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Oncology

Successful partial nephrectomy of a T1b multilocular clear cell renal cell carcinoma arising in a renal graft

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Introduction

Kidney transplantation offers a higher life expectancy and a better quality of life compared to dialysis. The prevalence of primary renal cell carcinoma in transplanted patients is reportedly 4.6%, owing to post-transplantation long-term immunosuppression therapy.[2] Surgical treatment is difficult because of local fibrosis and adhesions to the adjacent tissues. The most prevalent surgical option is total nephrectomy of the graft. However, recent studies have highlighted that partial nephrectomy offers superior benefits to the patients since the advantages of the transplantation over dialysis are maintained, while oncologic outcomes are comparable. We present a 39-year-old patient with a multilocular cystic form of renal cell carcinoma (MCCRCC) treated with nephron-sparing surgery (NSS) 7 years post-transplantation.

Case presentation

A 39-year-old man with end-stage renal disease under hemodialysis underwent renal transplantation at our institution. The triad maintenance immunosuppression regimen consisted of Tacrolimus, Mycophenolate mofetil, and Prednisone. The patient was discharged on day 10 post-surgery with a serum creatinine level of 1.3 mg/dL.

Two years after the transplantation surgery, routine follow-up ultrasonography identified a simple cystic lesion with a diameter of 2.3 cm localized at the inferior pole of the renal graft; the serum creatinine was normal and stable. The patient was monitored for 2 years, during which time the cyst grew to 4.4 cm. After the final routine follow-up visit, the patient was monitored at another institution before returning to our facility after experiencing discomfort in the left flank accompanied by a mild elevation of creatinine. On computed tomography and CEUS (Fig. 1A and B), the cyst appeared as a complex mass with vascularized septa, thickened walls, and a diameter of up to 6.4 cm. Furthermore, we identified a compressive effect of the renal pelvis and minimal hydronephrosis. The patient's serum creatinine level was 1.61mg/dL. The patient provided informed consent to undergo graft preservation and partial nephrectomy to avoid resuming dialysis.

The patient underwent a partial allograft nephrectomy under local hypothermia, with total excision of the tumor and reconstruction of the pelvicalyceal system with an estimated 70% of the renal mass remaining (Fig. 2A and B, C, D). The total surgical time was 115 minutes, ischemia time was 24 minutes, and blood loss was 60 mL, with no intraoperative complications. After the surgery, the patient developed transient acute tubular necrosis (ATN) with preserved diuresis; his serum creatinine level increased to a maximum of 5.1 mg/dL during the fourth post-surgical day. After his serum creatinine levelled off, the patient was discharged 11 days after surgery with a creatinine level of 1.8 mg/dL.

In our patient, the surgical approach was favored because of the absence of significant local fibrosis. The challenges were the large size of the tumor, the presence of fluid content, and protrusion inside the renal sinus. Thus, the experience of the surgeon was a critical element in the success of the surgery.

Histopathological examination of the specimen revealed an MCRCC with negative resection margins (Fig. 2, E). The maintenance immunosuppressive treatment was adapted to the minimum therapeutic dose. At the 3-month follow-up visit, our patient remained well, with a creatinine level of 1.9 mg/dL and normal Doppler ultrasound findings (Fig. 2, F). The dosage of tacrolimus is maintained up to 6 ng/mL.

Discussion

The incidence of renal cell carcinoma in allografts is approximately 0.2% in the transplanted kidney population. The increasing survival of these patients is believed to be a factor in the rising incidence rate of this disease,[1] as well as the immunosuppression therapy,[2–5] especially the cyclosporine treatment.

Initially, radical nephrectomy was considered the best option,

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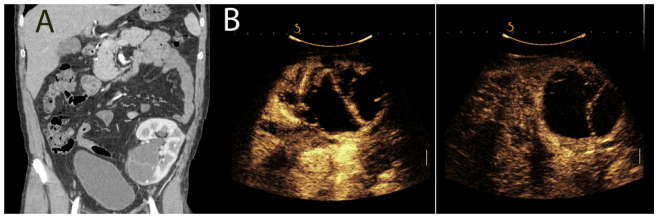

Fig. 1. A – Preoperative venous phase CT scan, B – CEUS findings.

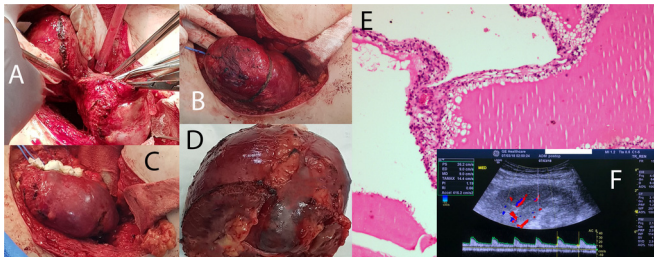

Fig. 2. A – Excision line, B – allograft tumor, C – final aspect after declamping, D –tumor sinusal protrusion, C – Doppler ultrasound findings, D – histology.

however, NSS[1] and radiofrequency ablation (RFA) have gained increasing attention, especially due to the similar outcome.

There are approximately 160 cases of renal cancers arising in transplanted allografts described in the literature.[2] The sole worldwide review available to date describes 174 graft masses. Clear-cell carcinoma comprises the majority of cases, followed closely by papillary renal cell carcinoma, with a prevalence of Fuhrman grade II. Chromophobe renal cell carcinoma and other types are very rare.

Among all renal neoplasms, MCRCC accounts for 3.1–6% of clear-cell carcinomas and up to 60% of Bosniak III cysts are reportedly malign and have low aggressiveness.

Our patient appears to be the first reported case with a Bosniak III renal cyst with MCRCC histology treated with partial nephrectomy.

The recurrence rates after NSS in allograft and native kidneys appears to be similar.[2] Only 7.6% of patients reportedly returned to hemodialysis.[2]

The choice of immunosuppression therapy is difficult considering the lack of information on this topic. Immunosuppression can lead to a higher incidence of cancer in transplanted patients because of the immune system's decreased ability to prevent tumor genesis. Additionally, calcineurin inhibitors (CNIs) have been shown to play a role in the proliferation of malignant cells by increasing the levels of VEGF and TGF-beta-1.[4] A lower CNI dose may increase the risk of acute rejection, although it reduces the risk of cancer. Alternatives for CNIs include mTOR inhibitors, which reduce the risk of de novo tumors, but carry a higher risk of transplant rejection.

Considering the fact that only 29 of 163 previously described patients switched their immunosuppression regimens,[2] and considering our patient's histologic results, we decided to continue the initial immunosuppressive therapy while maintaining the blood concentration of tacrolimus at a lower therapeutic level. While data is insufficient to promote any specific strategy, all therapies appear to produce comparable outcomes.

Conclusion

Transplanted patients carry a higher incidence of tumors due to the immunosuppressive therapy. Close follow-up with extensive imaging evaluation of any suspected lesion is critical for detecting any developing tumors. NSS appears to be a good solution for the oncological outcome and the quality of life of transplanted patients.

The maxim among surgeons of “When in doubt, operate!” may hold true in the case of a lesion of uncertain histology. The experience of the surgeon is also a critical decision-making factor. Maintaining doses of immunosuppressants at the minimum therapeutic level is mandatory.

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