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Original Research Paper

General Surgery

COMPARISON OF VENTRAL MESH RECTOPEXY AND LAPAROSCOPIC SUTURE TECHNIQUE FOR RECTAL PROLAPSE

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ABSTRACT The ongoing quest for the best surgical treatment for rectal prolapse (RP) is rooted in the many techniques that have been presented over the past few decades, frequently with conflicting outcomes. Rectal intussusception (RI), RP, and associated symptoms should be resolved by this. For the surgical treatment of internal rectal prolapse, the purpose of this study is to assess and contrast the functional results following laparoscopic ventral mesh rectopexy and laparoscopic suture rectopexy. Thirty patients with internal rectal prolapse were randomly assigned to one of two groups in this prospective study, which was conducted in the general surgery department at MADRAS MEDICAL COLLEGE and Hospital. In Group A, 15 patients were suggested for laparoscopic suture rectopexy, whereas 15 patients of Group B were suggested for laparoscopic ventral mesh rectopexy. The duration of the ventral mesh rectopexy procedure was much longer than that of the laparoscopic suture procedure. With the exception of one bleeding incident in the LSR group, there was no discernible difference between the two groups' intraoperative problems. In conclusion, laparoscopic mesh rectopexy and suture rectopexy are both practical and effective treatments for internal rectal prolapse that are linked to reduced recurrence rates, enhanced anorectal function, and alleviation of ODS symptoms.

KEYWORDS : Rectal prolapse; Rectopexy; Suture rectopexy; Ventral rectopexy

1. INTRODUCTION

Rectal prolapse occurs when the rectum descends through the anal canal and protrudes from the anus. This condition is associated with various anatomical abnormalities, including deepening of the Douglas pouch, levator ani diastasis, a redundant sigmoid colon, a movable mesorectum, and a wide anus. While rectal prolapse can affect individuals of any age, its highest prevalence in adults is typically between the ages of 40 and 70. In the adult population, the condition is more common in women, with a male-to-female ratio of approximately 1:6. Rectal prolapse has been classified either as an upper rectal intussusception or as a form of herniation through the pelvic fascia. Patients may experience symptoms such as constipation, fecal incontinence, and the visible protrusion of a mass from the anus. Surgical treatment is generally required for adults, though there is ongoing debate about the most effective surgical approach. The goal of surgery is not only to repair the structural defect but also to improve anorectal function and prevent complications post-operatively.

In suture rectopexy (SR), the rectum is mobilized and secured with a non-absorbable suture. As adhesions form between the rectum and the presacral fascia, the rectum is held in place through the combined effects of mobilization, suturing, and fibrosis. Although both men and women can benefit from SR for treating rectal prolapse or internal rectal intussusception (IRI), some studies have shown that men tend to experience better overall clinical outcomes. The lack of routine endoanal ultrasonography in the early years of prolapse surgery may have contributed to the failure to detect underlying sphincter abnormalities in women before surgery. In Europe, laparoscopic ventral mesh rectopexy is considered the gold standard for treating rectal prolapse. This study aims to compare the functional outcomes of laparoscopic ventral mesh rectopexy and laparoscopic suture rectopexy, focusing on factors such as post-operative hospital stay, improvement in obstructed defecation, and recurrence rates.

2. Patients and Methods:

This prospective study was conducted at the Institute of General Surgery, Madras Medical College and Hospital, after obtaining approval from the research ethics committee. All participants provided informed consent to take part in the study. A total of 30 patients diagnosed with internal rectal prolapse (IRP) and obstructed defecation syndrome (ODS), who did not respond to conservative or medical treatments, were enrolled. These patients were followed up for 12 months, starting from January 1, 2024, to January 1, 2024.

Study Population:

The study involved adult male and female patients aged 15–60 years from Chennai, who sought treatment for symptomatic internal rectal prolapse at the Institute of General Surgery, Madras Medical College and Hospital. Inclusion criteria consisted of symptomatic patients with IRP (with or without anterior rectocele) who did not respond to conservative measures, following a complete medical history, clinical evaluation, and radiological assessment. Exclusion criteria included individuals with complete rectal prolapse, multiple organ prolapse, recurrent cases, history of radiotherapy, or rectal and colonic inertia.

Grouping of Patients:

The participants were randomly divided into two groups:
Group A: 15 patients with an average ODS score of 21.7/24, who underwent laparoscopic ventral mesh rectopexy.
Group B: 15 patients with an average ODS score of 21.4/24, who underwent laparoscopic suture rectopexy.

Proposed Interventions:

The two surgical techniques proposed were:
Laparoscopic ventral mesh rectopexy
Laparoscopic suture rectopexy

Data Collection Methods:
History and Obstructed Defecation Assessment: The obstructed defecation was assessed using a modified Longo score, which included seven lifestyle and symptom-based parameters.
Clinical Assessment:
Inspection: The patient was asked to bear down to observe

the full-thickness rectal prolapse and its concentric folds.

Per Rectum Examination: This helped assess the integrity of the anal sphincter, check for masses in the anal canal and lower rectum, and identify the internal rectal prolapse during straining.

Per Vaginal Examination: This was performed to detect cystocele or rectocele during rest and straining.

Anorectal Manometry: Preoperative and postoperative manometry were performed at 6 and 12 months using a Solar GI HRAM MMS system with a 24-channel water-perfused catheter and latex balloon, evaluating rectal sensations, anal sphincter pressures, and excluding anismus.

Imaging: All patients underwent MR defecography.

Colonoscopy: A colonoscopy was performed on all patients to exclude any proximal lesions and obtain biopsy samples from any rectal ulcers to rule out malignancy.

Routine Preoperative Laboratory Tests: Standard laboratory tests were conducted for all patients before surgery.

Patient Preparation and Positioning:

Before the surgery, each patient was administered two rectal enemas the night prior and received prophylactic antibiotics: 1 gm of ceftriaxone and 500 mg of metronidazole. After anesthesia induction, the patient was placed in a modified lithotomy position with thighs spread and bent upwards to allow simultaneous access to the abdomen and perineum. The surgical team positioned themselves as follows: the surgeon on the right, the assistant on the left, and the camera operator beside the assistant.

Surgical Techniques:

Laparoscopic Suture Rectopexy:

After urinary catheterization, pneumoperitoneum was created using a Veress needle via an umbilical stab incision. A 10 mm camera port was inserted through the umbilicus, and a 30-degree telescope was introduced.

Two 5 mm working ports were placed on the right side, and one 5 mm port was placed on the left side for the assistant.

After exploration of the abdominal cavity in a Trendelenburg position, the sigmoid colon was retracted, and the rectum was dissected from the sacral promontory and surrounding tissues.

The rectum was then retracted upwards to identify the optimal point for suture fixation, and the posterior wall of the rectum was sutured to the presacral fascia. The procedure was completed with suspension sutures for added support and to prevent adhesions.

Laparoscopic Ventral Mesh Rectopexy:

The procedure began similarly, with dissection of the anterior rectum and identification of key structures like the hypogastric nerve and ureter. The anterior space was mobilized, and polypropylene mesh (15x4 cm) was inserted into the abdomen.

The mesh was secured to the anterior rectum using interrupted sutures and tacked to the sacral promontory. The peritoneum was then closed over the mesh to complete the surgery.

Postoperative Care:

All patients received standard post-operative care, including pain management, antibiotics, and stool softeners. They remained NPO (nothing by mouth) until they passed flatus, after which they were given fluids. During the hospital stay, patients were assessed for improvement in obstructed defecation, constipation, and recurrence of prolapse.

Follow-up:

Follow-up visits were scheduled one week post-surgery, then monthly for the next 12 months. At the 6- and 12-month follow-ups, patients were reassessed using anorectal manometry and the modified Longo score.

Statistical Analysis:

Data were processed using SPSS version 23. Qualitative variables were expressed as numbers and percentages, while quantitative variables were expressed as mean ± standard deviation (SD).

3. RESULTS

No significant differences were observed between the two groups in terms of baseline characteristics (Table 1). Similarly, there was no statistical difference between the groups regarding preoperative symptoms (Table 2). The duration of hospital stay and the time from surgery to the passage of flatus did not differ significantly between the two groups (Table 3). Additionally, there were no significant differences between the groups at the 6-month and 12-month follow-up regarding mean resting anal pressure. However, both groups showed a highly significant reduction in first rectal sensation, first urge, and intense urge. Moreover, there was a highly significant increase in mean squeeze pressure in both groups at the 6- and 12-month post-operative assessments (Table 4). Furthermore, a significant reduction in the modified Longo score and the need for laxative use was observed preoperatively and at the 6- and 12-month follow-ups (Table 5).

Table (1): Basal Characteristics of included patients.

	LVMR (N=15)	LS (N=15)	P value
Age (Years)	42.3 (11.6)	44.4 (11.3)	>0.05[1]
Sex			>0.05[2]
Male	5 (33.63%)	6 (40%)	
Female	10 (66.67)	9 (60%)	
BMI (Kg/m^2)	23.5 (2.3)	24.3 (2.5)	>0.05[1]
Marital Status			>0.05[2]
Single	6 (40%)	5 (33.33)	
Married	9 (60%)	10 (66.67)	
Residence			
Urban	7 (46.67)	6 (40%)	
Rural	8 (53.33)	9 (60%)	
Smoking	5 (33.33)	6 (40%)	>0.05[2]
Previous Surgery			
Colonic or rectal	0	0	
Appendectomy	6 (40%)	7 (46.67)	
Upper abdominal	1 (6.67%)	2 (13.33)	
Other	1 (6.67)	1 (6.67)	
Symptoms duration	1.3 (0.2)	1.25 (0.15)	>0.05[1]

1: T-test | 2: Chi square
P > 0.05 No statistical Difference
P < 0.05 Statistical Difference
P < 0.001 High Statistical Difference
BMI: Body Mass Index

Table (2): Lesions and pre-operative symptoms.

	LVMR (15)	LS (15)	P value
e-operative symptoms			
fficulty in defecation	15 (100%)	15 (100%)	
eeding per rectum	2 (13.33%)	2 (13.33%)	>0.05[2]
ucous discharge	5 (33.33%)	4 (16.67%)	
ctal Lesions			
terior rectocele	11 (73.34%)	10 (66.67%)	
ctal ulcer	4 (26.67%)	5 (33.33%)	>0.05[2]

1: T-test | 2: Chi square
P > 0.05 No statistical Difference
P < 0.05 Statistical Difference
P < 0.001 High Statistical Difference

Table (3): Post operative data.

	LVMR (15)	LS (15)	P value
Mean operative time	120 M.	100 M	<0.001
Intraoperative bleeding	0	1(6.66%)	
Duration of Hospital Stay (Day)	3.0 (1.0)	2.9 (1.2)	>0.05[1]
Pass of flatus (Hours)	20.3 (2.4)	19.6 (3.1)	>0.05[1]
Mortality	0	0	-
Recurrence	1(6.66%)	1(6.66%)	>0.05[2]

1: T-test
P > 0.05 No statistical Difference
P < 0.05 Statistical Difference
P < 0.001 High Statistical Difference

Table (4): Comparison between both groups regarding Assessment results.

Items	6 Months post Operative			12 Months post Operative		
	LVMR (15)	LS (15)	P. Value	LVMR (15)	LS (15)	P value
Mean Resting anal Pressure (mmHg)	33±2.2	33±2.3	>0.05[1]	33±2.4	33±2.5	>0.05[1]
Mean Squeeze anal Pressure (mmHg)	150±7.5	140±7	<0.05[1]	155±7.75	145±7.25	<0.05[1]
First sensation (mmHg)	50±2.5	30±1.5	<0.0001[1]	55±2.75	35±1.75	<0.0001[1]
First Urge (mmHg)	120±6	80±4	<0.0001[1]	100±5	75±3.75	<0.0001[1]
Intense Urge def. (mmHg)	230±11.5	200±10	<0.0001[1]	220±11	190±9.5	<0.0001[1]

1: T-test | 2: Chi square
P > 0.05 No statistical Difference
P < 0.05 Statistical Difference
P < 0.001 High Statistical Difference

Table (5): Comparison between both groups regarding Assessment results.

Items	6 Months post Operative			12 Months post Operative		
	LVMR (15)	LS (15)	P. Value	LVMR (15)	LS (15)	P value
Modified Longo score	12±0.6	10±0.5	<0.0001[1]	10±0.5	8±0.4	<0.0001[1]
Laxative dependence	5 (33.33%)	3 (20%)	<0.05[2]	3 (20%)	2 (13.33%)	<0.05[2]

4. DISCUSSION

The treatment of rectal prolapse aims to control the prolapse, restore continence if affected, and prevent constipation or impaired evacuation. However, selecting the optimal

treatment can be challenging due to the variety of available options and the lack of definitive guidelines. Therefore, the choice of procedure should be personalized to both the patient and the surgeon [7]. While various abdominal and perineal surgical approaches have been proposed, randomized trials comparing these two methods have failed to demonstrate a clear advantage for one over the other [7, 8].

A 2019 study highlighted that laparoscopic ventral mesh rectopexy (VMR) is a safe and effective option for managing full-thickness external rectal prolapse, offering minimal recurrence and low complication rates [9]. Nevertheless, laparoscopic VMR requires special skills and highly trained surgeons who can perform a thorough ventral dissection of the rectovaginal septum (rectovesical septum in males) down to the pelvic floor. Additionally, suturing within the confined pelvic space makes the procedure technically challenging. Despite this, laparoscopic VMR remains the gold standard for rectal prolapse surgery in European countries [10].

However, despite being the procedure of choice, laparoscopic VMR is associated with several complications, particularly related to the mesh. These complications include rectal stricture, pain, dyspareunia, mesh erosions, rectovaginal fistulas, and autonomic dysfunction due to pelvic nerve injury during rectal dissection, which may lead to worsened constipation postoperatively [11]. In contrast, laparoscopic suture rectopexy (LSR) is considered a safer alternative with lower morbidity and mortality, and a recurrence rate of less than 10%. In addition to effectively addressing rectal prolapse, LSR often improves both constipation and continence in patients, and it avoids the complications associated with mesh use [12].

The goal of this study was to compare the outcomes and efficacy of laparoscopic suture rectopexy versus laparoscopic ventral mesh rectopexy in the treatment of internal rectal prolapse. The study followed 30 patients for 6 months postoperatively.

Preoperative and Postoperative Findings:

Before surgery, varying degrees of obstructed defecation symptoms were observed in both groups, as assessed by the modified Longo score, with no significant difference between the groups. However, postoperative assessments showed significant improvements in obstructed defecation symptoms in both groups. Despite this, 3 patients (20%) in the laparoscopic ventral rectopexy (LVR) group and 2 patients (13.3%) in the laparoscopic suture rectopexy (LSR) group continued to rely on laxatives post-surgery. The continued need for laxatives may be attributed to slow colonic transit time in some patients or the presence of dolichocolon. Therefore, we recommend evaluating colonic transit times preoperatively for better assessment.

Regarding anorectal function, there were no significant differences between the two groups in mean resting pressure, as the internal anal sphincter is an autonomic muscle. However, there was a significant increase in mean squeeze pressure in both groups, likely due to the avoidance of muscle fatigue from frequent attempts at evacuation. This improvement is consistent with findings from studies following open rectopexy procedures and was also observed by Hyun et al. in their study on laparoscopic suture rectopexy. However, some studies have suggested that surgical procedures may not significantly affect postoperative sphincter function.

Regarding rectal sensations, there was an improvement in all aspects of rectal sensation in both groups, though the LSR group showed significantly greater improvement than the LVR group. This difference may be due to reduced rectal capacity following suture rectopexy, which led to enhanced rectal sensation postoperatively, a finding also noted by Speakman et al. [19].

Recurrence and Complications:

Recurrence is a key parameter for evaluating the success of rectal prolapse surgery. In this study, two cases of recurrence were observed during the follow-up period—one in each group. This rate is similar to a study by Fargo and Latimer, which reported a recurrence rate of 15% [20]. In contrast, a study by Consten et al. found a recurrence rate of 8.2% following laparoscopic ventral rectopexy. Long-term studies have shown that recurrence rates tend to increase over time after rectal prolapse repair [22].

Duration of Surgery:

The duration of surgery is an important factor when assessing the advantages of a procedure. In this study, the mean duration for laparoscopic suture rectopexy was 100 minutes, while laparoscopic ventral mesh rectopexy took an average of 120 minutes. The difference was statistically significant ($P < 0.05$). This is consistent with findings from Sahoo et al., who reported a mean duration of 100.8 ± 12.4 minutes for LSR and 120 ± 10.8 minutes for LVR [23]. The longer duration for laparoscopic ventral mesh rectopexy is due to the additional time required for mesh insertion, adjustment, and suturing in the narrow pelvic space.

Intraoperative Complications:

No significant intraoperative complications were reported in either group, aside from one case of bleeding in the LSR group, which occurred due to injury to the presacral veins. This was managed successfully using bipolar diathermy. In the LVR group, the main concern was the potential for rectal injury during anterior dissection, although no such injury occurred in this study.

CONCLUSION

Both laparoscopic ventral mesh rectopexy and laparoscopic suture rectopexy are feasible and reliable treatments for internal rectal prolapse, with low recurrence rates, improved obstructed defecation symptoms, and enhanced anorectal function. However, laparoscopic VMR requires special skills and a highly trained surgeon capable of performing a complete ventral dissection of the rectovaginal (or rectovesical in males) septum down to the pelvic floor. The procedure's complexity makes it challenging, although it remains the gold standard for rectal prolapse treatment in European countries.

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