Anorectal Anomalies in Adults-Laparoscopic Management and Review of Literature

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Abstract Anorectal malformations (ARMs) are one of the most common congenital anomalies dealt by surgeons. The reported incidence of ARMs range between 1:3,300 and 1:5,000 live births. These defects are invariably detected and treated in infancy or early childhood. There is a group of patients among these who have fistulous external opening from the rectum. These may not present in child hood and may continue to live with fecal incontinence till adult hood. One of such anomalies is rectovaginal fistulas which comprises of only 4% of all anomalies. Delayed management in such cases increases surgical and functional complications. Traditionally high and intermediate anorectal anomalies are treated by posterior sagittal anorectoplasty (PSARP). This involves cutting of sphincter muscles in the midline and then placement of rectum in the sphincter complex. The continence results of this operation are less than ideal. Laparoscopically assisted anorectal pull-through (LAARP) has potential advantage of precise placement of the rectum inside the sphincter complex without dividing and weakening the muscles, diminished soft tissue scarring around the rectum leading to improved rectal compliance. Three adult female patients with ARMs were managed through LAARP procedure. It involves dissection around rectum, identification and ligation of fistula tract, creation of neoanus and pull through of rectum into neoanus. Results-Continence was good in all our patients which they regained after 3 to 4 days

of surgery. On follow up which ranged from 6 months to 2 years all were passing well formed stools 1–2 times a day and have symmetric anal contraction with strong squeeze on digital rectal examination. Conclusion-LAARP offers an excellent option to the patients of ARM over conventional posterior sagittal anorectal approach because of its theoretical advantages of early recovery and better continence. Long term followup is needed to substantiate these results.

Keywords Anorectal malformations · ARMs · Congenital anomalies · Laparoscopically assisted anorectal pull-through · LAARP

Introduction

Anorectal malformations (ARMs) are one of the most common congenital anomalies dealt by surgeons. The reported incidence of anorectal anomalies ranges between 1 in 3,300 and 1 in 5,000 live births. These defects are invariably detected and treated in infancy or early childhood. There is a group of patients among these who have fistulous external opening from the rectum. These may not present in childhood and may continue to live with fecal incontinence till adulthood. One of such anomalies is rectovaginal fistulas which comprise only 4% of all anomalies. Delayed management in such cases increases surgical and functional complications. There is little in medical literature about this entity in the postadolescent age group and their functional outcome after repair.

Ever since laparoscopic-assisted anorectal pull-through (LAARP) procedure for repair of high imperforate anus has been described, the role of laparoscopy in management of ARMs is expanding [1]. Most of the literature available

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on this is for the high ARM in the preadolescent age group [1, 2].

A few case reports of such anomalies in adults were managed by posterior sagittal anorectoplasty (PSARP) [3], but the role of laparoscopic treatment in such patients has not been explored.

Potential advantage of LAARP over the conventional PSARP, popularized by de Vries and Pena [4], includes precise placement of the rectum inside the sphincter complex without dividing and weakening the muscles, diminished soft tissue scarring around the rectum leading to improved rectal compliance, and the potential ability to perform the operation primarily avoiding the morbidity of a colostomy. This is even more applicable in adults.

We describe here a case series of three adult females with high anorectal anomalies managed laparoscopically.

Materials and Methods

We operated on three patients by LAARP over a 2-year period from 2008 to 2010. All three were females. The age ranged from 21 to 30 years (Table 1). Follow-up period ranged from 6 months to 2 years.

Two of the patients had absent anal canals and were passing stools through vagina and one patient through ectopic opening in the introitus. Examination revealed rectovaginal fistula of lower third in two and rectovestibular fistula in the third patient. One patient also revealed additional anomaly of hypoplastic uterus and absent right ovary.

All patients were preoperatively evaluated with ECHO, USG abdomen, micturating cystourethrogram and perineal scans to assess the cardiac status, genitourinary system, type of fistula and status of external sphincter.

We performed LAARP as single-stage definitive procedure. All the patients regained continence almost immediately after the surgery. One patient developed anal stenosis which was managed by repeated dilatations.

Procedure

Surgery started by placing a nasogastric tube and a urinary catheter. The patient was placed in lithotomy position with 15° head-down tilt.

Laparoscopy was performed as described by Georgeson et al. [1].

Pneumoperitoneum was created with CO₂ using a Veress needle through the umbilicus and pressure was maintained at 12–14 mmHg. Surgery was carried out using five ports—one 10 mm umbilical port for 30° telescope, one 10 mm, and three 5 mm ports (Fig. 1).

Complete examination of the abdomen was performed to see associated anomalies (Fig. 2).

Laparoscopic rectal dissection was started at the level of peritoneal reflection using ultra-scissors. The distal rectal peritoneal attachment was released and dissection was continued anteriorly and laterally on the rectal wall, taking care not to injure ureters and genital structures. Anterior dissection was stopped once the cervix uteri were visualized. As the rectum tapered distally, the fistula to the vagina was identified and divided close to the distal insertion after its ligation with 3-0 Vicryl. Then, the bowel was retracted cephalad out of the pelvis. This dissection allowed examination of the underlying levator muscles in the pelvic floor.

Externally, the anal area of the perineum was mapped. The anterior, lateral and posterior limits of this anal area were marked with sutures and a 1.5 cm vertical midline incision was made in the perineum at the site of the proposed anal orifice.

The intrasphincteric plane was dissected bluntly from below to the level of the levator sling.

A radially expanding trocar over a Veress needle was passed through the intrasphincteric plane and advanced between the two bellies of the pubococcygeus muscle in the midline using laparoscopic guidance (Fig. 3).

If the needle was inaccurately passed to either side of the midline, it was readily apparent because of laparoscopic surveillance and easily corrected before radial dilation of the tract.

The tract was then dilated radially to 2 cm and the divided rectal fistula was grasped and pulled onto the perineum.

No attempt was made to suture rectum to the levator musculature. The anastomosis between rectum and neo-anus was completed with interrupted 3-0 polyglycolic acid suture.

Postoperatively nasogastric tube decompression was maintained for 12 h.

Table 1 Patient characteristics

Patient no.	Age at LAARP	Sex	Type of fistula	Associated anomaly	Complications
1	22 years	F	Rectovaginal	—	Anal stenosis
2	21 years	F	Rectovestibular	—	
3	30 years	F	Rectovaginal	Hypoplastic uterus with absent right ovary

Fig. 1 Port positions

Oral feeds and ambulation of the patients were started on the first postoperative day.

Results

All the patients withstood surgery well. There were no problems in gaining enough length for pulled-through rectum. Continence was good in all our patients which they regained after 3–4 days of surgery. On follow-up which ranged from 6 months to 2 years, all our patients were passing well-formed stools one to two times a day and had symmetric anal contraction with strong squeeze on digital rectal examination. However, these patients need further follow-up on a long-term basis.

One patient developed anal stenosis postoperatively which was managed with regular dilations.

Discussion

Malformations of the anorectum are relatively common congenital anomalies. The cause of ARM is unknown. The

Fig. 2 Laparoscopic view showing absent right adenexa

Fig. 3 Veruss needle coming out through centre of levator complex

vast majority of experience in the management of these problems has been obtained at specialized children's hospitals that deal with disorders of the newborn. Some families have a genetic predisposition with ARMs. Management of ARMs varies according to the level of the defect. Also, majority of the malformations are detected and treated in infancy.

Delayed presentation is defined as a patient who presented after 7 days of birth except for females where low-type ARM presenting after 6 months is considered as delayed. Delayed management increases surgical and functional complications of the patient [5].

ARMs are generally classified using Wingspread [6] classification (Table 2) which is used to address commonly observed anorectal anomalies.

Rectovaginal fistulas are a rare congenital ARM in females, constituting only 3–4% of all ARMs.

Although rectovaginal fistulas are classified as high or intermediate type of anomaly, it does not present as surgical emergency as other high ARMs. Patients with this anomaly

Table 2 Wingspread classification of ARM's

Level	Male	Female
High	Anorectal agenesis	Anorectal agenesis
	With rectoprostatic urethral fistula	With rectovaginal fistula
	Without fistula	Without fistula
	Rectal atresia	Rectal atresia
Intermediate	Rectobulbar urethral fistula	Rectovestibular fistula
		Rectovaginal fistula
	Anal agenesis without a fistula	Anal agenesis without a fistula
Low	Anocutaneous fistula	Anovestibular fistula
	Anal stenosis	Anocutaneous fistula
		Anal stenosis
		Cloacal malformations
	Rare malformations	Rare malformations

can continue to pass stools through vagina and can reach adult age group with only complaint of incontinence. There are very few case reports in literature of presentation of such anomalies in the postadolescent age group [3, 7]. Ideal treatment and long-term results in such cases are unknown.

PSARP has become standard surgical management of high and intermediate ARMs. It involves dissection of the striated muscle complex, levators, and the rectum for the exact placement of the distal rectum within the muscle complex.

The continence result of this operation is less than ideal. Short-term functional results after the PSARP and its modifications have been encouraging with good results obtained in 70% of patients [8].

Long-term results for patients with high imperforate anus indicate that an excellent to good result will be obtained in approximately 50% of patients, whereas the remaining half will have a fair or poor (incontinent) outcome.

In an attempt to improve on these results and because posterior sagittal anorectal approach causes significant perineal and pelvic scarring leading to decrease compliance of the rectum, other techniques have been developed. One of these is laparoscopic-assisted anorectal pull-through (LAARP).

The technique of LAARP bears some similarities to abdominoperineal pull-through procedure previously practiced. Over the years it has been established by Kiesewetter and Nixon [9] that the placement of rectum in the levator sling mechanism will achieve maximum benefit.

Several abdominoperineal and later the sacroabdominoperineal approaches for treatment of high ARM were developed. These surgeons also believed that surgical dissection through the sphincter muscles could be detrimental for future continence. Clinical results suffered most because adequate visualization and identification of the levators and external sphincter complex was not possible in the above techniques.

This problem was remedied by the realization of de Vries and Pena [4], where adequate visualization of the sphincteric mechanism could be achieved through posterior sagittal approach by division of the external sphincter and levators in the midline to expose the bowel.

Unfortunately, PSARP also divides the constricting mechanism of the muscle complex while exposing the muscles responsible for the continence.

The greatest benefit of LAARP derives from the fact that it allows the surgeon to treat a high lesion essentially like a low lesion.

There is no need to divide the muscle complex from below because the pubococcygeus can be visualized and center of the two bellies is easily targeted from above [10] with the help of laparoscope and laparoscopic muscle stimulator. Immediately after the procedure, strong and symmetric contraction of the sphincter around the neo-anus provides reassurance that

the bowel has accurately been brought down through the sphincters.

This approach also conserves the bowel, and by securing the fistula to the perineum, preserves the distal bowel wall, which may contain muscle fibers recruitable for internal sphincter function [11].

ARM presenting in the postadolescent age group is extremely rare. In most cases, the condition either goes unrecognized or is incompletely treated in childhood. Very little has been reported in the medical literature about it. In his review Katz et al. [12] describes 29 patients with ARM manifesting in patients older than 15 years. In his review, the oldest patient presented at age of 68 years. Maximum number of these patients had rectovaginal fistula [10] as ARM. Surgery was performed in 19 patients and good functional results were attained in 11 patients.

LAARP in management of high and intermediate ARMs in adults gives patients theoretical advantage of early recovery as it leaves small abdominal wounds and better continence because of accurate placement of the bowel through the anatomical midline and levator sling without cutting through the sphincter. Long-term follow-up is essential for evaluation of final results.

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