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Laparoscopic dissection and division of distal fistula in boys with rectourethral fistula



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ABSTRACT

Background: Congenital rectourethral fistula (RUF) is the most common form of anorectal malformations found in boys. The aim of this study is to review our experience with dissection and division of distal fistula using laparoscopic surgery in the management of RUF, especially rectourethral bulbar fistula.

Methods: One hundred and two consecutive boys with congenital RUF who underwent conventional or single-incision laparoscopic surgery between July 2008 and June 2015 were enrolled in the study. The dissection of the distal fistula was performed along submucosal layer to a level 0.5 cm proximal to the urethra. Rectal mucosa of the fistula was dissected to the distal most point and completely transected flush with the posterior urethra. The residual muscular cuff was ligated with Hem-o-Lock clip or 5-0 PDS suture. Voiding cystourethrography and pelvic magnetic resonance imaging were performed at 3 mo, 6 mo, and 1 y postoperatively.

Results: All patients successfully underwent laparoscopic surgery without conversion. The mean age at the time of operation was 4.3 ± 2.9 mo. The operative times for the rectoprostatic fistula and rectobulbar fistula were similar (118.2 versus 119.4 min, $P = 0.082$). There was no significant difference in average operative time between conventional laparoscopic surgery group and single-incision laparoscopic surgery group (118.8 versus 119.1 min, $P = 0.281$). There was no injury to the urethra or vas deferens. The urethral catheter was removed on postoperative day 10. All patients were followed up. The median follow-up period was 3.3 ± 1.8 y. No recurrent fistula or urethral diverticulum was detected on voiding cystourethrography and pelvic MRI at 1 y.

Conclusions: Submucosal dissection and division of distal fistula using a laparoscopic approach is safe, feasible, and effective for congenital RUF, especially bulbar fistula, in boys.

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Introduction

Congenital rectourethral fistula (RUF) is the most common form of anorectal malformations found in boys.¹ RUF is often categorized into rectobulbar and rectoprostatic fistula.² Although various surgical procedures for congenital RUF have been described, there has been controversy about the most appropriate procedure.^{3,4} Laparoscopic surgery has been performed in the treatment of rectoprostatic fistula for several years.⁵ However, the surgical technique is still not recommended for the rectobulbar fistula in the literature.⁶ The procedure has its difficulties including dissection and ligation of the fistula, the risk of posterior urethral diverticulum (UD) or recurrence of fistula, and uncertain long-term outcomes of the technique.⁷⁻⁹ Resolving the aforementioned issues requires a study with a large number of patients and long-term follow-up assessment to evaluate the role of the approach. The aim of this study is to review our experience with dissection and division of distal fistula using laparoscopic surgery in the management of RUF, especially rectobulbar fistula.

Materials and methods

We reviewed the outcomes of laparoscopic management of rectourethral fistula conducted in our center over the previous 7 y. The operations were performed by one team of surgeons. All patients were regularly followed up by a resident doctor. Ultrasonography of the abdomen to evaluate the urinary tract was routinely performed. Voiding cystourethrography (VCUG) and pelvic MRI were performed at 3 mo, 6 mo, and 1 y post-operatively. Patient data were collected and analyzed using SPSS 17.0 software (SPSS, Chicago, IL).

Patients

One hundred and two consecutive boys with congenital rectourethral fistula underwent conventional laparoscopic surgery or single-incision laparoscopic surgery (SILS) between July 2008 and June 2015. Seventeen boys underwent single-stage repair during the neonatal period (Table 1). The distal colostogram and VCUG were performed preoperatively to identify the anatomy (Figs. 1A and 2A). All patients underwent chest x-ray, spine x-ray, abdominal ultrasonography, and echocardiography preoperatively. Those patients who had imperforate anus without rectourethral fistula or with severe spinal deformity were excluded from the study. Ethics approval from the Ethics Committee of Capital Institute of Pediatrics was obtained. Written informed consents were obtained from the parents of the anorectal malformation patients before the surgery.

Operative technique

The patient was placed in Trendelenburg position. CO₂ pressure was maintained between 8-12 mmHg. The bladder was emptied by a urinary catheter. From July 2008 to April 2011, the conventional laparoscopic approach was carried out using

Table 1 – Clinical patient data.

Variables	Frequency	Range/percentage
Mean age (mo)	4.34 ± 2.95	0.1-21.0
Type of fistula		
Rectoprostatic fistula	33	32.4% (33/102)
Rectobulbar fistula	69	67.6% (69/102)
Type of operation		
Conventional laparoscopic surgery	34	33.3% (34/102)
Single-incision laparoscopic surgery	68	66.7% (68/102)
Mean diameter of fistula (centimeter)	0.34 ± 0.09	0.20-0.60
Length of fistula (centimeter)		
≤ 0.5 cm	65	63.7% (65/102)
> 0.5 cm	37	26.3% (37/102)
Closure of fistula		
5-0 PDS sutures	72	70.6% (72/102)
Hem-o-lock	30	29.4% (42/121)
Hospital stay (days)	7.59 ± 1.08	7.0-12.0
Complication		
Recurrence of fistula	0	0
Wound infection	0	0
Urethral diverticulum	0	0
Mean follow-up time (y)	3.34 ± 1.81	1.2-8.0

three trocars. The technique involves inserting a 5-mm trocar through the umbilicus for the 30° laparoscope (26046BA, Karl Storz GmbH & Co. KG, Tuttlingen, Germany), a 3-mm trocar at the left iliac fossa, and a 3-mm port at the right iliac fossa for the instruments. Between May 2011 and June 2015, patients underwent SILS. A 2-cm vertical umbilical incision was made and stretched horizontally. Three trocars were placed at a horizontal line through this same incision. The 30° laparoscope was inserted through the 5-mm middle port, whereas a 3-mm instrument port was inserted on each side.

Rectal dissection begun at the peritoneal reflection. A “window” through the rectal mesentery was created. A stay suture was placed through the abdominal wall to help retract the bladder out of the way and to maintain the optimal tension for the dissection along the plane between posterior urethra and rectal pouch. The rectal blind pouch was pulled up to expose the fistula. The dissection of distal fistula was performed along submucosal layer to a level 0.5-cm proximal to the urethra (Fig. 3). The mucosa was dissected to the distal most point and completely transected flush with the posterior urethra. The 0.5-cm remnant muscular cuff of the fistula was ligated with Hem-o-Lock clip or 5-0 PDS suture. For those patients with long fistula (>0.5-cm length), the stump of muscular cuff was ligated by Hem-o-Lock clip (Fig. 4). For those cases with short fistula (≤0.5-cm length) or fistula located in deeper pelvis, the stump of muscular cuff was sutured by 5-0 PDS (Fig. 5). Then, a tunnel through the center of the sphincter complex was created using artery forceps

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