

CASE REPORT

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Pre-surgical sunitinib treatment enabling nephron-sparing surgery in a patient with renal cell carcinoma in a solitary kidney

Kosuke Tochigi, Yasuhito Funahashi, Aya Mori, Yoshihisa Matsukawa, Masashi Kato, and Momokazu Gotoh

Department of Urology, Nagoya University Graduate School of Medicine, Nagoya, Japan

ABSTRACT

A 55-year-old man with a solitary kidney was diagnosed with an 8.5 cm renal cell carcinoma in the right kidney without metastasis. Twenty five months of sunitinib treatment reduced the tumor from 8.5 to 5.5 cm and enabled nephron-sparing surgery. He has no evidence of recurrence 58 months after the surgery.

Keywords: pre-surgical, targeted therapy, renal cell carcinoma, nephron-sparing surgery, sunitinib

Abbreviations & acronyms:

CT: computed tomography

TKI: tyrosine kinase inhibitor

NSS: nephron-sparing surgery

RCC: renal cell carcinoma

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INTRODUCTION

Radical nephrectomy is the standard surgical option for renal cancers suspicious of clinical stage T3. However, when a large renal tumor is found in patients with a solitary kidney, treatment selection is difficult. Tyrosine kinase inhibitor (TKI) sunitinib has been used in the pre-surgical setting in patients unsuitable for primary surgery due to advanced disease. Several authors have reported its effectiveness in some patients.¹⁻³ However, only a few cases have been reported that enabled nephron-sparing surgery (NSS) and avoided radical nephrectomy.⁴⁻⁶ Here, we report a case of pre-surgical administration of sunitinib that enabled NSS in a patient with a solitary kidney.

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Corresponding Author: Yasuhito Funahashi, MD, PhD

Department of Urology, Nagoya University Graduate School of Medicine, 65 Tsurumai-cho, Showa-ku, Nagoya 466-8550, Japan

Tel: +81-52-744-2985, Fax: +81-52-744-2319, E-mail: yfunahashi@med.nagoya-u.ac.jp

CASE REPORT

A 55-year-old man was pointed out a mass in the right kidney by abdominal ultrasonography at a medical check-up. He had undergone a left nephrectomy 22 years earlier for retroperitoneal malignant lymphoma. Abdominal contrast-enhanced computed tomography (CT) revealed a well-enhanced 8.5 cm right renal mass that was very suggestive of renal cell carcinoma (RCC) (Fig. 1). The renal mass was adjacent to major renal vessels, as well as the collecting system, and the R.E.N.A.L. nephrometry score was $3 + 1 + 3 + x + 3 = 10x$, which was considered unsuitable for NSS. No metastases were found on CT or bone scintigraphy. His serum creatinine level was elevated slightly (1.2 mg/dL), while the serum C-reactive protein, lactate dehydrogenase, calcium, and hemoglobin levels were normal.

Sunitinib (37.5 mg/day) was chosen for his initial treatment. We managed his hypertension with hydrochlorothiazide and the hypothyroidism with levothyroxine. He suffered from CTCAE Grade II hand-foot syndrome, but no major adverse events had occurred. The tumor diameter decreased to 6.0 cm after 6 months, and a repeat CT demonstrated a plateaued reduction in diameter of the tumor (5.5 cm) after 25 months, with less area adjacent to major renal structures. His R.E.N.A.L. nephrometry score was $2 + 2 + 3 + p + 2 = 9p$, which made the patient a candidate for NSS (Fig. 2). His performance status index remained 0 throughout the treatment. An open partial nephrectomy was performed for the renal mass after discontinuing sunitinib 1 week. The operating time was 161 min, the cold ischemia time during hilar clamping was 31 min, and blood loss was 411 mL. No intraoperative or postoperative complications were detected, including delayed wound healing or urinary leakage. His peak creatinine level was 2.2 mg/dL on postoperative day 2, and decreased to 1.6 mg/dL on postoperative day 16. Pathological examination revealed pT3a Fuhrman Grade II clear cell carcinoma with perirenal fat invasion and a negative surgical margin. He had no evidence of recurrence without additional treatment 58 months after the operation.

DISCUSSION

NSS has equivalent oncological outcomes for T1 RCC compared with radical nephrectomy and results in better kidney functional preservation and overall survival.⁷ A radical nephrectomy is usually performed for T3 RCC to achieve complete resection of the tumor; however, radical nephrectomy in patients with a solitary kidney leads to loss of kidney function. It is difficult to perform NSS for an advanced RCC that occurs in a solitary kidney or bilateral RCC.

TKI treatment has been attempted in the neo-adjuvant setting to enable NSS in such imperative cases. TKIs shrink the tumor volume and may make tumor down-staging possible, allowing resection of tumors that are considered unresectable at the initial presentation. Hellenthal et al reported that administering sunitinib for 3 months reduced primary tumor size in 85% of patients.⁴ The mean change in tumor diameter was -11.8% (range, -27% to 11%), which enabled eight patients with cT1b disease (40%) to undergo NSS. Lane et al demonstrated the effectiveness of sunitinib for potential NSS candidates with primary RCC in situ; 72 patients with 78 kidneys received sunitinib during the preoperative setting.⁵ Downsizing occurred in 65 tumors (83%) and median primary tumor size shrank from 7.2 to 5.3 cm, which enabled 49 kidneys (63%) to receive partial nephrectomy. In our case, tumor diameter decreased 36% (8.5 to 5.5 cm). At the initial presentation, the tumor was located widely adjacent to the hilar vessels, and less area touched the renal hilar after 25 months of sunitinib treatment. These findings enabled the patient to be a candidate for NSS.

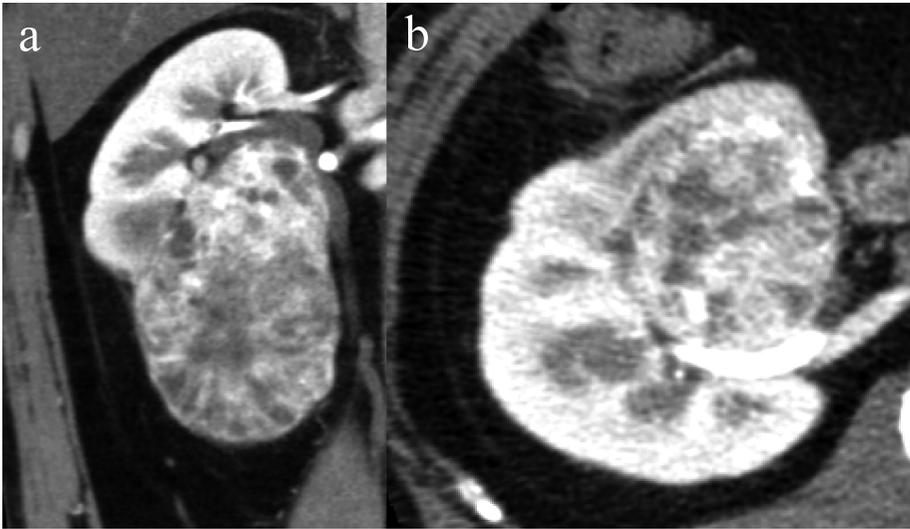


Fig. 1 CT images before sunitinib use.

Fig. 1a: Parietal image.

Fig. 1b: Horizontal image. 8.5 cm right renal tumor was adjacent to major renal vessels and the collecting system.

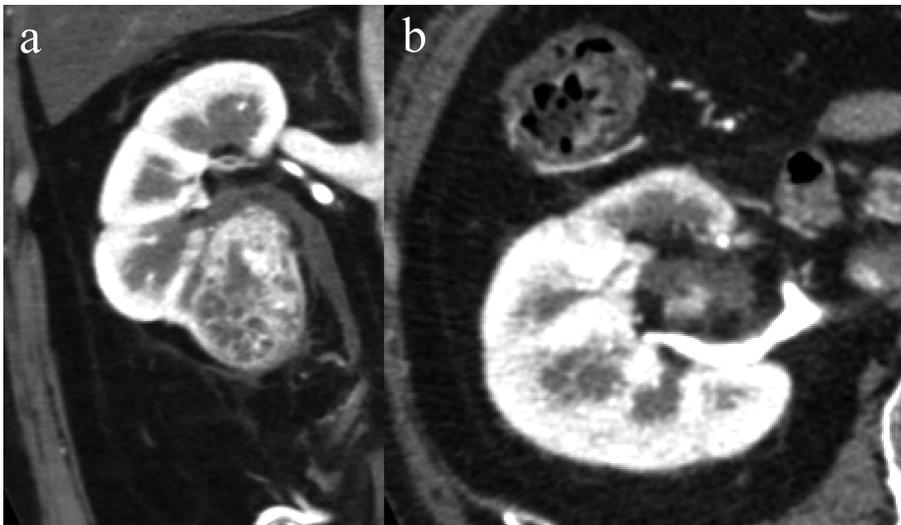


Fig. 2 CT images after 25 months of sunitinib use.

Fig. 2a: Parietal image.

Fig. 2b: Horizontal image. Tumor diameter decreased to 5.5 cm, with less area adjacent to major renal structures.

Several analyses have detailed significant complications associated with the preoperative use of TKIs. Although the incidences of wound dehiscence,³ intraoperative adhesions,² and urinary leakage⁶ have been reported, use of a pre-surgical TKI is not associated with any major complications. In our case, we did not experience any complications, including adhesions, urinary leakage, or wound dehiscence. The reported preoperative TKI duration has not previously exceeded 4

months. Here, we show the safety of long term TKI use followed by NSS.

Most reports administered TKI with the aim of tumor reduction and the goal of performing NSS. There are only a few reports of a major change in treatment, from radical nephrectomy to NSS, owing to pre-surgical TKI. This patient was deemed unsuitable for NSS at the first presentation. The tumor was reduced by taking sunitinib for 25 months, which allowed the patient to undergo NSS. About 73% of the renal parenchyma was preserved (from 270 mL to 198 mL), and the postoperative creatinine level was maintained. Pre-surgical administration of TKI has the potential to convert unresectable tumors into an operative state without increasing perioperative complications.

CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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