

# Laparoscopic Donor Nephrectomy for a Right Pelvic Kidney; A Case Report of Challenging Dilemma

Sağ Pelvik Böbrekte Laparoskopik Donör Nefrektomi; Zorlu ikilem Olgusu

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## Özet

Transplantasyon ve diyaliz son dönem böbrek yetmezliğinin temel tedavi seçenekleridir. Kalıcı çözüm sağlayan nakil işlemi kadavradan ve canlıdan olmak üzere iki farklı şekilde yapılabilir. Kadavradan nakil arzu edilen seçenek olsa da ülkemizde yapılan böbrek nakillerinin yaklaşık yüzde 70'i canlıdan yapılmaktadır. Canlıdan yapılan donör nefrektomilerde sağladığı avantajlar nedeniyle genellikle sol böbrek tercih edilir ve minimal invaziv yöntem olan laparoskopi kılavuzlarca önerilmekte ve cerrahlarca tercih edilmektedir. Bu çalışmamızda sağ pelvik yerleşimli ve kompleks renal vasküler yapısı olan ve 99mTc-Dimerkapto-süksinik asit sintigrafide fonksiyonu % 45 olması nedeniyle tercih edilen ve laparoskopik sağ pelvik donör nefrektomi yapılan olgu sunulmuştur.

**Anahtar Kelimeler:** donör nefrektomi, laparoskopik, pelvik böbrek

## Abstract

Transplantation and dialysis are the main treatment options for end-stage renal failure. Transplant, which provides a permanent solution, can be done in two different ways: cadaver and living. Although transplantation from cadaver is the desired option, approximately 70 percent of kidney transplants in our country are made from live donors. In living donor nephrectomies, the left kidney is generally preferred due to its advantages, and laparoscopy, a minimally invasive method, is recommended by guides and is preferred by surgeons. In this study, we present a case with right pelvic location and complex renal vascular structure and preferred for laparoscopic right pelvic donor nephrectomy due to its function on 99mTc-Dimercaptosuccinic acid scintigraphy.

**Keywords:** donor nephrectomy, laparoscopic, pelvic kidney

## INTRODUCTION

Renal transplantation is the gold standard method while managing End Stage Renal Disease (ESRD) [1]. Living organ donation is frequently chosen not only in our country but also in many others while the incidence of ESRD is increased and cadaveric renal donation is very limited in number. Efforts have been made in order to extend the sources of living donors, including those after cardiac death, marginal donors, and ones with ectopic kidneys or even kidneys which small tumors were previously excised from [2, 3].

Even though they serve as sources to renal transplantation, being a relatively rare anomaly, ectopic kidneys are mostly accompanied by vascular anomalies or anomalies regarding drainage. This condition causes technical problems related with transplantation surgery and utilization of such kidneys is between two fires.

The transplantation of ectopic kidneys was first reported in 1973 [4]. During the last three decades there are only a few case reports and most of them were open surgeries due to the complexity of the anatomy [5-8].

In a previous case report, laparoscopic left ectopic donor nephrectomy was reported in living donor [9], although to the best of our knowledge, our case is the first to report the successfully transplanted kidney obtained via laparoscopic right donor nephrectomy from a living donor.

## CASE REPORT

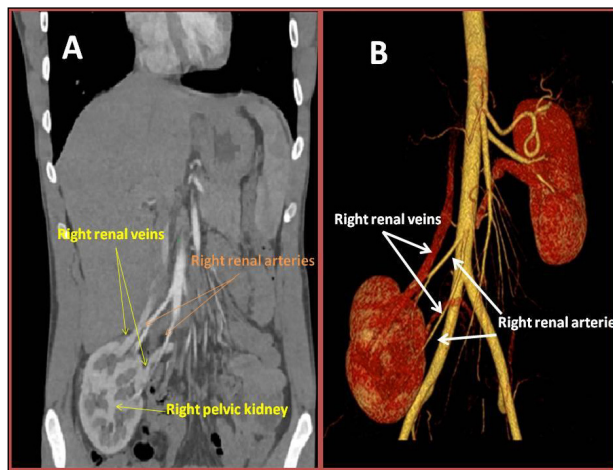
Our donor case was a healthy 25 year-old male who donated his kidney to his brother. He had no significant history of medical incidents. His Body Mass Index (BMI) was 20. During the preoperational workup it was reported that there was a right pelvic kidney and a left kidney in the anatomical location (Figure 1). His physical examination revealed no abnormalities. Blood measures and urea testing were normal. Relative function of the ectopic kidney was 45% in DMSA measure. During our multidisciplinary meeting of renal transplantation, it was agreed that right laparoscopic donor nephrectomy is to be performed. Computerized Tomography Angiography (CTA) revealed 2 renal arteries, 2 renal veins and 1 ureter on the right. The ectopic

kidney was measured 98 mm x 63 mm. The renal arteries were originating from aorta at the inferior mesenteric artery level (Figure 1).

The patient was placed in left lateral decubitus position (Figure 2). Five centimeters medial to the right anterior superior iliac spine, intraperitoneal plane was reached via right inguinal incision of approximately 5 to 6 cm parallel to the inguinal ligament. Hand port (GelPort Applied Medical, Rancho Santa Margarita, CA, USA) was then placed. Once the pneumoperitoneum was achieved, camera port was placed 2 cm inferolaterally to the umbilicus, different from that usually preferred due to the unusual localization of the ectopic kidney. Later, 10 mm port was placed on the right side of the camera port at the midclavicular line. One 10 mm port was placed through the hand port. Assistant port of 5 mm was placed at the anterior axillary line for the retraction (Figure 2). The colon was mobilized medially from the Toldt plane. Ureter and right common iliac artery were identified. Dissection was furthered through cranial plane and renal arteries as well as veins were dissected. The kidney was freed from its surrounding tissue until it was only connected with renal vessels (Figure 3). Renal arteries were stapled via Endo-TA stapler (Covidien, Mansfield, MA, USA). Renal veins were then clipped with the help of Hem-o-Lok clips (Weck Surgical Instruments, Teleflex Medical, Durham, NC, USA) and kidney was removed through the hand port. Warm ischemic time was 100 seconds. On the bench, the thin one among the renal veins was sacrificed (Figure 3). Duration of the donor surgery was 95 minutes and the estimated amount of blood loss was 70 ml.

The recipient was 21 year-old male holding the diagnosis of IgA nephropathy and he was on 3/7 hemodialysis due to end stage chronic kidney disease. The recipient and donor were told that IgA nephropathy is a recurrent disease, and there may be a possibility of relapse after transplantation. It has been explained that in case of relapse, there may be a loss of graft and this rate is approximately 7 to 10 percent in 10 years and their approvals were obtained (10). Transplanted kidney was localized in right iliac fossa. Two renal arteries were anastomosed end-to-side and then renal vein was

anastomosed with iliac vein end-to-side (Figure 3). Transplanted kidney was immediately re-perfused. The cold ischemic time was 30 minutes while the time for arterial anastomosis and the venous anastomosis being 21 minutes and 15 minutes, respectively. Subsequently, the ureter was anastomosed to the bladder with modified Lich-Gregoir technique and double pigtail stent was placed. The duration of ureteral anastomosis was 14 minutes. Abdominal wall was then closed and the operation completed. The duration of the recipient surgery was 240 minutes and estimated amount of blood loss was 200 ml. Blood loss was calculated by measuring the amount of blood accumulated in the aspirator

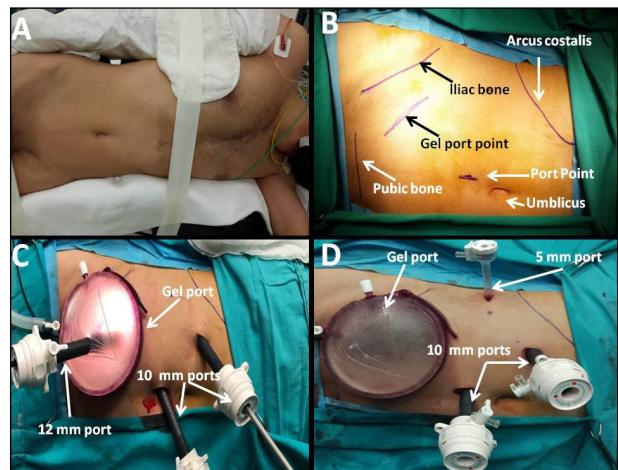


**Figure 1.** Preoperative Computerised Tomography images. A: Coronal view. B: Renal pedicle after VRT 3D reconstruction.

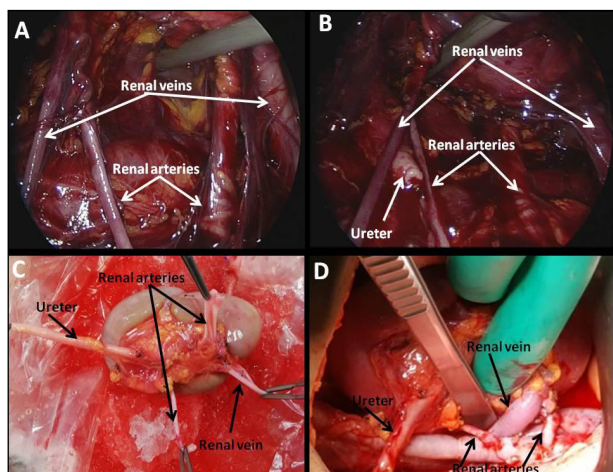
after the operation.

Donor nephrectomy and transplantation of the kidney to the recipient were performed by two separate surgical teams.

Neither the donor nor the recipient had pre-operative or post-operative complications of any kind. The donor was discharged at the post-operative day 2. The creatinine levels of the donor at the 3th month were within normal limits. The incisional scars at post-operative day 7 were represented in Figure 4. The recipient was discharged at post-operative day 8 and at this time the Creatinine level was 0.8 mg/dl. Creatinine level at the end of the first month was 0.8 mg/dl.



**Figure 2.** Patient positioning and port placement. A: Lateral decubitus position. B: Landmarks for port placement. C: Port placement in the beginning of the operation. D: Additional 5 mm port to retract the ureter.



**Figure 3.** Intraoperative images. A: Laparoscopic image of the dissected renal pedicle. B: Dissected ureter. C: Dissection of the additions of graft kidney in the bench surgery. (Smaller vein was ligated) D: Transplanted graft.



**Figure 4.** Incisional scars of donor nephrectomy at post-operative day 7.

## DISCUSSION

Ectopic pelvic kidney is a congenital anomaly first recognized by 16th century anatomists and is due to migration failure of the kidneys to their anatomical end localization at lumbar region during the embryonic period. Dretler et al reported the incidence of this anomaly as 1/1000 in a remarkable number of autopsies. There is a site preference towards the left and is more common among men (11)

Pelvic kidneys have a flatter and discoid shape and is smaller than usual due to their incomplete malrotation. Renal pelvis is also localized more anteriorly due to this malrotation. In half of these patients there is secondary hydronephrosis either due to ureteropelvic or ureterovesical obstruction, Grade 3 or higher level of reflux or even due to the malrotation itself (35%, 15%, 25%, 25%; respectively) (12). Besides, similar to that is seen in our case; short ureter, defective ureteral drainage, multiple renal arteries or veins may accompany malrotated renal pelvis.

During the donor surgery, pre-operative imaging is extremely important in order to enlighten the renal anatomy beforehand, and to avoid serious complications which may even end up with graft loss. Even so, the mismatch of CT renal angiography and surgical exploration is approximately seen in 5 to 15% of the cases (13).

There are only a few case reports representing successfully transplanted pelvic kidney most probably due to the complexity of the anatomy (4-7,8,9,14-17). In most of the cases this complexity necessitated an open surgical approach (5-8)).

First laparoscopic nephrectomy was defined by Clayman et al at 1991 and once enough experience was gathered Ratner et al performed the first laparoscopic donor nephrectomy at 1995 [18,19].

Given the fact that the donors are healthy individuals, the ultimate goal is less post-operative pain, short hospital stays, early mobilization and tolerable cosmetic results. This is the reason why laparoscopic donor nephrectomy is chosen over open surgery [20]. Moreover, in some case series it is reported that the utilization of Gel Port™ (Applied Medical, Rancho Santa Margarita, CA) reduces the warm ischemic time and is of benefit in preventing possible complications during

laparoscopy (21).

The graft kidney is so important that the preferred surgical technique should be the one, which the surgeon is more comfortable with. We performed transperitoneal laparoscopic donor nephrectomy via Gel Port™ (Applied Medical, Rancho Santa Margarita, CA) in which we are most experienced.

## CONCLUSION

We state that the utilization of ectopic kidneys in transplant surgery might not extend the donor sources significantly, although it is possible to transplant ectopic kidneys if the renal vascular anatomy is revealed pre-operatively and also to obtain graft kidneys via laparoscopic donor nephrectomy if the operation team is experienced in vascular reconstruction. As a result, laparoscopic pelvic donor nephrectomy can be performed effectively and safely in high-volume centers and limited-compulsory situations by experienced surgeons.

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## Ethical Statement

Informed consent was obtained once the risks were discussed with the patient in details. This case report did not require ethical approval from our institute. The patient gave permission for the publication of details of his case. His anonymity has been preserved.

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