Original Article

Clinical Outcome Following Laparoscopic Abdominal Rectopexy in Full-Thickness Rectal Prolapse at a Tertiary Care Centre

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Abstract

Background: Full-thickness rectal prolapse is one of the most ancient surgical diseases that affects the sufferer both physically and socially yet remains enigmatic in terms of ideal surgical management and individual outcome till current time. Laparoscopic abdominal rectopexy nowadays is the standard of care given operative ease and lesser patient morbidity. A lot of variations in techniques prevail. We resorted to Laparoscopic Posterior Mesh Rectopexy with a novel technique of mesh fixation to the pelvic fascia to look for surgical outcomes in the Indian population. **Material and Methods:** 49 patients with full-thickness rectal prolapse underwent Laparoscopic Posterior Mesh Rectopexy after clinical and colonoscopic examination. They were followed up for one month post-operatively. Each case was analyzed in light of the improvement in incontinence score in Wexner's Scale measured after 01-month post-surgery, postoperative hospital stays in number of days and Postoperative Pain at postoperative day 2 and day 7 in Visual Analogue Scale. **Results:** Most of the patients presented at their 5th decade of life with female preponderance. One patient underwent laparoscopic to open abdominal surgery conversion (3.77%). No cases of postoperative mortality or chronic pelvic pain were noted. Significant improvement in continence was noted in 73.09% of patients after surgery. Mean postoperative hospital stay remained at 3.18±1.22, (2-7 days). Most of the patients experienced moderate pain (5-7 in VAS) on post-op day 2 and mild pain (0-2) on post-op day 7 and resumed routine activity after 7 days. **Conclusion:** The above study adopted a useful technique of laparoscopic rectopexy by posterior mesh fixation in full-thickness rectal prolapse. The procedure reduced operative time by reducing extensive suturing time, postoperative pain, and morbidity whereas continence outcome remained comparable to other studies.

Keywords: Full Thickness Rectal Prolapse, Posterior Mesh Rectopexy, Functional Outcome, Follow Up.

Received: 25 July 2025 **Revised: 10 August 2025** **Accepted: 24 August 2025** **Published: XX August 2025**

Introduction

Full-thickness rectal prolapse is one of the most ancient surgical diseases which affects the sufferer both physically and socially, yet remained enigmatic in terms of ideal surgical management and individual outcome till current time. Rectal prolapse has been described in all ages with peaks of frequency obtained in the fourth and seventh decades of life.[1] The sex incidence of rectal prolapse is equal or slightly weighted toward males in the paediatric population.[2] A familial association has been reported between patients with rectal prolapse having a history of psychiatric illness.[3]

Abdominal rectopexy remained time tested and gained popularity over perineal procedures which are reserved for debilitated elderly population, unfit for abdominal surgery.[4] Laparoscopic abdominal rectopexy nowadays is the standard of care given operative ease and lesser patient morbidity.[5] A lot of variations in techniques prevail. We resorted to Laparoscopic Posterior Mesh Rectopexy to look for surgical outcome in Indian population.

Complete rectal prolapse is a protrusion of all layers of the rectal wall through the anal verge as a probable combination of 'sliding hernia' theory and mid-rectal intussusception augmented by a host of risk factors namely chronic constipation, neurologic disease, female sex, multiparity, redundant rectosigmoid, deep pouch of Douglas, patulous anus (weak internal sphincter), diastasis of levator ani muscle (defect in the pelvic floor), lack of fixation of rectum to sacrum, operative procedure such as haemorrhoidectomy or fistulectomy.[6] Abdominal Laparoscopic Posterior Mesh Rectopexy (LPMR) using Prolene Mesh, over time has gained popularity although Laparoscopic Ventral Mesh Rectopexy (LVMR) exhibits similar outcomes in terms of morbidity, mortality, recurrence, and continence.[7] Numerous surgical procedures, both perineal and abdominal, are currently practiced for the treatment of full-thickness rectal prolapse. Several controversies regarding the evidence-based comparison of various operations prevail. Generally abdominal operations due to lower recurrence rate and improved functional outcome are preferred over perineal operations.[8] The latter are reserved for patients, unfit to undergo an abdominal procedure. The abdominal techniques for treatment of full thickness rectopexy

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DOI:
10.21276/amit.2026.v13.i1.581

How to cite this article: Bhattacharya R, Varshney A, Dwivedi SK. Clinical Outcome Following Laparoscopic Abdominal Rectopexy in Full- Thickness Rectal Prolapse at a Tertiary Care Centre. Acta Med Int. 2026;13(1):974-979.

differ in the extent of rectal mobilization, methods of rectal fixation and addition or omission of a sigmoid resection.

The conundrum of finding the "ideal" operation for the treatment of Full Thickness Rectopexy remains as yet unsolved. For the surgeon, it is a tightrope walk between achieving durable functional outcomes coupled with a low recurrence rate on one hand and mesh related complications on the other.

This study aimed to study the clinical outcomes of laparoscopic abdominal rectopexy in full thickness rectal prolapse and to estimate the outcome of laparoscopic rectopexy in terms of symptomatic relief and improvement in continence after 1 month of surgery, the length of post operative hospital stays and level of pain 48 hrs and one-week post-surgery.

Materials and Methods

Study design: The current Observational prospective study was conducted in a study population, which comprised all patients who presented with full- thickness rectal prolapse, for 12 months from November 2018 to October 2019, at a tertiary care center. Ethical clearance was obtained from the institutional Ethical and Research Committee.

Subject Selection: The Inclusion criteria were patients of all ages, of both sexes, who presented in the surgery Out Patients Department in a Tertiary care center with a diagnosis of full-thickness rectal prolapse. The Exclusion criteria were any associated chronic constipation, associated pelvic organ prolapse, colorectal carcinoma, Ulcerative Colitis, or Crohn's Disease- associated rectal prolapse.

The study protocol and Data collection: All patients were evaluated for clinical features of full-thickness rectal prolapse and a colonoscopy was done. They were followed up on an OPD/ inpatient basis till 1-month post-op. Continence was evaluated by Wexner's scale and pain was evaluated with Visual Analogue Scale.

Operative Technique: The uterus was hitched to the anterior abdominal wall. The peritoneum was opened with the help of ultracision. Posterior rectal mobilization was done. Finally, complete rectal mobilization was done.

Statistical Data Analysis: The data on categorical variables is shown as n (% of cases) and the data on continuous variables is presented as Mean and Standard deviation (SD). The inter-group statistical comparison of the distribution of means of continuous variables is done using the analysis of variance (ANOVA) technique. The pair-wise statistical comparisons of the distribution of means of continuous variables are done using paired t-tests. The pair-wise statistical comparisons of the distribution of categorical variables are done using Wilcoxon's signed rank sum test. The underlying normality assumption was tested before subjecting the study variables to t- test and ANOVA. All results are shown in tabular as well as in suitable graphical format to visualize the statistically significant difference more clearly. In the entire study, the p-values less than 0.05 are considered to be statistically significant. All the hypotheses were formulated using two-tailed alternatives against each null hypothesis (hypothesis of no difference). The entire data is statistically analyzed using Statistical Package for Social Sciences (SPSS ver 22.0, IBM Corporation, USA) for MS Windows.

Results

The study included 52 cases who presented in the Surgical Outpatient Department in a tertiary care teaching hospital with complaints of full-thickness rectal prolapse. Two cases were converted from lap to open (3.77%) and 1 patient was lost to follow-up and hence was excluded from the study, thus the statistical analysis was performed on 49 cases.

The following section shows a detailed statistical analysis of the available data.

Age distribution: Of 49 cases studied, 2 (4.1%) had age between 14 – 23 years, 7 (14.3%) had age between 24 – 33 years, 8 (16.3%) had age between 34 – 43 years, 8 (16.3%) had age between 44 – 53 years, 7 (14.3%) had age between 64 – 73 years and 9 (18.4%) had age between 74 – 83 years. The mean ± SD of age of cases studied in the entire group was 52.18 ± 18.53 and the minimum – maximum age range was 14 – 80 years.

Sex distribution: Of the 49 cases studied, 18 (36.7%) were male and 31 (63.3%) were female. The male-to-female sex ratio was 0.58: 1.00.

Table 1: The distribution of mean pain score (VAS) at post-op day 1, day 2, and day 7 among the cases studied in the study group.

	Pain Score (VAS)	
	Mean	**SD**
Post-op Day 1	3.88	1.35
Post-op Day 2	2.37	1.36
Post-op Day 7	0.53	0.62
P-value (Pair-wise)		
Day 1 vs Day 2	0.001***	
Day 1 vs Day 7	0.001***	
Day 2 vs Day 7	0.001***	
P-value by paired t-test. P-value<0.05 is considered to be statistically significant. ***P- value<0.001.		

Distribution of mean pain score (VAS) at post-op day 1, day 2, and day 7

The distribution of mean ± SD of pain score (VAS) at post-op day 1, day 2, and day 7 was 3.88 ± 1.35, 2.37 ± 1.36 and 0.53 ± 0.62 respectively.

The distribution of mean pain score (VAS) at Post-op day 7 is significantly lower compared to mean pain score (VAS) at Post-op day 1 and post-op day 2 (P- value<0.001 for both). The distribution of mean pain score (VAS) at Post-op day 2 is significantly lower compared to mean pain score (VAS) at Post-op day 1 (P- value<0.001).

Table 2: The distribution of level of pain score (VAS) at post-op day 1, day 2, and day 7 among the cases studied in the study group.

	Pain Score (VAS)					
	Grade 1 (0 – 4)		Grade 2 (5 – 7)		Total	
	n	%	n	%	n	%
Post-op Day 1	37	75.5	12	24.5	49	100.0
Post-op Day 2	44	89.8	5	10.2	49	100.0
Post-op Day 7	49	100.0	0	0.0	49	100.0
P-value (Pair-wise)						
Day 1 vs Day 2			0.001***			
Day 1 vs Day 7			0.001***			
Day 2 vs Day 7			0.001***			
P-value by Wilcoxon's signed rank test. P-value<0.05 is considered to be statistically significant. ***P-value<0.001.						

Distribution of level of pain score (VAS) at post-op day 1, day 2, and day 7

Of 49 cases studied at post-op day 1, 37 (75.5%) had Grade 1 (0-4) pain, 12 (24.5%) had Grade 2 (5 – 7) pain. Of 49 cases studied at post-op day 2, 44 (89.8%) had Grade 1 (0-4) pain, 5 (10.2%) had Grade 2 (5 – 7) pain. Of 49 cases studied at post-op day 7, all i.e. 49 (100.0%) had Grade 1 (0-4) pain.

The distribution of level of the pain at post-op day 7 is significantly lower compared to level of pain at post-op day 1 and post-op day 2 (P-value<0.001 for both). The distribution of level of the pain at post-op day 2 is significantly lower compared to level of pain at post-op day 1 (P-value<0.001).

Distribution of duration of post-op stay: Of 49 cases studied, 34 (69.4%) had duration of post-op stay between 2 – 3 days, 13 (26.5%) had post-op stay between 4 – 5 days and 2 (4.1%) had post-op stay for more than 5 days in the study group.

The mean ± SD of post-op duration of stay among the cases studied in the entire group of was 3.18 ± 1.22 days and the minimum – maximum post-op duration of stay range was 2 – 7 days.

Table 3: The distribution of duration of operation time among the cases studied in the study group.

Operation time (mins)	No. of cases	% of cases
60 – 80	17	34.7
80 – 110	25	51.0
110 – 130	7	14.3
Total	49	100.0

Table 4: The distribution of complaint duration among the cases studied in the study group.

Compliant duration (years)	No. of cases	% of cases
2 – 5	21	42.9
6 – 10	13	26.5
11 – 15	15	30.6
Total	49	100.0

Distribution of complaint duration: Of 49 cases studied, 21 (42.9%) had a complaint duration between 2 – 5 years, 13 (26.5%) had a complaint duration between 6 – 10 years and 15 (30.6%) had a complaint duration between 11 – 15 years in the study group.

The mean ± SD of complaint duration among the cases studied in the entire group of was 7.65 ± 4.63 years and the minimum – maximum duration of complaints range was 2 – 15 years.

Table 5: The distribution of mean incontinence score at pre-op and post-op day 30 among the cases studied in the study group.

	Fecal Incontinence score (Cleveland Clinic Florida)	
	Mean	SD
Pre-op	8.31	4.24
Post-op Day 30	2.79	1.51
% Change at Post-op Day 30	73.09%	--
P-value (Pair-wise)	0.001***	
Pre-op vs post-op		
P-value by paired t test. P-value<0.05 is considered to be statistically significant. ***P-value<0.001.		

Distribution of mean incontinence score at pre-op and post-op day 30

The distribution of mean ± SD of incontinence score at pre-op and post-op day 30 was 8.31 ± 4.24 and 2.79 ± 1.51 respectively.

The mean % change (%improvement) in the post-op incontinence score compared to pre-op incontinence score was 73.09%.

The distribution of mean incontinence score at post-op day 30 is significantly lower compared to mean pre-op incontinence score (P-value<0.001).

Table 6: The distribution of level of incontinence at pre-op and post-op day 30 among the cases studied in the study group.

	Fecal Incontinence score (Cleveland Clinic Florida)								
	0 – 5 (Mild)		6 – 15 (Moderate)		16 – 20 (Severe)		Total		
	n	%	n	%	n	%	n		%
Pre-op	16	32.6	30	61.2	3	6.2		49	100.0
Post-op Day 30	38	79.2	10	20.8	0	0.0		48	100.0
P-value (Pair-wise)	0.001***								
Pre-op vs Post-op									
P-value by Wilcoxon's signed rank test. P-value<0.05 is considered to be statistically significant. ***P- value<0.001.									

Distribution of level of incontinence at pre-op and post-op day 30

Of 49 cases studied pre-operatively, 16 (32.6%) had incontinence scores between 0 – 5 (mild), 30 (61.2%) had incontinence scores between 6 – 15 (moderate) and 3 (6.2%) had incontinence scores between 16 – 20 (severe). Of 48 cases studied post-operatively at day 30, 38 (79.2%) had incontinence scores between 0 – 5 (mild), 10 (20.8%) had incontinence scores between 6 – 15 (moderate) and none had incontinence scores between 16 – 20 (severe). The distribution of level of incontinence improved significantly at post-op day 30 follow-up compared to level of incontinence pre-operatively (P-value<0.001).

Table 7: The distribution of mean pre-op incontinence and post-op incontinence score according to complaint duration in the study group.

	Pre-op incontinence		Post-op incontinence	
Complaint duration (years)	Mean	SD	Mean	SD
2 – 5 (n=21)	4.29	1.31	0.67	0.79
6 – 10 (n=13)	8.69	1.70	2.54	0.88
11 – 15 (n=15)	13.60	1.50	6.21	1.05
P-value (ANOVA)	0.001***		0.001***	
P-value by ANOVA. P-value<0.05 is considered to be statistically significant. ***P-value<0.001.				

Distribution of mean pre-op incontinence and post-op incontinence score according to complaint duration

The distribution of mean ± SD of pre-op an incontinence score in the group of cases with complaint duration 2 – 5 years, 6 – 10 years and 11 – 15 years was 4.29 ± 1.31, 8.69 ± 1.70 and 13.60 ± 1.50 respectively.

The distribution of pre-op incontinence score is significantly higher in the group of cases with higher complaint duration compared to group of cases with relatively lower complaint duration in the study group (P-value<0.001).

The distribution of mean ± SD of post-op day 30 incontinence score in the group of cases with complaint duration 2 – 5 years, 6 – 10 years and 11 – 15 years was 0.67 ± 0.79, 2.54 ± 0.88 and 6.21 ± 1.05 respectively.

The distribution of post-op day 30 incontinence score is significantly higher in the group of cases with higher complaint duration compared to group of cases with relatively lower complaint duration in the study group (P-value<0.001).

Table 8: The distribution of mean pre-op incontinence and post-op incontinence score according to age in the study group.

	Pre-op incontinence		Post-op incontinence	
Age group (years)	Mean	SD	Mean	SD
14 – 23 (n=2)	3.00	0.00	0.00	0.00
24 – 33 (n=7)	3.29	0.48	0.00	0.00
34 – 43 (n=8)	5.00	1.31	0.88	0.35
44 – 53 (n=8)	6.13	1.13	1.88	0.83
54 – 63 (n=8)	9.25	1.48	2.63	0.74
64 – 73 (n=7)	12.14	0.69	5.29	0.95
74 – 83 (n=9)	14.44	1.33	6.75	0.89
P-value (ANOVA)	0.001***		0.001***	
P-value by ANOVA. P-value<0.05 is considered to be statistically significant. ***P-value<0.001.				

Distribution of mean pre-op incontinence and post-op incontinence score according to age group

The distribution of mean ± SD of pre-op incontinence score in the group of cases with age group 14 – 23 years, 24 – 33 years, 34 – 43 years, 44 – 53 years, 54 – 63 years, 64 – 73 years and 74 – 83 years was 3.00 ± 0.00, 3.29 ± 0.48, 5.00 ± 1.31, 6.13 ± 1.13, 9.25 ± 1.48, 12.14 ± 0.69 and 14.44 ± 1.33 respectively.

The distribution of pre-op incontinence score is significantly higher in the group of cases with older age group compared to group of cases with relatively younger age group (P-value<0.001).

The distribution of mean ± SD of post-op incontinence score in the group of cases with age group 14 – 23 years, 24 – 33 years, 34 – 43 years, 44 – 53 years, 54 – 63 years, 64 – 73 years and 74 – 83 years was 0.00 ± 0.00, 0.00 ± 0.00, 0.88 ± 0.35, 1.88 ± 0.83, 2.63 ± 0.74, 5.29 ± 0.95 and 6.75 ± 0.89 respectively.

The distribution of post-op incontinence score is significantly

higher in the group of cases with older age group compared to group of cases with relatively younger age group (P-value<0.001).

Discussion

Complete rectal prolapse is a distressing condition and is more common in adults than children.[9] Most of our patients presented at 4th-5th decade of life with a mean age of 52.18 years. Although in the western population M: F ratio is 1:6; this study showed an M: F ratio of 1:1.7 (36.7%:63.3%). Laparoscopic to open conversion of rectopexy was necessary in two cases with a conversion rate of 3.77% whereas Dyrberg et al and Iqbal Dar et al in their studies had conversion rates of 6.2% and 6.6% respectively.[10-12] Mortality due to rectal prolapse is very rare and there was no mortality pre- or post-operatively in our study. No technical difficulty was encountered with Prolene mesh placement. The mean duration of complaint at presentation was 7.65 yrs. In our study, significant improvement in continence was obtained, though in the older age group improvement was lesser than younger age group, and the older age group of patients presented with a longer duration of complaint. [Table 4-8] The mean operating time remained at 91.73 minutes. In comparison, Dyrberg et al(n=82) and Iqbal Dar et al(n=30) showed mean operating times of 82 mins and 110 mins respectively.[11,12] Mean post-op Return of bowel sound was 31.68 hours. A study of LPMR by Iqbal Dar et al recorded a mean time for the return of bowel sound of 27.4 hrs.[12] In a study by Omar et al patients were allowed orally at a mean of 30.24 hrs which was similar to our study, patients were allowed orally at a mean of 38.35 hours.[13] Sudhanshu et al(n=33) and Iqbal Dar et al in their studies showed mean post-op hospital stay of 7.8 days and 4.33 days respectively.[14] The current study had a mean post-op stay of 3.18 days. On post-op day two only 10% of patients had moderate pain with a VAS score of 5 to 7, mean pain score being 2.37. On the other hand, on post-op day 7 mean pain score remained 0.53 indicating only mild pain or discomfort, which was statistically significant and all patients resumed routine activity by day 7 postoperatively.

The mean pre-op incontinence score was 8.31 and the post-op mean incontinence score was 2.79. Overall improvement in continence was 73.09%. Older patients presented with longer duration of disease complaints than younger patient population and showed lesser post-op improvement in continence. According to Keehoon et al study showed a comparison among different continence scores showed mean pre- and post-op continence in the Wexner scale: 9.2 and 4.36 respectively in patients who underwent LPMR.[15] A recent randomized control trial established the fact that in LPMR vs LVMR, there is no significant difference in post-op continence or recurrence outcome.[16] Nevertheless, LPMR is widely practiced all over the world. On the other hand, LVMR has been reported with a post-operative increase in constipation.[17] It is already established that peri-hollow viscous non- absorbable mesh fixation has a high chance of mesh-related visceral erosion and the use of biological mesh includes a high recurrence rate.[18] To balance between these two mesh-related problems, in the present study LPMR was performed by suspending the rectum to sacral promontory by Prolene sutures, and the mesh was tacked to the pelvic fascia only rather than fixing mesh directly to the rectum would prevent recurrence of prolapse and minimize mesh erosion in the long run. We found only two patients with complaints of post-op constipation who improved with symptomatic use of laxatives and a high-fibre diet.

Limitations: Lack of long-term follow-up and pre & post-surgical rectal manometry that would have brought out more valuable data. Patients who present with long- standing disease are found to have incontinence more due to prolonged nerve compression by prolapsing rectum resulting in sphincter incompetence. Revival of nerve activity is anticipated maximum by 18-24 months.[19,20] A follow-up of up to 2 years will bring out more valuable information regarding LPMR and incontinence score-related data in the Indian population, especially the elderly population.

Conclusion

The above study adopted a useful technique of laparoscopic rectopexy by posterior mesh fixation in FTRP. The procedure reduced operative time by reducing extensive suturing time, postoperative pain, and morbidity whereas incontinence outcome remained comparable to other studies.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Oruc M, Erol T. Current diagnostic tools and treatment modalities for rectal prolapse. *World J Clin Cases*. 2023;11(16):3680–3693. doi:10.12998/wjcc.v11.i16.3680.
2. Mostafa RM. Rectal prolapse: Diagnosis and clinical management. World J Gastroenterol. 2010;16(17):2193–2194. doi:10.3748/wjg.v16.i17.2193
3. Pak AD, et al. Adolescent psychosis and rectal prolapse. Cureus. 2022;14(8):e27615. doi:10.7759/cureus.27615
4. Ganapathi SK, et al. Laparoscopic posterior rectopexy for complete rectal prolapse: Is it the ideal procedure for males? J Minim Access Surg. 2022;18(2):295–301. doi:10.4103/jmas.JMAS_323_20
5. Ahmad NZ, et al. Laparoscopic ventral mesh rectopexy: Functional outcomes after surgery. Surg J (N Y). 2018;4(4):e205–e211. doi:10.1055/s-0038-1675358
6. Tou S, et al. Surgery for complete (full-thickness) rectal prolapse in adults. Cochrane Database Syst Rev. 2015;(11):CD001758. doi:10.1002/14651858.CD001758.pub3
7. Franceschilli L, et al. Laparoscopic ventral rectopexy using biologic mesh for treatment of obstructed defaecation syndrome and/or faecal incontinence in patients with internal rectal prolapse. Tech Coloproctol. 2015;19(4):209–219. doi:10.1007/s10151-014-1255-4
8. Faucheron JL, et al. Anterior rectopexy for full-thickness rectal prolapse: Technical and functional results. World J Gastroenterol. 2015;21(16):5049–5055. doi:10.3748/wjg.v21.i16.5049
9. Emile SH, et al. A network meta-analysis of surgical treatments of

complete rectal prolapse. Tech Coloproctol. 2023;27(10):787–797. doi:10.1007/s10151-023-02813-2
10. Tsunoda A. Surgical treatment of rectal prolapse in the laparoscopic era: A review of the literature. J Anus Rectum Colon. 2020;4(3):89–99. doi:10.23922/jarc.2019-035
11. Dyrberg DL, Nordentoft T, Rosenstock S. Laparoscopic posterior mesh rectopexy for rectal prolapse is a safe procedure in older patients: A prospective follow-up study. Scand J Surg. 2015;104(4):227–232
12. Dar MI, Shah AP. Clinical study of laparoscopic posterior mesh rectopexy for complete rectal prolapse. Int J Curr Res. 2017;9(7):55072–55075
13. Abdelraheem O, Khalil M. Comparison between laparoscopic and open abdominal rectopexy for full-thickness rectal prolapse: Controlled clinical trial. Int Surg J. 2017;4(8)
14. Mohanty SS, Panigrahy P, Rout BK. Our experience with use of posterior mesh rectopexy in complete rectal prolapse. J Evid Based Med Healthc. 2017;4(93):5689–5691
15. Hyun K, Yang SJ, Lim KY, Lee JK, Yoon SG. Laparoscopic posterolateral rectopexy for treatment of full-thickness rectal prolapse: Experience with 63 patients and short-term outcomes.
16. Boccasanta P, Rosati R, Venturi M, Montorsi M, Cioffi U, Demone M. Comparison of laparoscopic rectopexy with open technique in treatment of complete rectal prolapse: Clinical and functional results. Surg Laparosc Endosc. 1998;8:460–465
17. Tsunoda A, et al. Surgical treatment of rectal prolapse in the laparoscopic era: A review of the literature. J Anus Rectum Colon. 2020;4(3):89–99
18. Oelschlager BK, Pellegrini CA, Hunter JG, et al. Biologic prosthesis to prevent recurrence after laparoscopic paraesophageal hernia repair: Long-term follow-up from a multicenter prospective randomized trial. J Am Coll Surg. 2011;213:461–468
19. Cuschieri A, Banting S, et al. Laparoscopic prosthesis fixation rectopexy for complete rectal prolapse. Br J Surg. 1994;81:138–139
20. Chiaramonte R, Pavone V, Testa G, et al. The role of physical exercise and rehabilitative implications in nerve repair in peripheral neuropathies: A systematic review. Diagnostics (Basel). 2023;13(3):364.