Laparoscopic clampless partial nephrectomy for T1 kidney tumor with subsequent successful transplantation

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Kidney transplantation is considered the treatment of choice for patients with end-stage renal disease. However, the kidney transplantation rate has remained stable over the last few years while the waiting lists have been steadily increasing. Marginal organs such as kidneys with small renal masses have also been proposed as potential kidney transplants. We report the case of a 57-year-old woman who underwent clampless laparoscopic left partial nephrectomy, and subsequently, the remaining graft was successfully transplanted to her 59-year-old husband.

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CASE REPORT

Patient characteristics and clinical findings

A 57-year-old woman was identified as a compatible kidney donor for her unrelated husband, a 59-year-old man with end-stage renal disease (ESRD) of unknown etiology. During the pretransplant screening, the donor was diagnosed with an asymptomatic 3x3x2cm T1 renal mass near the posterior surface of the inferior pole of the left kidney (Figures 1, 2). After considering the possible surgical options (in situ partial nephrectomy versus ex vivo tumor excision), laparoscopic partial nephrectomy was performed.

Procedure

A laparoscopic living donor nephrectomy with in situ tumor excision was performed. Total tumor removal was followed by a frozen section biopsy from the tumor base that turned out to be negative. In native partial nephrectomy, renal vessels are sometimes clamped during the procedure. However, in our case, renal vessels were not initially clamped to avoid potential vessel damage and additional warm ischemia. Following renorrhaphy and diligent hemostasis, the vessels were clamped with clips and subsequently widely dissected (Figure 3). The specimen was removed and flushed with UW solution at the back table. Afterward, a standard

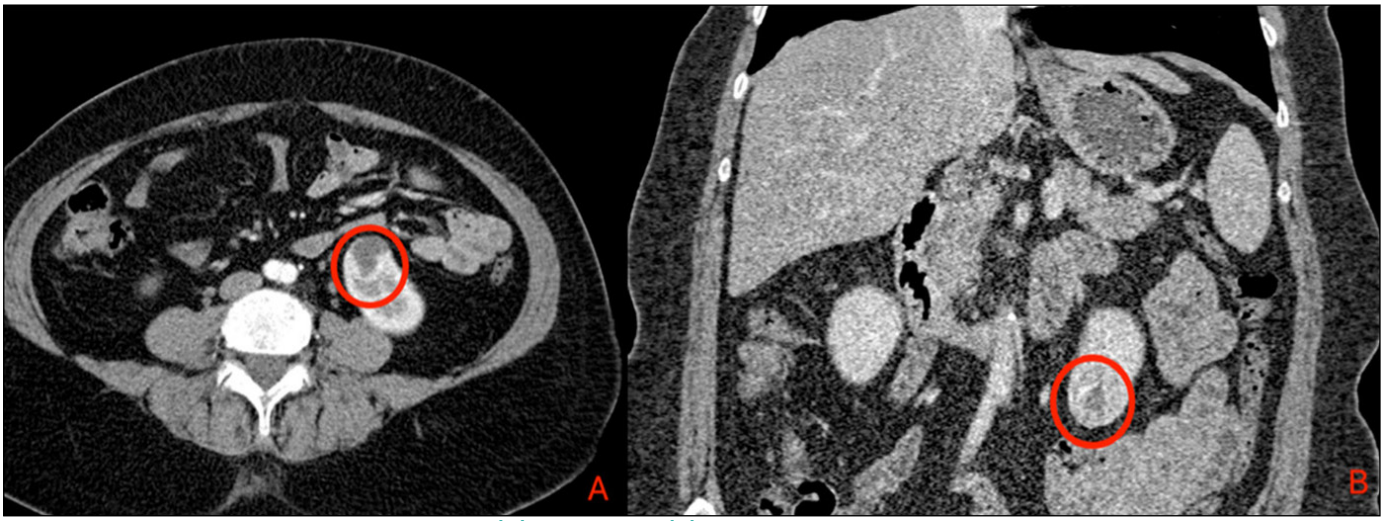

Figure 1. *Computed Tomography scan in axial* **(A)** *and coronal* **(B)** *plane. The red circle presents the tumor site.*

transplantation procedure was followed with minimal blood loss and no need for recipient transfusion. End-to-site anastomoses were performed between the donor renal vein and the recipient external iliac vein as well as between the donor renal artery and the recipient external iliac artery. The kidney was fully reperfused without active bleeding from the mass abscission site. The ureter was anastomosed to the bladder with an end-to-site anastomosis using single antireflux sutures. The latter anastomosis was performed over a 7 Fr ureteric stent which had been placed prior to the surgery.

Follow-up and outcome

Donor warm ischemia time as well as recipient warm and cold ischemia time were 6 min, 48 min and 410 min, respectively. The post-transplant doppler scan confirmed good kidney graft perfusion with normal waveforms. Immediately after the transplantation, serum creatinine and urea level were 4.9 mg/dl and 96 mg/dl, respectively. However, the average hourly urine output decreased steadily after postoperative day 2, and on postoperative day 3 the hourly urine output didn't exceed 70 ml/h. Consequently, the patient underwent dialysis, and the next day transplant biopsy was performed. Acute humoral rejection was revealed and was successfully treated with pulsed steroids and plasmapheresis. The patient was discharged on postoperative day 14, showing satisfying levels of daily urine output, as well as stable creatinine (2.9 mg/dl), urea (151 mg/dl) and potassium (4.0 mmol/L) levels. The donor recovered uneventfully and was discharged on postoperative day 2. The excised renal mass biopsy revealed oncocytoma.

Figure 2. *3-Dinemsional reconstruction of the Computed Tomography scan. The red circle presents the tumor site.*

DISCUSSION

Current literature suggests that the best therapeutic option for patients suffering from ESRD is kidney transplantation as it provides lower mortality rates compared to hemodialysis as well as a better quality of life [1, 2, 3]. Depending on the source of the donor organ, kidney transplant is classified

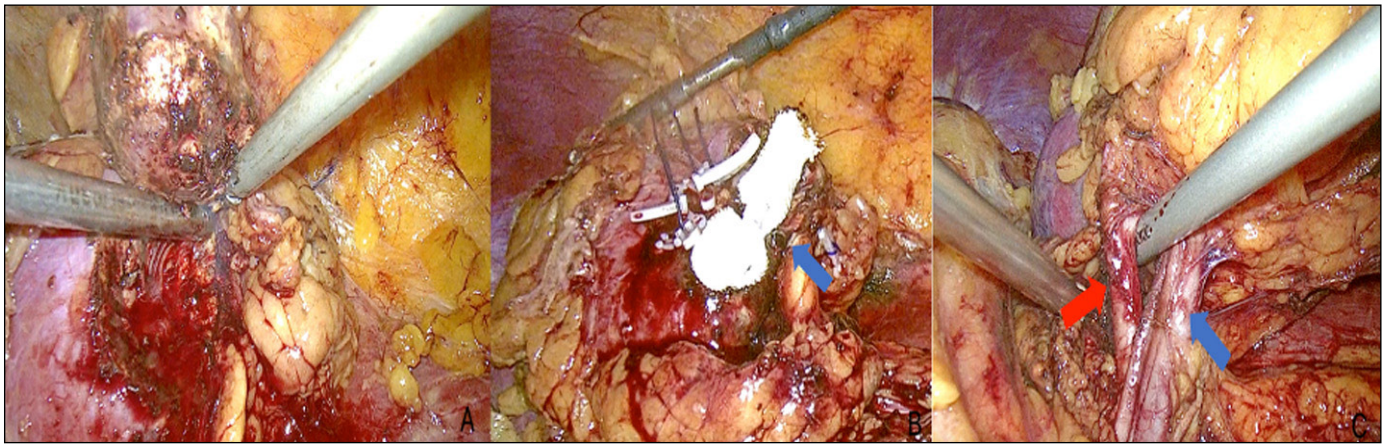

Figure 3. A) *Tumor excision.* **B)** *Renorraphy of the tumor site (blue arrow).* **C)** *Wide dissection of the renal artery (red arrow) and renal vein (blue arrow)*

as deceased-donor or living-donor specimen [4]. Living donor kidney transplantation is becoming a more realistic option for patients [4]. Among other benefits, living donor kidneys are associated with better graft function and longer graft survival compared to deceased donor transplants [4]. Thus, even kidneys that were previously considered marginal or unsuitable due to benign lesions are now being taken into consideration for potential transplantation [5]. Since living donors are mainly healthy individuals, it is important to ensure both their safety and the best outcome for the recipient [4].

To expand the living donor pool, many urological surgical techniques should be taken into consideration [1]. One of them is partial nephrectomy, which is safe for both the donor and the recipient and should be considered among potential donors with benign renal lesions [1]. Due to the widespread usage of ultrasound and computed tomography, the number of incidentally discovered renal masses has increased. Partial nephrectomy is the treatment of choice for localized renal tumors as it shows good oncological and functional outcomes [6]. Nevertheless, doubt still exists whether these kidneys should be used for transplantation considering the potential risk of donor transmitted malignancies [7, 8]. The past decades, radical nephrectomy was the gold standard for renal carcinoma. However, longitudinal studies have shown that local recurrence risk and metastatic spread in pT1 renal tumors was extremely low [7]. Therefore, partial nephrectomy is increasingly being used in transplant recipients with de novo renal cell carcinoma within the kidney graft, especially for tumors less than 4 cm [7].

Our case demonstrates the feasibility of the technique which ensures minimal blood loss and optimal hemostasis as well as kidney perfusion maintenance and wise renal function. This technique could also be considered in patients receiving anticoagulants perioperatively as it minimizes the potential need for intra- or post-operative transfusion.

CONFLICT OF INTERESTS

Authors declare no conflict of interest.

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