Case Report

Partial nephrectomy for a completely endophytic tumor in an allograft kidney, 14 years after transplantation

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ABSTRACT

We report our experience with nephron-sparing surgery for a completely endophytic small renal mass in an allograft kidney. A 37-year-old female, 14 years post live-related renal transplant for end-stage renal disease due to crescentic glomerulonephritis, presented with a 3.6 cm renal mass. She underwent open allograft partial nephrectomy and was discharged on the 5th postoperative day. Six months postsurgery, she showed excellent graft function with no tumor recurrence. Nephron-sparing surgery of the allograft kidney presents challenges regarding vascular anatomy, hilar, and parenchymal adhesions making the surgery difficult, but is feasible and oncologically safe for transplant recipients with tumors in the allograft kidney.

INTRODUCTION

Renal cell carcinoma (RCC) accounts for 3% of the total global cancer diagnosis and deaths, and, in the last 50 years, its incidence has doubled.[1] Compared to the general population renal transplant recipients are twice as likely to develop a malignancy, with RCCs occurring in 1.5%–4.6%.[2,3] The native kidneys are the usual site of occurrence. Rarely RCC can arise in the allograft kidney.

Nephron-sparing surgery (NSS) is the standard of care for small renal mass (SRM) and for selected larger tumors.[1] However, for tumors arising in the allograft kidney, there is no consensus on the optimal treatment, historically, radical nephrectomy was considered the first-line option in view of aggressive pathology and an increased potential for metastasis.[2]

However, this results in the patient becoming dialysis dependent again, adversely affecting the quality of life and life expectancy. We report on our experience with performing NSS for a completely endophytic SRM arising in the allograft kidney, 14 years after transplant.

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CASE REPORT

A 37-year-old female, 14 years post live-related renal transplantation performed for end-stage renal disease (ESRD) due to antiglomerular basement membrane antibody disease presenting as crescentic glomerulonephritis, was referred to us for a 3.6 cm renal mass in her graft kidney detected on routine annual evaluation. She had been on triple agent immunosuppression of tacrolimus, azathioprine, and prednisolone since transplant. At presentation, her serum creatinine was 1.06 mg/dl (eGFR of 62 ml/min). Magnetic resonance imaging [Figure 1] showed the graft kidney in the right iliac fossa measuring 10.1 cm × 5.6 cm with normal ancillary parameters. In the lower third of the graft, an entirely endophytic, well-defined T2 heterointense/T1 isointense mass was noted measuring 3.6 cm × 2.6 cm,

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closely abutting the lower pole calyces, nephrometry score of 9×. Emphasis was given to the location of renal vasculature and hilar structures in relation to the tumor to decide on the best approach for surgery. She underwent percutaneous ultrasound-guided Trucut biopsy of the renal mass, which was reported as a clear cell RCC, ISUP Grade 2.

We proceeded with an open allograft partial nephrectomy. A modified Gibson incision was made along the previous scar, adhesions were carefully separated and the graft was exposed. Dense adhesions around the hilum precluded dissection of the renal vessels, hence, the right common iliac vessels were looped and clamped. As the tumor was entirely endophytic, intraoperative ultrasonogram was used to assess the position and extent of the tumor and to plan the best approach for the excision of the tumor. Surface cooling was performed with crushed ice, subsequently, enucleoresection of the mass was performed [Figure 2]. The parenchymal defect in the remnant kidney was approximated with a two-layered renorrhaphy. The total warm ischemia time was 18 min. Preservation of lower limb perfusion was confirmed with intraoperative Doppler both pre- and postprocedure. She maintained adequate urine output throughout the surgery and in the postoperative period. The immunosuppressive regimen was not interrupted, and serum creatinine remained stable. The postoperative period was uneventful, and she was discharged on the 5th postoperative day with a serum creatinine of 1.14 mg/dl.

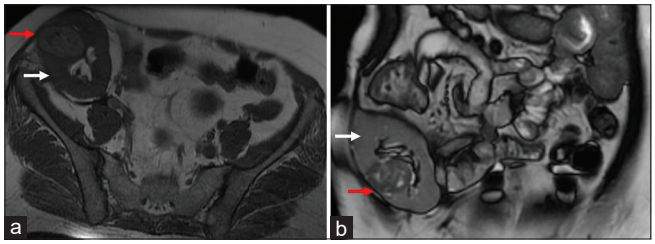

Figure 1: Magnetic resonance imaging abdomen. Axial (a) and coronal (b) images showing a completely endophytic tumor (red arrow) in the allograft kidney (white arrow) in the right iliac fossa

The histopathological report showed pT1aNx, clear cell RCC of size 2.5 cm × 2 cm × 2 cm, ISUP Grade 2 with no sarcomatoid or rhabdoid differentiation, with uninvolved resection margins.

At 6 months postsurgery, the serum creatinine was 1.21 mg/dl and graft ultrasound showed normal Doppler parameters with maintained corticomedullary differentiation and no evidence of tumor recurrence.

DISCUSSION

RCC occurring in the transplant allograft is rare, with a reported rate of 0.2%–0.5%.[2] An increasing incidence of these tumors has been attributed to expanded donor criteria for age, and an increased survival of the graft and patient due to improvements in posttransplant care and immunosuppression.

Among the risk factors for developing RCC after kidney transplantation, longer duration of pretransplant dialysis, immunosuppression with calcineurin inhibitors rather than proliferation signal inhibitors, over immunosuppression, and development of obesity after transplantation have been proposed to be potentially modifiable risk factors.[4]

Clear cell RCC, papillary RCC, and chromophobe RCC have been reported in the allograft, with either clear cell or papillary tumors being the most frequent in different series.[2] Notably, the overt predominance of clear cell RCC as in the general population is not seen.

An allograft nephrectomy has been associated with a significantly worse survival outcome in comparison to surviving allograft recipients and notably even ESRD patients

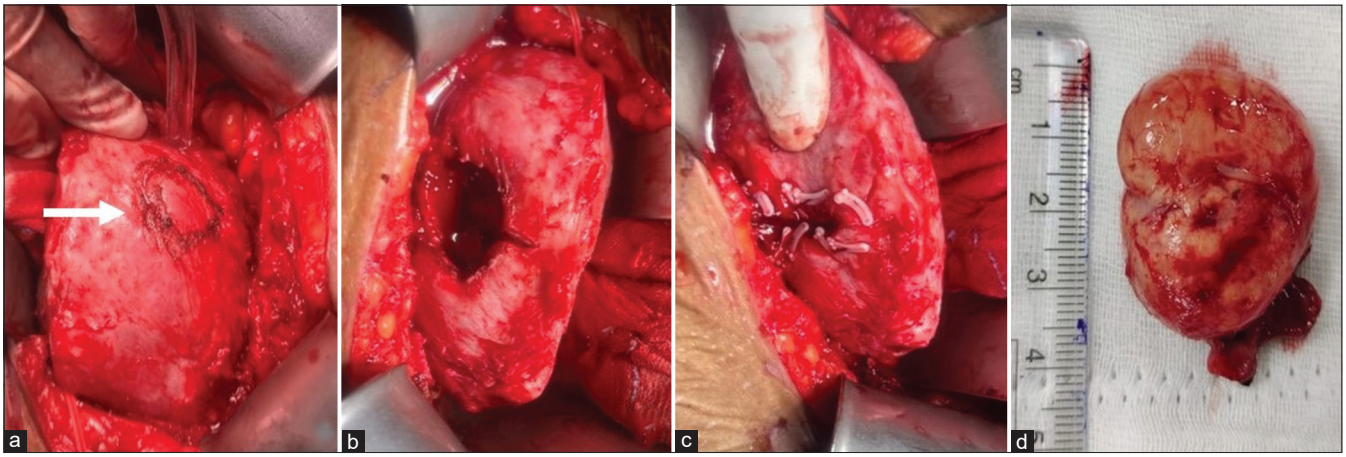

Figure 2: Intraoperative images. Tumor delineation on kidney cortex (white arrow) using intraoperative ultrasonogram (a), residual allograft kidney after tumor resection (b), after completion of renorrhaphy (c) and the resected tumor (d)

on the transplant waiting list.[5] Hence, nephron-sparing approaches must be attempted whenever feasible.

Partial nephrectomy of the allograft kidney presents several challenges, including difficult vascular anatomy and adhesions around the hilum and parenchyma making hilar control, renal mobilization, and subsequent resection difficult. As in our case, dissection and control of the common iliac vessels is safer and can prevent iatrogenic injuries to the hilum which may be difficult to repair. The value of intraoperative ultrasonogram, particularly in a completely endophytic tumor as in this patient, cannot be overemphasized. The tumor location, kidney surface to tumor distance, and the presence of major vasculature and collecting system can be ascertained, which can guide surgical approach to minimize collateral damage to the normal kidney.

Alternatives to NSS include cryoablation and radiofrequency ablation, although their use has been reported, long-term follow-up data are lacking.

Graft nephrectomy is recommended in infiltrative tumors, sarcomatoid histology, when tumor size, location, or multifocality precludes nephron-sparing approach.

Due to the antiproliferative effect of proliferation signal inhibitors such as sirolimus or everolimus, change of immunosuppressive regimen to these drugs from calcineurin inhibitors has been suggested by some authors.

As with RCC in the general population, a good prognosis can be expected with timely management in early-stage tumors. In addition, in most series reports, patients maintained renal function, with most remaining dialysis free after nephron-sparing approaches, on short-term follow-up.

CONCLUSION

NSS is feasible and oncologically safe in renal transplant recipients with tumors arising from allograft kidney, even when entirely endophytic, especially when aided by intraoperative ultrasound, meticulous preoperative planning, and a sound surgical approach.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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