นิพนธ์ต้นฉบับ

# การผ่าตัดผ่านกล้องแก้ไขรูรั่วระหว่างท่อไตและช่องคลอดที่เกิดหลังการผ่าตัดมดลูก

*ไพบูลย์ เอี่ยมสุภัคกุล, กิตติณัฐ กิจวิกัย*

หน่วยศัลยศาสตร์ระบบปัสสาวะ ภาควิชาศัลยศาสตร์
คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล กรุงเทพฯ

## บทคัดย่อ

**วัตถุประสงค์:** เพื่อรายงานผล และเทคนิค การผ่าตัดผ่านกล้องรักษารูรั่วระหว่างท่อไตและช่องคลอดที่เกิด หลังการผ่าตัดมดลูก

**วิธีการศึกษา:** ศึกษาข้อมูลย้อนหลังผู้ป่วยจำนวน 8 รายที่ ได้รับการผ่าตัดแก้ไขรูรั่วระหว่างท่อไตและช่องคลอดโดยการตัดท่อไตกับกระเพาะปัสสาวะด้วยกล้องผ่านช่องท้อง ระหว่างเดือนกรกฎาคม พ.ศ. 2007 ถึงเดือนธันวาคม พ.ศ. 2015

**ผลการศึกษา:** จากการศึกษาการผ่าตัดแก้ไขรูรั่วระหว่างท่อไตและช่องคลอดสามารถผ่าตัดได้ผลสำเร็จทุกราย ระยะเวลาที่ใช้ในการผ่าตัดเฉลี่ยอยู่ที่ 143 นาที การสูญเสียโลหิตเฉลี่ย 58.75 มิลลิลิตร ระยะเวลาของการพักรักษาตัวในโรงพยาบาลเฉลี่ย 4.5 วัน และระยะเวลาการตรวจติดตามเฉลี่ยที่ 4 ปี โดยที่ไม่พบภาวะแทรกซ้อนในผู้ป่วยทั้ง 8 ราย รวมถึงไม่พบภาวะท่อไตตีบหลังการผ่าตัด

**สรุป:** การผ่าตัดตัดต่อท่อไตกับกระเพาะปัสสาวะด้วยกล้องมีความปลอดภัยและได้ผลสำเร็จเทียบเท่าการผ่าตัดแบบเปิด การรักษามีผลข้างเคียงน้อยและผู้ป่วยฟื้นตัวได้เร็ว

**คำสำคัญ:** การผ่าตัดผ่านกล้อง, รูรั่วระหว่างท่อไตและช่องคลอด, การผ่าตัดมดลูก

Original article

# Laparoscopic ureteroneocystostomy for ureterovaginal fistula after hysterectomy: A Ramathibodi Hospital experience

*Paiboon Iemsupakkul, Kittinut Kijvikai*

Division of Urology, Department of Surgery, Faculty of Medicine,
Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

## Abstract

**Objective:** To describe our experience and report the outcomes of laparoscopic ureteroneocystostomy treatment in patients who had ureterovaginal fistula after hysterectomy.

**Material and Methods:** We retrospectively reviewed the data of 8 patients who underwent laparoscopic extravesical ureteroneocystostomy using the psoas hitch procedure for ureterovaginal fistulas following hysterectomy between July 2007 and December 2015. Transperitoneal laparoscopic approach was performed in all cases.

**Results:** The procedures were performed successfully in all patients without any conversion. Mean operative time was 143.13 (range 100 to 200) minutes;mean estimated blood loss was 58.75 (range 20 to 200) ml; average hospital stay was 4.5 (range 3 to 7) days, and mean follow up was 4 (range 1 to 5) years. There was no minor or major complication and there was no stricture formation in our series.

**Conclusions:** Laparoscopic ureteroneocystostomy with psoas hitch can be performed safely with a success rate comparable to that of open surgery. It provides excellent outcomes with less morbidity and a faster recovery period.

**Keywords:** Laparoscopy, ureteroneocystostomy, hysterectomy

## Introduction

The majority of ureteral injuries during gynecological procedure are identified in the postoperative period. In the modern era, they are usually associated with electrocoagulation during the surgery.[1]

When an injury is recognized postoperatively, treatment is usually initiated with endoscopic management. If endoscopic surgery fails, ureteroneocystostomy is performed using either the open or laparoscopic approach. In the past, open ureteric reimplantation was the gold standard for ureterovaginal fistulas. As the experience with laparoscopy grows, there has been an increase in the laparoscopic approach.

Herein, we present our experience with initial laparoscopic ureteroneocystostomy in patients who had ureterovaginal fistula after hysterectomy. This is the first report of its kind in our country.

## Materials and Methods

A total of 8 patients underwent laparoscopic ureteroneocystostomy from July 2007 to December 2015 for ureterovaginal fistula following open or laparoscopic hysterectomy. The surgery was performed 1 to 3 weeks after hysterectomy in all cases. There were 6 cases that underwent total laparoscopic hysterectomy and there were 2 cases that underwent open hysterectomy for benign disease, including endometriosis of the uterus. All patients had no prior endourological procedures or percutaneous nephrostomy.

Preoperative evaluation included computerized-tomography (CT) scan of the KUB system to confirm the diagnosis. Cystoscopy, cystography and the tampon test were also conducted in order to rule out concomitant vesicovaginal fistula. Sterile urine was confirmed before initiating the procedure.

### Surgical techniques

The patient was placed under general anesthesia in the 30 degree head-down Trendelenburg position. The initial 10 mm trocar was placed at the lower edge of the umbilicus and used as a camera. An additional three 5 mm working ports were placed in the standard pelvic laparoscopic surgical position. Basically, these working ports were placed in the same position as in previous hysterectomies. The ureter was identified and dissected down to the stricture part with the maximal care taken to preserve good periureteral blood supply. The distal ureter was clipped with Hem-o-lok. The proximal part of the ureter was spatulated approximately 1 cm in diameter. The bladder was filled with sterile normal saline and it was fully mobilized. The bladder wall was hitched to the ipsilateral psoas tendon or the tissue near the psoas muscle with interrupted 4-0 Prolene sutures. The Lich-Gregoir ureteroneocystostomy technique was used for ureter and bladder anastomosis. The ureter was anastomosed to the bladder mucosa using running 3-0Vicryl sutures. After which, detrusorrhaphy was performed with 2-0Vicryl sutures. Double J (DJ) stent and Jackson-Pratt drain were inserted in all cases. The urethral catheter was removed on day 7 postoperatively and the DJ stent approximately 2-3 weeks after surgery. Follow-up was performed with ultrasonogram or CT scan at 3 months. Diuretic renal scan was conducted at 1 year in order to confirm the patency of ureteral anastomosis. Perioperative data were collected for analysis.

## Results

Mean patient age was 36.5 (range 36 to 52) years and average BMI was 25.03 (range 20.1 to 27.7) $kg/m^2$. The procedure was performed

successfully in all patients without any conversion. Mean operative time was 143.13 (range 100 to 200) minutes; estimated blood loss was 58.75 (range 20 to 200) ml; average hospital stay was 4.5 (range 3 to 7) days, and mean follow-up was 4 (range 1 to 5) years. Morphine requirement was minimal. There was no minor or major complication in our series. Figure 1 shows an excellent, small postoperative scar.

Postoperative CT or ultrasonogram at 3 months did not reveal an obstruction in any patient. Diuretic renal scan at one year showed no sign of obstruction in all cases.

## Discussion

Regarding the hysterectomy, the risk of ureteral injury is highest during laparoscopic hysterectomy compared with the other approaches.[2] However, with the advancement of experience in laparoscopy, a recent report has demonstrated that the incidence of ureteral injury during gynaecologic surgeries in laparoscopic cases was 1.1%, which is similar to open laparotomy at 1.2%[3]

The location of ureteral injuries isusually at the distal ureter, at the level of the uterine artery near the uterosacral ligaments. The blood supply of the ureter in this area is usually poor. Therefore, ureteroneocystostomy should be considered the procedure of choice for definitive treatment. Initial management with ureteral stenting in ureterovaginal fistula following gynaecologic injuries seems to be the best initial approach, with a reported success rate of 71%[4] Failure of endoscopic management requires surgical repair. However, it is our experience that the endoscopic approach has a high failure rate. This is a major cause of dissatisfaction in our patients because they suffer due to along treatment period. Therefore, we prefer to perform ureteroneocystostomy without the trial of ureteral stenting as the initial procedure. Surgical repair is conducted as soon as the patient's condition makes it feasible, irrespective of the duration from the time of ureteral injury. In the past, open reconstruction of the lower ureter was described as the gold standardfor the management of lower ureteric injury or obstruction. However, open surgery has the disadvantages of a higher morbidity, longer recovery period, and prolonged hospitalization when compared with laparoscopic surgery. Although technically challenging, especially laparoscopic suturing, with our increasing experience in laparoscopic procedures, laparoscopic ureteroneocystostomy has become the treatment of choice in our institute. Recently, robotic-assisted ureteroneocystostomy was reported to have successful outcomes. We have had one successful case.[5,6] However, it has higher costs; thus, it may not be suitable for patients in our community.

Laparoscopic ureteroneocystostomy was first described in children by Ehrlich et al. for high-gradevesicoureteral reflux.[7] It has a success rate of 90-100%.[8] The key principles of ureteral surgery should be kept in our considerations. Ureteral tension, torsion, and angulation should be avoided in order to keep a very good blood supply during ureteroneocystostomy. Thus, it is important to mobilize the bladder fully and then perform psoas hitch. Italso gives an additional length of the ureter for no tension anastomosis. Non-refluxing anastomos is was recommended because this condition was found in the group of patients who were sexually active. They were predisposed to recurrent urinary tract infection[8]

In a recent prospective study on laparoscopic ureteroneocystostomy, the mean blood loss was 283 (50-550) ml and the mean operative time was 215 (131-351) minutes. The mean hospital stay was 8.7 days. The average time interval for returnto normal activity was 2.6 weeks. The success rate of theprocedure in their study was high at 95.8% with a median follow-upof 35 months.[9] The most recent retrospective study in 9 cases of laparoscopic re-implant ureter demonstrated similar perioperative and posto-perative outcomes.[2] Our results are comparable to those of the previously reported series. Recurrent stricture usually develops within 1 year after surgery. Only an 11% stricture rate was reported after 1 year with an average follow-up of 8.5 years.[10] In our study, all patients had follow-ups of more than 1 year and up to now there has been no stricture formation or obstruction in our series based on the data from diuretic renal scans. We did not perform voiding cystography to confirm the non-refluxing anastomosis in every case. This is the major drawback of our series. However, there was no report of urinary tract infection in all of the patients.

## Conclusions

To our knowledge, this is the first series report of laparoscopic ureteroneocystostomy for ureterovaginal fistula in our country. It can be performed safely with an excellent success rate compared to that of open surgery, but with less morbidity and a faster recovery period.

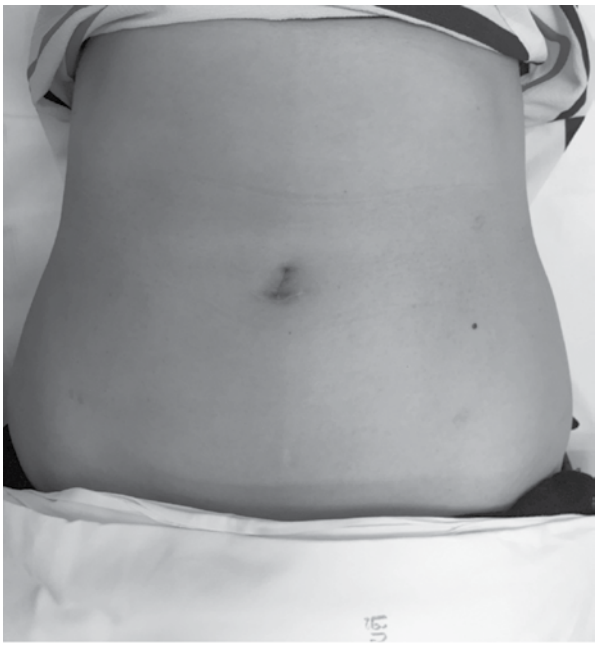

**Figure 1.** The picture shows an unnoticeable posto-perative scar at one year after surgery.

## References

1. Ostrzenski A, Radolinski B, Ostrzenska KM. A review of laparoscopic ureteral injury in pelvic surgery. Obstet Gynecol Surv. 2003; 58(12):794-9.
2. Ghosh B, Biswal DK, Bera MK, Pal DK. Laparoscopic Extravesical Lich-Gregoir Ureteroneocystostomy with Psoas Hitch for the Management of Ureterovaginal Fistula in Post-Hysterectomy Patients. Urol Int. 2016; 96(2):171-6.
3. Wu HH, Yang PY, Yeh GP, Chou PH, Hsu JC, Lin KC. The detection of ureteral injuries after hysterectomy. J Minim Invasive Gynecol. 2006;13(5):403-8.

4. Shaw J, Tunitsky-Bitton E, Barber MD, Jelovsek JE. Ureterovaginal fistula: a case series. Int Urogynecol J. 2014;25(5):615-21.
5. Yang C, Jones L, Rivera ME, Verlee GT, Deane LA. Robotic-assisted ureteral reimplantation with Boari flap and psoas hitch: a single-institution experience. J Laparoendosc Adv Surg Tech A. 2011;21(9):829-33.
6. Kozinn SI, Canes D, Sorcini A, Moinzadeh A. Robotic versus open distal ureteral reconstruction and reimplantation for benign stricture disease. J Endourol. 2012;26(2): 147-51.
7. Ehrlich RM, Gershman A, Fuchs G. Laparoscopic vesicoureteroplasty in children: initial case reports. Urology. 1994;43(2):255-61.
8. Modi P, Gupta R, Rizvi SJ. Laparoscopic ureteroneocystostomy and psoas hitch for post-hysterectomy ureterovaginal fistula. J Urol. 2008;180(2):615-7.
9. Gozen AS, Cresswell J, Canda AE, Ganta S, Rassweiler J, Teber D. Laparoscopic ureteral reimplantation: prospective evaluation of medium-term results and current developments. World J Urol. 2010;28(2):221-6.
10. Selzman AA, Spirnak JP. Iatrogenic ureteral injuries: a 20-year experience in treating 165 injuries. J Urol. 1996;155(3):878-81.