

Review began 11/09/2023
Review ended 11/13/2023
Published 11/18/2023

© Copyright 2023
Florou et al. This is an open access article
distributed under the terms of the Creative
Commons Attribution License CC-BY 4.0.,
which permits unrestricted use, distribution,
and reproduction in any medium, provided
the original author and source are credited.

Laparoscopic-Assisted Anorectoplasty for Anorectal Malformation With Recto-Prostatic Urethral Fistula: A Case Report and Review of the Literature

Maria Florou ¹, Chrysostomos Kepertis ², Vassileios Mouravas ², Kleanthis Anastasiadis ², Ioannis Spyridakis ²

1. 2nd Department of Pediatric Surgery, Aristotle University of Thessaloniki, Papageorgiou General Hospital of Thessaloniki, Thessaloniki, GRC 2. Department of Pediatric Surgery, General Hospital Papageorgiou, Thessaloniki, GRC

Corresponding author: Maria Florou, flwrou.mar@gmail.com

Abstract

Congenital recto-urethral fistula is the most common form of anorectal malformation found in boys. The final repair includes the ligation of the fistula and the anorectoplasty, and can be achieved either way: posterior sagittally or laparoscopically. We present a case of a term male infant diagnosed with anorectal malformation and recto-prostatic urethral fistula, that underwent a laparoscopic-assisted posterior sagittal anorectoplasty in our department.

Categories: Pediatrics, Pediatric Surgery, Gastroenterology

Keywords: pediatric surgery, urethral fistula, anorectoplasty, laparoscopic, anorectal malformation

Introduction

Anorectal malformations include a variety of congenital anomalies, affecting boys and girls that involve congenital anomalies of the distal anus and rectum, as well as the urinary and genital tracts. Their incidence is approximately 1:5,000 live births [1]. The traditional classification by Wingspread, still in widespread use, divides these clinical entities into high, intermediate, and low anorectal anomalies, according to the relation of the distal rectum with the levator muscle and the pelvic floor [2]. A more practical classification followed, that describes the anatomic characteristics of the malformations. The recto-urethral fistula is the commonest form of anorectal malformations found in boys and is further divided into recto-prostatic type and recto-bulbular type of fistula [1]. Here we present a case of a laparoscopic-assisted anorectoplasty (LAARP) applied in a boy with high anorectal malformation. The procedure was performed for the first time in our surgical department. The patient recovered smoothly, and the results of this technique are closely observed in the long-term follow-up.

Case Presentation

The patient was a male term infant, admitted to the neonatal intensive care unit of our hospital directly after birth, as an imperforate anus was discovered in the initial assessment. Physical examination after admission ascertained the anal atresia and a rectourethral fistula was suggested by abdominal ultrasonography (Figure 1) [3].

How to cite this article

Florou M, Kepertis C, Mouravas V, et al. (November 18, 2023) Laparoscopic-Assisted Anorectoplasty for Anorectal Malformation With Recto-Prostatic Urethral Fistula: A Case Report and Review of the Literature. Cureus 15(11): e49008. DOI 10.7759/cureus.49008

Proposed Classification of Anorectal Malformations

Male defects

- Perineal fistula
- Rectourethral bulbar fistula
- Rectourethral prostatic fistula
- Rectovesical (bladder neck) fistula
- Imperforate anus without fistula
- Rectal atresia and stenosis

Female defects

- Perineal fistula
- Vestibular fistula
- Imperforate anus with no fistula
- Rectal atresia and stenosis
- Cloaca

FIGURE 1: Current classification of anorectal malformations

Suggested classification by Dr. Peña.

The genitalia were normal and there were not recognized no other congenital anomalies. On the second day of life, a divided colostomy of the sigmoid colon was applied in the left iliac fossa, in order to relieve the infant from the excessive abdominal distention. Postoperatively, the infant recovered well, gained weight as expected, and was discharged home until the scheduled anorectoplasty when the baby was one year old. A recto-prostatic urethral fistula was confirmed by a post-operative distal colostogram and a voiding urethrography.

The diagnosis of high anal atresia was established, and we decided to perform laparoscopic-assisted anorectoplasty. The placement of the anus was marked on the perineum pre-operatively after the application of transcutaneous electrostimulation (Figure 2).



FIGURE 2: The placement of the anus was marked on the perineum pre-operatively.

Cystoscopy was performed first, and the diagnosis of a recto-urethral fistula was confirmed by detecting the fistula in the posterior wall of the prostatic urethra (Figure 3).

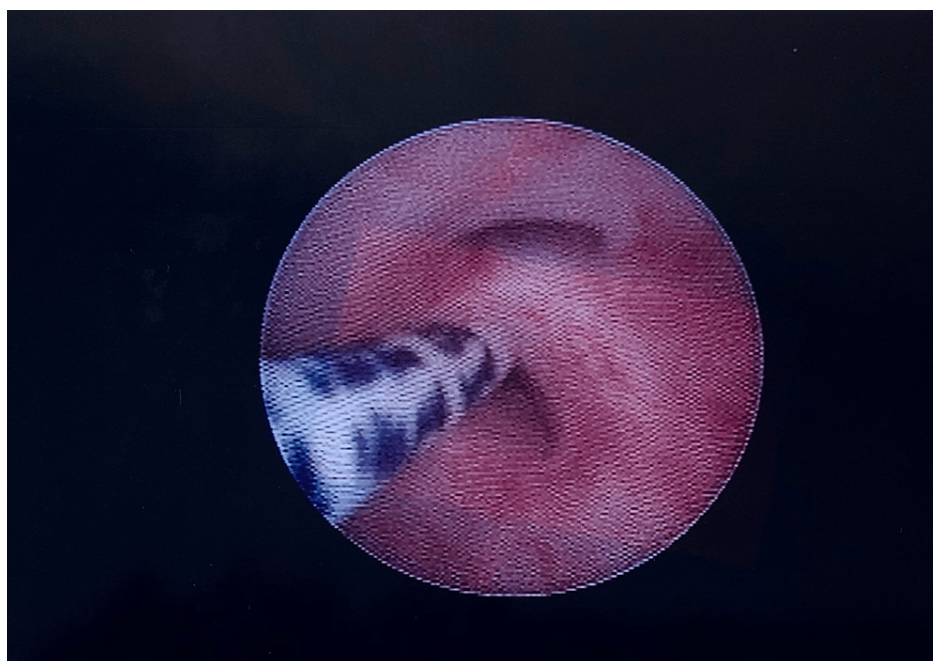


FIGURE 3: Cystoscopy detecting the recto-urethral fistula in the posterior wall of the prostatic urethra.

The applied technique involved inserting a 10-mm trocar through the umbilicus for the 30° laparoscope with

the Hasson method, as well as a 3-mm trocar at the left iliac fossa, a 5-mm port and a 3-mm port at the right iliac fossa for the instruments. Rectal dissection began at the peritoneal reflection and continued on a rectal plane until the rectal blind pouch was pulled up to expose the fistula. The blunt dissection was made close to the rectal wall to minimize potential injury to anatomical structures, such as the ureters, the vas deferens, nerves, and vessels. The fistula to the urethra was identified, then was closed with a Polydioxanone (PDS) synthetic, absorbable, monofilament suture, size 5-0, and was sharply dissected to the most distal point. Transcutaneous electrostimulation was applied on the perineum and the area of maximal contraction was marked with silk sutures for the placement of the anus (Figure 3). Then a 10-mm vertical midline incision was made in the middle of this marked area and a tunnel through the perineal center of the sphincter complex was created by using artery forceps and a Veress needle. The anorectoplasty followed as suggested by Georgeson et al. [4]. More specifically, the tunnel was then dilated under laparoscopic vision using trocars gradually to 5 mm and then to 12 mm, just posterior to the urethra. The distal rectal pouch was pulled onto the perineum with Babcock forceps while the trocar was removed. The anastomosis between the rectum and the marked neoanus was completed with an interrupted 5-0 polydioxanone (PDS) suture. Post-operatively the boy received intravenous analgesics for four days and wide-broad spectrum antibiotics (cephalosporin second generation, metronidazole, and amikacin) for seven days. He recovered well and was discharged home. The closure of the sigmoidostomy followed four months later uneventfully. The patient presented good functional outcomes and fine cosmetic results, in the immediate post-operative period. The child gained weight and thrived as expected. There were no major complications, apart from a mucosal prolapse and a small posterior urethral diverticulum. The mucosal prolapse was found through clinical examination, two years after the anorectoplasty, and the patient was scheduled for a prompt fixation of the rectum. The urethral diverticulum was discovered in a planned urethrography, three years after the LAARP. Since then, the boy has not mentioned any related clinical symptoms, as urine incontinence or urine infection, the urine laboratory tests are normal, and the diverticulum remains the same size in the follow-up examinations: pelvic magnetic resonance imaging and voiding cysto-urethrography. The patient presents regularly at the surgical department in the arranged appointments and no problems are reported in the long-term follow-up (Figure 4).

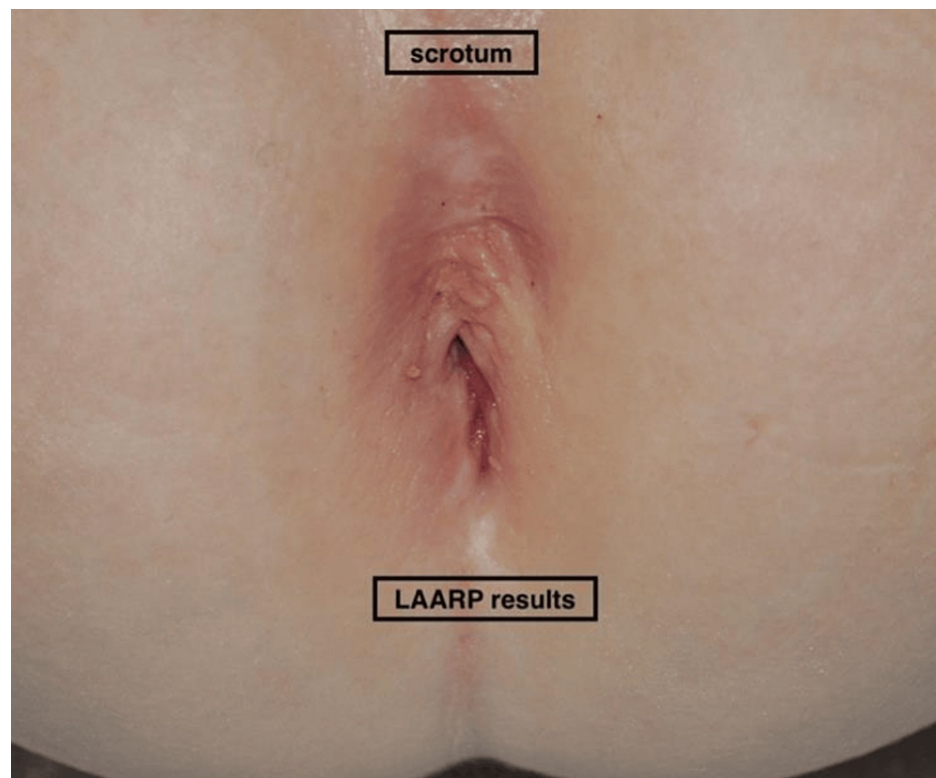


FIGURE 4: Cosmetic results of anorectoplasty seven years after the LAARP.

It has been seven years since the LAARP procedure so far, the boy has good bowel control and mentions completely voluntary bowel movements, without any incidence of fecal incontinence, soiling, or serious constipation.

Discussion

This was the first case of anorectal malformation treated with a laparoscopic approach in our department.

The open surgical correction has been known to be the most effective management, but recently new approaches have been proposed. More specifically, two milestones can be recognized in the surgical management of anorectal malformations. The first was in 1980 with the introduction of the posterior sagittal approach by Alberto Peña. The posterior sagittal anorectoplasty (PSARP) enabled surgeons to fix the congenital defects under direct vision of the rectum, the genitourinary tract, and the muscle complex [3,5]. Since then, it has been considered the predominant technique in the management of anorectal malformations with good functional outcomes and rare severe complications [5]. The second milestone in the surgical repair of anorectal malformations was the introduction of the laparoscopic-assisted approach in 1998 by Willital [6]. The first LAARP for the repair of imperforate anus was applied in 2000 by Georgeson et al. [4]. The procedure combines minimal perineal dissection, preservation of the distal rectum, and precise placement of the rectum within the levator ani and external anal sphincter muscle complex. Laparoscopic surgery has been suggested to be also a safe approach for congenital anorectal anomalies with urinary fistula. LAARP technique has gained popularity since its introduction in 2000 and many studies followed that compared this technique to the gold standard PSARP method [3,4]. Regarding the operative time of each procedure, there are studies that report the longer time of the LAARP, while others mention the longer surgical time of the PSARP [7,8]. The literature data is inconclusive as the operative time depends on the complexity of the ARM, the patient comorbidities, and the skills of the different surgeons [9]. The cosmetic results, the wound infection incidence, the requirement of postoperative analgesia, and the consequent surgical stress, are in favor of the LAARP technique. The development of small-size instruments for the laparoscopic approach and the small 3-5 mm incisions are in favor of the LAARP technique, as on the contrary the extensive perineal dissection of the PSARP predisposes the patient to increased risk of wound infection and post-operative pain and stress [10]. The literature data on the functional clinical results, including the frequency of bowel movements, constipation, and soiling, either report no differences between the two procedures [11,12] or estimate better results of the LAARP approach [10,13]. On the other hand, the occurrence of rectal mucosal prolapse has been reported higher in LAARP treatment [7,14], as well as the incidence of posterior urethral diverticulum is more commonly seen in the follow-up of the laparoscopic management [15,16]. These two post-operative clinical entities are not considered major complications and were also noticed in the present case report. Last but not least the long-term follow-up of the two techniques on the voluntary bowel movements and the soiling presents similar rates for the two techniques and improved results for the constipation rates after the LAARP [14]. In overall, LAARP compared to the gold standard PSARP is less invasive and presents short-term and long-term outcomes similar if no better than PSARP [9,14].

Conclusions

In conclusion, we performed laparoscopic-assisted anorectoplasty after a temporary divided colostomy, for a male imperforate anus with recto-bulbar urethral fistula, without any major problems. The treatment of children affected by anorectal malformations is still considered a challenge for the pediatric surgeon. When compared to the gold standard PSARP technique, both LAARP and PSARP can successfully treat anorectal malformations. More long-term, large studies with high-quality evidence are needed in the future to confirm the current literature data.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Maria Florou, Chrysostomos Kepertis, Vassileios Mouravas, Kleanthis Anastasiadis, Ioannis Spyridakis

Acquisition, analysis, or interpretation of data: Maria Florou, Chrysostomos Kepertis, Vassileios Mouravas, Kleanthis Anastasiadis, Ioannis Spyridakis

Drafting of the manuscript: Maria Florou, Chrysostomos Kepertis, Vassileios Mouravas, Kleanthis Anastasiadis, Ioannis Spyridakis

Critical review of the manuscript for important intellectual content: Maria Florou, Chrysostomos Kepertis, Vassileios Mouravas, Kleanthis Anastasiadis, Ioannis Spyridakis

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Levitt MA, Peña A: Anorectal malformations. *Orphanet J Rare Dis*. 2007, 2:33. [10.1186/1750-1172-2-33](https://doi.org/10.1186/1750-1172-2-33)
2. Samuk I, Bischoff A, Hall J, Levitt M, Peña A: Anorectal malformation with rectobladder neck fistula: a distinct and challenging malformation. *J Pediatr Surg*. 2016, 51:1592-6. [10.1016/j.jpedsurg.2016.06.001](https://doi.org/10.1016/j.jpedsurg.2016.06.001)
3. Peña A, Hong A: Advances in the management of anorectal malformations. *Am J Surg*. 2000, 180:370-6. [10.1016/s0002-9610\(00\)00491-8](https://doi.org/10.1016/s0002-9610(00)00491-8)
4. deVries PA, Peña A: Posterior sagittal anorectoplasty. *J Pediatr Surg*. 1982, 17:638-43. [10.1016/s0022-3468\(82\)80126-7](https://doi.org/10.1016/s0022-3468(82)80126-7)
5. Georgeson KE, Inge TH, Albanese CT: Laparoscopically assisted anorectal pull-through for high imperforate anus--a new technique. *J Pediatr Surg*. 2000, 35:927-30; discussion 930-1. [10.1053/jpsu.2000.6925](https://doi.org/10.1053/jpsu.2000.6925)
6. Willital GH: Endosurgical Intrapuborectal reconstruction of high anorectal anomalies. *Pediatr Endosurg Innovat Techn*. 1998, 2:5-11. [10.1089/PEI.1998.2.5](https://doi.org/10.1089/PEI.1998.2.5)
7. Yazaki Y, Koga H, Ochi T, Okawada M, Doi T, Lane GJ, Yamataka A: Surgical management of recto-prostatic and recto-bulbar anorectal malformations. *Pediatr Surg Int*. 2016, 32:939-44. [10.1007/s00383-016-3948-4](https://doi.org/10.1007/s00383-016-3948-4)
8. Tong QS, Tang ST, Pu JR, et al.: Laparoscopically assisted anorectal pull-through for high imperforate anus in infants: intermediate results. *J Pediatr Surg*. 2011, 46:1578-86. [10.1016/j.jpedsurg.2011.04.059](https://doi.org/10.1016/j.jpedsurg.2011.04.059)
9. Han Y, Xia Z, Guo S, Yu X, Li Z: Laparoscopically assisted anorectal pull-through versus posterior sagittal anorectoplasty for high and intermediate anorectal malformations: a systematic review and meta-analysis. *PLoS One*. 2017, 12:e0170421. [10.1371/journal.pone.0170421](https://doi.org/10.1371/journal.pone.0170421)
10. Koga H, Ochi T, Okawada M, Doi T, Lane GJ, Yamataka A: Comparison of outcomes between laparoscopy-assisted and posterior sagittal anorectoplasties for male imperforate anus with recto-bulbar fistula. *J Pediatr Surg*. 2014, 49:1815-7. [10.1016/j.jpedsurg.2014.09.028](https://doi.org/10.1016/j.jpedsurg.2014.09.028)
11. Koga H, Miyano G, Takahashi T, et al.: Comparison of anorectal angle and continence after Georgeson and Peña procedures for high/intermediate imperforate anus. *J Pediatr Surg*. 2010, 45:2394-7. [10.1016/j.jpedsurg.2010.08.041](https://doi.org/10.1016/j.jpedsurg.2010.08.041)
12. De Vos C, Arnold M, Sidler D, Moore SW: A comparison of laparoscopic-assisted (LAARP) and posterior sagittal (PSARP) anorectoplasty in the outcome of intermediate and high anorectal malformations. *S Afr J Surg*. 2011, 49:39-43.
13. Yang J, Zhang W, Feng J, et al.: Comparison of clinical outcomes and anorectal manometry in patients with congenital anorectal malformations treated with posterior sagittal anorectoplasty and laparoscopically assisted anorectal pull through. *J Pediatr Surg*. 2009, 44:2380-3. [10.1016/j.jpedsurg.2009.07.064](https://doi.org/10.1016/j.jpedsurg.2009.07.064)
14. Ming AX, Li L, Diao M, Wang HB, Liu Y, Ye M, Cheng W: Long term outcomes of laparoscopic-assisted anorectoplasty: a comparison study with posterior sagittal anorectoplasty. *J Pediatr Surg*. 2014, 49:560-3. [10.1016/j.jpedsurg.2013.11.060](https://doi.org/10.1016/j.jpedsurg.2013.11.060)
15. Bischoff A, Levitt MA, Peña A: Laparoscopy and its use in the repair of anorectal malformations. *J Pediatr Surg*. 2011, 46:1609-17. [10.1016/j.jpedsurg.2011.03.068](https://doi.org/10.1016/j.jpedsurg.2011.03.068)
16. Alam S, Lawal TA, Peña A, Sheldon C, Levitt MA: Acquired posterior urethral diverticulum following surgery for anorectal malformations. *J Pediatr Surg*. 2011, 46:1231-5. [10.1016/j.jpedsurg.2011.03.061](https://doi.org/10.1016/j.jpedsurg.2011.03.061)