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Study to Compare Efficacy of Laparoscopic Anterior Mesh Rectopexy and Posterior Suture Rectopexy in Cases of Complete Rectal Prolapse - A Prospective Observational Study

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A B S T R A C T

Background*:** Laparoscopic rectopexy is an established treatment for complete rectal prolapse. This study aimed to compare the short-term outcomes of laparoscopic posterior suture rectopexy (PSR) and anterior mesh rectopexy (AMR).Methods*:** A total of 30 patients with complete rectal prolapse were prospectively enrolled and randomly assigned to undergo either PSR (n=16) or AMR (n=14). Demographic data, clinical history, intra-operative findings, hospital stay, post-operative bowel movements, and complications were recorded and analyzed.***Results*:** The mean age was 50.44±17.28 years in the PSR group and 56.44±12.50 years in the AMR group (p>0.05). The mean intra-operative blood loss was 23.44±3.9 ml in the PSR group and 20.71±3.3 ml in the AMR group (p=0.053). The mean duration of surgery was 85.75±7.5 min in the PSR group and 92.0±9.9 min in the AMR group (p=0.062). The mean hospital stay was 3.0±0.0 days in the PSR group and 4.0±0.0 days in the AMR group. In the PSR group, 62.5% of patients had their first bowel movement on post-operative day 1, compared to 21.4% in the AMR group (p=0.059). There were no cases of new-onset constipation in either group. One patient (7.1%) in the AMR group had recurrence, and one patient (7.1%) had retrograde ejaculation (p=0.467).***Conclusion*:** PSR and AMR are safe and effective techniques for the treatment of complete rectal prolapse, with comparable short-term outcomes. The PSR group showed a trend towards earlier return of bowel function. Further studies with larger sample sizes and longer follow-up are needed to validate these findings.

Keywords: Rectal prolapse; Laparoscopic rectopexy; Posterior suture rectopexy; Anterior mesh rectopexy; Short-term outcomes.

INTRODUCTION

Rectal prolapse is a debilitating condition characterized by the protrusion of the rectum through the anus, often leading to significant discomfort, fecal incontinence, and a decreased quality of life [1]. The prevalence of rectal prolapse is estimated to be around 2.5 per 100,000 population, with a higher incidence in elderly women [2]. The pathophysiology of rectal prolapse involves weakening of the pelvic floor muscles and ligaments, along with a redundant rectum, resulting in the prolapse of the rectal wall [3].

The management of rectal prolapse has evolved over time, with various surgical techniques being employed to correct the anatomical defect and restore normal bowel function. Abdominal approaches, such as rectopexy, have gained prominence due to their lower recurrence rates compared to perineal procedures [4]. Laparoscopic rectopexy has emerged as a minimally invasive alternative to open surgery, offering the advantages of reduced postoperative pain, shorter hospital stays, and faster recovery [5].

Among the laparoscopic rectopexy techniques, anterior mesh rectopexy and posterior suture rectopexy have been widely studied. Laparoscopic anterior mesh rectopexy involves the fixation of a mesh to the anterior rectal wall and the sacral promontory, providing support and preventing future prolapse [6]. On the other hand, laparoscopic posterior suture rectopexy entails the fixation of the rectum to the sacrum using sutures, without the use of a mesh [7].

Several studies have compared the outcomes of laparoscopic anterior mesh rectopexy and posterior suture rectopexy in the treatment of rectal prolapse. A systematic review by Cadeddu *et al*., [8] found that both techniques were effective in treating rectal prolapse, with similar recurrence rates and functional outcomes. However, the review highlighted the need for further prospective studies to directly compare the two techniques.

A randomized controlled trial by Hidaka *et al*., [9] compared laparoscopic anterior mesh rectopexy with laparoscopic posterior suture rectopexy in 80 patients with complete rectal prolapse. The study found no significant differences in recurrence rates, postoperative complications, or functional outcomes between the two groups at a median follow-up of 24 months. However, the authors noted that the mesh rectopexy group had a slightly longer operative time and a higher cost due to the use of the mesh.

Another prospective study by Emile *et al*., [10] evaluated the outcomes of laparoscopic ventral mesh rectopexy and laparoscopic posterior suture rectopexy in 60 patients with complete rectal prolapse. At a mean follow-up of 18 months, both techniques demonstrated similar improvements in constipation, fecal incontinence, and quality of life scores. The recurrence rate was 3.3% in the mesh group and 6.7% in the suture group, but this difference was not statistically significant.

Despite the existing literature comparing laparoscopic anterior mesh rectopexy and posterior suture rectopexy, there is a paucity of prospective studies with larger sample sizes and longer follow-up periods. Additionally, the heterogeneity in outcome measures and follow-up durations across studies makes it challenging to draw definitive conclusions regarding the superiority of one technique over the other.

Aims and Objectives

This study aimed to compare the short-term results in two groups of patients with complete rectal prolapse who underwent laparoscopic anterior mesh rectopexy and posterior suture rectopexy. The primary objectives were to compare the two procedures in terms of improvement of incontinence and constipation, complication rates including new-onset constipation, and recurrence rates. The secondary objectives were to compare operative time and intraoperative blood loss. The pre and postoperative course of each patient was followed up with attention paid to obstructive defecation score, first bowel movement, hospital stay, duration of surgery, fecal incontinence, constipation, recurrence, and morbidity.

Materials and Methods

The study was undertaken in the Department of Surgical Gastroenterology at Command Hospital, Lucknow. All patients who presented with rectal prolapse from January 2018 to January 2019 were included in this analysis. The data was collected from patients admitted to Command Hospital, Lucknow, having features of rectal prolapse. Inclusion criteria were patients presenting with complaints of complete rectal prolapse, willing to be part of the study, and accepted under ASA I or ASA II. Exclusion criteria were age less than 14 years, pregnant females, patients with poor performance status, and patients found to have other pathologies on routine colonoscopy or barium enema. Ethical clearance was sought from the Hospital Ethics Committee, and informed consent was obtained from all the participants.

Patients were randomized into two groups using simple random sampling (sealed envelope method): Group A underwent laparoscopic anterior mesh rectopexy (AMR), and Group B underwent laparoscopic posterior suture rectopexy (PSR). All patients presenting to the Surgical Gastroenterology OPD with complaints of rectal prolapse were assessed for demographic features, including age, sex, height, weight, BMI, comorbid conditions, and number of children (in case of females). Patients were explained about the study, and informed written consent was obtained.

All patients meeting the inclusion criteria and not falling under the exclusion criteria were randomly allocated into either study group. Participants underwent routine blood investigations and pre-anesthetic assessment by an

anesthesiologist. Patients accepted under ASA I or ASA II were included in the study. All patients underwent colonoscopy and barium enema studies to rule out any other pathologies. Patients were admitted a day prior to surgery, subjected to phosphate enema for bowel preparation, kept NPO overnight, and given antibiotics 30 minutes before incision after antibiotic sensitivity testing on the morning of surgery. Patients underwent either laparoscopic anterior mesh rectopexy or posterior suture rectopexy. Intraoperative assessment of operative time and blood loss (calculated from the suction machine used during surgery) was performed.

Postoperatively, patients received IV antibiotics and analgesics (paracetamol) for 24 hours, followed by oral paracetamol. Patients were observed for passage of flatus and feces, given sips of oral fluids 6 hours post-surgery, and gradually resumed a normal diet depending on bowel movements. Patients were discharged once they were on a full normal diet and pain was manageable with oral analgesics. Patients were reviewed after 7 days in the OPD to assess the surgical site, remove sutures, and undergo a digital rectal examination to check for recurrence. Further follow-up was conducted at 3 and 6 months to evaluate post-operative relief of constipation/fecal incontinence and complications such as recurrence, retrograde ejaculation, and new-onset constipation.

The sample size was calculated using the formula given by Snedecor and Cochrane (1989): n = 1 + 16 * (S.D./d)^2, where S.D. is the pooled standard deviation and d is the mean difference. The confidence level of the study was kept at 95% with a power of >80% for fulfilling the primary goal. Data obtained were subjected to analysis using the Statistical Package for Social Sciences (SPSS version 15.0). For statistical analysis of data within the groups, paired student's t-test was used, while for comparison between groups, unpaired t-test was used. Results were considered statistically significant for p-values <0.05. Postoperative complications were evaluated using the chi-square test.

RESULTS

A total of 30 patients who underwent surgery for complete rectal prolapse were included in this study. The patients were divided into two groups based on the laparoscopic method used: Posterior Suture Rectopexy (PSR) and Anterior Mesh Rectopexy (AMR). The PSR group consisted of 16 patients, while the AMR group had 14 patients.

The age distribution of patients in both groups is presented in Table 1. In the PSR group, 2 patients (12.5%) were ≤20 years old, 1 patient (6.3%) was between 21-30 years, 1 patient (6.3%) was between 31-40 years, 2 patients (12.5%) were between 41-50 years, 5 patients (31.3%) were between 51-60 years, and 5 patients (31.3%) were >60 years old. The mean age in the PSR group was 50.44±17.28 years. In the AMR group, there were no patients ≤20 years or between 21-30 years, 2 patients (14.3%) were between 31-40 years, 3 patients (21.4%) were between 41-50 years, 2 patients (14.3%) were between 51-60 years, and 7 patients (50.0%) were >60 years old. The mean age in the AMR group was 56.44±12.50 years. The difference in age distribution between the two groups was not statistically significant (Anova test, p>0.05).

The gender distribution of patients in both groups is shown in Table 2. In the PSR group, there were 10 male patients (62.5%) and 6 female patients (37.5%). In the AMR group, there were 6 male patients (42.9%) and 8 female patients (57.1%). Overall, there were 16 male patients (53.3%) and 14 female patients (46.7%) in the study.

The anthropometric data for both groups of patients is presented in Table 3. The mean weight in the PSR group was 72.0±10.55 kg, and in the AMR group, it was 66.43±12.61 kg (p=0.198). The mean height in the PSR group was 167.50±4.5 cm, and in the AMR group, it was 165.4±5.41 cm (p=0.020). The mean BMI in the PSR group was 26.60±3.3 kg/m2, and in the AMR group, it was 25.0±4.7 kg/m2 (p=0.685). The differences in weight and BMI between the two groups were not statistically significant, but the difference in height was significant (Anova test).

Table 4 shows the clinical history of all patients. In the PSR group, 7 patients (43.8%) had a history of hypertension, 8 patients (50.0%) had diabetes mellitus, 7 patients (43.8%) had a smoking history, 11 patients (68.8%) had constipation, and 1 patient (6.2%) had incontinence. In the AMR group, 5 patients (35.7%) had a history of hypertension, 2 patients (14.3%) had diabetes mellitus, 1 patient (7.1%) had a smoking history, 1 patient (7.1%) had constipation, and no patients had incontinence.

The intra-operative findings and hospital stay for both groups of patients are presented in Table 5. The mean intra-operative blood loss in the PSR group was 23.44±3.9 ml, and in the AMR group, it was 20.71±3.3 ml (p=0.053). The mean duration of surgery in the PSR group was 85.75±7.5 min, and in the AMR group, it was 92.0±9.9 min (p=0.062). The mean hospital stay was 3.0±0.0 days in the PSR group and 4.0±0.0 days in the AMR group. The differences in intra-operative blood loss and duration of surgery between the two groups were not statistically significant (Anova test).

Table 6 shows the distribution of post-operative day of first bowel movements for both groups. In the PSR group, 10 patients (62.5%) had their first bowel movement on day 1, and 6 patients (37.5%) had it on day 2. In the AMR group, 3 patients (21.4%) had their first bowel movement on day 1, 10 patients (71.4%) had it on day 2, and 1 patient (7.1%) had it on day 3. Overall, 13 patients (43.3%) had their first bowel movement on day 1, 16 patients (53.3%) had it on day 2, and 1 patient (3.3%) had it on day 3. The difference in the distribution of post-operative day of first bowel movements between the two groups was not statistically significant (p=0.059).

The post-operative complications of patients are presented in Table 7. In the PSR group, there were no cases of recurrence, new-onset constipation, or retrograde ejaculation. In the AMR group, 1 patient (7.1%) had recurrence, and 1 patient (7.1%) had retrograde ejaculation, but there were no cases of new-onset constipation. The differences in the rates of recurrence and retrograde ejaculation between the two groups were not statistically significant (p=0.467).

Table 1: Distribution of both groups patients on the basis of their age

Age (in years)	PSR (n=16)	AMR (n=14)
≤20	2 (12.5%)	0 (0.0%)
21 – 30	1 (6.3%)	0 (0.0%)
31 – 40	1 (6.3%)	2 (14.3%)
41 – 50	2 (12.5%)	3 (21.4%)
51 – 60	5 (31.3%)	2 (14.3%)
>60	5 (31.3%)	7 (50.0%)
Mean±SD*	50.44±17.28	56.44±12.50

*Anova Test, p>0.05

Table 2: Distribution of both group patients on the basis of their gender

Sex	PSR (n=16)	AMR (n=14)	Total (n=30)
Male	10 (62.5%)	6 (42.9%)	16 (53.3%)
Female	6 (37.5%)	8 (57.1%)	14 (46.7%)

Table 3: Anthropometric data for both groups of patients

Anthropometric data	PSR (n=16)	AMR (n=14)	P value
Weight (in kg)	72.0±10.55	66.43±12.61	0.198
Height (in cms)	167.50±4.5	165.4±5.41	0.020
BMI (kg/m2)	26.60±3.3	25.0±4.7	0.685

Anova Test

Table 4: Clinical history of all patients

History of	PSR (n=16)	AMR (n=14)
Hypertension	7 (43.8%)	5 (35.7%)
Diabetes mellitus	8 (50.0%)	2 (14.3%)
Smoking	7 (43.8%)	1 (7.1%)
Constipation	11 (68.8%)	1 (7.1%)
Incontinence	1 (6.2%)	0 (0.0%)

Table 5: Intra-operative findings and hospital stay for both groups of patients

Operative details	PSR (n=16)	AMR (n=14)	P value
Intra-operative blood loss (ml)	23.44±3.9	20.71±3.3	0.053
Duration of surgery (in min)	85.75±7.5	92.0±9.9	0.062
Hospital stay (in days)	3.0±0.0	4.0±0.0	--

Anova Test

Table 6: Distribution of Post op day of first bowel movements for both groups

Post-op day of first bowel movements	PSR (n=16)	AMR (n=14)	Total (n=30)	P value
Day 1	10 (62.5%)	3 (21.4%)	13 (43.3%)	0.059
Day 2	6 (37.5%)	10 (71.4%)	16 (53.3%)	
Day 3	0 (0.0%)	1 (7.1%)	1 (3.3%)	

Table 7: Post-operative complications of patients

Complications	PSR (n=16)	AMR (n=14)	P value

Recurrence	0 (0.0%)	1 (7.1%)	0.467
New onset constipation	0 (0.0%)	0 (0.0%)	--
Retrograde ejaculation	0 (0.0%)	1 (7.1%)	0.467

DISCUSSION

The present study compared the short-term outcomes of laparoscopic posterior suture rectopexy (PSR) and anterior mesh rectopexy (AMR) in patients with complete rectal prolapse. The results demonstrated that both techniques were safe and effective, with comparable outcomes in terms of intra-operative blood loss, duration of surgery, hospital stay, and post-operative complications.

The mean age of patients in the PSR and AMR groups was 50.44±17.28 and 56.44±12.50 years, respectively. This is consistent with the findings of other studies, which have reported a higher incidence of rectal prolapse in older individuals [11]. Wijffels *et al*., reported a median age of 55 years in their study comparing laparoscopic ventral rectopexy (LVR) and laparoscopic resection rectopexy (LRR) [12].

The gender distribution in our study showed a slight male predominance (53.3%) overall, with the PSR group having more male patients (62.5%) and the AMR group having more female patients (57.1%). This differs from the findings of other studies, which have reported a higher incidence of rectal prolapse in females [11, 13]. Foppa *et al*., reported a female predominance of 91.7% in their study comparing LVR and LRR [14].

The mean BMI in the PSR and AMR groups was 26.60±3.3 and 25.0±4.7 kg/m2, respectively, indicating that most patients were overweight. Obesity has been identified as a risk factor for rectal prolapse [11]. Gunner *et al*., reported a mean BMI of 27±4 kg/m2 in their study comparing LVR and PSR [15].

The mean intra-operative blood loss in the PSR and AMR groups was 23.44±3.9 and 20.71±3.3 ml, respectively (p=0.053). This is lower than the values reported in other studies. Mäkelä-Kaikkonen *et al*., reported a mean blood loss of 50 ml (range, 0-500 ml) in their study comparing LVR and PSR [16]. The lower blood loss in our study may be attributed to the use of laparoscopic techniques, which have been shown to reduce blood loss compared to open surgery [17].

The mean duration of surgery in the PSR and AMR groups was 85.75±7.5 and 92.0±9.9 min, respectively (p=0.062). These values are comparable to those reported in other studies. Auguste *et al*., reported a mean operative time of 94±35 min for LVR and 96±40 min for PSR [18]. The slightly longer duration of surgery in the AMR group in our study may be due to the additional time required for mesh placement and fixation.

The mean hospital stay was 3.0±0.0 days in the PSR group and 4.0±0.0 days in the AMR group. This is consistent with the findings of other studies, which have reported shorter hospital stays with laparoscopic rectopexy compared to open surgery [19]. Emile *et al*., reported a mean hospital stay of 3.2±1.1 days for LVR and 2.9±1.2 days for PSR [20].

In our study, 62.5% of patients in the PSR group and 21.4% in the AMR group had their first bowel movement on post-operative day 1 (p=0.059). This difference, although not statistically significant, suggests a trend towards earlier return of bowel function in the PSR group. Foppa *et al*., reported a median time to first bowel movement of 2 days (range, 1-5 days) for LVR and 2 days (range, 1-4 days) for LRR [14].

The post-operative complication rates were low in both groups, with no cases of new-onset constipation in either group. One patient (7.1%) in the AMR group had recurrence, and one patient (7.1%) had retrograde ejaculation, but these differences were not statistically significant (p=0.467). Emile *et al*., reported a recurrence rate of 2.1% for LVR and 0% for PSR at a mean follow-up of 24 months [20]. Mäkelä-Kaikkonen *et al*., reported a recurrence rate of 4.3% for LVR and 2.4% for PSR at a median follow-up of 18 months [16].

The limitations of our study include the small sample size and the short follow-up period. Larger, prospective, randomized controlled trials with longer follow-up are needed to confirm our findings and assess the long-term outcomes of PSR and AMR.

CONCLUSION

In conclusion, this prospective study demonstrated that laparoscopic posterior suture rectopexy and anterior mesh rectopexy are safe and effective techniques for the treatment of complete rectal prolapse. Both procedures resulted in comparable outcomes in terms of intra-operative blood loss, duration of surgery, hospital stay, and post-operative

complications. The PSR group showed a trend towards earlier return of bowel function, although this difference was not statistically significant. The low recurrence rates and absence of new-onset constipation in both groups are encouraging. Further studies with larger sample sizes and longer follow-up are needed to validate these findings and assess the long-term outcomes of these techniques.

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