ORIGINAL ARTICLE

Short-term Outcomes of Laparoscopic Ventral Approach of Rectopexy with Polypropylene Mesh for Rectal Prolapse

Ayman M Essawy[1], Ahmed E Fares[2], Ashraf M Thabet[3], Khaled M Bauomie[4]

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Abstract

Background: Complete rectal prolapse (CRP) is a disease in which all layers of the rectum herniate through the anal sphincter. Patients with CRP may complain of constipation which precedes the prolapse.

Aim of the study: To evaluate the efficacy of laparoscopic ventral mesh rectopexy (LVMR) in the management of CRP.

Patients and methods: This trial was conducted on 20 patients with rectal prolapse (RP) who underwent LVMR admitted from the general surgery outpatient clinic in Fayoum University Hospital in the period from July 2015 to December 2017.

Results: We included 15 male patients (75%) and 5 female patients (25%), the average age of participants was 34.4 years. There was a significant improvement in constipation and inflammation and ulceration postoperatively. Recurrence occurred in one patient (5%).

Conclusion: The utilization of an anterior approach of laparoscopic technique is the approach of choice for patients with full-thickness RP. The LVMR has the advantage of avoiding unnecessary repeated operations with all its physical and psychological effects on patients, minimal recurrence, a high success rate, and a low complication rate for this procedure.

Keywords: Laparoscopy, Polypropylene mesh, Rectal prolapse, Rectopexy.

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Introduction

Rectal prolapse is classified according to its severity into the following three major grades:[1] (i) Mucosal prolapse is a disease in which the mucosal lining of the rectum protrudes through the anus. (ii) Internal prolapse, rectal intussusception, in which part of the rectal wall invaginates into the lumen of another part of the rectum. (iii) The third grade is complete prolapse of the rectum through the anus.[2–4]

Complete rectal prolapse is disease in which all layers of the rectum herniate through the anal sphincter.[5,6] Complete rectal prolapse is a disabling disease affecting about 2.5 individuals per 100,000 population.[7] The exact etiology of rectal prolapse is unknown, however. Straight rectum, weakness of pelvic floor muscles and anal sphincter, and lack of ligamentous support of the rectum are considered anatomical predisposing factors for CRP.[8] A mass protruding from the anus is the main clinical feature of the CRP. At first, the prolapse occurs after defecation, but with time it may occur spontaneously upon standing or coughing. Incontinence is a frequent disabling symptom affecting about half of the patients with CRP.[5,9,10] The prolapsed rectum damages the rectal nerves and sphincters, which in turn, may lead to fecal incontinence not resolving after surgery.[10]

The long history of constipation is defined as the most reported complaint among patients with CRP.[11] Weakness of the pelvic muscles by chronic straining may contribute to rectal prolapse. Surgical intervention is the treatment of choice of CRP in adults.[12,13] The surgery aims to restore normal physiology and anatomy by correcting the prolapse.[14,15] It also improves bowel and sexual function. Many surgical procedures have been suggested to treat CRP. Available surgical treatment options include abdominal and perineal approaches.[16,17] Abdominal approaches either open or laparoscopic are better for young fit patients. On the other hand, the perineal approach is preferable for old patients who are unfit for abdominal procedures.[18] Laparoscopic correction of RP includes rectopexy and/or resection rectopexy. Laparoscopic ventral mesh rectopexy has been popularized in the past decade because of its benefits over alternative surgical options.[19] Laparoscopic ventral mesh rectopexy is associated with better anatomical results, fewer complications, less recurrence rate, and low mesh-related morbidity.[20,21] The ventral approach avoids the circumferential mobilization which decreases the complications of rectal denervation.[22]

Our aim in this study was to measure the success and suitability of the anterior approach of laparoscopic rectopexy for the treatment of CRP.

Patients and Methods

Study Design

The current clinical trial was conducted in general surgery outpatient clinic in Fayoum University Hospital in the period from

[1–4]Department of General Surgery, Faculty of Medicine, Fayoum University, Fayoum, Egypt

Corresponding Author: Khaled M Bauomie, Department of General Surgery, Faculty of Medicine, Fayoum University, Fayoum, Egypt, Phone: +201024260661, e-mail: kbauomie@yahoo.com

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Conflict of interest: None

2015 to 2017 obtaining ethical approval from the local ethical committee and after taking fully informed consent from patients.

Patient Selection and Evaluation

This study included 20 patients with CRP who underwent LVMR with polypropylene mesh.

Inclusion Criteria

- All patients have CRP without any other pathology by colonoscopy. All these patients were between 6 and 70 years of age with no contraindication to laparoscopic surgery and those patients with physical status classification system of American Society of Anesthesiologists (ASA), categories I and II.
- Patients with failure of conservative management after at least 6 months.
- Patients with distressing symptoms such as rectal pain, bleeding, ulceration, and prolapse that require frequent manual reductions or show difficulty in reduction.
- Recurrent or persistent prolapse after previous trials of injection sclerotherapy or surgery.

Exclusion Criteria

- Patients who were younger than 6 years or older than 70 years.
- Cases of rectal polyps (till polyps are investigated and treated).
- Rectal prolapse following anorectal malformation procedures and Hirschsprung's disease repair.
- Patients with neurological causes for RP such as spina bifida and meningomyelocele.
- Patients suffering from cystic fibrosis.

Data on age, gender, and preoperative baseline symptoms including constipation, urine incontinence were obtained. Operation time, intraoperative complications, immediate and late postoperative complications were assessed.

Preoperative Assessment

All patients underwent a comprehensive evaluation including a detailed history, full physical examination, barium enema, colonoscopy, electromyography, imaging, and routine preoperative investigations, such as full blood count, liver function tests, kidney function tests, and ECG for patients older than 60 years to assess the eligibility criteria and fitness for surgery.

All patients underwent bowel preparation by daily enema for two days preoperatively. They received 50 mg/kg of ceftriaxone and 7.5 mg/kg of metronidazole before surgery (Fig. 1).

Operative Procedure

The procedure was performed under general anesthesia and the patients were in the supine position. Four ports were inserted, the first in the umbilicus for the camera, the second in the right midclavicular line for a grasper, the third was placed at the same position on the left side and the fourth was placed at the left anterior axillary line above the level of the umbilicus for grasping the rectum and keeping it in place throughout the procedure with the table in Trendelenburg position. Patients positioned in Trendelenburg position to expose the pelvic organs and the small intestine is retracted cephalad. Hysteropexy may be performed as needed for exposure. The rectosigmoid is retracted toward the spleen to expose the peritoneum. The right ureter is identified along the right pelvic sidewall. The right-side peritoneum is then incised at the level of the sacral promontory and the peritoneal dissection continues downward in the midpoint between the rectum and sidewall to the level of the pelvic floor. Dissection is performed in the anterior space through Denonvilliers' fascia to the rectovaginal space. In men, the dissection in the recto-vesical pouch is carried to the apex of the prostate but the lateral dissection around the seminal vesicles is avoided. In some cases, the hernia sac may be redundant and associated with enterocele which require resection of the peritoneal sac (Fig. 2).

Posterior and lateral dissection is avoided. Once the anterior space is mobilized, polypropylene mesh is secured to the anterior aspect of the rectum and the proximal end of the mesh is anchored to the sacral promontory with sutures or tacks using Ethibond Suture 0, taking care to avoid full-thickness rectal bites, two or three polypropylene sutures (3/0) were used to fix the seromuscular wall of the lowermost part of the rectum. This elevates the anterior wall without any traction on the rectum. The posterior vaginal fornix is lifted and sutured to the mesh (anteriorly), aiding in the repair of the rectocele, as well as prolapse. The proximal end of the mesh is anchored to the sacral promontory with sutures or tacks. The pelvic peritoneum is then approximated to extraperitonealize the mesh closed by absorbable sutures and the port site wounds were closed using subcuticular sutures.

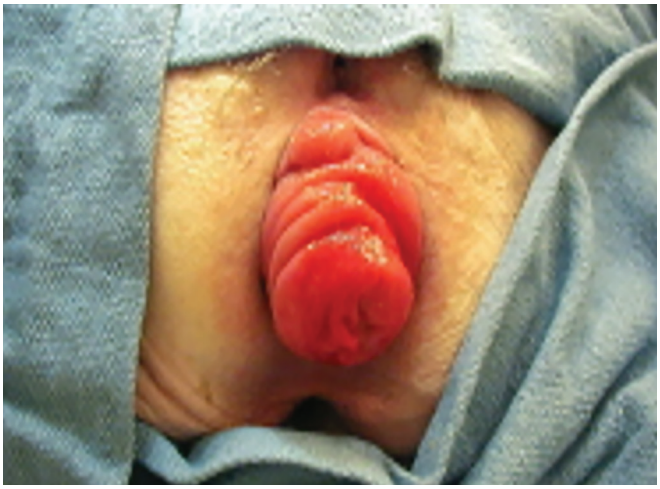

Fig. 1: Patient with CRP

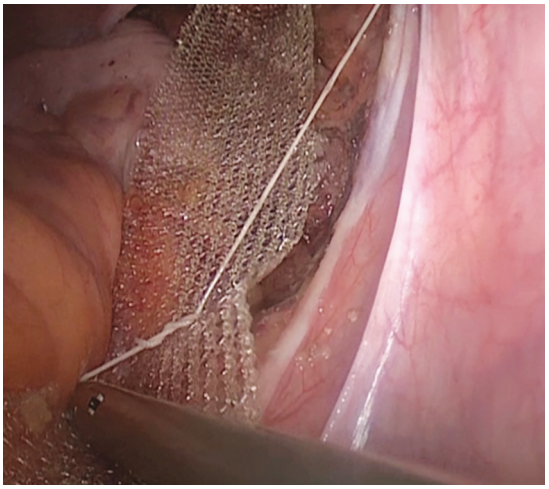

Fig. 2: Fixation of mesh to the rectum and sacral promontory

Follow-up

Stool softeners were used for one month after operation along with instructions to avoid constipation, lifting heavy objects, straining, doing heavy exercise for 6 weeks, having sexual intercourse for 4 weeks. Follow-up duration ranged from 6–12 months.

Statistical Analysis

Data were presented as mean ± standard deviation, number, and percentages. Statistical analysis was performed using MedCalc© version 12.5 (MedCalc© Software bvba, Ostend, Belgium) and Microsoft© Excel© 2010 (Microsoft© Corp., Redmond, Washington, USA).

Results

Demographic and Clinical Characteristics

We included 20 patients suffering from CRP who underwent LVMR. The patients were admitted from the outpatient clinic in Fayoum University Hospital in the period from 2015 to 2017. The average age of patients was 34.4 ± 19.8 (range: 8–70) years. There was male predominance. We included 15 male patients (75%) and 5 female patients (25%). The baseline preoperative symptoms were constipation in 35% of patients, urine incontinence in 5% of patients, inflammation and ulceration by colonoscopy in 30% of patients. Baseline demographic data are illustrated in detail in Table 1.

Primary Outcomes

- **Constipation**: Seven patients were constipated preoperatively (35%). There was a significant postoperative improvement of patients with constipation. All patients reported an absence of constipation (100%) after the operation.
- **Urine incontinence**: Only one patient complained of urinary incontinence before operation. There was no effect on the continence of patients. After the operation, there was one patient still complaining of urinary incontinence.
- **Inflammation and ulceration by colonoscopy**: There was a significant improvement of inflammation and ulceration after the operation. All patients showed complete healing of the colon after our approach.
- **Operative complications**: There was no bowel injury, nerve injury, major blood loss, or mesh erosion that occurred during the operation. Only one case (5%) was converted to open rectopexy as dissection was lateral and pelvic vessels were exposed. Another patient (5%) reported postoperative pain on defecation resulting from an acquired anal fissure during preoperative preparation and it was managed conservatively. Another patient (5%) complained of perianal maceration from severe diarrhea. The third patient had prolonged postoperative ileus and initiated feeding on the fourth postoperative day. This patient was discharged home on the fifth day and returned to the hospital with feeding intolerance.
- **Recurrence:** Recurrence of rectal prolapse after our procedure occurred in one patient (5%) that was managed with open rectopexy (Table 1).

Discussion

All patients presented with RP during the period of the study. Twenty patients who had complete persistent rectal prolapse or recurring after previous interventions were subjected to an anterior approach of laparoscopic rectopexy. Male predominance was noted in our study, which was also noted in Potter et al., Flum et al., Laituri et al., and Chan et al.[23–25] In pediatrics, rectal prolapse affects equally males and females. The disease is much more common in underdeveloped countries, with common causes including parasitic disease, malnutrition, and diarrheal illness.[13]

Twelve patients had no associated comorbidities. Patients tend to strain vigorously against closed sphincters, leading eventually to prolapse. Some authors considered that prolongation of the conservative treatment time is inappropriate because it is distressing for patients with unlikeliness of response. Therefore, early surgical intervention was considered more appropriate in such cases.[27,28] In the study by Potter et al., 47% of patients had no predisposing factors[23] Also, in Flum et al., 62% of patients had no predisposing factors.[24] However, meticulous history taking and thorough re-examination were done to pick up any predisposing factor that would have been missed. Other treatable predisposing factors such as constipation, diarrhea, and malnutrition were managed by stool softeners and diet modification (Fig. 3).

Laituri et al. in 2010[25] reported that extensive evaluation is not necessary in most uncomplicated cases as evaluation of patients with RP is relatively straightforward. However, we had baseline

Table 1: Baseline demographic data of 20 patients with CRP

Number (%)	*20 (100%)*
Age (mean ± SD)	34.4 ± 19.8
Sex (male:female)	15:5
Constipation *n* (%)	7 (35%)
Urine incontinence *n* (%)	1 (5%)
Inflammation and ulceration *n* (%)	6 (30%)
Previous surgery rectal prolapse *n* (%)	4 (20%)
Barium enema abnormalities *n* (%)	0 (0%)
Conversion to open surgery *n* (%)	1 (5%)
Average operating time (minute)	75 (60–90)
Follow-up duration range (month)	6:12
Average hospital stay (days)	3 (1–5)

n, number; SD, standard deviation

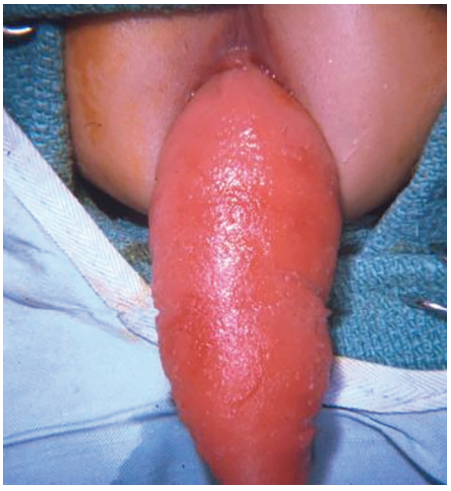

Fig. 3: Severe rectal prolapse with clinically significant edema and mucosal ulceration

investigations for all patients which were stool culture, plain X-ray abdomen, barium enema, and colonoscopy to assess the presence of any other pathologies and the fitness of patients. In 2010, Potter et al.[23] used colonoscopy or barium enema before operative intervention for evaluation of rectum.

Shalaby et al.[29] in their study used plain radiographs, barium enema, proctoscopy, colonoscopy, and pre and postoperative EMG. We reserved the use of colonoscopy for adult cases of significant bleeding per rectum or abnormalities detected on barium enemas. Similarly, EMG use was conserved for cases with the significantly diminished anal tone, as pelvic floor weakness, which is usually seen in adults and rarely seen in children.[30]

Our operative time ranged 60–90 minutes with a mean of 75 minutes. Potter et al.[23] had a range 28–117 minutes with a mean of 72 minutes. Shalaby et al.[29] had a range 50–70 minutes with a mean of 60 minutes. Abdominal procedure via the laparoscopic approach is now the recommended approach in all cases. There is a recurrence rate of 2–5% after laparoscopic sigmoid resection with or without rectopexy.[31] Generally, in mesh rectopexy, there is a mobilization of the rectum to the pelvic floor with a ventral or a posterior application of the mesh. The circumferential mobilization of the rectum usually damages the autonomic supply of the rectum, which in turn affect the motility of rectosigmoid yielding *de novo* constipation or worsening of existing constipation.[32] Other techniques that performed complete mobilization of the rectum, were found to be unnecessary as good results were obtained without the need for complete mobilization.[33]

In 2006, D'Hoore and Penninckx[20] reported "nerve–sparing ventral rectopexy" as a main procedure for the management of rectal prolapse. The primary advantage of laparoscopic ventral rectopexy is that it avoids any posterolateral dissection of the rectum keeping the autonomic innervation intact. Nowadays, this technique has gained widespread acceptance and is considered the standard method for treating pelvic organ prolapse.[34] The benefits of the laparoscopic approach and anterior approach of rectopexy have made the procedure effective and safe with minimal functional disturbance.

Many published studies reported a recurrence rate of 5% following LVMR. These recurrences usually occur within the first 2–3 years.[21,35] The risk of recurrence is similar to that reported for other abdominal procedures 2–9%.[36] The overall Recurrence, in our study, is one out of 20 patients 5% that is being managed with open rectopexy and improved on follow-up. Laparoscopic ventral mesh rectopexy is associated with a lower incidence of recent–onset constipation. Besides, it shows a great improvement in pre-existing constipation as compared with posterior rectal dissection.

Three randomized trials have shown an improvement in constipation by avoiding lateral and posterior dissection.[37–39]

Postoperative dyschezia and constipation were reported in many case series.[29,40] These postoperative symptoms were not encountered in our study, which is attributed to the avoidance of retro rectal dissection.

One can argue that the utilization of an anterior approach of laparoscopic technique is the approach of choice for patients with full-thickness RP. The LVMR has the advantage of avoiding the unnecessary repeated operations with all its physical and psychological effect on patients, minimal recurrence, the high success rate, and low complication rate for this procedure.

Study limitations were the relatively small number of patients, but this could be attributed to the characteristics of the disease in children and the fact that a big number of patients resolve spontaneously, which is the same limitation in most studies dealing with the RP.

The other limitation is the relatively short period of follow-up. Subsequent studies with a longer follow-up period would be useful in accessing the success rate of the LVMR.

From the obtained results, we found that the anterior approach of laparoscopic rectopexy is a simple, minimally invasive technique, with reasonable operative time and minimal immediate postoperative morbidities.

Data Availability Statement

Data will be available to any researcher who contact the corresponding author.

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