

# Surgical and functional outcome of laparoscopic suture rectopexy for management of pediatric rectal prolapse

Original  
Article

Hazem E. Ali, Ahmed S.A.E. Mohammed, Emad E.M.A. Hafez, Hussein G. El Goharey and Mohamed A. Elbegawy

Department of General Surgery, Faculty of Medicine, Benha University, Benha, Egypt.

## ABSTRACT

**Background:** Rectal prolapse in pediatric populations presents significant management challenges with varying surgical outcomes. Laparoscopic suture rectopexy represents a promising approach, yet its efficacy and safety in children have not been thoroughly quantified. The purpose of this study was to evaluate the surgical and functional outcomes of laparoscopic suture rectopexy for the management of pediatric rectal prolapse.

**Patients and Methods:** This prospective study was conducted on 30 children aged 4–16 years with symptomatic rectal prolapse. Preoperative evaluations included comprehensive diagnostics and history taking. Surgical interventions followed standardized procedures with postoperative follow-up assessing anal sphincter pressures, complication rates, and overall parental satisfaction.

**Results:** All 30 participants successfully underwent the procedure with minimal complications. Postoperative follow-up revealed significant improvement in anal sphincter resting pressure from a preoperative mean of 88.7 mmHg (SD=15.8) to 97.6 mmHg (SD=17.3) postsurgery ( $P=0.005$ ). Squeeze pressure also improved significantly, from 150.3 mmHg (SD=23.3) to 167 mmHg (SD=25.9) ( $P=0.004$ ). Only one (3.3%) patient experienced a partial recurrence manifested as mucosal prolapse. Parental satisfaction was universally high, with all children returning to unrestricted daily activities within a short period.

**Conclusion:** Laparoscopic suture rectopexy is a safe and effective surgical option for managing pediatric rectal prolapse, showing significant improvements in anal sphincter function and high rates of parental satisfaction with minimal recurrence.

**Key Words:** Anal sphincter pressures, laparoscopic suture rectopexy, pediatric rectal prolapse, postoperative complications, surgical outcomes.

**Received:** 8 May 2024, **Accepted:** 5 June 2024, **Published:** 4 October 2024

**Corresponding Author:** Ahmed S.A.E. Mohammed, Msc, Department of General Surgery, Faculty of Medicine, Benha University, Benha, Egypt. **Tel.:** +20 100 340 3645, **E-mail:** drahmedsaad125@gmail.com

**ISSN:** 1110-1121, October 2024, Vol. 43, No. 4: 1371-1376, © The Egyptian Journal of Surgery

## INTRODUCTION

Rectal prolapse in children is a distressing condition characterized by the protrusion of the rectal wall through the anus<sup>[1]</sup>. This condition not only causes significant discomfort and potential for complications such as mucosal ulceration and bleeding but also poses a psychological burden on young patients and their families. Although rectal prolapse is less common in children than in adults, its management remains a critical challenge in pediatric surgery<sup>[2]</sup>.

The traditional approach to rectal prolapse in children has largely centered around conservative management, including dietary modifications and physiotherapy<sup>[3]</sup>. Surgical intervention is typically reserved for cases where conservative measures fail. Among surgical options, procedures vary from perineal approaches, such as the Thiersch operation, to abdominal procedures, including

rectopexy. Abdominal approaches are generally favored in recurrent or full-thickness prolapse due to lower recurrence rates compared to perineal methods<sup>[4,5]</sup>.

Laparoscopic techniques in pediatric surgery have gained favor for various conditions due to advantages such as reduced postoperative pain, quicker recovery times, and minimal scarring. Laparoscopic rectopexy, in particular, has been noted for its efficacy in adult populations, yet comprehensive data on its outcomes in pediatric patients remain sparse. The technique involves the mobilization of the rectum and its fixation to the presacral fascia, with or without sigmoid resection, aiming to restore the normal anatomic position of the rectum<sup>[6,7]</sup>.

Given the potential benefits of laparoscopic approaches, there is a need for rigorous studies evaluating the outcomes of laparoscopic suture rectopexy in the pediatric population. This study aims to fill this gap by assessing

both the surgical and functional outcomes of laparoscopic suture rectopexy in children presenting with symptomatic rectal prolapse.

The work aims to evaluate the surgical and functional outcomes of laparoscopic suture rectopexy for the management of pediatric rectal prolapse.

## **PATIENTS AND METHODS:**

---

### ***Study design and patients***

This prospective study included 30 children with symptomatic rectal prolapse coming to the outpatient clinic and meeting our inclusion criteria were enrolled in this study. They were selected from the General Surgery Department of Benha University Hospital after approval from the research ethics committee in Benha Faculty of Medicine during the period from January 1 to November 30, 2023. All participants included had signed a consent form.

The inclusion criteria were children with symptomatic rectal prolapse between 4 and 16 years old.

Exclusion criteria were children with previous operative management for rectal prolapse, aged below 4 or above 16 years old, patients with chronic disease, and patients with known neurological or pelvic musculoskeletal deficits or lower gastrointestinal tract anomalies.

### ***Methods***

All studied cases were subjected to the following.

#### ***Detailed history taking***

A detailed history was taken from each patient, which included information such as age, sex, duration of prolapse, prior interventions, and comorbidities.

#### ***General examination and investigations***

This included a complete blood picture, stool and urine analysis, serum creatinine, blood urea, fasting blood sugar, coagulation profile, liver function tests, and examination per rectum during rest and during straining to evaluate the prolapse and to confirm the absence of previous surgical correction.

#### ***Surgical procedure***

Preoperative management of comorbidities, if any, like diarrheal disease, chronic constipation, parasitic infestation, and malnutrition, was properly carried out so that all patients with persistent rectal prolapse were cleared for surgery. All patients had a single dose of intravenous cefotaxime sodium 50 mg/kg before shifting the patient to

the operating room. All cases underwent general anesthesia with endotracheal intubation. Three 5-mm ports were generally enough for visualization, mobilization, presacral dissection, rectal fixation, and sigmoidopexy. We used an umbilical port for the telescope and two mid-clavicular line working ports at the same horizontal level of the umbilicus or a bit lower, whichever permitted a proper triangulation. Retrorectal dissection was carried out on both sides, starting from the level of the sacral promontorium down to the pelvic floor without dividing the lateral rectal ligaments<sup>[8]</sup>.

Mobilization was performed using a combination of sharp, blunt, and monopolar cautery dissections. A sterile, Gentian violet-tipped wooden stick was introduced to mark the rectum at the level of the proposed suture rectopexy opposite the sacral promontory while the rectum was pulled taut by the hand grasper. The posterior wall of the rectum was then fixed to the fascia over the sacral promontory using two (right and left) 2/0 silk sutures<sup>[9]</sup>.

A third seromuscular sigmoidopexy suture was used to fix the sigmoid colon to the left lateral peritoneum of the anterior abdominal wall, about two fingers breadth above and medial to the anterior superior iliac spine. Suture placement on the sigmoid was positioned so that no colonic redundancy was left between the two fixed points: sigmoidopexy and rectopexy. The sigmoidopexy suture was passed via the right port with the knot being tied extracorporeally and then slid using a knot pusher [9].

### ***Follow up***

All patients were assessed after surgery for the duration of hospital stay, time interval before return to unrestricted daily activities, postoperative complications, and overall parental satisfaction.

### ***Manchester Scar Scale***

It is a multiitem categorical scale, with a global scar assessment made with a visual analog scale. This scale includes descriptors of greater clinical significance, such as contour (flush, indented, hypertrophic, or keloid), as opposed to physical measurements<sup>[10]</sup>.

### ***Statistical analysis***

Statistical analysis of the collected data was conducted using IBM SPSS Statistical analysis was done using IBM SPSS statistics for windows, Version 25.0. Armonk, NY: IBM Corp. Data were revised, coded, and presented with appropriate analyses tailored to the data type for each parameter. The Shapiro–Wilk test determined the normality of data distribution. Descriptive statistics included mean and SD for numerical data and frequency and percentage for nonnumerical data. Analytical statistics involved the Student t test and Mann–Whitney test (U test) for assessing the significance of differences between

two study groups, the Kruskal–Wallis test for differences among more than two groups, and the  $\chi^2$  and Fisher's exact tests for relationships between two qualitative variables. A *P* value of less than 0.05 was considered significant at a 95% confidence interval.

## RESULTS:

The current study was carried out on 30 children with complete rectal prolapse who underwent laparoscopic suture rectopexy. Studied cases were compared according to demographic data, operative data, follow-up, and outcome.

Demographics, medical history, and operation-related data of the studied patients are illustrated in (Table 1).

According to clinical follow-up data for studied participants, at a 72-h posttreatment checkpoint, only one (3.3%) patient experienced mucosal prolapse, while the vast majority, 29 (96.7%) patients, showed no signs of recurrence of the initial condition. Additionally, all patients (100%) showed improvement regarding straining. In terms of postoperative ultrasound examination and at 2 weeks postoperation of the studied participants, all participants (100%) had normal ultrasound results (Table 2).

The resting pressure of the anal sphincter, however, shows a significant change from the preoperative to the postoperative state. Preoperatively, the mean resting pressure was 88.7 mmHg, with a SD of 15.8 mmHg. Postoperatively, the mean resting pressure increased to 97.6 mmHg with a SD of 17.3 mmHg. A significantly higher postoperative resting pressure was observed among the studied participants ( $P=0.005$ ). The squeezing pressure of the anal sphincter shows a significant change from the preoperative to the postoperative state. Preoperatively, the mean squeeze pressure was 150.3 mmHg with a SD of 23.3 mmHg. Postoperatively, the mean squeeze pressure increased to 167 mmHg with a SD of 25.9 mmHg. A significantly higher postsqueeze pressure among studied participants ( $P=0.004$ ) (Table 3).

Out of the total participants (n=30), 29 (96.7%) of them did not experience any complications. Only one (3.3%) participant had a complication described as "partial recurrence." According to the association between different parameters (age, sex, operation time, symptoms/signs, clinical follow-up) and complications following a medical procedure. The previous table compared a group with no complications (29 cases) to a group with partial recurrence of symptoms (one case). Partial recurrent patient was associated with mucosal prolapse and abnormal RAIR reflex ( $P=0.033$ ). Other factors like age, sex, and operation time did not differ significantly between groups (Table 4).

**Table 1:** Demographics, medical history and operation related data of the studied patients

		Total subjects n=30
Age (years)	M ± SD	8.6±3.5
Age (Groups)	4-7 years	14(47%)
	8-10 years	11(37%)
	> 11 years	5(17%)
Gender	Female	11(36.7%)
	Male	19(63.3%)
Signs	Mass protruding from anus	30(100%)
	BPR	19(63.3%)
	Pain	19(63.3%)
	Obstructed defecation	6(20%)
Previous surgery for rectal prolapse	No	30(100%)
Operation time (min)		75.5±9.2
Hospital days	One day	30(100%)
Medical signs of acute abdomen or bleeding per rectum	No	30(100%)
Pass of flatus	Before discharge	30(100%)

**Table 2:** Clinical follow up and ultrasound assessment among studied patients

		Total subjects n=30
72 hours Clinical follow up	Mucosal prolapse	1(3.3%)
	No recurrence	29(96.7%)
Straining	Improved	30(100%)
Post operative Ultrasound	Normal	30(100%)
2 weeks post operative US	Normal	30(100%)

**Table 3:** Anal manometry and squeeze pressure results among studied patients

		Pre operative	Post operative	Test	p
RAIR reflex	Positive	30(100%)	30(100%)	-	-
Resting pressure (mmHg)	M ± SD	88.7±15.8	97.6±17.3	2.803	0.005*
Squeeze pressure (mmHg)	M ± SD	150.3±23.3	167±25.9	2.483	0.004*

Test, Wilcoxon signed ranks test; \* for significant p value (<0.05)

**Table 4:** Complications and its association with other parameters among studied patients

		Total subjects n=30			
Complications		No	29(96.7%)		
		Partial Recurrence	1(3.3%)		
		No complications N=29	Partial recurrence N=1	Test	p
Age		8.7±3.5	5±0	t=1.036	0.309
Gender	Female	11(37.9%)	0(0%)	FE	0.633
	Male	18(62.1%)	1(100%)		
Operation time (min)		75.5±9.4	75±0	Z=0.000	1.000
Signs	Mass protruding from anus	29(100%)	1(100%)	FE	0.100
	BPR	18(62%)	1(100%)		
	Pain	18(62%)	1(100%)		
	Obstructed defecation	5(17%)	1(100%)		
72 hours Clinical follow up	Mucosal prolapse	0(0%)	1(100%)	FE	0.033*
	No recurrence	29(100%)	0(0%)		
RAIR reflex	Negative	0(0%)	1(100%)	FE	0.033*

t, independent t test; Z, Mann whitney test; FE, Fissure exact

**DISCUSSION**

The management of rectal prolapse in pediatric patients presents unique clinical challenges, necessitating interventions that balance efficacy with minimal invasiveness to ensure quick recovery and low recurrence. This study aimed to evaluate the outcomes of laparoscopic suture rectopexy, a surgical approach that has gained favor for its potential benefits over traditional open surgeries. The study included 30 children with symptomatic rectal prolapse coming to the outpatient clinic.

Regarding demographics, our results were similar to a study by Morsi and colleagues, which found

that a total of 66 patients, who had suture rectopexy done, were followed up for a minimum of 6 months following surgery. It found that patient ages ranged between 2.5 and 12 years, with a mean of 5.9 and 6.59 years for the laparoscopic suture rectopexy and PSR groups, respectively<sup>[9]</sup>.

Also, the study by Yehya *et al.*<sup>[6]</sup>, found that the mean age at the time of operation was 8 years (range, 5–12 years). There were 40 (62.5%) males and 24 (37.5%) females with a male : female ratio of 1.6 : 1.

Conversely, Mokhtar *et al.*<sup>[11]</sup> revealed that the mean age was 3.32 years, with the youngest patient presented at the age of 2 months.

According to clinical signs among studied cases, our results were similar to Awad *et al.*<sup>[8]</sup>, who found that 5% of patients had anal pain while 50% had bleeding per rectum.

Regarding operation time, our study was in harmony with Yehya *et al.*<sup>[6]</sup>, who found that the mean operative time was 45.7 min (range, 34–60 min) for laparoscopic suture rectopexy.

Similarly, Mokhtar *et al.*<sup>[11]</sup> found a close operation time and hospital stay range to our study as they found that the operative time required for laparoscopic suture rectopexy was 60–142 with a mean time of 87.2 min, and almost all cases were discharged in less than 48 h postoperatively which was 31.87 ( $P=0.042$ ).

According to clinical follow-up data, our results were in line with Morsi and colleagues, who found that postoperative quality of life scores, according to the modified Bai's scale, recorded 6 months after surgery showed a remarkable improvement in both groups, which again was not statistically significant in favor of either technique. Most cases returned to full activities (running, school attendance) within 2 weeks postoperatively<sup>[9]</sup>.

Also, Rose *et al.*<sup>[12]</sup> performed a study to investigate the safety of various laparoscopic techniques in terms of perioperative and postoperative general and technique-specific complications and 150 patients undergoing laparoscopic or laparoscopic-assisted colorectal surgery for rectal prolapse.

Concerning the resting pressure of the anal sphincter, our results were in line with Yoshioka and colleagues performed a study to assess anorectal function after abdominal rectopexy, included Twelve patients with a full-thickness rectal prolapse underwent posterior abdominal rectopexy. Parameters that predicted return of continence, including long anal canal, showed a significant improvement at rest ( $P<0.05$ )<sup>[13]</sup>.

In contrast to our results, Abuelnasr *et al.*<sup>[14]</sup> found that the mean resting pressure preoperatively was  $42.8\pm 14.51$ . At 6 months was  $43\pm 14.22$  and at 12 months,  $44.8\pm 13.5$ ; therefore, no significant difference between different measures was observed.

Regarding squeeze pressure of the anal sphincter, our results were similar to Abuelnasr and colleagues, who found that mean squeezing pressure showed an overall significant difference between different measures as it changed from  $136\pm 42.03$  preoperatively to  $152\pm 38.51$  and  $156.8\pm 35.91$  at 6 and 12 months preoperatively ( $P<0.001$ ) and this may be due to avoiding muscle fatigue related to straining<sup>[14]</sup>.

Out of the total participants (n=30), 29 (96.7%) of them did not experience any complications. Only one (3.3%) participant had a complication described as “partial recurrence.”

Parallel to our results, Yehya *et al.*<sup>[6]</sup> found that recurrence after suture rectopexy has been reported as ranging from 0 to 3%.

Comparable to that, Koivusalo and colleagues carried out a study to evaluate the usefulness of laparoscopic suture rectopexy in pediatrics and included eight patients with rectal prolapse. He found that six patients with laparoscopic suture rectopexy had a median follow-up of 13 months (range, 4–24). None have had recurrences, and two (33%) patients require laxatives. This may be due to the small sample size included in laparoscopic suture rectopexy operation<sup>[15]</sup>.

Similarly, Ismail and colleagues performed a study to evaluate the results that can be achieved by using laparoscopy in the management of complete rectal prolapse in children and included 40 presented with complete rectal prolapse and fecal incontinence grades (3-4) according to Rintala scale (37 secondary to prolapse and three neuropathic) and revealed no recurrences<sup>[16]</sup>.

Finally, this study had some limitations as it was a single-center study with a relatively small sample size. Thus, future multicenter studies with larger sample sizes are needed to validate our findings.

## CONCLUSION

Laparoscopic suture rectopexy is a safe and effective surgical option for managing pediatric rectal prolapse, showing significant improvements in anal sphincter function and high rates of parental satisfaction with minimal recurrence. These findings advocate for its use as a standard approach in suitable cases.

## CONFLICT OF INTEREST

There are no conflicts of interest.

## REFERENCES

1. Rentea RM, St Peter SD. Pediatric rectal prolapse. *Clin Colon Rectal Surg* 2018; 31:108–116.
2. Cares K, Klein M, Thomas R, El-Baba M. Rectal prolapse in children: an update to causes, clinical presentation, and management. *J Pediatr Gastroenterol Nutr* 2020; 70:243–246.

3. Antao B, Bradley V, Roberts JP, Shawis R. Management of rectal prolapse in children. *Dis Colon Rectum* 2005; 48:1620–1625.
4. Barfield LR. Perineal approaches to rectal prolapse. *Clin Colon Rectal Surg* 2017; 30:12–15.
5. Pellino G, Fuschillo G, Simillis C, Selvaggi L, Signoriello G, Vinci D, *et al.* Abdominal versus perineal approach for external rectal prolapse: systematic review with meta-analysis. *BJS Open* 2022; 6:zrac018.
6. Yehya A, Gamaan I, Abdelrazek M, Shahin M, Seddek A, Abdelhafez M. Laparoscopic suture versus mesh rectopexy for the treatment of persistent complete rectal prolapse in children: a comparative randomized study. *Minim Invasive Surg.* 2020; 2020:3057528.
7. Usman M, Khan IU, Hadi A. Outcomes of laparoscopic suture vs mesh rectopexy for complete rectal prolapse. *Cureus* 2023; 15:e50758.
8. Awad K, El Debeiky M, AbouZeid A, Albaghdady A, Hassan T, Abdelhay S. Laparoscopic suture rectopexy for persistent rectal prolapse in children: is it a safe and effective first-line intervention? *J Laparoendosc Adv Surg Tech A* 2016; 26:324–327.
9. Morsi AH, Elshahat W, Kassem H, Gobran TA, Tantawy IM, Waly AH. Short-term outcome of suture rectopexy in children with rectal prolapse: laparoscopic versus posterior sagittal approach. *Egypt J Surg* 2019; 38:106–112.
10. Choo AMH, Ong YS, Issa F. Scar assessment tools: how do they compare? *Front Surg* 2021; 8:643098.
11. Mokhtar A, Abouheba M, Shehata S. Evaluation of laparoscopic rectosigmoidopexy for the treatment of complete rectal prolapse in children. *Minim Invasive Surg* 2017; 1:24–30.
12. Rose J, Schneider C, Scheidbach H, Yildirim C, Bruch HP, Konradt J, *et al.* Laparoscopic treatment of rectal prolapse: experience gained in a prospective multicenter study. *Langenbecks Arch Surg* 2002; 387:130–137.
13. Yoshioka K, Hyland G, Keighley MR. Anorectal function after abdominal rectopexy: parameters of predictive value in identifying return of continence. *Br J Surg* 1989; 76:64–68.
14. Abuelnasr MI, Nawar AM, Salama AM. Evaluation of anorectal functions after laparoscopic suture rectopexy with complete division of lateral rectal ligaments. *Egypt J Surg* 2022; 41:319–326.
15. Koivusalo AI, Pakarinen MP, Rintala RJ. Rectopexy for paediatric rectal prolapse: good outcomes but not without postoperative problems. *Pediatr Surg Int* 2014; 30:839–845.
16. Ismail M, Gabr K, Shalaby R. Laparoscopic management of persistent complete rectal prolapse in children. *J Pediatr Surg* 2010; 45:533–539.