Laparoscopic Dismembered Pyeloplasty and Pyelolithotomy in a Patient With a Retrocaval Ureter
Our Experience and Review of Literature

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INTRODUCTION

The incidence of retrocaval ureter is reported as 1 in 1100, with male to female predominance of 2.8:1.[1] The cause of this anomaly is persistence of posterior cardinal vein as infrarenal vena cava during the embryologic development.[2] The symptoms usually start in 3rd to 4th decade of life, and the common presentation is recurrent flank pain, recurrent urinary tract infection, or hypertension due to hydronephrosis.[3,4]

Retrocaval ureter is diagnosed by the appearance of S-shaped curve of the upper ureter, which may be confirmed by spiral contrast-enhanced computerized tomography (CECT) scan.[5] This vascular anomaly is not usually associated with the ureteral obstruction.[6] Any functional urinary obstruction may be diagnosed by nuclear scan.[7]

Open dismembered pyeloplasty has been the traditional treatment for retrocaval ureter.[7-9] Recently, few papers have focused on the laparoscopic dismembered pyeloplasty and reported acceptable results.[10-14] The laparoscopic technique has advantage of decreased convalescence and analgesic requirement.[8,9,15] Laparoscopy is challenging as extensive caval dissection in the medial and lateral regions of the vena cava are performed.[15-19]

Herein, we discuss the laparoscopic management of retrocaval ureter presenting with renal calculus, which was managed by pyelolithotomy and dismembered pyeloplasty in the same session.

CASE REPORT

An 18-year-old man presented with recurrent right flank pain for 6 months. He did not report other urological symptoms. His abdominal examination was unremarkable. His renal function tests were within the normal limits.

The ultrasonography of the kidney, ureter, and bladder (KUB) region showed right hydronephrotic kidney with a 2-cm renal calculus. His plain KUB x-ray depicted a 2 cm × 1 cm radiopaque shadow in the right renal area (Figure 1). Intravenous urogram (IVU) showed right moderate hydronephrosis with a J-shaped ureter and a renal stone (Figure 2). The spiral CECT scan of the abdomen revealed right hydronephrosis with the ureter passing posterior to the inferior vena cava (IVC) (Figure 3). His nuclear scan depicted right kidney split renal function of 45% with subrenal obstruction.

Figure 1. Plain kidney, ureter, and bladder x-ray showing radiopaque shadow in the right renal area.

Figure 2. Intravenous urogram showing typical J-shaped proximal ureter with an inferior calyceal calculus.

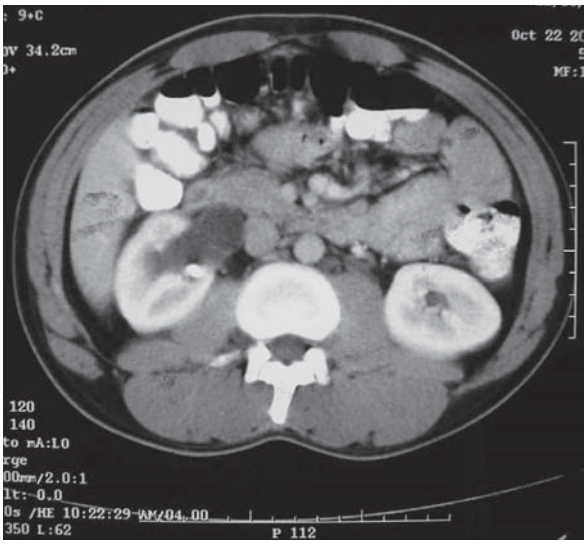

Figure 3. Contrast-enhanced computerized tomography scan of the abdomen showing dilated right renal pelvis with the proximal ureter passing postero-medial to the inferior vena cava.

He was managed by transperitoneal laparoscopic pyelolithotomy and dismembered pyeloplasty.

TECHNIQUE

Cystoscopy and right retrograde pyelography were performed, which showed findings suggestive of the right retrocaval ureter. A 6-F ureteric catheter was negotiated in the right ureter, but it got stuck a few centimeters below the right pelviureteric junction (PUJ). A guidewire (0.035" Terumo Glidewire) could enter the pelvicalyceal system.

The patient was placed in left lateral position with slight tilt to the left side and 4 ports were placed. The right colon was reflected and the right ureter was identified above the pelvic brim and traced till the point where it was passing in front of and behind the IVC (Figure 4). The IVC was lifted with dissecting forceps and the ureter was mobilized in the interaortocaval region, where it was passing posterior to the IVC. The proximal ureter, lateral to the IVC, was dissected free till the PUJ level. The ureter at the PUJ was transected and the atretic unhealthy portion (approximately 2 cm in length) was excised; following which the ureter was spatulated for 2 cm. A vertical incision in the pelvis was made and the stone was retrieved with the help of a grasper (Figure 5). The double-J stent was inserted in

the ureter by antegrade technique. Uretropelvic anastomosis was performed with 4-0 polyglactin suture in continuous fashion (Figure 6). A 16-F continuous suction drain was placed in the right renal area at the end of the laparoscopic surgery.

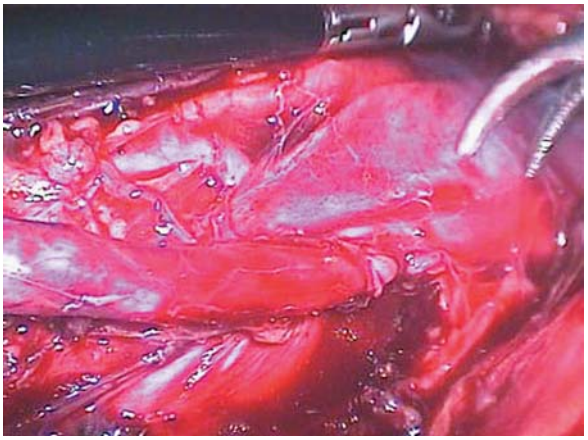

Figure 4. Laparoscopic view of the ureter passing postero-medial to the inferior vena cava.

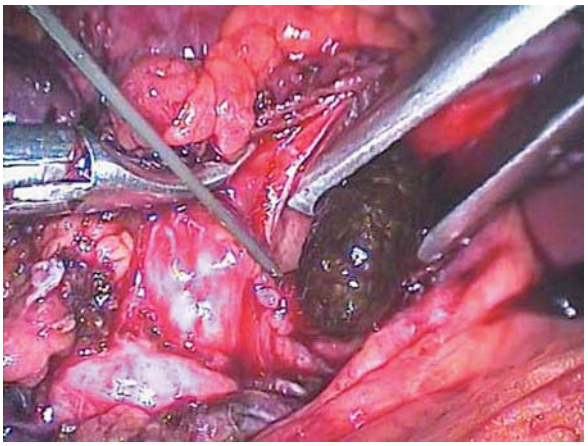

Figure 5. Laparoscopic view while extracting the renal calculus.

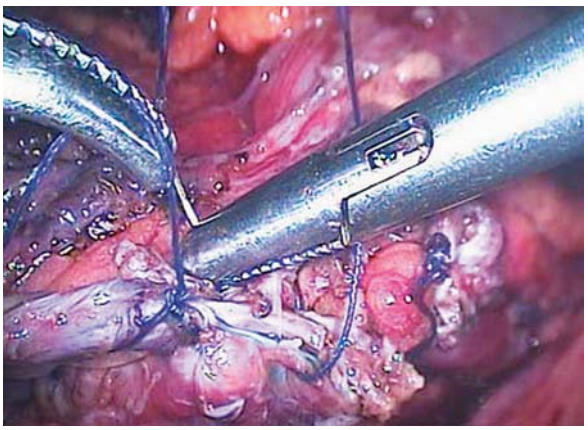

Figure 6. Laparoscopic view of uretropelvic anastomosis by intracorporeal suturing over a stent.

RESULTS

The operation and the intracorporeal suturing time were approximately 180 and 60 minutes, respectively. The blood loss was approximately 50 mL. The postoperative course was uneventful. Suction drain was removed after 48 hours and the patient was discharged on the 3rd postoperative day. Double-J stent was removed after 6 weeks. After 2 weeks following stent removal, nuclear scan showed no evidence of subrenal obstruction. The patient is doing well at 6 months of follow-up period.

DISCUSSION

Retrocaval ureter may be asymptomatic or discovered during radiologic imaging for some other problems.[6] Spiral CECT scan of the abdomen is said to be the gold standard investigation.[5] However, IVU shows the typical appearance of the ureter. Two types of retrocaval ureter have been described; type I is typical S-shaped or fish hook pattern (J-shaped) while type II has a more horizontal shape that gives it the appearance of sickle shape.

If the patient is symptomatic with documented subrenal functional obstruction, dismembered pyeloplasty is the gold standard treatment.[8,9] If the retrocaval portion is atretic, then it may be left in situ. Uretropelvic or uretroureterostomy is the recommended treatment in this situation.[19,20]

Over the past decade, few case reports and case series describing transperitoneal or retroperitoneal laparoscopic dismembered pyeloplasty with intracorporeal suturing have appeared in literature (Table). Till date, approximately 50 cases have been reported in literature using laparoscopic technique.

In this patient, there was an associated renal stone, which was changing position. Ultrasonography of the KUB suggested it as a pelvic stone, IVU showed it as inferior calyceal stone, while we located it in the renal pelvis during the procedure. Pyelolithotomy was done prior to the uretropelvic anastomosis.

Published literature on laparoscopic surgical management of the retrocaval ureter.

First Author	Year of publication	Number of patients	Access	Number of ports	Operation duration, min	Open conversion	Anastomotic time, min	Blood loss, mL
Baba[10]	1994	1	TP	5	560	-	150	NR
Matsuda[11]	1996	1	TP	5	450	-	NR	<30
Ishitoya[12]	1996	1	TP	4	365	1	NR	NR
Gaur[21]	1997	1	RP	4	300	1	NR	NR
Polascik[13]	1998	1	TP	3	225	-	Anastomosis done by automatic suture device	NR
Salomon[14]	1999	1	RP	4	270	-	NR	<20
Mugiya[20]	1999	1	RP	4	300	-	Anastomosis done by automatic suture device	50
Ameda[15]	2001	2	TP RP	4 4	450 400	- -	NR NR	20 NR
Gupta[16]	2001	1	RP	3	210	-	NR	NR
Miyazato[22]	2002	1	RP	3	180	-	NR	<50
Bhandarkar[23]	2003	1	TP	3	240	-	NR	NR
Ramalingam[17]	2003	2	TP TP	6 6	240 210	- -	NR	Minimal NR
Tobias-Machado[18]	2005	1	RP	3	130	-	40 Extracorporeal anastomosis	50
Simforoosh[19]	2006	6	TP	4	180	-	NR	<50
Gundeti[24]	2006	1	TP	3	210	-	Robot assisted	NR
Chung[25]	2008	1	TP	4	210	-	30	minimal
Fernandez-Fernandez[26]	2008	1	TP	3	60	-	NR, Extracorporeal anastomosis	NR
Xu[27]	2009	7	RP	3	128	-	-	20 (mean)
Smith[28]	2009	1	TP	3	294	Robot assisted	NR	-
Li[29]	2010	10	RP	3	82	-	-	<10
Autorino[30]	2010	1	TP	1	180	-	-	minimal
Hemal[31]	2010	4	TP	3	138	Robot assisted	-	98
Dogan[32]	2010	4	TP	4	210	-	NR	NR

TP indicates transperitoneal laparoscopic dismembered pyeloplasty; RP, retroperitoneal laparoscopic dismembered pyeloplasty; and NR, not reported.

Simforoosh and colleagues have reported simultaneous treatment of renal stone and retrocaval ureter with laparoscopic technique earlier.[19] Similarly, Mugiya and associates reported a case, in which retrocaval ureter and upper ureteric calculus were managed during the same procedure.[21]

Even with our limited experience, we believe that laparoscopic technique should be kept as the first option for the management of retrocaval ureter even if it is complicated by the presence of a renal calculus.

CONFLICT OF INTEREST

None declared.

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