

Transperitoneal laparoscopic ureteroureterostomy for the treatment of retrocaval ureter: analysis of 3 consecutive cases

Retrocaval üreter tedavisi için transperitoneal laparoskopik üreteroüreterostomi:
Ardışık 3 vakanın analizi

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Abstract

The aim of this report was to demonstrate the operative technique and assess outcomes of laparoscopic ureteroureterostomy on 3 consecutive cases diagnosed with retrocaval ureter. The presenting symptom of these cases was recurrent right flank pain and the diagnosis was established by intravenous urography. All patients were successfully treated with transperitoneal laparoscopic ureteroureterostomy using an intracorporeal suture technique with a mean operative time of 118 min. The mean blood loss was 76 cc and hospital stay 3.3 days. The minimally invasive laparoscopic surgery should be considered as the first choice of treatment for retrocaval ureter due to cosmetic advantages and early recovery.

Key words: Laparoscopy; retrocaval ureter; ureteroureterostomy.

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Özet

Bu yazının amacı, 3 ardışık retrokaval üreter olgusunda uygulanan laparoskopik üreteroüreterostominin cerrahi tekniğini göstermek ve sonuçlarını değerlendirmektir. Hastaların temel şikayeti tekrarlayan sağ yan ağrısı idi ve tanı ürografi ile konuldu. Tüm hastalar transperitoneal laparoskopik üreteroüreterostomi ile intrakorporal sütür tekniği kullanılarak ortalama 118 dk operasyon süresi ile tedavi edildi. Ortalama kan kaybı 76 cc ve hastanede kalış süresi 3.3 gün olarak saptandı. Retrokaval üreter tedavisinde, kozmetik avantajları ve erken iyileşme süresi nedeniyle, minimal invazif laparoskopik yaklaşım ilk tedavi seçeneği olarak düşünülmelidir.

Anahtar sözcükler: Laparoskopi; retrokaval üreter; üreteroüreterostomi.

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Retrocaval ureter (RCU) or preureteral vena cava is a rare congenital abnormality with a prevalence of about 1 in 1000 and with a male to female ratio of 2.8:1.^[1,2] It occurs as a consequence of the persistence of the posterior cardinal veins during embryologic development; as an anomaly of inferior vena cava (IVC).^[3] This abnormality, which occasionally causes hydronephrosis, requires treatment in symptomatic patients. Two types of RCU have been described. Type I (low loop) is the most common type where the dilated proximal ureter assumes a reverse J or fishhook-shape. Type II (high loop) is rarer and ureter courses behind IVC at the level of the ureteropelvic junction.

RCU usually becomes symptomatic in the 3rd or 4th decades of life. Its presence should be suspected with the finding of a characteristic S-shaped deformity on intravenous or retrograde pyelography which is confirmed with computerized tomography (CT).^[4] Surgery is the mainstay of the treatment and open surgery has been the standard option. However, large skin incision causing considerable postoperative pain and unfavorable cosmetic results are significant disadvantages of the open approach.

In the last decade, laparoscopic procedures have replaced many open surgeries because of well-documented advantages of minimally invasive surgery. In

addition, a growing body of evidence in the literature indicates that laparoscopic repair of RCU should be considered as the first-line treatment for this congenital abnormality. It has been reported that this congenital abnormality may be managed successfully with either transperitoneal or retroperitoneal laparoscopic approach leading to minimal postoperative pain and shorter convalescence.^[5-10] Accordingly, the aim of the present report is to analyze our experience of laparoscopic ureteroureterostomy in three cases with RCU.

Case report

Case 1: A 32-year-old female patient presented with a history of intermittent right side flank pain. Her urograms revealed right hydronephrosis and a suspect RCU (Fig. 1a). Meanwhile, a magnetic resonance (MR) urography demonstrated a RCU at the level of L4 with a shape of reverse J which categorized this anomaly as type 1 RCU.

Surgical technique: The patient was placed in a lithotomy position under general anesthesia and a 6 Fr ureteral catheter was inserted into the right ureter using a 22 Fr cystoscope to facilitate the visualization of the ureter during laparoscopy as well as to test the water-tightness of the anastomosis. Afterwards, the patient was placed in a modified flank position. Veress needle was used to create a 15 mmHg pneumoperitoneum. A 10 mm trocar was placed through the umbilicus and the camera was introduced into the abdominal cavity. An 11 mm second port was placed at the midclavicular line 2 cm below the costal margin while the 5 mm third port was inserted between the anterosuperior iliac spine and the umbilicus. Dissection started with the incision of the white line of Toldt and the ascending colon was reflected medially clearly exposing the retroperitoneum. The dilated and nondilated proximal segments of the right ureter were identified and dissected from the IVC (Fig. 2). The ureter was transected just above the retrocaval segment and transferred to the anterolateral side of the IVC. Afterwards, ureteral catheter that was placed before laparoscopy was introduced into the dilated proximal ureter and end-to-end anastomosis was performed with interrupted 4-0 absorbable polyglactin sutures. Proximal ureter was filled with 20 mL of saline solution and patency of the anastomosis was confirmed. At the end of the procedure, a closed suction drain was placed at the anastomosis

site. Finally, the patient was placed on lithotomy position, 6 Fr ureteral catheter was removed, and a 4.8 Fr double-J catheter was placed into the right ureter. Total operative time was 115 min, where 35 min was required for end-to-end anastomosis. The estimated blood loss was recorded as 60 mL. The urethral catheter and drain were removed on the postoperative 4th day and the patient was subsequently discharged. Ureteral double-J stent was removed at 1 month after the surgery and the patient was pain free and Grade 3 hydronephrosis was regressed to Grade 1 at postoperative 11 months.

Case 2: A 44-year-old male patient was evaluated for right flank pain. His ultrasonographic examination revealed severe dilatation of the pyelocalyceal system of the right kidney. His urography showed a J-shaped proximal ureter, suggesting RCU (Fig. 1b) and CT confirmed this diagnosis. The surgical technique was similar as in Case 1 with the exception that a 4.8 Fr double-J stent was introduced intracorporeally instead of placing 6 Fr ureteral catheter initially. Total operative time was 150 min, where 50 min were employed for the anastomosis. The estimated blood loss was 50 mL and no intraoperative complication was noted. The patient was discharged on the 3rd postoperative day and his symptoms were resolved at one month follow-up.

Case 3: A 51-year-old male patient was presented with a 10-year history of intermittent right flank pain and abdominal ultrasound revealed severe right hydronephrosis. Intravenous urography and CT showed a RCU (Fig. 1c). Different from the other two cases, a 4.8 Fr ureteral double-J stent was placed initially and the procedure was performed as described previously. Total operative time was 90 min with 30 min of anastomosis and the estimated blood loss was 120 mL. The only intraoperative complication noted was bleeding from a vein of mesocolon while inserting the Veres needle. The bleeding was immediately controlled using bipolar coagulation. The patient was discharged from the hospital on the 3rd postoperative day and was symptom-free at one month follow-up.

Discussion

In urologic laparoscopy, the use of either transperitoneal or retroperitoneal approach for entering retroperitoneum has always been a subject of debate. In the current literature, the majority of reports on the laparoscopic repair of RCU have used the trans-

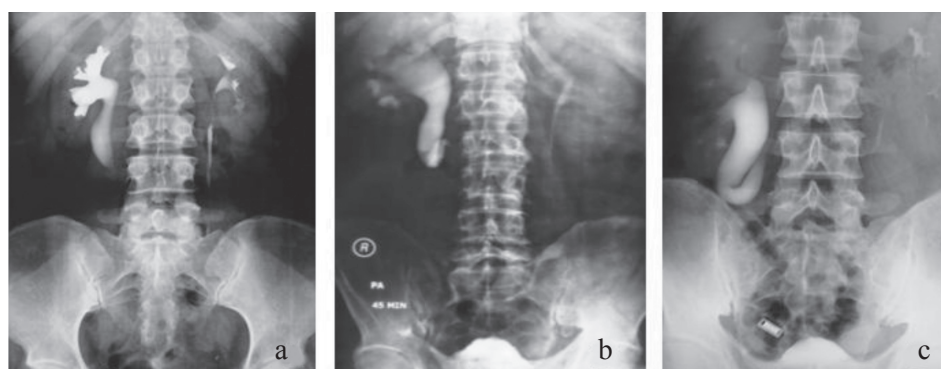


Figure 1 Urograms of case 1 (a), case 2 (b) and case 3 (c).

peritoneal access because of the large working space which has a significant importance for intracorporeal suturing. Meanwhile, it was reported by many authors that the main limiting factor for laparoscopic management of this pathology has been the intracorporeal anastomosis of the ureter which prolongs the operative time.^[4-8] In the first case mentioned in the literature, Baba et al.^[4,5] performed this procedure that required 9.3 hours, including 2.5 hours for intracorporeal suturing. Polascik and Chen^[7] performed laparoscopic ureteroureterostomy for a RCU in 3 hours and 45 min using an automatic suture device. The first case of retroperitoneoscopic approach was reported by Salomon et al.^[9] where the authors indicated shorter operative time than that of the transperitoneal approach. Meanwhile, Ramalingham and Selvarajan^[10] reported 2 cases supporting that transperitoneal intracorporeal suturing is less time consuming and easier than retroperitoneal suturing. In our cases, the mean anastomosis time was 38 min revealing that intracorporeal suturing is probably much easier in transperitoneal approach.

A field that deserves attention is the resection of ureteral segment posterior to the IVC. Chung and Gill^[11] reported resection of the segment that was found to be atretic and stenotic. Dogan et al.^[12] presented 4 cases managed without resection. Despite transaction and spatulation of dilated proximal ureter in most studies, resection has been rarely applied. Similarly, in none of our cases did the RCU appear dysplastic, atretic or stenotic. Thus, end-to-end anastomosis was performed without resection of the retrocaval segment. Nevertheless, it is compulsory to verify the patency of the distal ureter intraoperatively before proceeding to definitive repair in order

to avoid areas of potential stenosis. Meanwhile, it is worth mentioning that transaction and reduction of the proximal ureter (or renal pelvis) necessitates extra intracorporeal knot tying and thus, challenges the operation. For this reason, reduction of the dilated proximal ureter was not preferred in our cases. We believe that reduction is not necessary in cases where the proximal ureter is not excessively dilated.

A notable point in the surgical technique is the insertion of a ureteral catheter before starting laparoscopy. Cystoscopic placement of a double-J stent or a ureteral catheter before the procedure shortens operative time significantly. One should note that performing the anastomosis is easier, safer and more rapid with an ureteral catheter in situ, as ureter is generally fragile and easy to flap. In our series the intracorporeal anastomosis was completed in 30 and 35 min with an in situ 4.8 Fr double-J stent and a 6 Fr ureteral catheter, respectively. On the contrary, the anastomosis was performed in 50 min in the patient without ureteral catheter. Thus, we advocate the use of an ureteral catheter beforehand. On the other hand, it should be kept in mind that extended laparoscopic experience is needed in order to achieve meticulous suturing and delicate handling of the tissue in a shorter operative time.

Another area of debate concerns retrograde pyelography (RGP) which is used preoperatively or intraoperatively by some authors. Dogan et al.^[12] recommends intraoperative RGP to avoid missing coexisting pathologies, such as atretic retrocaval ureteral segment as reported by Chung and Gill.^[11] We believe that there is no need for preoperative RGP as it is an invasive procedure, where a reconstructed CT or MR urography would clearly demonstrate

any significant pathology that may be needed to be corrected. Meanwhile, we believe that the stenotic and atretic ureteral segments can be observed during laparoscopic exploration. Otherwise, retrograde pyelography is very rarely used in pyeloplasty operations where the adynamic ureteropelvic segment is

resected. Consequently, RGP is an imaging study that does increase operative time especially in an operative room without a C-arm.

There are some limitations in the present report that merit mentioning. Firstly, the limited number of our patients prevents precise evaluation of the transperitoneal laparoscopic approach in terms of perioperative parameters. Secondly, the limited follow-up period of our patients prevents the prediction of overall success rate. However, the outcomes of laparoscopic repair of RCU in the literature followed-up up to 58 months have been promising (Table 1). Briefly, all procedures have been reportedly associated with minimal blood loss and no complications. The operative time was variable and seemed to decrease as the experience increases.

In conclusion, minimal invasive access, relative technical ease, short hospital stay, reduced postoperative pain, and early return to daily activities are the most appealing aspects of laparoscopic surgery compared to open surgery for management of RCU. Despite no direct comparison with open surgery was performed, it is rational to consider laparoscopic repair of RCU as a first-line treatment in the light of the current limited literature.

Conflict of interest

No conflict of interest was declared by the authors.

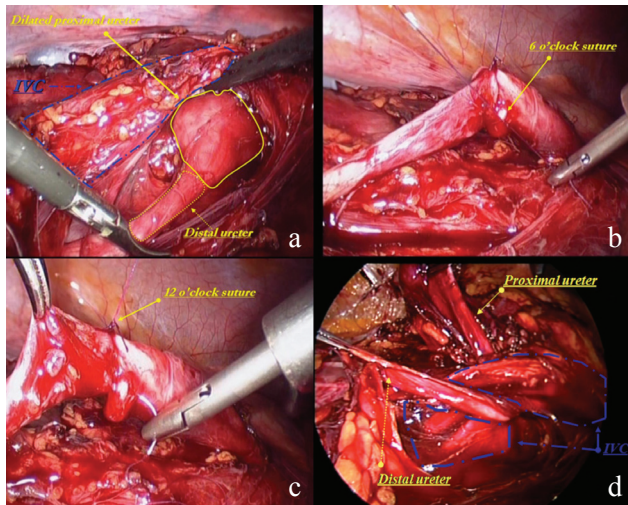


Figure 2

Photograph of proximal and distal ureter after dissection and elevation of inferior vena cava (IVC) (a); after placing the first suture at 12 o'clock position and traction with a Carter-Thomason device, a 6 o'clock suture is placed (b); other sutures are placed between 6 o'clock and 12 o'clock sutures (c); and photograph showing the traction of proximal and distal ureteric segments to elevate IVC (d).

Table 1. Results of published case reports of laparoscopic approach for retrocaecal ureter

Author	Number of cases	Approach	Blood loss (mL)	Operative time (min)	Anastomosis time (min)	Complications	Follow-up (months)
Baba et al. ^[5]	1	TP	NR	560	150	None	2
Ishitoya et al. ^[6]	1	TP	NR	365	-	None	2
Polascik et al. ^[7]	1	TP	NR	225	45	None	NR
Matsuda et al. ^[8]	1	TP	<30	450	-	None	NR
Salomon et al. ^[9]	1	RP	<20	270	-	None	6
Dogan et al. ^[10]	4	TP	NR	210	-	None	3
Xu et al. ^[13]	7	RP	20	128	36	None	16
Mugiya et al. ^[14]	1	RP	50	300	-	None	6
Ameda et al. ^[15]	2	TP	20	450	-	None	NR
		RP	NR	400	-	None	NR
Tobias-Machado et al. ^[16]	1	TP	50	130	40	None	3
Present report	3	TP	75	118	38	1 ^a	3

TP: Transperitoneal, RP: retroperitoneal, NR: Not reported.

^aBleeding from mesocolonic vein while inserting a Veres needle.

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