

DOES LAPAROSCOPIC ASSISTED ANORECTOPLASTY IMPROVE THE LONG-TERM FECAL CONTINENCE OUTCOMES IN CHILDREN WITH HIGH ANORECTAL MALFORMATIONS

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ABSTRACT:

Background: Anorectal malformations are a broad spectrum of anomalies with different approaches of management and variable outcomes.

Aim of The Work: Our aim was to retrospectively assess the long-term fecal continence outcomes after laparoscopic-assisted anorectoplasty (LAARP) in comparison with outcomes of the classic posterior sagittal anorectoplasty (PSARP).

Patients and Methods: Our study included 27 male patients with high anorectal malformations (recto-vesical, recto-bladder neck & recto-prostatic urethral fistula) whose ages were 4 years or older and have undergone LAARP or PSARP (LAARP 15, PSARP 12) in Sohag university hospital and El Minya university hospital from 2015 to 2019. Postoperative fecal continence scores were retrospectively compared.

Results: Fecal continence scores were comparable between the two groups. Complications in the form of mucosal rectal prolapse occurred in 4 cases of LAARP vs. 2 cases of PSARP ($p = 0.09$) and posterior urethral diverticulum (PUD) occurred in 3 cases of LAARP vs. 1 case of PSARP ($p = 0.07$).

Conclusion: The use of LAARP didn't give any extra benefit as regard postoperative fecal continence, on the other hand, it was associated with higher risk for mucosal prolapse and PUD.

Keywords: Anorectal malformation; Posterior sagittal anorectoplasty; Laparoscopic-assisted anorectoplasty; Long-term outcomes.

INTRODUCTION:

Anorectal malformations are a diverse group of anomalies with a spectrum of clinical presentations and different approaches of management. Posterior sagittal anorectoplasty (PSARP) with or without laparotomy was the classic procedure used for repair. Laparoscopy was introduced in 2000 by Georgeson as an alternative minimally invasive technique for PSARP and the procedure was termed Laparoscopic-assisted anorectoplasty (LAARP)⁽¹⁾.

AIM OF THE WORK:

We aimed to compare the long-term fecal continence outcomes of both procedures.

PATIENTS AND METHODS:

Study Sample:

Twenty-seven male patients with high anorectal malformations passed the inclusion criteria of the study among all male patients who underwent LAARP or PSARP at Sohag university hospital and El Minya university hospital between January 2015 and September 2019. Their lesion varied between Recto-vesical, Recto-bladder neck and recto-prostatic urethral fistula.

Surgical Technique:

Here, we describe the current operative procedure for recto- prostatic urethral fistula.

LAARP:

In this technique the patient lies supine across the table. The area from the mid-chest to the foot is prepped with antiseptic solution. A Foley catheter of suitable size was inserted. Three 5 mm ports; a camera port through the umbilicus and two working ports through the right and left side of the abdomen, were used. Insufflation pressure was always set to 8-10 mmHg. The rectum was dissected starting from the peritoneal reflection downwards, and recto-urinary fistula clipped or transfixion-ligated about 4-5 mm above its junction with the urethra. A small perineal incision is made exactly in the centre of anal sphincter defined by the magnified view of the laparoscope on the pelvic side and the muscle stimulator induced contractions on the perineal side. A 12-mm port with an expandable dilator is inserted through this incision to create a tunnel through which the rectum is pulled down and sutured to the perineal skin to finalize the procedure. Figure (1)



Figure 1: Technique of LAARP

PSARP:

PSARP was performed as described by deVries and Peña⁽⁵⁾ Figure (2)

Postoperative fecal continence and other long-term complications (namely mucosal rectal prolapse and posterior urethral diverticulum) were retrospectively compared between both groups.



Figure 2: Technique of PSARP

Fecal continence scores were compared at 3 different ages 4,6 and 8 based on Rintala's questionnaire. This questionnaire consists of 7 items, each has a score from 0 to 3, except for the frequency of defecation, which is scored 1-2. The final score ranges from 1 to 20 Figure (3). A total score ranging from 17 to 20 means "excellent" continence, from 11 to 16 "good", from 9 to 11 "fair", and from 6 to 9 "poor" continence⁽⁶⁾.

Statistical analysis was done using the Wilcoxon rank-sum test for continuous data and Fisher's exact test for categorical data. *p* value of less than 0.05 was considered statistically significant.

Frequency of defecation	
Normal (1-2/day)	2
Often (3-5/day)	1
Very often	0
Fecal consistency	
Normal	2
Loose	1
Liquid	0
Soiling	
None	2
When stressed or if there is diarrhea	1
Always	0
Sensation of rectal fullness	
Normal	2
Uncertain	1
Absent	0
Ability to control the urge to defecate	
Normal (min)	2
Short (s)	1
None	0
Ability to discriminate between formed, loose, or gaseous motions	
Normal	2
Poor	1
Absent	0
Need for enemas, drugs, pads	
Never	2
Occasionally	1
Always	0

Figure 3: Rintala Fecal Continence score

Ethical consideration:

The approval of the research ethics committees was obtained (14-SC-1345) on 22/9/2023.

RESULTS:

Demographic data are summarized in Table (1). Twenty-seven patients with high anorectal malformations were included in the study. LAARP was done in 15 cases while PSARP was done in 12 cases. Operative time was longer in the LAARP group than in the PSARP group (210± 35) and (175±27) with p value of (0.02).

No significant difference was found as regard the level of the recto-urinary fistula,

the associated anomalies and chromosomal abnormalities or sacral ratio. The age at operation was older in the LAARP group than PSARP group (6.7±3.2) and (4±2.5) respectively with p-value (0.05). The ages of the patients at the time of the study were comparable (6±2) and (7±1.75). Evaluation of fecal continence was done using the Rintala fecal continence score which was applied to patients at 4,6 & 8 years of age. The median scores were comparable for both groups at all ages 10±2 vs 9±3 (p 0.7) at 4 years, 13±3 vs 11±2 (p 0.5) at 6 years and 14±3 vs 13±4 (p 0.9) at 8 years of age. Mucosal rectal prolapse occurred in 4 cases of LAARP vs. 2 cases of PSARP (p = 0.09) and posterior urethral diverticulum (PUD) occurred in 3 cases of LAARP vs. 1 case of PSARP (p = 0.07).

Table 1: Demographic data

	LAARP (n = 15)	PSARP (n = 12)	p
Birth wight (kg)	2.6±0.6	2.9±0.7	0.09
Age at operation(in months)	6.7±3.2	4±2.5	<0.05
Body Weight at operation (kg)	7.0±1.3	5.6±1.4	<0.05
Operative time	210± 35	175±27	<0.05
Associated malformation			
Cardiac anomalies	3	3	0.65
Lumbo-sacral deformities	5	1	0.40
Chromosomal abnormalities	2	3	0.69
Urinary tract anomalies	3	4	0.20
Sacral ratio	0.78 (0.67–0.85)	0.83 (0.73–0.95)	0.10
Fistula type:			
Recto-vesical	3	2	1.00
Recto-bladder neck	5	4	0.55
Recto-prostatic	7	6	0.53
Age at the end of the study	6±2	7±1.75	0.3
Long-term Complications			
Mucosal rectal prolapse	4 (26.5 %)	2 (16.5%)	0.09
Posterior urethral diverticulum	3 (20%)	1(8%)	0.07

Table 2: Comparison of fecal continence scores at different ages.

	4y	6 y	8y
LAARP	10±2	13±2	13±3
PSARP	9±3	10±2	12±2
P value	0.7	0.5	0.9

DISCUSSION:

LAARP has several advantages over PSARP i.e the preservation of the pelvic floor

muscles and the external anal sphincter, the smaller perineal wound with less wound complications and excellent cosmetic properties as well as the shorter hospital stay

and early recovery. This is why LAARP has been widely performed in recent years⁽³⁾.

Koga et al. reported that the centralization of the rectum within the sphincters and the bilateral symmetry of pelvic floor muscles are identical in both LAARP & PSARP patients⁽⁷⁾. Our results support these findings according to the results of postoperative follow up MRI done to 13 of our patients (6 LAARP & 7 PSARP) for assessment of the repair.

The median age at operation was significantly higher in the LAARP group due to technical requirements. The median age at the conclusion of the study was comparable. For similar technical reasons the operative time was significantly longer in the LAARP group compared with the PSARP group. However, the mean operative time decreased with more case volume and surgeon's experience.

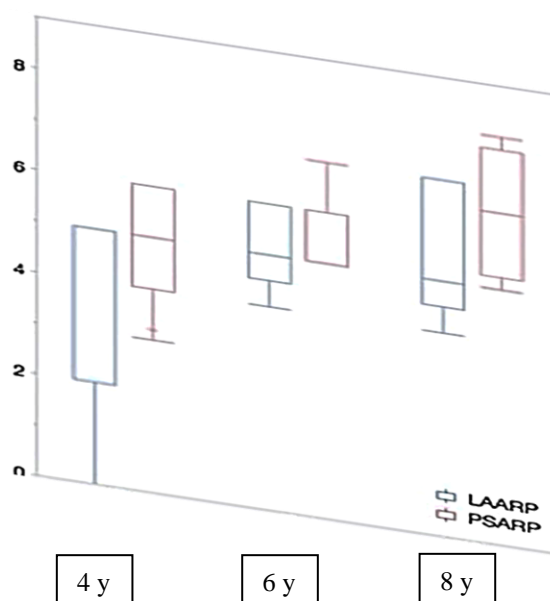


Figure 4: Postoperative fecal continence based on the Rintala continence score.

There was no significant difference in continence scores at different ages. However, there was a tendency towards rising of the score over time from fair to good. Figure (4)

The fact of the comparable fecal continence outcomes between the two groups despite our previous expectations, suggests that the final outcome of ARM may be subjected to other multiple factors⁽²⁻⁴⁾.

There were also reports of higher incidence of rectal mucosal prolapse and posterior urethral diverticula in association with LAARP. The former may be explained by further dissection and mobilization of the rectum which makes it less supported and more liable to descent through the neoanus. The latter may be a result of incomplete

excision of the fistula and leaving a few mm stump to transfix in LAARP in comparison with the open procedure in which the fistula is excised flush with the wall of the urethra^(8,9).

Conclusion:

Although the use of LAARP causes less damage to the muscles and nerves of the pelvic floor and has many advantages on the short-term, it didn't show a statistically significant improvement of fecal continence outcomes on the long-term follow up. Moreover, it was associated with higher incidences of rectal mucosal prolapse and posterior urethral diverticula. There's still a need for further assessment and refinement of laparoscopic techniques used in repair of

anorectal malformations.

Conflict of interest:

The authors have no conflict of interest to disclose.

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هل يؤدي الإصلاح بمساعدة منظار البطن الجراحي لتحسين نتائج التحكم في البراز لدى الأطفال المصابين باتسداد الشرج الخلقى المرتفع

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يعتبر استخدام منظار البطن الجراحي من أهم التطورات التي تم إدخالها على التقنيات الجراحية خلال العقود القليلة الماضية وقد تم التوسع في استخدامه ليشمل علاج العديد من الحالات المختلفة ومن بينها عمليات إصلاح التشوهات الخلقية للشرج بأنواعها. وقد أجريت العديد من الدراسات لمقارنة نتائج هذه العمليات المتقدمة مقارنة بالطريقة التقليدية المنسوبة إلى دكتور (بينيا) ورفقاه والمعروفة بالشق السهمي الخلفي ولكن أغلب هذه الدراسات تناولت النتائج قصيرة المدى. أما في هذه الدراسة الحالية فقد قمنا بإجراء مقارنة بين التقنيتين على المدى البعيد. وقد تبين من خلال البحث الذي بين أيدينا أن استخدام المنظار الجراحي لم يكن له أثر يذكر في تحسين وظائف التحكم في إخراج البراز كما أنه ارتبط بنسب أعلى من حالات السقوط الشرجي ورتج مجرى البول الخلفي.