



Laparoscopic treatment of rectovaginal fistulas. Feasibility, technical details, and functional results of a rare anorectal malformation

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Abstract

Introduction: Rectovaginal fistulas are a rare variety of anorectal malformations. Eight patients with this anomaly among 420 children with anorectal malformations were treated in our center. We used a laparoscopic approach in 5 of the children. The aim of this study is to define the feasibility and technical details of laparoscopy in the treatment of these patients as compared with those treated by posterior sagittal anorectoplasty (PSARP) and to evaluate the preliminary results.

Methods: Three patients were treated with a PSARP starting February 2000 (group 1 [G1]). The laparoscopic approach (laparoscopic treatment [LT]) was used in the next 5 girls starting in November 2002 (group 2 [G2]). All patients were operated on by the authors. In LT cases, we used 3 ports. The rectum was dissected laparoscopically, and the fistula was transected. An assisted anorectal pull-through was then performed using a minimal perineal incision. Clinical features, age at operation, associated anomalies, ratio/sacrum (sacral ratio [SR]), distal colostogram, operative findings, complications, urinary continence, voluntary bowel movements, constipation, soiling, and requirements of bowel management program were analyzed. Patients older than 3 years and 6 months and with more than 3 months after colostomy closure were included in the analysis of functional results.

Results: The mean age at the time of operation was 21.8 months. Urogenital anomalies were seen in 6 (75%) of the 8 girls. Two patients had SRs less than 0.6. Only 3 patients in each group were considered for evaluation of functional results. Mean age was 67 months in 3 (G1) and 64 months in 3 (G2) patients. All 6 patients were continent of urine. Only 1 in G1 had an SR less than 0.6. Voluntary bowel movements were present in 1 patient in G1 and 2 in G2. One patient in G1 had severe constipation and grade 2 soiling requiring bowel management program (SR <0.6), and 1 patient in G2 had occasional soiling.

Conclusions: Laparoscopy allowed an optimal view of the pelvis and helped to achieve a low dissection of the fistula. Although the number of patients in this study is few, functional results with LT seem to be comparable to the open PSARP approach when done by experienced pediatric surgeons. The laparoscopic approach may be considered as an option for the treatment of this rare anomaly.

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Anorectal malformations (ARMs) affect 1 in 4000 to 5000 live births [1]. They are usually associated with other anomalies. The Krickenbeck classification published in 2005 described rectovaginal fistulas as a rare regional variant with an incidence of 1% [2]. We present 8 patients with this anomaly seen among 420 children with ARMs, representing 1.9% of the total group. The aim of this study is to report our experience with this rare anomaly, define the feasibility and technical details of laparoscopic approach in the treatment of these patients as compared with those managed by posterior sagittal anorectoplasty (PSARP), and evaluate the preliminary results.

1. Material and methods

This study was done in a tertiary referral center of pediatric surgery from February 2000 to July 2009. Of 420 patients with ARMs, 8 patients were identified with rectovaginal fistulas. All 8 patients were operated on by the authors.

Clinical features, age at operation, associated anomalies, ratio/sacrum, distal colostogram, operative findings, complications, voluntary bowel movements, urinary continence, constipation, soiling, and requirement of bowel management program as described by Peña were analyzed [3].

The clinical features in each case included an imperforate anus and the presence of 2 perineal orifices (urethra and vagina) (Fig. 1). The urethra had a normal appearance in all 8 cases. One patient had a longitudinal septum in her vagina

(bifid vagina) seen when traction was applied to the labia minora. The anterior-posterior and lateral sacral ratios (SRs) were used to evaluate the sacrum [4]. All the patients received a protective sigmoid colostomy before laparoscopic repair or PSARP. Seven of the colostomies were performed in other institutions before referral. A distal colostogram showed the distal colon ending in the midvagina in 7 and in the vaginal septum in the patient with a septated vagina (Fig. 2A, B).



Fig. 1 Clinical feature of rectovaginal fistula.

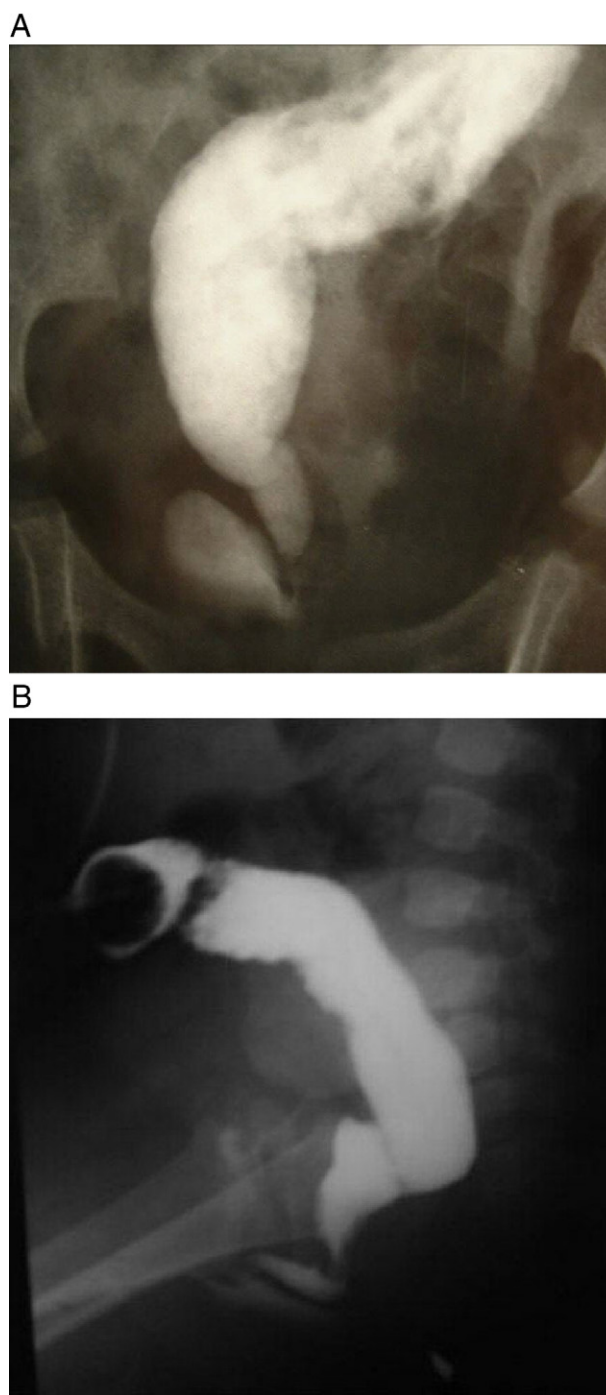


Fig. 2 The distal colostogram in anterior-posterior (A) and lateral view (B) showed the distal colon ending in the middle vagina.

Preoperative bowel preparation was accomplished with simple distal enemas. Posterior sagittal anorectoplasty was performed as originally described by de Vries and Peña [5].

We used 3 ports for the laparoscopic treatment (LT): a 4-mm 30° 20-cm lens was inserted in the umbilicus using the transumbilical approach; one left 3-mm port was inserted at the medial edge of the colostomy and one 5-mm port in the right lower quadrant. A transparietal stitch was used to suspend the uterus to the anterior abdominal wall (Fig. 3). The fistula was dissected and visualized clearly, and sutured with 5/0 absorbable suture and divided in its vaginal end (Fig. 4A, B). The common wall between the vagina and rectum was dissected from above using a delicate 3-mm monopolar cautery tip or blunt dissection avoiding entry into the vagina or rectum. We easily found a narrow fistula in 3 of the 5 patients done laparoscopically. This seemed to be an easier dissection than the usual retrograde distal separation of the rectovaginal septum through the PSARP approach. That was not the case in the other 2 in whom the laparoscopic dissection was slower and more difficult and the rectum required more distal dissection to reach its narrow ending at the site of the fistula. In general, it may be wise to leave a little distal fistula to reinforce the thin posterior vaginal wall in this type of anomaly (rectovaginal fistula). This is different than managing a rectourethral fistula in a male where the risk of a persistent diverticulum is a problem related to the laparoscopic approach. External and laparoscopic muscle stimulators were used to localize the anal site and the pelvic floor muscles. A 1.0-cm vertical incision was made (Fig. 5A), and proximal dissection under laparoscopic vision was achieved. A low-profile Step Veress needle with a radially expanding sheet was placed into the perineal wound and passed through under direct laparoscopic vision (Fig. 5B), and a blunt trocar replaced the needle into the sheet (Fig. 5C). The rectum was grasped and gently guided down while distending its distal descent channel and was sutured to the surrounding muscles to prevent rectal prolapse as done in the open procedure, and an anoplasty

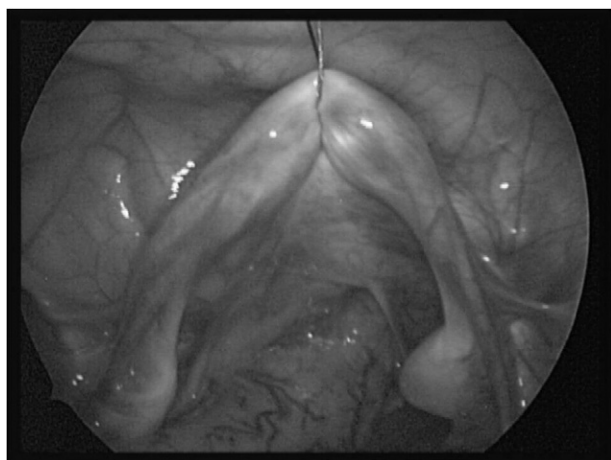


Fig. 3 A transparietal stitch was used to suspend the uterus to the anterior abdominal wall.

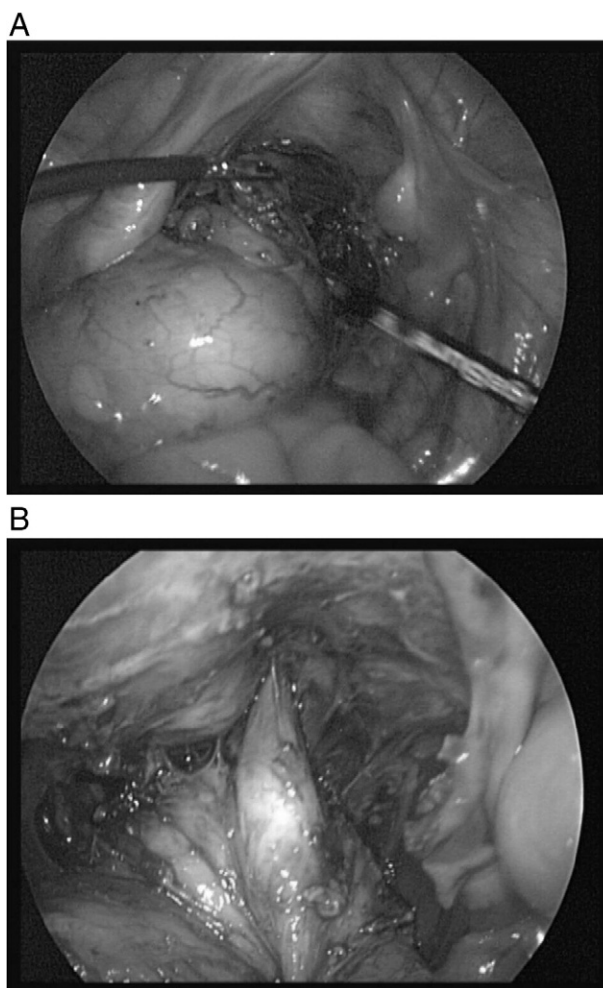


Fig. 4 A and B, Laparoscopic dissection of rectovaginal fistula.

was performed in the usual way using interrupted 5/0 sutures (Fig. 6).

Contrast enema was done in 7 of 8 patients before colostomy closure and showed no evidence of a postoperative rectovaginal fistula. One of the patients had an inverted sigmoid colostomy in the upper right quadrant done in another institution. Although this was recognized before laparoscopic reconstruction, it was kept in place and used as a port for traction of the distal colon. After dissection and transaction of the rectovaginal fistula, the ostomy was taken down; and the rectum was pulled through under laparoscopic visualization. This was the only patient left without a protective colostomy, but she had no large incision in terms of risk of dehiscence.

Bowel control was assessed using the same parameters in all patients: the presence of voluntary bowel movements, fecal soiling, urinary continence, and constipation. *Voluntary bowel movements* were defined as the act of feeling the urge to use the toilet to have a bowel movement and the ability to hold the bowel movement until reaching the bathroom [6]. *Soiling* was defined as the involuntary leaking of small amounts of stool that leads to fecal smearing of the

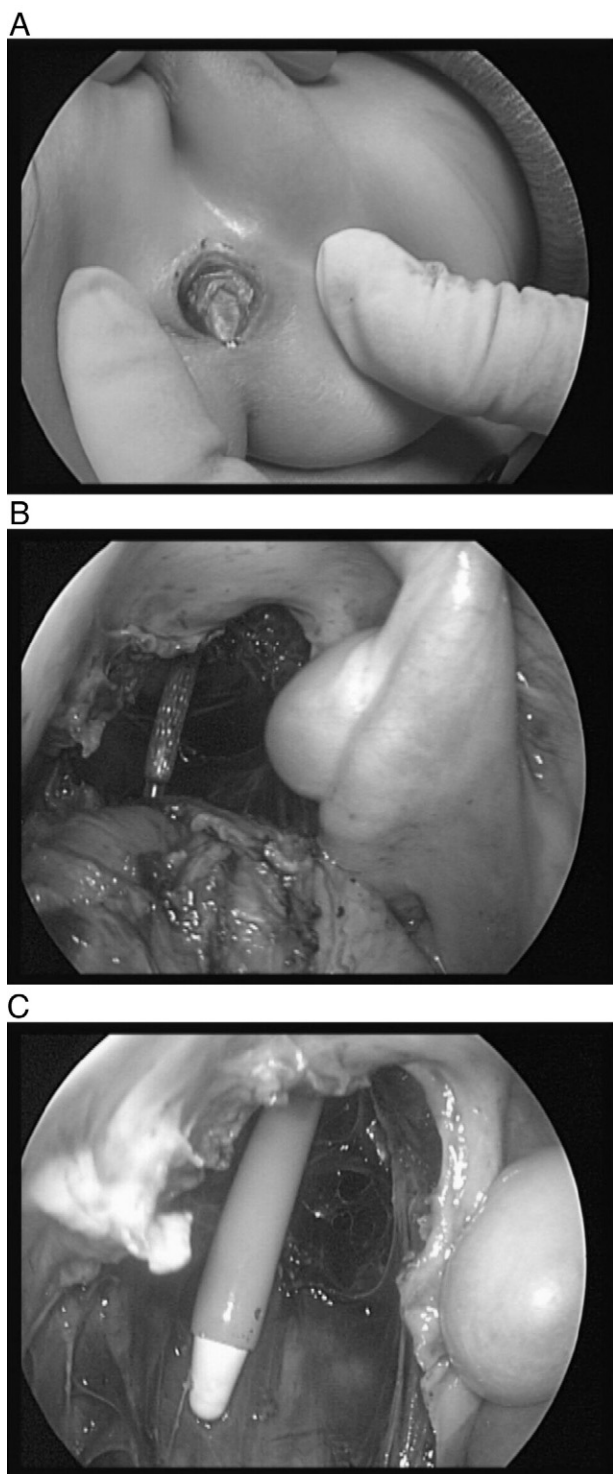


Fig. 5 A vertical perineal incision was made (A), a Step Veress needle with expanding sheet was passed through under laparoscopic vision (B), and a blunt trocar replaced the needle into the sheet (C).

underwear. Constipation was considered the incapacity to empty the rectum spontaneously on a daily basis.

Only patients older than 3 years and 6 months of age and with more than 3 months after colostomy closure underwent investigation for functional status.

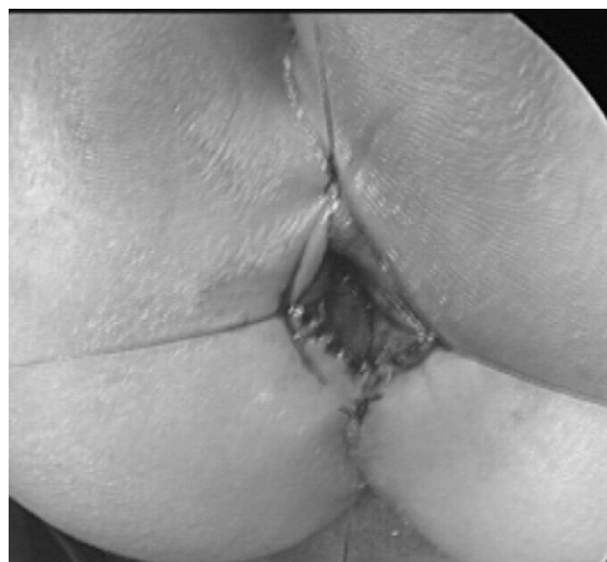


Fig. 6 The rectum was sutured to the surrounding muscles, and anoplasty was done using 5/0 sutures.

We have not assessed postoperative vaginal wall quality with vaginoscopy, only clinical inspection using traction of labia minora under anesthesia at the time of colostomy closure.

2. Results

The mean age at the time of surgery was 21.8 months (range, 12-33 months) and was similar in each group: 22.6 months in group 1 (G1) (PSARP) and 21.4 months in group 2 (G2) (LT).

Associated anomalies were identified in all the patients (100%). Some of these patients had more than 1 associated anomaly. The distribution of these associated defects is shown in Table 1. Six (75%) involved the urinary tract, 2 (25%) involved the spine, and 2 (25%) had a tracheoesophageal fistula.

Sacral ratio less than 0.6 was noted in 2 patients, 1 in each group. The patient in G1 required daily enemas, and the other is still less than 3 years of age.

Seventy-five percent of the procedures were done by the chief resident assisted by one of the attending physician authors. Average operative time was 176.6 minutes for G1 (median, 180; range, 120-230) and 231 minutes for G2 (median, 240; range, 180-285). One patient in G2 required a simultaneous colostomy closure, and the difference was not statistically significant with *P* of .13 (Mann-Whitney) (Graph 1).

Postoperative complications occurred in 2 patients: a slight wound dehiscence in G1 and rectal mucosal prolapse in G2. The mucosal prolapse was minimal and occurred in the patient left without a protective colostomy and may be

Table 1 Associated anomalies found in patients with rectovaginal fistulas

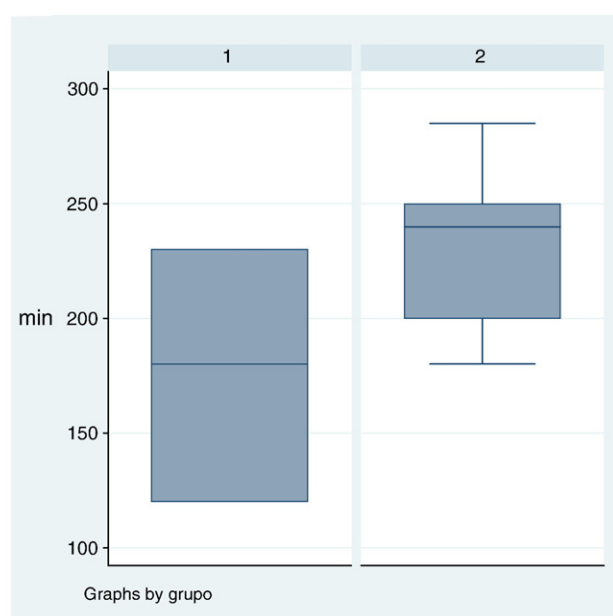
Patients	LT/PSARP	Genitourinary defects	Spinal column defects	Others
1	PSARP	Hydronephrosis,	–	–
2	PSARP	Vesicoureteral reflux	Sacral dysplasia, hemivertebrae	Tracheoesophageal fistula
3	PSARP	Renal agenesis	–	–
4	LT	–	–	Tracheoesophageal fistula
5	LT	Hydronephrosis	–	–
6	LT	Hydronephrosis, megaloureter	–	–
7	LT	–	Syringohydromyelia, tethered cord, medullary lipoma, partial sacral agenesis	–
8	LT	Renal agenesis, vesicoureteral reflux	–	–

Some of these patients had more than one associated anomaly.

related to an excessive exteriorization of the distal rectum. We had no instances of recurrent rectovaginal fistula based on findings during a distal colostogram before ostomy closure and by clinical follow-up and inspection.

Only 3 patients in each group were considered old enough for evaluation of functional results. Mean age was 67 months in 3 patients (G1) and 64 months in 3 patients (G2) for each group. All patients (6) were continent of urine. Only 1 in G1 had a SR less than 0.6. Voluntary bowel movements were present in 1 patient in G1 and 2 in G2. One patient in G1 had severe constipation and grade 2 soiling requiring bowel management program (SR <0.6), and 1 patient in G2 has occasional soiling (Table 2).

Although the numbers of patients are small, to compare results, we thought it was valuable to divide patients according to procedure when reporting postoperative results of a rare anomaly.

**Graph 1** The statistical analysis of time of operation comparing both groups (Mann-Whitney).

3. Discussion

The current standard of surgical care for high ARMs is PSARP. This operation provides excellent exposure of the anatomy and the precise placement of the distal rectum within the muscle complex. Despite this excellent anatomical exposure, many patients need bowel management after PSARP.

In 2000, Georgeson et al [7] introduced a laparoscopically assisted technique for the treatment of anorectal anomalies that has gained interest because of minimal abdominal and perineal wounds. Functional results are not so clear because of the lack of definition of the kind of patients treated when comparing function.

The laparoscopic approach allows an optimal view of the pelvis and helps to achieve a low dissection of the fistula with minimal trauma in patients who require an abdominal approach. We have been using this approach for the treatment of male patients with rectobladder and prostatic fistulas and selected cloacal anomalies with an abdominal rectum combined with perineal, sagittal, or even transvesical approaches in some cloacas. We do not use laparoscopy in instances of perineal, vestibular, or bulbar fistulas. Rectovaginal fistula is a very rare anomaly. The common wall between the vagina and rectum is higher; and sometimes, there is some normal distal vaginal wall. Therefore, we thought the laparoscopic approach may have some advantages and play a role in their treatment and initiated this study. Based on this preliminary experience, we believe that the laparoscopic approach is a valid alternative method to treat patients with rectovaginal fistulas. It is feasible and

Table 2 Functional results

	G1 (n = 3)	G2 (n = 3)
Voluntary bowel movements	33% (1/3)	66% (2/3)
Soiling G1	–	33% (1/3)
Soiling >G1	33% (1/3)	–
Bowel management program	33% (1/3)	–

reproducible with preliminary good functional results when done by experienced pediatric surgeons.

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