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Partial Nephrectomy for the Treatment of Translocation Renal Cell Carcinoma

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Abstract

We describe our experience with partial nephrectomy for the treatment of translocation renal cell carcinoma (RCC). During a 10-year period, 4 patients (0.02% of total RCC cases and 40% of translocation tumors) presented with an incidentally detected translocation RCC and were treated with partial nephrectomy. During a mean follow-up of 37 months, all patients were alive without evidence of disease. These data suggest that partial nephrectomy is a safe treatment option for select cases of translocation RCC.

Background—The aim of this study was to evaluate the outcome of patients with translocation renal cell carcinoma (RCC) treated with partial nephrectomy.

Patients and Methods—Our institutional review board-approved renal mass registry was queried for patients who underwent partial nephrectomy for a pathologically confirmed translocation RCC. We describe the demographic, clinical, pathological, and follow-up data for this series of patients.

Results—Between 2003 and 2013, 1897 patients with RCC were treated at our institution with a radical or partial nephrectomy. In total, 10 (0.5%) patients were diagnosed with a translocation RCC. Of these patients, 4 (40%) underwent treatment with partial nephrectomy for an incidentally detected small renal mass (mean imaging diameter, 2.6 cm [range, 1.0–4.2 cm]). During a mean follow-up of 37 months (range, 8–81 months), all patients were alive without evidence of disease.

Conclusion—At short-term follow-up, partial nephrectomy appears to be an effective treatment option for patients with small translocation RCCs. Larger studies are required to more extensively investigate the optimal treatment of these potentially aggressive tumors.

Keywords

TFE3; TFEB; Xp11.2

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Disclosure

The authors have stated that they have no conflicts of interest.

Introduction

Renal cell carcinoma (RCC) associated with translocation of the transcription factor E3 (*TFE3*) gene located at Xp11.2 was first described nearly 3 decades ago.[1] More recently, the transcription factor EB (*TFEB*) gene located on chromosome 6 has also been implicated in the pathogenesis of RCC.[2] Combined, tumors associated with the overexpression of *TFE3* and *TFEB* fusion products are termed MiT family translocation RCCs.[3] In total, translocation tumors represent 1% to 5% of all cases of RCC, with the highest frequency among children and young adults.[4,5] Unique to this aggressive RCC subtype, up to half of all patients will present with regional or metastatic disease.[4–8] Despite this fact, a subset of patients with translocation RCC will be diagnosed incidentally with a small renal mass. At present it is unknown if partial nephrectomy represents an adequate form of treatment for this potentially aggressive tumor type. Herein, we describe the outcomes of a small series of patients with translocation RCC treated with partial nephrectomy.

Patients and Methods

Our institutional review board-approved renal mass registry was queried for patients who underwent a partial nephrectomy for a pathologically confirmed translocation RCC. Demographic, clinical, pathological, and follow-up data were compiled for the study cohort. Previously we have reported our surgical technique and outcomes for partial nephrectomy.[9,10] Similarly, our institution's diagnostic approach to the work-up of suspected cases of translocation RCC has been reported elsewhere.[11–13] After treatment, all cases of translocation RCC were followed in a manner consistent with the current guideline from the American Urological Association.[14] In text, categorical data are presented as proportions with percentages and continuous variables as means with ranges.

Results

Between 2003 and 2013, 1897 patients with RCC were treated at our institution with either radical or partial nephrectomy. In total, 10 (0.5%) patients were diagnosed with a translocation RCC. Of these patients, 4 (40% of translocation RCCs and 0.2% of total RCCs) underwent treatment with a partial nephrectomy. Table 1 provides details of the study cohort. In brief, the cohort consisted of 2 men and 2 women, with a mean age at presentation of 45 years (range, 28–68 years). Notably, all patients were asymptomatic at presentation and their tumors had a mean cross-sectional imaging diameter of 2.6 cm (range, 1.0–4.2 cm). On final surgical pathology, the diagnosis of a translocation RCC was confirmed using immunohistochemistry in 1 (25%) case and with fluorescence in situ hybridization in 3 (75%). Using these techniques, 3 (75%) patients were diagnosed with an Xp11.2 translocation RCC and 1 (25%) patient with a t(6;11) translocation RCC. No case had a positive surgical margin or invasion into the renal fat or a lymphovascular space. During a mean follow-up of 37 months (range, 8–81 months) all patients were alive without evidence of disease.

Discussion

Current guidelines support the use of partial nephrectomy for the treatment of small renal masses whenever technically feasible.[15,16] This recommendation is premised on data demonstrating that partial nephrectomy offers oncological outcomes comparable with that of radical nephrectomy[17] and is associated with a decreased risk of surgically induced chronic kidney disease.[18,19] Within the translocation RCC literature (most recently reviewed by Su and coworkers[20]), reports of partial nephrectomy performed for the treatment of translocation RCC are uncommon. This is particularly true of adult patients, as much of this literature focuses on pediatric patients.[21] Thus, the oncological efficacy of partial nephrectomy for the treatment of translocation RCC remains largely unknown. Certainly available data are inadequate to compare the efficacy of partial to radical nephrectomy in this context.

In this report, we add to the existing literature by reporting the favorable short-term outcomes of 4 patients with incidentally detected translocation RCCs treated with partial nephrectomy. In all cases, partial nephrectomy was completed with a negative surgical margin. During a mean follow-up of approximately 3 years, all patients were alive without evidence of disease. This experience is consistent with the limited existing literature[20,22] which has suggested favorable outcomes with partial nephrectomy in select patients with small translocation tumors.

The presented data might help inform the management of a patient with a translocation RCC incidentally diagnosed after a partial nephrectomy. When faced with such a patient, the urologist must decide between management with a completion nephrectomy or close surveillance. Based on a combination of the presented data and the body of literature that suggests equivalent oncological outcomes of partial and radical nephrectomy,[17] one could consider close monitoring in place of completion nephrectomy. Similarly, this report might inform the management of a patient for whom the diagnosis of a translocation RCC is made on a preoperative biopsy—a scenario which is now increasingly common due to renewed interest in the use of renal mass biopsy.[23] In accordance with current guidelines,[15,16] we believe a partial nephrectomy can be attempted in selected cases so as to maximize postoperative renal function. However, there are several caveats to this point. One worth emphasizing is the need to achieve a negative surgical margin in these patients, as previously it has been shown that a positive margin confers an increased risk of disease progression.[24] Second, it is clear that MiT family translocation RCCs are not homogeneous. The t(6;11) RCCs are more indolent than the Xp11.2 translocation RCCs.[25] Among Xp11.2 translocation RCCs, those with the alveolar soft part sarcoma chromosome region candidate 1 (*ASPSCR1*)-*TFE3* gene fusion present with involved lymph nodes in 75% of cases, which is statistically more than is seen in those Xp11.2 translocation RCCs with the papillary renal cell carcinoma (*PRCC*)-*TFE3* gene fusion.[26] Because lymph nodes are typically not sampled during partial nephrectomy, understaging is a serious concern for the *ASPSCR1*–*TFE3*-positive cases. Finally, MiT family translocation RCCs are typically slow-growing and thus may recur late, up to 30 years after resection. Hence, longer follow-up is needed before a definitive conclusion can be reached.

Limitations of the current study include the retrospective design and small sample size. These limitations, however, are difficult to overcome because of the low overall incidence of this RCC subtype. For example, at our large tertiary referral center—one that has pioneered the development of assays for the diagnosis of translocation RCC[11–13]—we only encountered a total of 10 surgical cases over the past decade. It should be noted, however, that we do not routinely screen cases of RCC for *TFE3* and *TFEB* gene fusions, so it is likely that other MiT family translocation RCCs mimicking more common RCC subtypes have been missed. Moreover, only 4 cases were treated with a partial nephrectomy. Thus, larger collaborative studies are required to investigate this rare entity.

Conclusion

Translocation RCC is a rare and potentially aggressive subtype of kidney cancer. A proportion of patients with translocation RCC will be diagnosed incidentally with a small renal mass amenable to partial nephrectomy. In our experience, these tumors may be adequately treated with partial nephrectomy. Larger studies are needed to more extensively evaluate the optimal treatment and subsequent follow-up of these patients.

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Clinical Practice Points

- Translocation RCC is a rare and aggressive form of renal cancer.
- A subset of patients with translocation RCC will be diagnosed incidentally with a small renal mass amenable to partial nephrectomy.
- Because of the rare nature of this tumor, at present it is unknown if partial nephrectomy represents an adequate form of treatment.
- In this study we present data on a small series of patients with translocation RCC managed successfully with partial nephrectomy.
- In light these data, patients with a small translocation RCC detected on renal mass biopsy should be considered for partial nephrectomy. In addition, a completion nephrectomy may not be required for patients diagnosed with a translocation RCC after partial nephrectomy so long as the tumor was resected with a negative margin.

Table 1

Study Cohort Characteristics

Patient Number	Age, Years	Sex	Race	Imaging Diameter, cm	R.E.N.A.L. Score	Surgical Approach	Translocation Type	pT Stage	Follow-Up, Months	Disease Status
1	32	Male	Asian	2.3 cm	8x	Laparoscopic	Xp11.2	T1a	81	NED
2	28	Female	White	4.2 cm	8a	Robotic	Xp11.2	T1a	41	NED
3	68	Male	Black	2.9 cm	7ah	Robotic	t(6;11)	T1a	19	NED
4	50	Female	Black	1.0 cm	7x	Open	Xp11.2	T1a	8	NED

Abbreviations: NED = no evidence of disease; pT = pathologic T stage; R.E.N.A.L. = radius, exophytic/endophytic, nearness to collecting system or sinus, anterior/posterior and location relative to polar lines.