

Renal cell carcinoma in renal allograft: Case series and review of literature

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Abstract

Renal cell carcinoma (RCC) in transplanted kidneys has been reported sporadically with incidence of about 0.5%. There are currently no standard guidelines on the management of allograft RCC in renal transplant recipients. Our objective was to study effectiveness of nephron-sparing surgery (NSS) for allograft RCC. We performed a retrospective analysis of patients with RCC in renal allografts managed with NSS in our institution from January 2000 to December 2015. Patient demographics, interval between transplant and RCC diagnosis, operative parameters, perioperative complications, final pathology, and renal function were evaluated. Three females underwent successful NSS for allograft RCC. Cause of end-stage renal disease was IgA nephropathy in all; mean time between renal transplant and diagnosis of RCC was 23 years. We were able to stay extraperitoneal in all the cases. In the final pathology, two had papillary and one had clear cell RCC. One patient developed pyelocutaneous fistula which was managed by stenting. Long-term functional outcomes of NSS are excellent; none of our patients is dialysis dependent.

Keywords: Allograft, nephron-sparing surgery, renal cell carcinoma

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Received: 25.04.2017, **Accepted:** 25.12.2017

INTRODUCTION

Renal cell carcinoma (RCC) in transplanted kidneys has been reported sporadically with incidence of about 0.5%.^[1,2] There has been a reported rise in detection of RCC in transplanted kidneys due to increasing age of the donors and the increasing graft and patient survival. The other risk factors include cigarette smoking, obesity, hypertension, and environmental risk factors.^[3]

RCC in the allograft kidney can be managed with radical nephrectomy, nephron-sparing surgery (NSS), radiofrequency ablation (RFA), or active surveillance. There are currently no standard guidelines on the

management of allograft RCC in renal transplant recipients.

We present a retrospective analysis of three patients with RCC in renal allografts managed with NSS in our institution.

CASE REPORTS


Case 1

A 61-year-old female with end-stage renal disease (ESRD) secondary to IgA nephropathy received deceased donor renal transplant (DDRT) in 1986. Posttransplant, her

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How to cite this article: Vasisth G, Kapoor A, Piercey K, Lambe S. Renal cell carcinoma in renal allograft: Case series and review of literature. Urol Ann 2018;10:229-32.

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/UA.UA_66_17

baseline creatinine varied in the range of 140–180 $\mu\text{mol/L}$. In the follow-up, ultrasound scan (USG) of the transplant kidney in 2012 demonstrated a complex cystic lesion in the lower pole. Contrast-enhanced computerized tomography scan (CECT scan) was performed which revealed a 3.4 cm transverse \times 3.1 cm AP \times 3.9 cm cephalocaudal exophytic mass arising from the lower pole of the right iliac fossa transplant kidney which was mildly heterogeneous and mildly hyperattenuating. USG-guided core biopsy proved the mass to be malignant, papillary RCC Type 1.

Partial nephrectomy was performed with estimated blood loss of 500 ml and histopathology examination (HPE) confirmed papillary RCC with negative margins. In the postoperative period, she developed pyelocutaneous fistula which was managed by stenting the transplant ureter. Four-year postpartial nephrectomy, her creatinine ranges 200–220 $\mu\text{mol/L}$ and she is not dialysis dependent.

Case 2

A 57-year-old female received identically matched live renal transplant in December 1990; the cause of renal insufficiency was IgA nephropathy. In December 2012, she was incidentally diagnosed having small renal mass in the upper pole transplant kidney in USG done for abdominal pain. CECT scan confirmed a solid enhancing lesion that measures 2.5 cm \times 2.1 cm. In January 2013, partial nephrectomy was performed. Intraoperatively, the main renal artery coming from external iliac artery was dissected and clamped. The blood loss was approximately 250 ml, and vascular clamp time was 25 min. The final histopathology was unifocal 2 cm clear cell RCC, grade 2/4, negative margins. Her baseline creatinine posttransplant was maintained in the range of 100–120 $\mu\text{mol/L}$, and 3-year postpartial nephrectomy, her creatinine is 140–170 $\mu\text{mol/L}$.

Case 3

A 53-year-old female diagnosed with ESRD secondary to IgA nephropathy received DDRT in 1993. Her baseline creatinine after transplant was 100–110 $\mu\text{mol/L}$. In July 2015 ultrasound of transplant, kidney was suggestive of the upper pole hypoechoic mixed cystic solid lesion. Subsequently, magnetic resonance imaging (MRI) was performed which demonstrated a well-encapsulated exophytic lesion in the upper pole which measured 7.2 cm \times 6.2 cm \times 6.9 cm [Figure 1]. Ultrasound-guided biopsy of the mass was inconclusive. However, due to high clinical and radiological suspicion of malignancy, partial nephrectomy was performed in January 2016. Intraoperatively, renal vessels were clamped *en bloc* after dissection of kidney off the peritoneum [Figure 2]. The procedure was uneventful with estimated blood

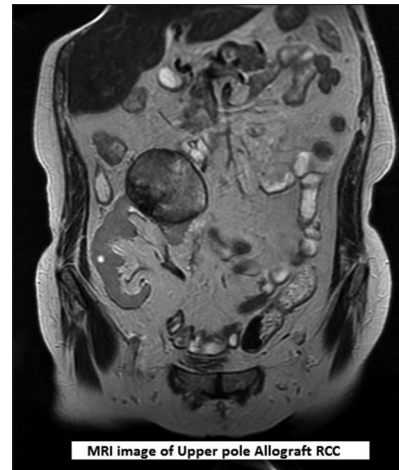


Figure 1: Magnetic resonance imaging image of upper pole allograft renal cell carcinoma

loss of 200 ml and ischemia time of 12 min. The final histopathology was unifocal 7 cm papillary RCC with negative margins. Six-month postpartial nephrectomy, her creatinine is 130–140 $\mu\text{mol/L}$.

DISCUSSION

Kidney transplant is the treatment of choice for ESRD, with advantages of extended life expectancy, improved quality of life, and cost-effectiveness.^[4-6] Patients undergoing renal transplant have overall higher risk of malignancies, especially skin cancer, hematologic cancer, and Kaposi sarcoma. Genitourinary malignancies are the second most common in the list, RCC being most prevalent.^[7]

RCC in transplanted kidneys has been reported sporadically with incidence of about 0.5%. RCC is more likely to develop in the native kidneys of a transplant recipient and accounts for 5%–16% of the posttransplantation malignancies.^[3] There is a higher risk of RCC in native kidneys than in the general population due to well-defined risk factors of end-stage kidney, acquired cystic kidney disease, and chronic hemodialysis.^[8,9] All the patients undergoing renal transplant are screened by ultrasound annually for the development of any pathology, and if suspicious mass found, it is confirmed by CT/MRI and needle biopsy.^[1,10]

Several previous studies stated that early occurrence of cancer in allografts is suggestive of their preexistence in renal parenchyma. However, time limit between transmitted tumors and *de novo* tumors remains unclear, but one large retrospective study has suggested 2 years as cutoff.^[11] In our series, the mean time between renal transplant and diagnosis of renal transplant was 23 years suggesting that RCC was not preexisting at the time of

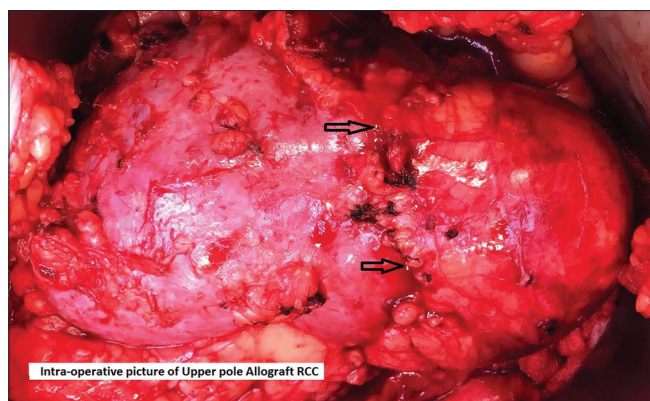


Figure 2: Intraoperative picture of upper pole allograft renal cell carcinoma

transplant. Furthermore, DNA analysis can be used to find the origin of tumor cells.^[12] We did not perform the DNA analysis in our study.

The presentation of tumors was incidental in follow-up; all of them were detected by ultrasound first then radiologically characterized by either CECT scan or MRI. Similar for native kidney tumors, if allograft tumors have symptomatic presentation, they have poorer prognosis.^[13] Ultrasound-guided biopsy was performed for all three, two confirming the pathology. As in native kidney tumors, NSS should be offered in selected patients as an alternative to transplantectomy. Multiple case reports and case series have reported feasibility and functional advantage of NSS in allograft RCC. NSS was done in all three patients with allograft RCC in our series. Long-term functional outcomes of NSS are excellent; none of our patients is dialysis dependent even 3–4 years' post-NSS.

Alternative to NSS in allograft RCC is similar to native RCC. Patients with small renal mass in transplanted kidney can be offered thermal ablative therapy. RFA has been used in allograft RCC and has proven to be safe and effective.^[14,15]

The incidence of subtype of RCC has been reported variably in the literature, papillary RCC being similar to the incidence in native RCC.^[16,17] However, lately, a comprehensive review has reported 45% papillary, 47% clear cell, and 3% clear cell (tubulo) papillary.^[18] In the present series, two cases (66%) were papillary and one (33%) of clear cell RCC. Although sample size is small, it corresponds to higher incidence of papillary RCC.

The surgery was performed through the same incision made for renal transplantation. We were able to stay extraperitoneal in all the three cases without much difficulty. A note was made that it was technically easy to dissect in

these cases as compared to transplantectomy for graft rejection. We found that the extraperitoneal approach was feasible in all three cases. All three cases are not dialysis dependent and free from local recurrence or distant metastases till the time of submission of manuscript.

CONCLUSION

The management of RCC in renal allograft does not differ much from that of RCC in native kidney. We can extrapolate from the facts we already know to make some projections about the management of RCC in transplanted kidneys. There are currently no standard guidelines on the management of allograft RCC in renal transplant recipients. The treatment of RCC in allograft should be tailored according to tumor characteristics such as size and localization of the RCC, number of tumor foci, stage of tumour, allograft function, need of dialysis, and the patient's preference.

Declaration of patient consent

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

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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