
Laparoscopic Suture versus Ventral Mesh Rectopexy for the surgical Treatment of Internal Rectal Prolapse

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Abstract:

Background; Over the last decades, numerous procedures have been proposed to treat rectal prolapse (RP) often with contrasting results, underlying the continuing search for the ideal surgical treatment. This should correct RP and/or rectal intussusception (RI) and derived symptoms. This study aims to evaluate and compare the functional outcome after laparoscopic Ventral Mesh Rectopexy and laparoscopic suture Rectopexy for the surgical Treatment of Internal Rectal Prolapse. **Subjects and methods;** This was prospective study, was carried out in General Surgery Department of Benha University Hospital on 30 patients with internal rectal prolapse those randomly divided into 2 groups: (Group A): 15 patients who were proposed to do laparoscopic ventral mesh rectopexy, (Group B): 15 patients who were proposed to do laparoscopic suture rectopexy. **Results;** Ventral Mesh Rectopexy operation time was highly significantly longer than Laparoscopic Suture. There was no significant difference between the two groups regarding intra operative complications except one case of bleeding in LSR group. **Conclusion;** Both laparoscopic mesh rectopexy and suture rectopexy are feasible and reliable methods for the treatment of internal rectal prolapse associated with low recurrence rate, improvement of ODS symptoms and better anorectal function.

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

1.Introduction

Rectal prolapse is defined as the descent of the rectum through the anal canal exiting from the anal orifice. Patients with rectal prolapse have certain anatomical defects such as deepening of the Douglas pouch, levator ani diastasis, redundant sigmoid colon, mobile mesorectum and patulous anus. Its peak incidence in adults is in the fourth and seventh decades of life, yet all ages can be affected ^[1].

The male-to-female ratio is about 1:6 in the adult population. Rectal prolapse has been considered as a form of herniation through the pelvic fascia or an intussusception of the upper rectum. Besides the symptoms of a mass prolapsing from the anus, patients with prolapse may have faecal incontinence or constipation ^[2].

Treatment in adult patients is essentially surgical, there being controversy about the optimal type of operation. Surgery for rectal prolapse not only aims to correct the anatomical defect but should also improve anorectal function and avoid postoperative functional sequelae ^[3].

Suture rectopexy (SR) involves mobilization and fixation of the rectum with a non-absorbable suture. The act of mobilization, suture, and fibrosis keeps the rectum fixed in position as adhesions form, attaching the rectum to the presacral fascia.

Although SR is considered a good option for the cure of rectal prolapse/IS in both men and women, some reviews of this procedure noted a better overall clinical outcome in men. This may be due to occult sphincter defects in women, and failure to detect these defects before surgery owing to the lack of routine endoanal ultrasonography in the earlier years of prolapse surgery ^[4].

The current gold standard in Europe for rectal prolapse surgery is the laparoscopic ventral mesh rectopexy. Although laparoscopic ventral mesh rectopexy usually results in functional improvement with low morbidity and low rate of recurrence, it is very demanding technically with long learning curve that needs an advanced training to reach the professional level needed ^[5].

This study aims to evaluate and compare the functional outcome after laparoscopic Ventral Mesh Rectopexy and laparoscopic suture Rectopexy for the surgical Treatment of Internal Rectal Prolapse as regard to post-operative length stay of hospital, improvement of obstructed defecation and recurrence.

2. Patients and methods

This prospective study was conducted in General Surgery Department of Benha University Hospital after an approval from the research ethics committee in Benha



Faculty of Medicine and all patients were signed informed consents that they were involved in this study.

A total of 30 patients with a diagnosed internal rectal prolapse with ODS not responding to constitutional and medical measures were recruited to our study with post-operative follow up plan for 12 months starting from first Jan. 2020 to first Jan 2022.

Study population (Study subjects): adult male and female populations of Egypt 15-60yrs old who were attending General Surgery Department of Benha University Hospital for treatment of symptomatic internal rectal prolapse

Symptomatic patients with IRP with or without anterior rectocele not responding to conservative and medical measures were included in the study after full history, clinical and radiological examination

Patients with Complete rectal prolapse, multiple organ prolapse, recurrent cases, Patients with Past history or radiotherapy and Patient with rectal and colonic inertia were excluded from the study.

Our patients are grouped randomly into two groups by:

Group A with average score of ODS 21.7\24 were 15 patients who were proposed to do laparoscopic ventral mesh rectopexy. Group B with average score of ODS 21.4\24 were 15 patients who were proposed to do laparoscopic suture rectopexy.

Proposed intervention: laparoscopic ventral mesh rectopexy and suture rectopexy.

Data collection methods

1. Full history and assessment of obstructed defecation by modified longo score in which a lifestyle change parameter to seven symptoms based Parameters.⁽⁶⁾

2. Clinical assessment.

- By inspection, the patient is asked to bear down, the full thickness rectal wall prolapse and its concentric folds can be seen.
- Per rectum examination, to assess the integrity of anal sphincter, excluding presence of masses in anal canal and lower rectum and feeling the internal

rectal prolapse while the patients bear down.

- Per vaginal examination during rest and during straining, anterior and posterior vaginal walls were observed for cystocele or rectocele.

3. Anorectal manometry was done preoperative and postoperative at 6 month and 12 month using Solar GI HRAM MMS with 24- channel water perfused catheter with latex balloon to evaluate rectal sensations, anal sphincter pressures and for exclusion of anismus.

4. Imaging

All patients were subjected to MR defecography.

5. Colonoscopy

Done for all patients to exclude any proximal lesions and for biopsy from the rectal ulcer to exclude malignancy.

6. Routine preoperative laboratory tests.

Preparation and position of patients in the two groups

Each patient underwent 2 rectal enemas in the night before operation and was given 1gm ceftriaxone and 500 mg metronidazole with induction of anesthesia.

The patient was placed in a modified lithotomy position with both arms near the body with the thighs spread moderately and bent upwards for simultaneous access to the abdomen and perineum. The operation positions are: surgeon on the right side of the patient, assistant to the left side of the patient, and camera man to the left side beside the assistant.

Laparoscopic suture rectopexy technique

After urinary catheterization, pneumoperitoneum was created by using a Veress needle through umbilical stab incision. Then 10 mm visiport trocar (camera port) inserted through umbilical incision and a 30 degree telescope inserted through this port. Then 2nd port 5 mm (functioned as the RT hand) inserted 2 finger medial to anterior superior iliac spine. The 3rd port 5mm (functioned as the left hand) inserted at the level of umbilicus at RT mid clavicular line. The 4th port 5mm (for the assistant) below level of umbilicus at Lt mid clavicular line (**Fig. 1**).



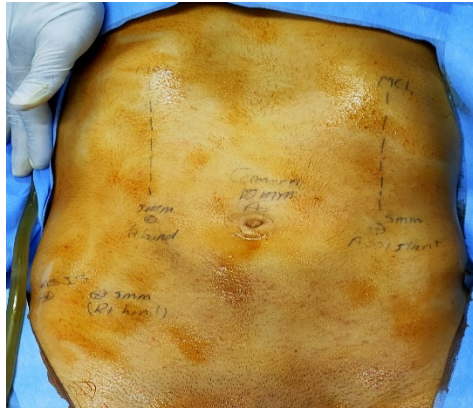


Fig (1): port site for suture rectopexy

We begin by formal exploration of the abdominal cavity with the patient in Trendelenburg position (30 degrees). In females, the uterus was retracted to the abdominal wall by 2/0 prolene sutures with straight needle for better anterior dissection of the rectum. Then the assistant from the left side trocar retract the sigmoid colon out of the pelvis and to the left side.

inspection of the ureter of pelvic wall and lateral dissection by incision of peritoneum over sacral promontory then we start posterior dissection of the rectum through the loose areolar tissue between the mesorectum and the presacral plexus of veins. The presacral nerves were identified and preserved during the course of the dissection (Fig 2).

Then we begin with suture rectopexy by

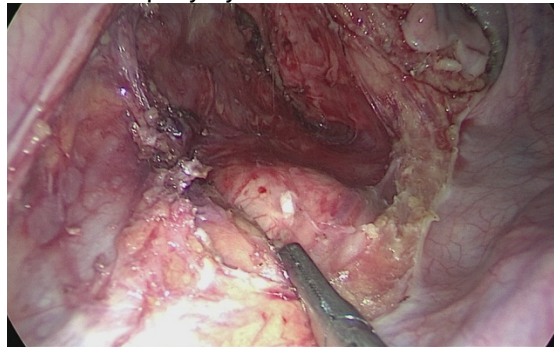


Fig (2): Preservation of presacral nerves during posterior dissection

Then anterior dissection was preceded until reaching pelvic floor muscles (Fig 3).

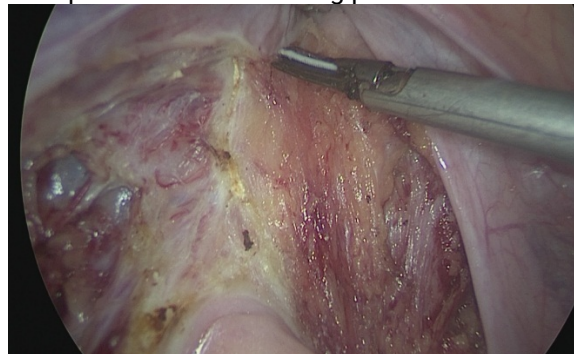


Fig (3): Anterior dissection till pelvic floor muscles

Then rectum retracted cranially to detect the optimal point for suture fixation. Then examination per rectum was done before taking sutures to ensure there is no prolapse

at this point of fixation. The seromuscular layer of posterior wall of the rectum was then sutured to the presacral fascia on both sides using at least two interrupted sutures

by prolene 2/0 sutures (Fig. 4).

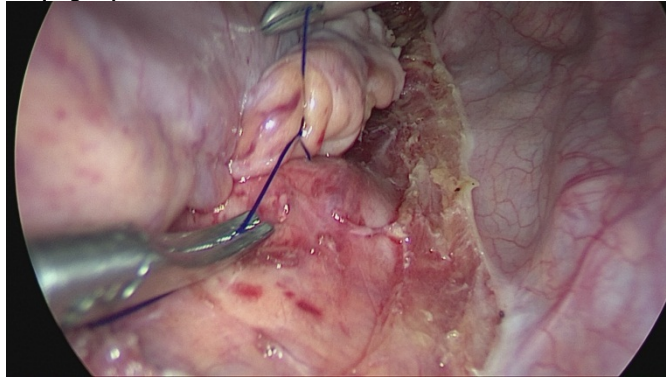


Fig (4): suturing posterior wall of rectum to presacral fascia

Then we suture the lateral peritoneum to the rectum at new higher point for more suspension to the rectum and for prevention

of adhesions by continuous sutures using pds 2/0

Laparoscopic ventral mesh rectopexy

Positions of the patient and the surgeons are the same as suture rectopexy

The upper rectum was pulled up, anteriorly and to the left. After that, the peritoneum was incised with caution to the right of the sacral promontory and then continued anteriorly along the right outer border of mesorectum till reaching the Douglas pouch.

The right hypogastric nerve and ureter should be identified and preserved. The dissection then extended anteriorly dividing the rectovaginal septum and continued as

inferiorly as possible, to the level of the pelvic floor muscles and laterally to the pelvic side walls.

Once the anterior space was mobilized, polypropylene mesh 15*4 cm introduced into abdomen and secured to the anterior aspect of the rectum with four interrupted sutures using (2/0 PDS). (Fig5, 6)

Then the mesh was tacked and secured to the sacral promontory by 2 tacks after digital rectal examination to ensure that no residual rectal prolapse. (fig.7) then peritoneum was then closed over the mesh with continuous PDS sutures. (Fig.8)

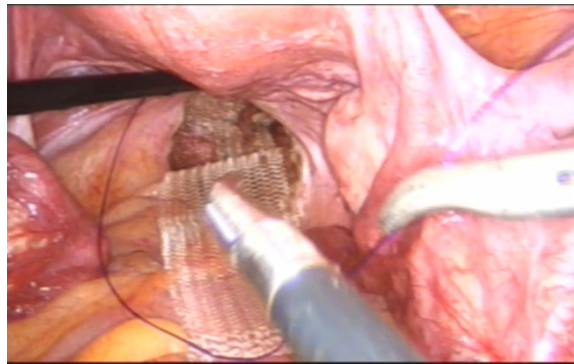


Fig.5 insertion of mesh in the mobilized anterior space



Fig. 6 suturing the distal end of mesh to anterior wall of rectum by interrupted sutures

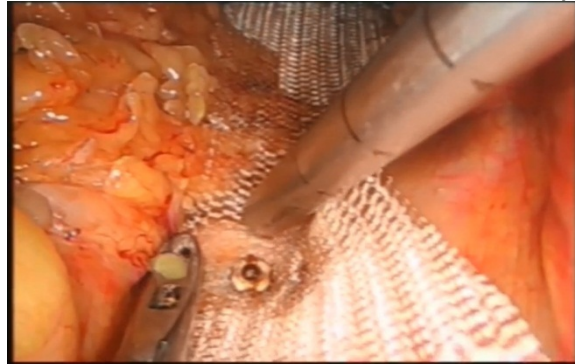


Fig.7 Tacking mesh to sacral promontory using tacker

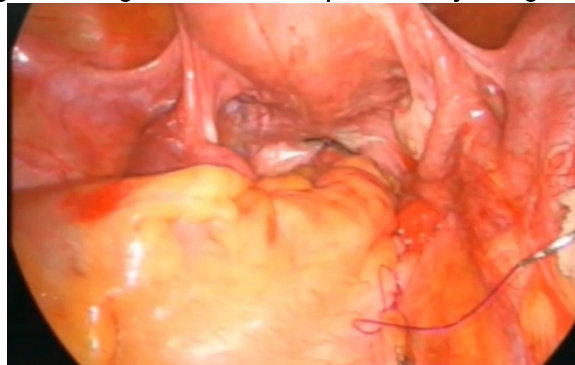


Fig.8 Closure of peritoneum by PDS sutures

Post-operative

All the patient under study received the same medication as anti-pain and antibiotics, stool softener and consultation during stay of the hospital as to be NPO until pass of flatus, then on fluids with continuous follow up and early post-operative assessment of patient during stay of the hospital as evaluation, inquiring and recording short term assessment of the improvement symptoms as obstruction defecation, constipation and recurrence of prolapse.

Follow up

The Follow up was done in outpatient

clinic one week after operation then every month for 12 month by senior surgeon .Patients reassessed after 6 months and after 12 months by anorectal manometry and modified longo score.

Statistical Analysis

Data were checked, entered and analyzed using SPSS version 23 for data processing. The following statistical methods were used for analysis of results of the present study. Data were expressed as number and percentage for qualitative variables and mean + standard deviation (SD) for quantitative one.

3.Results

There was no significant difference between the two groups regarding basal characteristics (Table 1).

There was no statistical difference between the two groups regarding pre-operative symptoms (Table 2).

There was no statistical difference between the two groups regarding hospital stay period or time from the operation to flatus pass (Table 3).

There was no statistical difference between the two group's assessments in the

6th and 12th month after the operation regarding Mean Resting anal Pressure. However, there was high significant decrease in first rectal sensation, first Urge and Intense Urge. While high significant increase in mean squeeze pressure in both groups in 6th and 12th month postoperative (Table 4).

There was high significant decrease in modified Longo score and need of laxative dependence pre-operative with 6 and 12 months post-operative (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
Pre-operative symptoms			
Difficulty in defecation	15 (100%)	15 (100%)	
Bleeding per rectum	2 (13.33%)	2 (13.33%)	>0.05 ²
Mucous discharge	5 (33.33%)	4 (16.67%)	
Rectal Lesions			
Anterior rectocele	11 (73.34%)	10 (66.67%)	
Rectal 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 ¹

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		P. Value	12 Months post Operative		P value
	LVMR (15)	LS (15)		LVMR (15)	LS (15)	
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		P. Value	12 Months post Operative		P value
	LVMR (15)	LS (15)		LVMR (15)	LS (15)	
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 should aim to control the prolapse, restore continence if affected, and prevent constipation or impaired evacuation. The choice of an optimal treatment is difficult due to the multiple options without exact guidelines so it is best to be tailored to patient and surgeon [7]. Although various abdominal and perineal procedures have been described, randomized trials comparing abdominal and perineal approaches failed to demonstrate any superiority of one modality over the other [7, 8].

In a study published in 2019, the authors stated that laparoscopic VMR is safe and effective in management of full-thickness external rectal prolapse with minimal recurrence and low complication rates [9]. However, laparoscopic VMR needs special skills and a highly trained surgeon who can perform a complete ventral dissection of the rectovaginal septum (rectovesical in males) down to the pelvic floor and take sutures within the narrow pelvic space that make the mission very difficult, yet it is the current gold standard for treatment of rectal prolapse in European countries [10]. In spite of being the operation of choice, it has some troublesome complications and adverse outcomes especially related to mesh such as rectal stricture, pain, dyspareunia, mesh erosions, rectovaginal fistula and autonomic dysfunction related to pelvic nerve injury during rectal dissection which may result in worsening constipation postoperatively [11].

Laparoscopic suture rectopexy may be regarded as an ideal laparoscopic procedure for rectal prolapse, its safe procedure with low morbidity and mortality With Recurrence rate less than 10%. In addition to treatment of rectal prolapse itself, most patients experience improvement in both constipation and continence following suture rectopexy in addition, it has no mesh related complications.⁽¹²⁾

The aim of this study is to compare laparoscopic suture rectopexy versus laparoscopic ventral mesh rectopexy techniques for surgical treatment of internal rectal prolapse in terms of outcome and efficacy in 30 patients with internal rectal prolapse through short time follow up for 6months after procedures.

In this study varying degree of obstructed defecation symptoms was observed in both groups, obstructed defecation symptoms assessed preoperative by modified longo score with no statistical differences between two groups. Postoperative in obstructed defecation symptoms significantly improved postoperative in both groups, however 3 patients (20%) in LVR group and 2 patients (13.3%) in LSR group still dependable on laxatives postoperative. Need of laxatives may be due to slow colonic transit time in some patients or presence of dolichocolon so we recommend colonic transit times for all patients before surgery for better evaluation.

Regarding anorectal functions, mean resting pressure show no statistical differences in both groups and this due to the fact that internal anal sphincter being autonomic muscle while there is significant increase in mean squeeze pressure in the two groups and this may be due to avoiding muscle fatigue related to frequent attempt to evacuate and this similar in studies after open rectopexy^(13,14,15) and also observed by **Hyun et al** in a study after laparoscopic suture rectopexy done⁽¹⁶⁾ although another studies have shown, The surgical procedure did not affect postoperative sphincter function.^(17,18)

Regarding rectal sensations postoperatively, improvement in all rectal sensations in both groups but LSR group was significantly improved than LVR group this may be due to decreased rectal capacity after suture rectopexy leading to improvement of rectal sensation



postoperative and this is similar with a study by **Speakman et al.**⁽¹⁹⁾

Incidence of recurrence considered One of the important parameters to evaluate the success surgery, two cases of recurrence was observed during follow up period, case for each group and this similar to a study done by **Fargo and Latimerin** which recurrence were observed in 15% of cases.

⁽²⁰⁾ While in a study done by **Consten et al.**, in which recurrence rate reach 8.2% after LVR.

⁽²¹⁾ While in Long-term studies have shown that recurrence rates after rectal prolapse repair increase over the years^[22].

Duration of surgery is considered a important parameter to gauge the advantages of an operation. In this study, the mean duration of suture rectopexy was 100 minutes and 120 min for mesh rectopexy with P value of < 0.05 which is statistically significant and this compares well with a study done by **Sahoo et al.**, in which the mean duration of LSR was 100.8 ± 12.4 and as regard LVR was 120 ± 10.8 min.^[23] The longer duration of surgery in mesh rectopexy due to extra time related to introducing the mesh, adjusting it and taking sutures in a very narrow space.

No significant intraoperative complication was found in both groups except case of bleeding was found in LSR group, the bleeding was found due to injury of pre sacral veins and was controlled using bipolar diathermy. While in LVR our fear related to the possibility of causing injury to rectum during anterior dissection with no need for posterior dissection.

5. Conclusion

Both laparoscopic mesh rectopexy and suture rectopexy are feasible and reliable methods for the treatment of internal rectal prolapse associated with low recurrence rate, improvement of ODS symptoms and better anorectal functions. However, laparoscopic VMR needs special skills and a highly trained surgeon who can perform a complete ventral dissection of the rectovaginal septum (rectovesical in males) down to the pelvic floor and take sutures within the narrow pelvic space that make the mission very difficult.

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