

Outcome of Laparoscopic Ventral Mesh Rectopexy for Management of Internal Rectal Prolapse

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Abstract:

Background: Rectal prolapse can be treated using laparoscopic ventral rectopexy, which combines the benefits of a minimally invasive method with the decreased recurrence rate seen following abdominal operations. Although the procedure's safety and functional outcomes have been often discussed, there is a dearth of recent literature on functional outcomes, particularly sexual function and quality of life. **Aim:** To ascertain the surgical and functional outcome of LVMR for the management of patients with internal rectal prolapse and to ascertain the frequency of sexual activity among patients. **Methods:** This investigation involved 40 adult patients with symptomatic internal rectal prolapse, LVMR was done. At 6 and 12 months, patients were reassessed by anorectal manometry and Modified Longo score. **Results:** statistically significant

decline in the frequency of need laxatives and a decrease in the Longo score. There are two cases of recurrence (5%) were found in postoperative period. Regarding anorectal manometry, there is a statistically significant increase in maximum squeeze pressure with a significant decrease in all rectal sensations with no significant change in mean resting pressure. There is a statistically significant increase in desire, arousal, satisfaction, and orgasm domains of FSFI score in 28 female patients while in males 2 cases (18%) reported transient retrograde ejaculation postoperative. **Conclusions:** LVR improves dyspareunia and sexual function in people with a history of sexual dysfunction in addition to its benefits for bowel function and structural repair. Additionally, it has a favorable effect on the quality of life, which is significant in the context of functional surgery.

Keywords: complete rectal prolapse; Internal rectal prolapse; Mesh rectopexy; Obstructed defecation.

Introduction

The term "internal rectal prolapse" refers to an endoluminal intussusception of all or a portion of the rectal wall that is not accompanied by exteriorization that is apparent at the anus level (1). The sensation of an incomplete evacuation, vigorous defecation efforts, digital maneuvers for stool extraction, or perineal support, prolonged use of the restroom, a small volume of feces evacuated, hard stools, abdominal bloating, and laxative use are the most common symptoms of internal rectal prolapse. (2)

Complete rectal prolapse (CRP) and symptomatic intussusception (IRP) are both known to be treated by laparoscopic ventral mesh rectopexy (LVMR). In addition to lowering prolapse, LVMR also helps with incontinence and blocked defecation. (3)

Rectopexy for the treatment of rectal prolapse has been extensively studied. However, the outcomes of these studies are inconsistent; some report improved SF while others report deterioration, which is likely due to factors including mesh exposure and tissue contraction surrounding the mesh. (4-6)

In order to manage patients who had internal rectal prolapse, we, therefore, sought to assess the surgical and functional results of LVMR as well as the frequency of sexual activity among patients.

Patient and methods

This prospective study was carried out at the colorectal surgery unit of the Benha University Hospital after receiving approval from the Benha Faculty of Medicine's research ethics committee (MS 9-10-2021) and receiving the patient's fully informed written consent.

This study was executed between October 2020 and November 2022, including the follow-up period, on 40 adult patients (aged 18 to 65 years) with symptomatic internal rectal prolapse, with or without anterior rectocele, who did not respond to conservative or medicinal treatment. Patients with multi-pelvic organ prolapse, complete rectal prolapse, history of pelvic radiotherapy, IRP with fecal incontinence and patients with pelvic floor dyssynergia were excluded.

Preoperative assessment:

1. Full history and assessment of obstructed defecation by modified Longo score (7).
2. Complete clinical assessment of patients.
3. Anorectal manometry was done preoperative and postoperative at 6 months and 12 months using Solar GI HRAM MMS with 24- a channel water perfused catheter with latex balloon- to evaluate anorectal sensations, anal sphincter pressures and for exclusion of anismus.
4. MRI Defecography for diagnosis of IRP and exclusion of multiorgan pelvic prolapse and anismus.
5. Pre-operative results of the two major components of the Short Form (36) Health Survey (SF-36); (physical component summary and mental component summary) were compared to determine quality of life (8) with the post-operative results at 6 and 12 months postoperative.
6. Sexual activity evaluation, in female patients: Assessment of sexual functioning of the female patients by using FSFI scale. (9) while in male patients: Sexual assessment of male patients by asking the patients for any sexual dysfunction, especially ejaculation.

7. Colonoscopy was done to exclude rectal carcinoma, rectal ulcer syndrome and other rectal or colon neoplasm.
8. Routine laboratory tests.

Laparoscopic surgical technique:

On the night before the operation, each patient underwent 2 rectal enemas and prophylactic antibiotics were given with the induction of anaesthesia in the form of 1gm ceftriaxone and 500 mg metronidazole.

The patient was situated in a modified lithotomy posture with both arms close to the body, the thighs split slightly, and the knees bent upwards. On the patient's right side, the surgeon was present, the assistant was positioned on the patient's left side, and the cameraman was on the assistant's left side.

An umbilical stab incision was made during urine catheterization through which a Veress needle was used to produce pneumoperitoneum. A 12 mm trocar (camera port) was inserted through a supra-umbilical incision, and a 30-degree telescope was inserted through this port. The 2nd port, measuring 5 mm, was inserted two fingers medial to the right anterior superior iliac spine and functioned as the RT hand. The 3rd port, measuring 5

mm, was inserted at the level of the umbilicus at the right mid-clavicular line and served as the left hand. The 4th port was inserted below the level of the umbilicus at the left mid-clavicular line for the assistant. Abdominal exploration was done first, the uterus of female patients was retracted to the front abdominal wall by 2/0 polyproline sutures using a straight needle for better anterior dissection of the rectum. A peritoneal incision was created on the sacral promontory's right side and extended on the right pararectal plane down to the peritoneal reflection of the rectum. Next, Denonvilliers' fascia was excised, and the rectovaginal septum was widened. on the rectum's anterior side, dissection is performed and continued as deeply as feasible to the perineal body (transverse white fibers). We avoid Lateral and posterior dissection. (Figure1)

In male patients, the dissection in the recto-vesical pouch is extended to the apex of the prostate, whilst it is avoided to dissect laterally around the seminal vesicles. At the pelvic inlet, the right hypogastric nerve is preserved with special care. After completion of dissection, a strip of Prolene Mesh ~3×17 cm (Ethicon Endosurgery, Blue Ash, Ohio, USA), ~3×17 cm), was

readied, and then put into the pelvic cavity through the 12-mm trocar site. One end of the mesh was set to the seromuscular anterior surface of the most distal part of the rectum using 2/0 PDS by four stitches. (figure 2) while Two stitches of polypropylene suture were used to secure the mesh's proximal end to the sacral promontory (figure 3)

The peritoneum was then roughly positioned to entirely enclose the mesh by continuous sutures using 2/0 PDS as shown in Figure (4) and a pelvic drain was placed.

Postoperative care and instructions

Ceftriaxone 1 gm once daily was described for all patients for 5 days with patient-controlled analgesia (PCA) pump. A stool softener was described to avoid postoperative straining.

All patients start drinking oral fluids the night before surgery, and soft foods are introduced on the first postoperative day.

The day before surgery, all patients were admitted, and the duration of the hospitalization was computed from the time of admission to the day on which the patient was deemed medically fit to be discharged.

Follow-up: Postoperative follow-up was done in the outpatient clinic, removal of pelvic drain after 72 hours then the 2nd visit one week after the operation and then every month for 12 months by the senior surgeon.

At 6 and 12 months, patients were reassessed by anorectal manometry and Modified Longo score. Additionally, sexual function was rated by the FSFI Index for female patients and asked for any ejaculation or erection dysfunction in male patients. Each patient's quality of life was evaluated by using the SF-36 score. Recurrence was evaluated clinically and monitored for one year or until the study ended.

Statistical analysis

The statistical package for the social sciences, SPSS, version 26, was utilized to examine the data. We compared changes over time using the McNemar test. The validity of the assumptions employed in parametric tests was checked using the Kolmogorov-Smirnov (distribution-type) and Levene (homogeneity of variances) tests. One continuous normally distributed variable was changed over two points in time within one group, and the change was measured using a paired sample t-test.

The repeated measure ANOVA test was used to analyze changes in a continuous quantitative variable over more than two points in time. $P < 0.05$ was chosen as the threshold for statistical significance.

Results

Forty patients were involved in this study with an age range from 18 to 65 years and a mean age of 40.62 years. Female patients represented 29/40 (72.5%) of study patients and 95% of them were married, 11/40 (27.5%) were male patients as shown in table 1. Their BMI ranged from 20.9 to 33.1 kg/m² with a mean of 27.07 kg/m². The baseline data was reported in table 1.

The mean operative time was 110.88 min (range, 80-170 min) and the mean post-Operative hospitalization was 28.8 hours (range, 24-72 hrs.), also the meantime to pass stool was 75.87 hours (range, 48 to 112 hrs.). There were two patients (5%) who experienced bleeding during the operation. No patients needed conversion to open, and no patients with bladder or intestinal injury were reported. One patient developed a pelvic hematoma and two patients had trocar site infection as an early postoperative complication (Table 2).

Table (1) Distribution of the studied patients according to baseline data.

	N=40	%
Age	40.62 ± 11.39 ^o	18 – 59 [¥]
Sex		
Female	29	72.5%
Male	11	27.5%
Marital status		
Married	38	95%
Single	2	5%
BMI	27.07 ± 2.84 ^o	20.9 – 33.1 [¥]
Comorbidities		
None	29	72.5%
Diabetes	4	10%
Hypertension	3	7.5%
Diabetes, hypertension	3	7.5%
Asthma	1	2.5%
ASA:		
I	31	77.5%
II	6	15%
III	3	7.5%
Defecography:	N=	%
IRP only	16	40%
IRP, rectocele	24	60%

Table (2) Distribution of the studied patients according to intraoperative and immediate postoperative data

	Mean ± SD	Range
Operative time (minutes)	110.88 ± 22.59	80 – 170
Intra operative complication		
Bleeding	N=	%
No	38	95%
Yes	2	5%
Conversion to open(no)	40	100%
Bladder injury (no)	40	100%
Intestinal injury (no)	40	100%
Length of hospital stays (hrs.)	28.8 ± 13.53	24 – 72
Passage of stool	75.87 ± 14.58	48 – 112
Post-operative complication		
Pelvic hematoma (n %)	1	2.5%
Trocar site infection (n %)	2	5%

There is a statistically significant increase in maximum SQ pressure from 118.5 preoperatively to 136.4 six months postoperatively which then significantly increased to 154.05 twelve months postoperatively in all

patients. There is a statistically significant decrease in first rectal sensation from 117.5 preoperatively to 47.75 six months postoperatively to 27.9 twelve months in studied cases. There is a statistically significant

decrease in first urge volume from 179.28 preoperatively to 136.08 six months postoperatively which then significantly decreased to 112.77 twelve months postoperatively. There is a statistically significant decrease in maximum tolerant volume from 260.9 preoperatively to 199.12 six months

postoperatively which then significantly decreased to 147.95 twelve months postoperatively (Table 3). There is a statistically significant decrease in the frequency of needed laxatives and a decrease in the Longo score. There are two cases of recurrence (5%) were found in the postoperative period. (Table 4).

There is a statistically significant increase in desire, arousal, satisfaction, and orgasm domains of FSFI score in 28 female patients. There is also a statistically significant increase in pain domain at 6 months postoperatively in most of the female patients then it significantly decreased and subsided gradually at 12 months postoperatively, but 2(18.8%) female patients had chronic pain postoperatively (Table 5).

There is a statistically significant increase in all components of physical and mental summary scores of qualities of life 6 months postoperatively and they continue in significant increase 12 months postoperatively (Table 6).

Table (3) Change in anorectal manometry among the studied patients pre and postoperatively.

	Preoperatively	6months post-op	12 months postop	P value
Mean R pressure	48.22 ± 4.19	48.13 ± 5.68	48.13 ± 5.68	0.05
maximum SQ pressure	118.5 ± 4.6	136.4 ± 3.43	154.05 ± 5.05	<0.001**
Rectal sensation				
First rectal sensation	117.5 ± 5.99	47.75±11.87	27.9 ±7.1	<0.001**
First urge volume	179.28±11.79	136.08 ± 5.18	112.77 ± 9.86	<0.001**
Maximum tolerance volume	260.9 ± 10.01	199.12 ± 19.41	147.95 ±17.49	<0.001**

Table (4) Change in Longo score, need for laxatives and recurrence among the studied patients pre and postoperatively.

	Preoperatively	6months postoperatively	12months Post operatively	P value
Longo score	20.33 ± 3.45	11.17 ± 2.23	9.85 ± 1.61	<0.001**
Need laxatives.				
Yes	40 (100%)	17 (42.5%)	10 (25%)	<0.001**
No	0 (0%)	23 (57.5%)	30 (75%)	
Post-operative data				
Recurrence	0 (0%)	1 (2.5%)	2 (5%)	

Table (5) Change in FSFI among the 28 studied female patients pre and postoperatively

	Preoperatively	6 months postop	12 months postop	P value
Desire	3.84 ± 0.54	4.29 ± 0.43	4.73 ± 0.49	<0.001**
Arousal	3.41 ± 0.61	3.9 ± 0.59	4.3 ± 0.58	<0.001**
Lubrication	3.81 ± 0.6	4.31 ± 0.49	4.49 ± 0.56	<0.001**
Satisfaction	4.18 ± 0.65	4.71 ± 0.58	5.0 ± 0.6	<0.001**
Pain	1.95 ± 0.73	2.2 ± 1.06	1.89 ± 1.26	<0.001**
Orgasm	4.22 ± 0.51	4.32 ± 0.79	5.02 ± 0.59	
Chronic pain	2 (18.8%)			

Table (6) Change in physical and mental components of QoL among the studied patients pre and postoperatively

	Preoperatively	6 months postop	12 months postop	P value
Physical components				
PF	34.08 ± 9.49	51.28 ± 8.55	70.88 ± 7.26	<0.001**
RP	34.9 ± 8.58	52.53 ± 6.46	72.53 ± 8.68	<0.001**
BP	38.45 ± 7.19	55.15 ± 6.61	74.38 ± 7.55	<0.001**
GH	34.53 ± 7.79	52.9 ± 7.49	74.2 ± 7.95	<0.001**
Mental components				
RE	36.0 ± 10.65	53.3 ± 8.36	73.65 ± 9.58	<0.001**
Vitality	34.3 ± 7.37	53.15 ± 5.88	74.75 ± 8.2	<0.001**
MH	36.18 ± 11.17	53.8 ± 8.98	79.58 ± 6.76	<0.001**
SF	34.85 ± 8.91	53.93 ± 8.0	77.98 ± 8.3	<0.001**

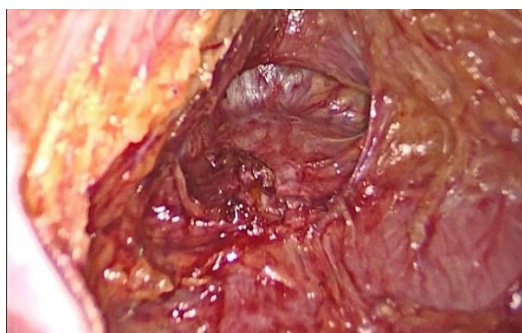


Figure 1. anterior dissection of rectum till pelvic floor muscles

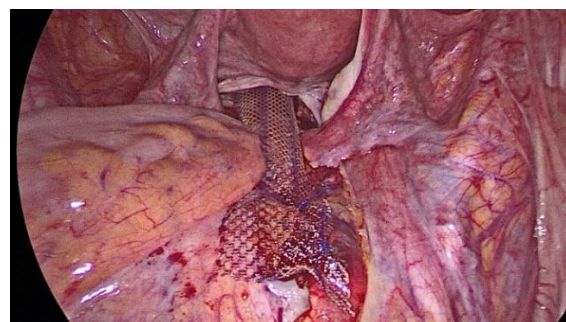


Figure 3. proximal mesh fixation in sacral promontory using prolene sutures.

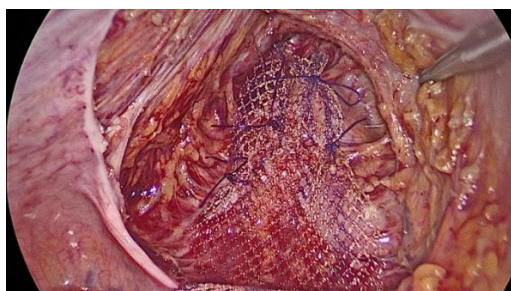


Figure 2. distal mesh fixation in lower rectum using PDS sutures.

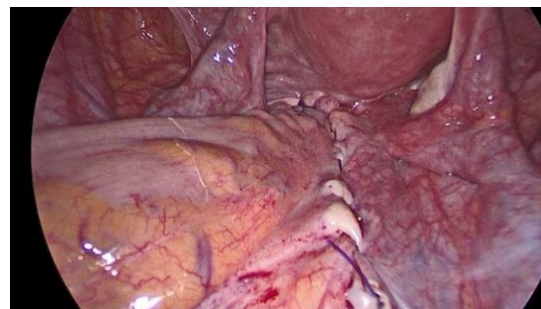


Figure 4. closure of peritoneum over mesh by continuous PDS sutures.

Discussion

For the treatment of internal and external rectal prolapse as well as symptomatic rectoceles, laparoscopic ventral rectopexy is a common procedure, particularly in European nations. Despite the frequent descriptions of the procedure's safety and functional outcomes, there is a dearth of recent evidence on these outcomes, particularly sexual function and quality of life. This study's objective was to assess the surgical and functional outcomes for patients with IRP who underwent LVR.

The current study included 40 patients ranging from 18 to 59 years of age with a mean of 40.62 years. Females represented 72.5% of patients and 95% of them were married. Varying degree of obstructed defecation symptoms was observed in 40 patients assessed preoperatively by modified Longo score. In the postoperative period, there was a statistically significant decrease in modified Longo score from 20.33 preoperatively to 11.17 six months postoperatively which then significantly decreased to 9.85 twelve months postoperatively. The reasons for the rise in ODS levels in our study are the complete anterior dissection of the rectum to pelvic floor muscles and suturing of the lateral peritoneum to the rectum at a new higher point for more suspension.

Only 4 patients (10%) have no significant improvement in modified Longo score

postoperative, in those we noticed redundant sigmoid colon was found intraoperative with kinking at the rectosigmoid junction, although there is a slight but present risk of the colonic anastomosis with this resection rectopexy, it has been demonstrated to have a higher functional outcome in those patients. (10) This is consistent with research that demonstrated a significant enhancement in constipation with LVMR in 156 (65.7%) of 237 participants who had preoperative constipation. According to their findings, after surgery, 51 patients (4.1%) had recurrent full-thickness rectal prolapse, while 34 (2.7%) had mucosal prolapse (11).

Despite improvement in ODS, 25% of patients are still depending on laxatives despite decreasing symptoms of ODS and this may be due to these patients having slow colonic transit time. This came in agreement with a study that found that after LVR for rectal prolapse and rectocele, the use of laxatives decreased from 53 to 19% (12).

Operative time ranged from 80 to 170 minutes with a mean of 110.88 minutes. No significant intraoperative complication was found except 2 cases of bleeding and no case need switch to open surgery, the bleeding was found due to injury of the vaginal Venus plexus during dissection of the lower rectum and was controlled using

gauze compression and bipolar diathermy. This was consistent with a study where the median operation duration was 122.3 (range: 85–200min) while 22 (1.8%) patients needed to be transformed to open surgery. (13) This was in line with a related study in which all patients underwent successful laparoscopic surgery with the exception of one patient (3%), who needed to have a laparotomy performed due to several postoperative adhesions (14).

In the current research, there was a statistically non-significant change in mean Resting pressure at any point in time. And this is related to the fact that resting pressure is related to the Internal anal sphincter which is the autonomic muscle. There was a statistically significant increase in maximum Squeeze pressure from 118.5 preoperatively to 136.4 six months postoperatively which then significantly increased to 154.05 twelve months postoperatively and this may be due to improvement of obstructed defecation and with avoiding frequent trials to defecate by the patients. This came in agreement with a study which reported that the squeezing pressure increased noticeably 2 months after surgery (15).

Regarding rectal sensations, there was a statistically significant decrease in all rectal sensations postoperatively.

Improvement of rectal sensations may be related to the good suspension of an anterior rectal wall after LVR.

The incidence of recurrence is one of the crucial factors to consider when assessing the effectiveness of rectal prolapse surgery. In our study, two cases of recurrence (5%) were found in the postoperative period, with a low recurrence rate related to full mobilization of the rectum till the pelvic floor. A similar study (16) reported a 6 % recurrence rate, after a mean follow-up of 3.5 years, the results contrast favorably with other studies that found recurrence rates ranging from 0% to 15% (17, 18).

Abdominal surgeries for correction of rectal prolapse have a chance of damaging the pelvic nerve, which could make males sexually dysfunctional. In this study 2 cases (18%) reported transient retrograde ejaculation postoperative that resolved after taking ephedrine and pseudoephedrine medications, these medications keep the bladder neck muscle closed during ejaculation. In research, 17.2% of patients who underwent posterior rectopexy experienced retrograde ejaculation and impotence (19,20).

In modern society, female sexuality is valued as a significant aspect of quality of life (21). In the current research Female patients represented 29/40(72.5%) of study patients and 95% of them were married.

The sexual activity of female patients was assessed pre and postoperative using the FSFI scale. postoperatively, all parameters, including arousal, desire, orgasm, satisfaction, lubrication, and pain scores, significantly improved. However, two patients had a worsened pain score postoperatively, which may be a reaction to the mesh. those patients were managed conservatively with non-steroidal analgesics, and the pain gradually decreased with time. And this is in agreement with a study done on 41 female patients who underwent LVR for symptomatic complex rectocele and the author reported that decrease in sexual dysfunction, reduction in dyspareunia and absence of new cases following LVR (22). Our findings revealed a statistically significant rise in all components of physical and mental summary scores of qualities of life 6 months postoperatively and they continue in significant increase 12 months postoperatively. According to a study, long-term functional results were outstanding when it comes to continence, with a significant improvement in lifestyle quality and no deterioration of constipation (16). In addition, another study demonstrated a higher quality of life following rectopexy (23).

Conclusion:

Internal rectal prolapse can be effectively treated by laparoscopic ventral mesh rectopexy, which combines excellent operational outcomes with a low recurrence rate. LVR helps patients with a history of sexual dysfunction with their sexual function and dyspareunia in addition to the benefits it has on their anatomical restoration and bowel function. Additionally, it enhances quality of life, which is crucial in the context of functional surgery.

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