Ex-vivo donor partial nephrectomy at the time of donor-directed renal transplantation

Eric C. Wendel, MD, Raunak D. Patel, MD, Daniel J. Canter, MD
Department of Urology, Ochsner Health System, New Orleans, Louisiana, USA

WENDEL EC, PATEL RD, CANTER DJ. Ex-vivo donor partial nephrectomy at the time of donor-directed renal transplantation. *Can J Urol* 2019;26(2):9740-9742.

The outcome of nephron-sparing surgical management of small renal masses is generally favorable, specifically in terms of long term renal function, overall survival, and oncologic outcomes. Given the overall prognosis and renal function preservation, transplantation of kidneys with small renal masses has increasingly been accepted as a donor option for renal transplantation. We present a case of an incidental renal mass on preoperative donor transplant evaluation and subsequent ex-vivo donor partial nephrectomy at the time of renal transplantation.

Key Words: small renal mass, partial nephrectomy, kidney transplant

Introduction

Small renal masses (SRMs) are defined as solid or cystic renal tumors that are contrast-enhancing, less than 4 cm in diameter, and are typically found on incidental axial imaging for non-urologic symptoms.[1] Most of these masses are consistent with stage T1a renal cell carcinoma (RCC). Around 80% of these masses that are surgically removed are malignant albeit typically low-grade, while the remaining 20% are benign.[2] Due to the likelihood of early detection and low-grade pathology, the prognosis is very favorable with estimated 5 year cancer-specific survival at 95% to 100% and only 2% of patients developing metastasis after treatment.[3] Also, as nephron-sparing surgery has increasingly grown in popularity, the overall morbidity of surgery for RCC has decreased, specifically in terms of long term renal function, overall survival, and equivalent oncologic outcomes.[4]

In general, transplantation of an organ with cancer or prior history of cancer is considered to be contraindicated. Given the aforementioned overall prognosis and renal function preservation, there has been larger consideration for transplantation of kidney with SRMs.[5] We present a case of an incidental renal mass discovered on preoperative donor transplant evaluation for a living-related donor and subsequent ex-vivo donor partial nephrectomy at the time of renal transplantation.

Accepted for publication March 2019

Address correspondence to Dr. Daniel J. Canter, Ochsner Medical Center, 1514 Jefferson Highway, New Orleans, LA 70121 USA

Figure 1. Bosniak III renal cyst in the upper pole of the donor left kidney.

Case report

The patient is a 33-year-old female with a past medical history of hyperlipidemia who was undergoing evaluation to become a renal transplant donor for her brother. During preoperative imaging for anatomic planning, the patient was found to have a Bosniak III renal cyst in the upper pole of her left kidney, Figure 1. She did not endorse any symptoms of gross hematuria, flank pain, or weight loss, and her physical examination was unremarkable. Her laboratory work was normal. The transplant recipient is a 36-year-old male with end-stage renal disease secondary to hypertension, managed with peritoneal dialysis at the time. After review of the imaging, discussion with the patients and the transplant team regarding the risk of recurrence in the potentially transplanted kidney, an ex-vivo back-table donor partial nephrectomy was planned concomitantly with renal transplantation.

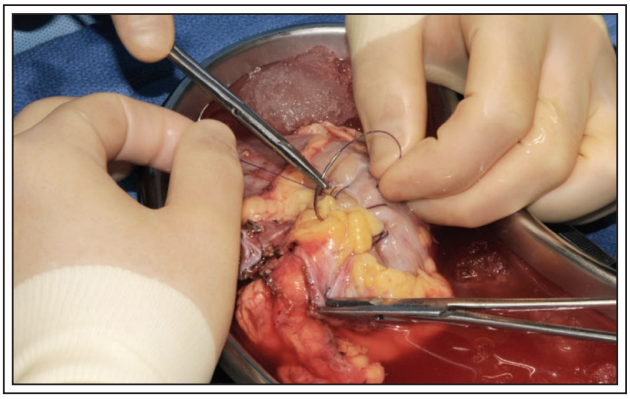

Figure 2. Renorrhaphy after partial nephrectomy.

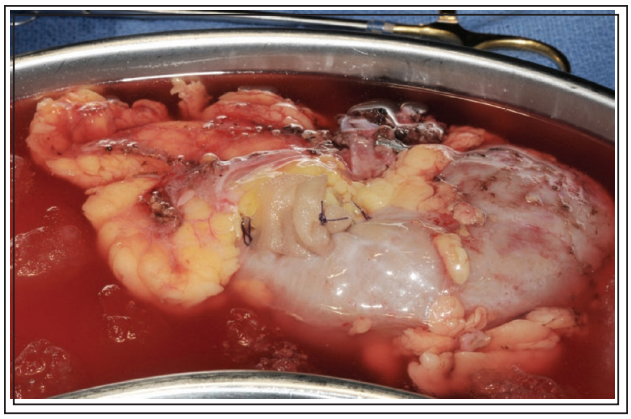

Figure 3. Completed renorrhaphy prior to transplantation.

After a laparoscopic donor nephrectomy by the transplant team, the donor kidney was placed on the back table and infused with hypothermic solution. The upper pole mass was easily identified and was enucleated sharply using tenotomy scissors. After complete enucleation, the mass was passed off the field for pathologic review. The edges of the capsule were cauterized circumferentially using bipolar electrocautery, and the defect was then closed using two 2-0 V lock sutures, Figures 2 and 3. The kidney was then successfully transplanted by the transplant team. Final pathologic diagnosis of the tumor revealed a 1.7 cm Fuhrman Grade I/IV cystic clear cell carcinoma with negative margins. Both patients did well postoperatively and have been followed closely with surveillance imaging. There has been no evidence of recurrence for either patient on 6 and 12 months follow up imaging.

Discussion

Small renal masses have consistently been shown to have an indolent course. The options for management of SRMs are effective, preserve renal function, and increase overall survival. Due to the favorable outcome of these patients and low risk for recurrent RCC, such kidneys are a reasonable transplant donor option, especially given limited donor options.

Transplantation of kidneys following partial nephrectomy has become a more acceptable practice. The rate of transmission of malignancy of a SRM in the transplanted kidney is estimated to be only < 0.1%-1% when risk-stratified to either minimal or low risk categories defined by the Disease Transmission Advisory Committee.[6] SRMs are classified within

this category. The largest series from Brooks et al evaluated 43 patients who underwent transplantation in a kidney with a prior SRM < 3 cm. In this series, patient survival was comparable to those without a SRM and significantly better than patients who remained on dialysis awaiting an organ. Additionally, there was only one local recurrence at 9 years after transplantation.[7] A systematic review was performed which included 109 donors, 86% of which were living donors. The vast majority of tumors was clear cell, and mean tumor size was 2 cm. Recurrence free survival at 5 years was 100%. Functional outcomes and complication rates were also comparable to conventional transplants, thus not attributable to a direct complication of partial nephrectomy.[8]

This case report illuminates the feasibility of performing a partial nephrectomy as well as the overall very favorable prognosis of patients with SRMs. Instead of eliminating patients with SRMs from the already small pool of available kidneys for transplantation, they appear to be a reasonable and safe option for transplantation, decreasing the overall morbidity and mortality of end-stage renal disease for recipients who continue to wait for an available organ. □

References

1. Finelli A, Ismaila N, Bro B et al. Management of small renal masses: American Society of Clinical Oncology Clinical Practice guideline. *J Clin Oncol* 2017;35(6):668-680.
2. Bhindi B, Lohse CM, Mason RJ et al. Are we using the best tumor size cut-points for renal cell carcinoma staging? *Urology* 2017;109:121-126.
3. Umbreit EC, Shimko MS, Childs MA et al. Metastatic potential of a renal mass according to original tumour size at presentation. *BJU Int* 2012;109(2):190-194.
4. Scosyrev E, Messing EM, Sylvester R, Campbell S, Van poppel H. Renal function after nephron-sparing surgery versus radical nephrectomy: results from EORTC randomized trial 30904. *Eur Urol* 2014;65(2):372-377.
5. Wang X, Zhang X, Men T et al. Kidneys with small renal cell carcinoma used in transplantation after ex vivo partial nephrectomy. *Transplant Proc* 2018;50(1):48-52.
6. Nalesnik MA, Woodle ES, Dimaio JM et al. Donor-transmitted malignancies in organ transplantation: assessment of clinical risk. *Am J Transplant* 2011;11(6):1140-1147.
7. Brook NR, Gibbons N, Johnson DW, Nicol DL. Outcomes of transplants from patients with small renal tumours, live unrelated donors and dialysis wait-listed patients. *Transpl Int* 2010;23(5):476-483.
8. Hevia V, Hassan Zakri R, Fraser Taylor C et al. Effectiveness and harms of using kidneys with small renal tumors from deceased or living donors as a source of renal transplantation: a systematic review. *Eur Urol Focus* 2018 Feb 9. pii: S2405-4569(18)30019-1.