

Comparison of open and pneumovesical approaches for Politano-Leadbetter ureteric reimplantation: A single-center long-term follow-up study

Bum Sik Tae, Jung Wan Yoo, Jae Young Park, Jae Hyun Bae

Department of Urology, Korea University Ansan Hospital, Korea University College of Medicine, Ansan, Korea

Introduction

Open ureteral reimplantation with a submucosal tunnel has long been the gold standard surgical treatment. However, minimally invasive surgical correction has been recently developed for VUR management.

Of these, the transvesicoscopic cross-trigonal ureteral reimplantation (Cohen) technique with the bladder filled with CO₂ was first introduced by Yeung et al.

The Politano-Leadbetter technique has the theoretical advantages of a long tunnel and retrograde catheterization through the normal ureteral orifice

We previously presented our initial experience with the transvesical laparoscopic technique for Politano-Leadbetter ureteric reimplantation using pneumovesicum

Here, we report our experience with the current technique for the treatment of VUR and compare our results with those from the traditional open approach.

Methodology

This retrospective study included all pediatric patients who underwent ureteric reimplantation between January 2012 and July 2017 at Korea University Ansan Hospital

From the medical records, data of age, sex, VUR grade, intraoperative parameters, and postoperative outcomes were reviewed and analyzed. On the basis of our experience, patients aged >2 years with a bladder capacity >100-150 mL were considered suitable candidates for the pneumovesical approach

Perioperative evaluation for VUR, renal scarring, or hydronephrosis were conducted using ultrasonography, VCUG, and dimercaptosuccinic acid (DMSA) renal scanning.

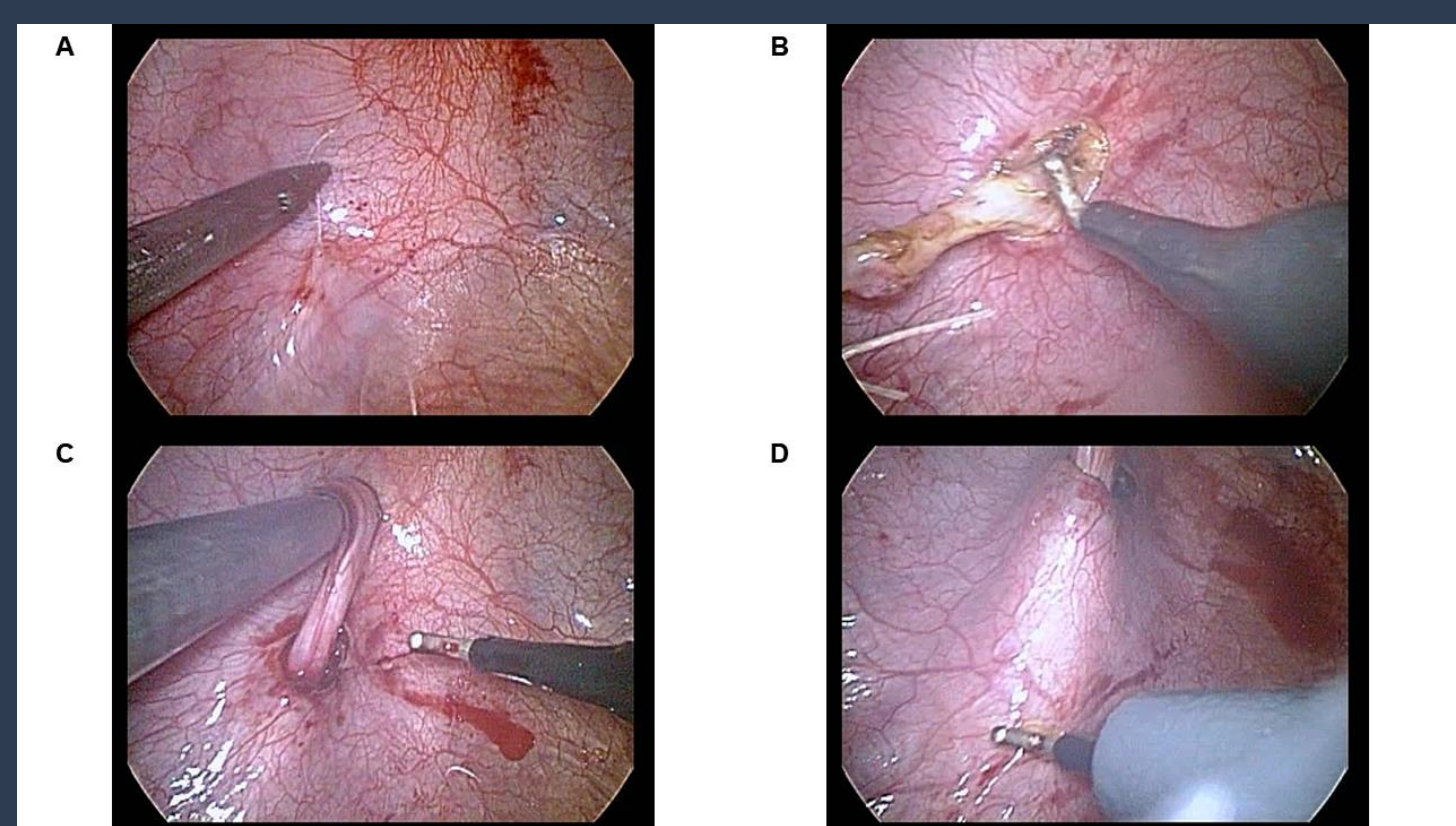
Follow-up ultrasonography was performed to check for postoperative obstruction at 5 days and 14 days postoperatively. VCUG was performed about 3 months after surgery.

Surgical procedure

After the bladder was filled with normal saline, three 5-mm ports were inserted through the bladder wall under cystoscopic guidance.

After port placement, normal saline was drained while simultaneously filling the bladder with gas (pressure, 8-12 mmHg and flow rate, 2-3 L/min). After traction of the ureteric orifice with a tagging suture using monofilament 5-0 (Fig. 1A), a circumscribing incision was made to perform ureteric mobilization (Fig 1B, C).

The location of the neo-hiatus was then selected in a straight-line superior to the original orifice (Fig. 1D).



Dissection of the submucosal tunnel was started from the neo-hiatus and advanced to the original hiatus (Fig. 2A), and the ureter was gently drawn through the tunnel (Fig. 2B).

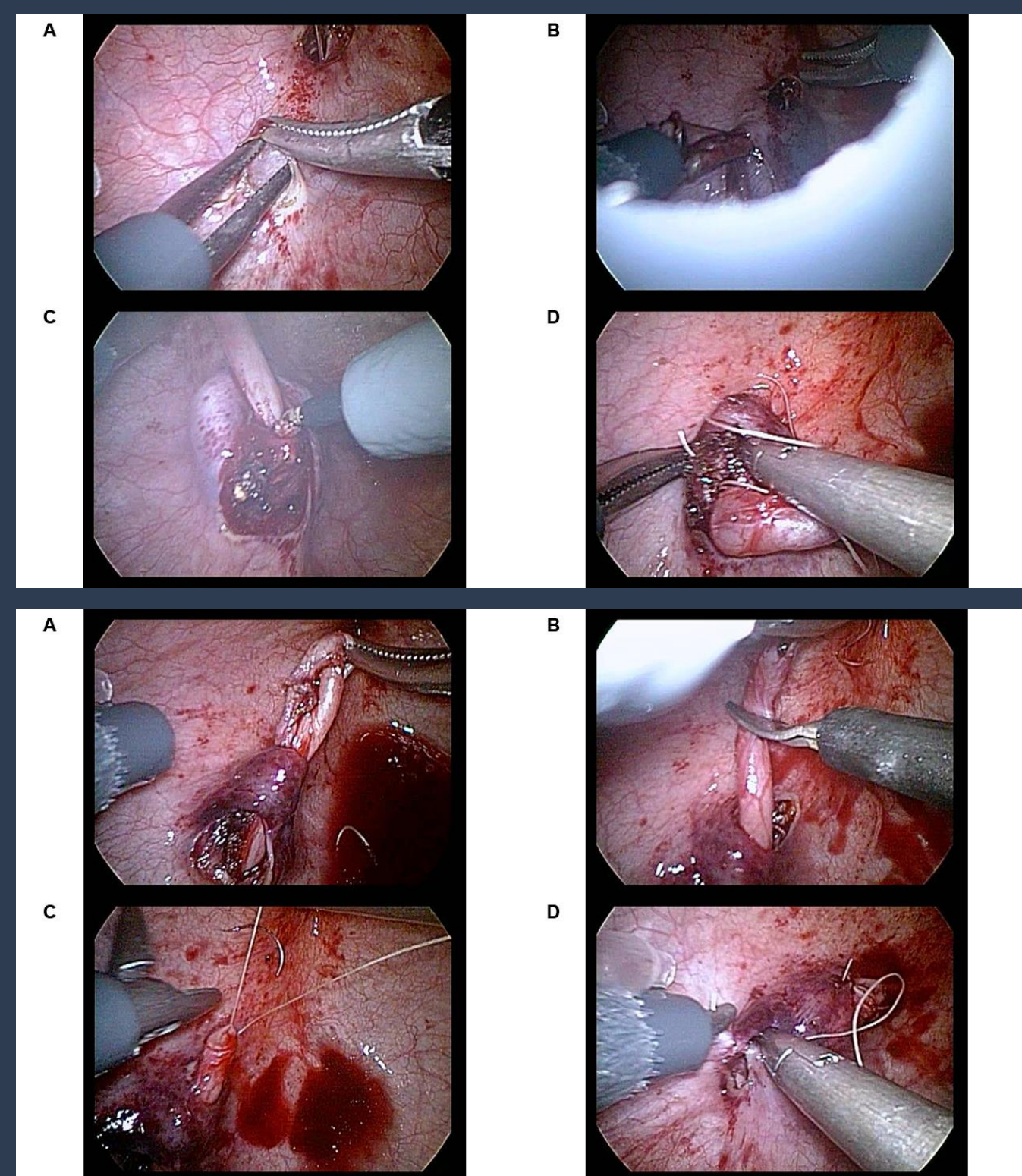
The ureter was rolled up, and the muscle fibers were incised until the ureter could freely move from the base of the neo-hiatus (Fig. 2C).

The incised detrusor muscle defect from the original hiatus to the neo-hiatus below the mucosal layer was closed using a single running suture (Fig. 2D).

Next, the ureter was brought to the original hiatus through a newly created submucosal tunnel between the mucosal layer and the repaired detrusor layer (Fig. 3A).

After spatulation of the distal part of the ureter (Fig. 3B), ureterovesical anastomosis was performed using 5-0 absorbable sutures at four points per ureteral orifice (Fig. 3C).

The mucosal defect of the neo-hiatus was also closed with 5-0 absorbable interrupted sutures (Fig. 3D). The Foley catheter was removed after the hematuria stopped. A ureteral stent was not placed.



Results

Table 1. Comparison of the baseline characteristics of the patients who underwent open surgery and those who underwent laparoscopic pneumovesical surgery for Politano-Leadbetter ureteric reimplantation

	Open approach n (%)	Pneumovesical approach n (%)	p Value
No. of patients	28	24 (2 patients converted to open surgery d/t port displacement)	
Gender	28	24	0.002
Male	23 (82.1)	9 (37.5)	
Female	5 (17.9)	15 (62.5)	
Mean age at operation (y)	5.96 ± 4.19	8.04 ± 4.53	0.115
Side	28	24	0.400
Unilateral	16 (57.1)	11 (45.8)	
Bilateral	12 (42.9)	13 (54.2)	
Renal scarring on DMSA	17 (60.7)	14 (58.3)	0.543
VUR Grade	28	24	0.776
III	4 (14.3%)	3 (12.5%)	
IV	9 (32.1%)	10 (41.7%)	
V	15 (53.6%)	11 (45.8%)	

Table 2. Comparison of the pneumovesical and open approaches for Politano-Leadbetter ureteric reimplantation

	Open approach (n = 28)	Pneumovesical approach (n = 24)	p Value
Mean follow-up (months)	53.50 ± 32.33	31.45 ± 21.38	0.006
VUR resolution (%; cured renal unit/total renal unit)	92.5% (37/40)	97.3% (36/37)	0.338
Mean operation time (min)	143.64 ± 33.13	125.67 ± 33.48	0.058
Single	133.06 ± 28.44	110.25 ± 28.00	0.803
Bilateral	157.75 ± 34.80	141.00 ± 31.04	0.242
Mean indwelling catheter duration (days)	7.00 ± 1.33	3.80 ± 1.20	0.001
Hospital stay (days)	7.43 ± 1.85	4.91 ± 1.31	0.001
Complication	4/28 (14.3%)	3/26 (11.5%)	0.543
Port displacement	0	2	
Wound infection	2	0	
Extravesical leakage	1	0	
Postoperative UTI	1	1	
Reoperation	0	0	
Pain control			
Ibuprofen	20 (71.4%)	12 (50.0%)	0.097
Morphine analgesic (1 mg/kg intramuscularly every 4 hours)	9 (32.1%)	1 (4.2%)	0.011

Conclusion

The transvesicoscopic Politano-Leadbetter technique with pneumovesicum is safe and effective for ureteric reimplantation and is comparable to the open approach.

Acknowledgements

Lakshmanan Y, Fung LC. Laparoscopic extravesicular ureteral reimplantation for vesicoureteral reflux: recent technical advances. *Journal of endourology*. 2000;14:589-93; discussion 93-4.

Yeung CK, Sihoe JD, Borzi PA. Endoscopic cross-trigonal ureteral reimplantation under carbon dioxide bladder insufflation: a novel technique. *Journal of endourology*. 2005;19:295-9.

Valla JS, Steyaert H, Griffin SJ, Lauron J, Fragoso AC, Arnaud P, et al. Transvesicoscopic Cohen ureteric reimplantation for vesicoureteral reflux in children: a single-centre 5-year experience. *Journal of pediatric urology*. 2009;5:466-71.

Tae BS, Choi H, Park JY, Bae JH. Laparoscopic Approach for Intravesical Surgery Using Pneumovesicum in Urology: Literature Review. *Int Neurourol J*. 2018;22:S10-22.

Choi H, Bae JH. Report of New Technique: Transvesicoscopic Politano-Leadbetter Ureteral Reimplantation. *Journal of Laparoendoscopic & Advanced Surgical Techniques*. 2013;23.

Choi H, Park JY, Bae JH. Initial experiences of laparoscopic intravesical detrusorraphy using the Politano-Leadbetter technique. *Journal of pediatric urology*. 2016;12:110.e1-7.