with usual suture fixation.

The Ripstein procedure (anterior rectopexy) was first described in 1952, the essence of which is the complete mobilization of the rectum, the anterior part of the presacral fascia or a strip of a synthetic prosthesis is placed in front of the rectum and several sutures are applied to the promontorium (Scaglia *et al*., 1994). In this case, the posterior curve and the anorectal angle, i.e. normal anatomical position of the rectum, are restored, thereby minimizing intra-abdominal pressure increased before surgery and improving defecation. Rectosigmoidal resection was performed by us only with a long and mobile mesentery and excessively mobile and (excessively) long (sigmoid colon, since the latter with its contents most often pushes the rectum out with constipation. This surgery also prevents the possible torsion of the organ in the future.

*Perineal Procedures*

The advantage of these procedures is that they are performed without a laparotomy, which makes them suitable for high-risk patients in the early stages of the disease, especially the elderly and old age (Albanqi *et al*., 2022; Almulhim *et al*., 2022; AlShayhan *et al*., 2022; Iryna *et al*., 2022; Shetgaonkar *et al*., 2022).

The Delorme procedure, described in 1981 (by Delorme), represents a surgical alternative for patients with prolapse, such as the elderly, frail patients, and those who are medically unsuitable for major surgeries due to being unable to undergo more extensive abdominal surgery (Tobin & Scott, 1994; Pescatori *et al*., 1998). The essence of this surgery is to widen the anus, perform acute separation of the mucous membrane from the sphincter muscles, and the intrinsic muscle, and divide the mucosa along with the fold of the intrinsic muscle. Then, with vertical corrugating seams, the prolapsed part is shortened and embedded in the pelvis (the place where it originally was). At the same time, hemorrhoids are removed, as well as the accompanying solitary rectum ulcer. The main indicators after the Delorme surgery: are 0-4% mortality and; 4-38% recurrence rate. Perianal rectosigmoidectomy. This procedure was first recommended by W.E. Miles in 1933 (Miles, 1933), and then by W.A. Altemeier *et al*. in 1971 (Altemeier *et al*., 1971). In this case, the distal part of the sigmoid colon is also completely removed. The overall case mortality rate ranges from 0 to 5%, and the recurrence rate is 0-16%. Its disadvantages include bleeding in the anastomosis line, infectious paraanastomotic complications with the development of sepsis (often severe sepsis) in the pelvis, as a result of insufficiency of the anastomotic sutures, due to its excessive tension, the development of edema, and poor blood supply (Agachan *et al*., 1997; Kim *et al*., 1999; Vijayvargiya *et al*., 2018).

## Results and Discussion

We performed suture rectopexy in 8 patients, after which recurrence developed in one case (12.5%). Complications requiring additional surgical aids were not encountered. According to the literature, recurrence rates range from 0% to 27%. After this procedure, constipation and the degree of insufficiency of the anal sphincter decrease, and, most importantly, the quality of life of patients improves **(Table 1)**.

**Table 1.** Statistics of operations performed on patients

| Abdominal surgery | n | Perineal surgery | n |
|---|---|---|---|
| Suture rectopexy | 8 | Perianal rectosigmoidectomy | 16 |
| Prosthetic rectopexy | 5 | Submucous sclerotherapy | 7 |
| Ripstein procedure | 8 | Longo staple resection | 5 |
| Rectosigmoidal resection | 3 | Traditional circular resection | 4 |
| Laparoscopic resection with suturing | 3 | Hemiresection of the prolapsed mucous membrane | 7 |
| Delorme procedure | 17 | | |
| Total | 44 | Total | 39 |

For prosthetic (mesh) rectopexy, we used strips up to 2 cm wide of polypropylene non-absorbable synthetic meshes (Prolene, Ethicon Inc; Marlex, CR Bard, Murray Hill) in 5 young patients: posterior and anterior rectopexy was performed according to Ripstein. It was performed only in cases where resection of the prolapsed part of the rectum was not required due to the prevention of purulent-infectious complications around the anastomosis. There were no complications or recurrences. Foreign body sensation was observed in 3 patients. There was a general improvement in stool and gas retention. However, the literature results for constipation are conflicting. Constipation continued to bother 3 patients. Significant pelvic sepsis is a major cause of postoperative morbidity, reported in 2–16% of patients with prosthetic rectopexy (Kulikovsky *et al*., 2019; Gramellini *et al*., 2021). This complication was not observed in our series.

Since the main predisposing factor for implant infection is infected hematoma and pelvic discharge, drainage of the pre-sacral pelvic area at the end of surgery is recommended (Kulikovsky *et al*., 2019; Tsunoda, 2020). In the presence of anastomosis in patients with resection, the risk of infection increases (Trompetto *et al*., 2019). If this complication does occur, removal of the foreign material is advisable because sepsis

does not go away until all of the foreign material has been removed (Gramellini *et al*., 2021).

The Ripstein procedure was performed in 8 patients, after which fecal retention improved, but constipation decreased insignificantly. Wound suppuration was observed in 1 patient, and cases of perirectal hematoma and recurrence were not observed **(Table 2)**. According to the literature, mortality rates after this surgery vary from 0% to 2.8%, and recurrence from 0% to 13% (Scaglia *et al*., 1994; Vijayvargiya *et al*., 2018). To prevent rectum constriction, we used Mc Mahan (1987) modifications, i.e. the mesh strips were sutured on the sides of the organ, leaving the anterior wall free (Miles, 1933).

**Table 2.** Complications and recurrences of the performed surgery

| Types of Surgery | Local infectious complication (suppuration of the wound) | Sepsis | Constipation | Recurrences |
|---|---|---|---|---|
| Suture rectopexy | - | - | - | 1 |
| Prosthetic rectopexy | - | - | 3 | - |
| Ripstein procedure | 1 | - | - | - |
| Rectosigmoidal resection | - | - | - | - |
| Laparoscopic resection with suturing | - | - | - | - |
| Delorme procedure | | | | |
| Perianal rectosigmoidectomy | 5 | 1 | - | 1 |

Rectosigmoidal resection was performed in 3 women, followed by suture fixation of the anastomotic line to the sacrum. In this case, dense fibrous-connective tissue strands are formed between the anastomosis line and the sacrum, reliably fixating the rectum in an elevated position. Defecation in patients has improved, and constipation has decreased significantly.

Laparoscopic suture resection was performed in 3 patients. In this case, the prostheses were not used. No complications or recurrences were observed.

We performed the Delorme procedure on 17 patients over the age of 70 who had serious contraindications for volumetric surgeries due to age or concomitant pathologies. Possible intraoperative damage to the sphincter, which leads to insufficiency of the closing apparatus of the rectum, sometimes of the 3rd degree, refers to the disadvantages of the surgery. Therefore, in such cases, the surgery was supplemented with sphincteroplasty, according to indications with levatoroplasty. Constipation was cured in all patients, the ability to hold stool and gas improved, and no recurrence was observed.

Perianal rectosigmoidectomy was performed by us in 16 male patients; of which, in 3 cases, there was an infringement of the prolapsed rectum segment with gangrenous-perforative consequences. Local infectious complications occurred in 5 patients; in one case, forced sigmostomy was imposed due to sepsis. The latter patient died of multi-organ dysfunction due to continued severe sepsis. A recurrence in one patient is associated with inadequate (small) resection of the excess sigmoid colon. The reduced capacity of the remaining reservoir due to the rather narrow colon just above the anal anastomosis results in a significant reduction and severity of preoperative symptoms. An excessive decrease in intracanal pressure at rest, a decrease in its volume, and a defect in the anatomical position of the rest of the sigmoid colon increase the frequency of bowel movements. Therefore, some authors (Altemeier *et al*., 1971) suggested adding posterior levatorplasty to this procedure. The advantage of the latter is that it recreates the anorectal angle, which significantly improves anal retention (Vijayvargiya *et al*., 2018). Concomitant levatorplasty allows for tremendous improvement in the condition, but also a lower recurrence rate compared to the Delorme procedure. The best indicators in comparison with other perineal procedures (perineal rectosigmoidectomy without levatoroplasty, Delorme procedure) were found in patients who had undergone perineal rectosigmoidectomy with levatorplasty: the largest recurrence-free interval, the lowest recurrence rate, and the most beneficial effect on constipation and anal continence (Alanazi *et al*., 2022; Alhazmi *et al*., 2022; Alshammari *et al*., 2022; Alturki *et al*., 2022; Khunfur *et al*., 2022).

It should be especially noted that perianal rectosigmoidectomy is often the best surgery for elderly patients and patients with severe concomitant pathologies, for whom large and voluminous abdominal surgeries are inappropriate (Vijayvargiya *et al*., 2018). Minimally invasive surgery in the early stages.

In 7 patients (0.8%) with prolapse of only the rectal mucosa, sclerotherapy was performed by submucous injection of 5% phenol solution in a volume of 3-5 ml from 3 to 7-8 points, in 6 cases (0.7%) ligation with latex rings was performed; in addition, transanal intermittent circular excision of mucose (5; 0.6%); stapler resection (with a Covidien or Ethicon kit) according to the Longo method (5; 06%); with mucosal prolapse of the 3rd degree classical circular resection (4; 0.5%) was performed. The latter procedure in several cases is complicated by anal stenosis. Therefore, we have developed a simplified modification of it, the essence of which is the anterior and posterior hemisection of the prolapsed mucous membrane, leaving it in the lateral parts within 0.5-1.0 cm. When excessively large masses fall out, flaps of the mucous membrane of the same size are left in 3 places (12, 5, and 7 o'clock on the dial). The developed techniques were performed not with a stapler, but manually in 7 patients (0.8%). There were no complications or recurrences after minimally invasive procedures.

*Choice of Surgery*

The operation of abdominal rectopexy is currently distinguished by very low mortality rates. Therefore, it is advisable to carry it out on patients who do not have concomitant pathologies. Such operations are characterized by fewer relapses and have a greater chance of favorable functional results.

When performing suture rectopexy surgery, it is possible to obtain good results in patients. However, when a back wall is added, the patient may experience a foreign body sensation, which is a disadvantage. In addition, there is an increased risk of infectious complications with prosthetic rectopexy.

Adding resection to rectopexy reduces constipation. This procedure is suitable for patients with a history of long (excess) sigmoid colon and constipation. With Ripstein's surgery,

constipation problems either persist or increase after the procedure.

Laparoscopic surgery is less painful than laparotomy. Its benefits also include shorter hospital stays and quicker recovery and return to work. Its results are similar to those after open procedures (regardless of the method used – suture material, posterior mesh pexia, or resection).

Perianal procedures are most often useful for frail, elderly patients with extensive comorbidity who are not eligible for major abdominal surgery. The higher recurrence rate requires that patients be warned about the need for repeated surgery. Whether the Delorme procedure or perineal rectosigmoidectomy is performed depends on the preference and experience of the surgeon. It should be borne in mind that the Delorme procedure is associated with an even higher recurrence rate than perianal rectosigmoidectomy. The Delorme procedure can be useful if the length of the prolapse is not long enough to perform perineal rectosigmoidectomy (Tobin & Scott, 1994; Pescatori *et al*., 1998). Perineal rectosigmoidectomy is well suited for patients with compressed and gangrenous RP, while abdominal rectopexy cannot be used in such situations, even in healthy patients.

In addition to reducing the potential risk of pelvic nerve injury, the perianal approach may be preferred for younger male patients. Beneficial outcomes can be achieved after perineal procedures by applying strict patient selection criteria.

In recent years, there has been a tendency to offer perineal rectosigmoidectomy to healthier patients (Vijayvargiya *et al*., 2018; Tsunoda, 2020). Although perineal rectosigmoidectomy can be performed with minimal hospitalization and disruption to the patient's life, the recurrence rate is in the range of 16% (Tsunoda, 2020). For younger female patients, the benefits of perineal rectosigmoidectomy, which is a lesser procedure, must be weighed against a higher recurrence rate (Tsunoda, 2020). When choosing a treatment option, consideration should be given to the patient's age and health status, functional outcomes, and benefits versus those of the surgical technique.

## Conclusion

For physically fit patients with rectal prolapse, abdominal procedures are suitable. For elderly patients and elderly patients with serious comorbidities, perineal procedures are suitable.

Rectopexy, both suture, and mesh are popular with many specialists. The choice of option depends on the particular surgeon. At the same time, suture rectopexy is adequate in treatment, and mesh rectopexy does not exceed suture one. However, with mesh rectopexy, the risk of infection increases.

The results of laparoscopic rectopexy are similar to or better than those after open pexy. It is preferable to carry out a laparoscopic suture rectopexy since it is simple and easy to perform.

Patients who cannot undergo abdominal procedures are recommended perineal surgeries. Perineal rectosigmoidectomy, especially with the addition of posteriorr levatoroplasty, has better results than Delorme's procedure.

**Acknowledgments:** None

**Conflict of interest:** None

**Financial support:** None

**Ethics statement:** The study was conducted in accordance with international ethical standards. Informed consent was obtained from all study participants.

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