Retro-Iliac Ureters: Review of Literature and Two Cases with Two Different Techniques

Retro-İliak Üreter: Literatür Özeti ve Farklı Teknikler ile Tedavi Edilmiş İki Olgunun Sunumu

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ABSTRACT Retro-iliac ureter (RIU) is a rare congenital condition that causes ureteral obstruction. Two cases with RIU treated by open and laparoscopic surgeries by us. To our knowledge, our second case is the first laparoscoply-repaired case in literature. First a 13-year-old boy had bilateral RIU and second a 5-year-old boy had right RIU. For the first patient, we performed open bilateral end-to-end anastomosis after repositioning the ureters anterior to the external iliac arteries. For the second case, we performed laparoscopic ureterolysis behind right common iliac and internal iliac arteries. Both patients were discharged from hospital on 3th day after operations and their symptoms were resolved on follow up. As conclusion, both techniques seem to be effective for the treatment of retro-iliac ureters.

Key Words: Ureteral obstruction; laparoscopy

ÖZET Retro-iliak üreter (RİÜ), üreteral obstrüksiyona yol açan ve nadir görülen konjenital bir anomalidir. RİÜ tespit ettiğimiz iki hasta tarafımızca açık ve laparaskopik olarak tedavi edilmiştir. İlk hasta 13 yaşında olup bilateral RİÜ saptanmıştır. İkinci hasta 5 yaşındadır ve sağ RİÜ saptanmıştır. İlk hasta için üreterler açık operasyon ile iliak damarların önüne alınarak bilateral uç uca anastomoz uygulanmıştır. İkinci hasta için laparoskopik olarak iliak damarla arkasında üreterolizis uygulanmıştır. Laparaskopik olarak tedavi edilen hasta literatürdeki ilk laparoskopik olarak tedavi edilmiş olan RİÜ olgusudur. Her iki hasta da operasyon sonrası 3. günde taburcu edilmiştir. Takiplerinde semptomlarının gerilediği izlenmiştir. Hem açık hem de laparoskopik cerrahinin RİÜ tedavisinde etkin olduğu değerlendirilmiştir.

Anahtar Kelimeler: Üreteral obstrüksiyon; laparoskopi

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Vascular anomalies, such as crossing accessory renal arteries, lumbar veins, retro-caval ureters, and ovarian vein syndrome may be responsible for ureteral obstruction.[1] Retro-iliac ureter (RIU) is a rare congenital condition that causes ureteral obstruction, infection or both. First RIU case was reported by Dees in 1940.[2] Since then there have been a few studies about RIUs and their effects. RIU is also reported as being in association with other urinary congenital anomalies like vaginal atresia, lumbosacral agenesis, malrotation of kidney.[2-5] In this article, we present two cases with RIU and two different surgical techniques.

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CASE REPORTS

Both of two patients gave their informed consent for participation in this report and permitted to use their other materials.

The first patient was a 13-year-old boy with cerebral palsy and epilepsy who was referred to our department for the assessment of recurrent hematuria and urinary tract infection. He had also bilateral undescended testes. Testes could be palpated bilateral at the distal inguinal canal and sonographic evaluation of the testes showed bilateral microlithiasis. His excretory urography (EU) showed delayed excretion of contrast into the ureters and extrinsic compression on the distal ureters at the level of sacroiliac joints (SJ) (Figure 1A). Ultrasonography (USG) of the kidneys showed bilateral hydroureteronephrosis, atrophy, and scar formation on the left kidney. A voiding cystourethrogram demonstrated a good capacity bladder without reflux. Multi dimensional computed tomography urography (MDCTU) showed that the ureters were passing behind the external iliac arteries and there were dilatation at proximal regions of ureters (Figure 1B). Passage of contrast material distal to the stenosis was shown poorly on computerize tomography (CT).

A pfannensteil incision was performed to explore the distal ureters and external iliac arteries. Bilateral ureters were dissected from the external iliac arteries and adjacent tissues. Dissection of the ureters was kept minimal in length in order to preserve the blood supply of the ureters. Ureters were divided from the external iliac arteries and transposed anteriorly over the external iliac arteries and reanastomosed end to end over a JJ catheter. The postoperative course was uneventful. Patient was discharged from the hospital on the postoperative 3rd day. At 6-month follow up, patient was free from haematuria and urinary tract infections. His EU showed no dilatation of pelvicaliceal systems or ureters and passage of contrast through the anastomosis was good.

The second case was a 5-year-old boy with right flank pain. Direct graph of kidney, ureter and bladder (KUB) showed 3 calculi at right renal region. USG confirmed the right renal calculi and showed right renal calyceal dilatation. EU demonstrated right ureteral dilatation till to the SJ and right renal calyceal deformation. Bladder capacity was good. With the suspicion RIU, Magnetic Resonance Urography (MRU) was applied. MRU revealed that right ureter was passing behind the right common iliac artery (RCIA) and right internal iliac artery (RIIA) (Figure 2). Ureter was dilated and tortious till to the RCIA and had 6-mm-long-stenotic segment behind RCIA. Stenosis behind RIIA couldn't be evaluated clearly because the

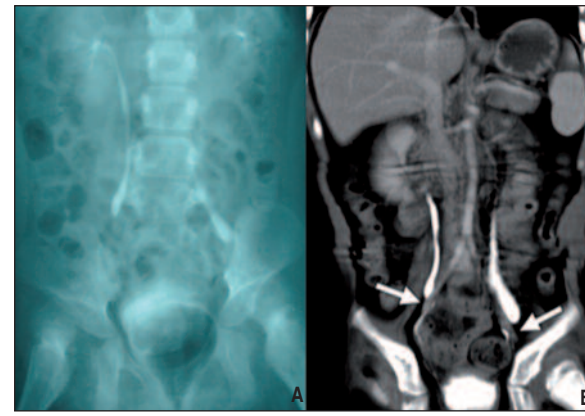

FIGURE 1: Radiographic images of first patient. **A.** Excretory urography: Extrinsic compression on the distal ureters at the level of sacroiliac joints. **B.** Coronal reformation CT image from biphasic contrast-enhanced Multi Dimensional Computed Tomography Urography (MDCTU) data: Both ureters show bilateral retro-external iliac artery course of ureters with ureteral dilatation.

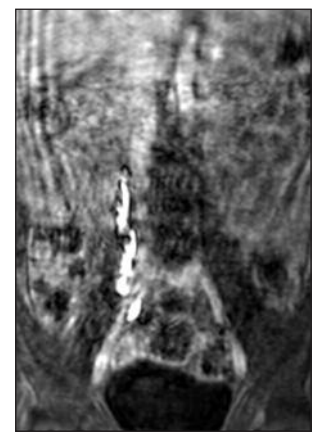

FIGURE 2: Magnetic Resonance Urography image for right retro-iliac ureter of second patient.

stenosis behind RCIA masked the distal part. Distal part of ureter from RIIA was normal till to the bladder. Diethylene triamine pentaacetic acid (DTPA) renal scintigraphy showed mild radionuclide stasis and mild response to intravenous (IV) diuretic of right kidney.

Ureterorenoscopy was applied firstly. Ureteric orifice was normal but stenosis began at 4 cm proximally from ureteric orifice. Pulsation of arteries could be seen easily and ureterorenoscope could difficultly be preceded proximally. This signs made us thought that the stenosis was due to external compression. Laparoscopic ureterolysis of ureter was planned. Before laparoscopy, a hydrophilic guide was proceeded into the right ureter by cystoscopy. After repositioning of the patient, peritoneal entrance and CO_2 insufflation were done by using a veress needle. Achieving the appropriate CO_2 pressure, 3 trocars (1 at umbilicus, 2 at inguinal regions of abdomen) were inserted intraperitoneally. Right ureter was seen passing behind the RCIA and RIIA. Posterior peritonea incised for the exposure of ureter. Ureter was grasped by laparoscopic babcock and dissected till to the bladder behind RCIA and RIIA (Figure 3). Finishing the dissection, incised peritoneum was sutured, and a JJ catheter implantation was done over the hydrophilic guide. The postoperative course was uneventful and the patient was discharged on the postoperative 3 day. At 3 and 12-month control, patient's flank pain was resolved and his excretory urography showed no dilatation of right ureter.

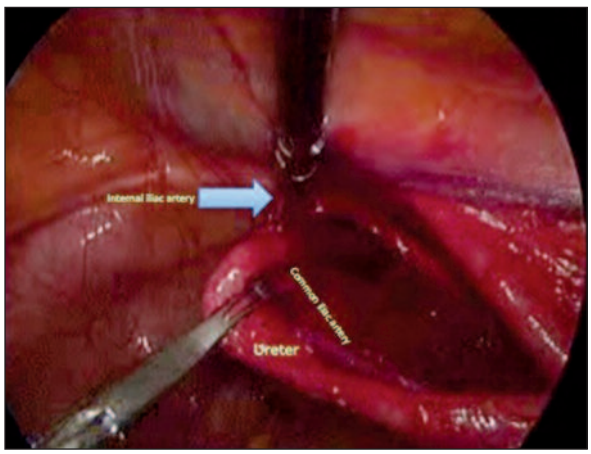

FIGURE 3: Laparoscopic dissection of ureter behind right common and internal artery.

DISCUSSION

Retro-iliac course of the ureter is a rare urologic anomaly. Nguyen et al. reviewed the reports of retro-iliac ureters and found only 24 cases till 1989, and from that time only a few cases have been added to literature.[2] RIU is thought to originate from embryologic defects.[1] Pathology of RIU is thought to be the abnormal migration of ureter behind iliac vascular system or abnormal development of the iliac vessels with persistence of the ventral root of the umbilical artery.[4-7] RIU is commonly located behind the common iliac artery, but other forms have been reported such as retrocommon iliac vein, retroexternal iliac artery or vein, and the retroexternal iliac artery or vein.[8] Abnormal migration of ureterer can cause additional urogenital anomalies such as malrotation of kidney, multicystic dysplastic kidney and vas deferentia inserting the ureter.[4,5,7] So, coexistence of other urologic anomalies can be seen in patients with RIU. In first of our patient, ureters were located behind external iliac arteries and in the second one right ureter was passing behind RCIA and RIIA. Our first patient had bilateral undescended testes with testicular microlithiasis and was reported in our previous study.[1]

The diagnosis of RIU depends on the suspicion. If the diagnosis cannot be determined clearly by USG and EU in a patient with hydronephrosis and ureteral dilatation, RIU should be thought.[1] The ureter usually dilated to the level of SJ, which helps us to differentiate this entity from retrocaval ureter. But in some cases aortic bifurcation may lay higher than normal position that leads to a dilatation of the retro-iliac ureter located at an unusually high level than sacroiliac joint.[5] These types of cases may be confused with retrocaval ureter before the evaluation of the vasculary system. In the first case bilateral ureters were dilated to the level of SJ and ın the second one only the right ureter was dilated to this level. MRU or MDCTU confirm the diagnosis and show the neighboring

ureter and vessels. In the first patient, we used MDCTU, because the family was not in favor of general anesthesia for MRU. In the second case we used MRU. Both revealed the anatomy well enough to see the course of ureter from kidney till to the bladder.

The gold standard treatment for retro-iliac ureters is ureteral resection and anterior transposition to the iliac vessels.[7] Arteries of the ureter lay longitudinally within the periureteral adventitia forming an extensive anastomosing plexus before reaching the ureter. The existence of these longitudinal ureteral arterial plexus allows the ureter to be safely mobilized from the surrounding retroperitoneal tissues without compromising the vascular supply, provided that the periureteral adventitia is not stripped.[8] In the first patient we performed direct ureteroureterostomy over a JJ catheter and, in the second case we performed laparoscopic ureterolysis. Ureters' dissections were kept minimal and the adventitia of ureters was not deformed to maintain the blood supply in both operations. To our knowledge no laparoscopic approach for RIU was reported in the literature. Only, Cobellis et al. reported a RIU case while laparoscopic nephrectomy for a nonfunctioning kidney, and that operation was not for the treatment of RIU.[7]

Although both of the patients' operations seem to be effective in the treatment of RIU, laparoscopic approach is a new option in these cases. As conclusion, RIU can be treated both with open or laparoscopic surgeries.

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