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Case Report

Sunitinib maleate administration before percutaneous CT-guided cryoablation for large renal cell carcinoma: A case report ☆,☆☆

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ABSTRACT

A 60-year-old woman taking anti-platelet drugs was referred to the hospital for the treatment of advanced renal cell carcinoma. CT revealed that the tumor had a diameter of 5 cm and hyper-vascularity. Percutaneous CT-guided cryoablation (CA) was indicated. Since preprocedural arterial embolization failed to provide sufficient embolic effects, sunitinib maleate was administered. It provided good tumor devascularization and volume reduction, which corresponded to downstage. Therefore, the administration contributed to successfully performing subsequent percutaneous CT-guided CA with no serious hemorrhagic complications. Sunitinib maleate may be an alternative to conventional treatments before CA for renal cell carcinoma.

Introduction

Sunitinib malate (Sutent, Pfizer Inc., NY) is a molecularly targeted agent for the treatment of several malignant tumors [1,2]. It is also used for advanced renal cell carcinoma (RCC) [3]. Previous studies reported that sunitinib maleate administration before surgery for large RCC contributed to downstaging the tumor, leading to successfully performing partial resection of the tumor instead of nephrectomy [4–6]. However, there is no report that sunitinib maleate administrated before percutaneous CT-guided cryoablation (CA) for RCC reduced tumor volume and vascularity. Herein, we report a case where pre-procedural sunitinib maleate administration was helpful to subsequent percutaneous CT-guided CA for advanced RCC.

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Case report

A 60-year-old woman was referred to our hospital for management of a renal tumor. The patient had taken medication for hypertension and diabetes mellitus. Moreover, the patient had been taking antiplatelet drugs because of a history of stroke within 3 months.

Contrast-enhanced computed tomography (CE-CT) revealed a renal tumor 50 mm in size, located at the middle pole of the right kidney and protruded into the renal pelvis (Fig. 1). The tumor had heterogeneous well-enhancement in the arterial phase of CE-CT and washout in the venous phase, suggestive of RCC. CT value of the tumor was 35 HU in the nonenhanced phase, 196 HU in the arterial phase, and 121 HU in the venous phase. No metastasis was noted. A needle biopsy was performed and the tumor was pathologically diagnosed as clear cell carcinoma.

Based on the patient's background, including a history of stroke and present medication, the surgical procedure was considered to be contraindicated. Percutaneous CT-guided CA was indicated instead of surgery. However, the tumor was 50 mm in size (corresponding to stage 1b) with hyper-vascularity and protruded into the renal pelvis. The profile of the tumor was considered to have a potential risk of hemorrhagic complications during or after the procedure [7]. Therefore, transcatheter arterial embolization (TAE) was performed before CA to shrink the tumor volume and reduce tumor vascularity. The tumor was successfully embolized using 100 to 300 μm of tris-acryl gelatin microspheres (Embosphere; Merit Medical, Tokyo, Japan).

CE-CT 1 month after TAE demonstrated that the central area of the tumor was not enhanced, whereas the surrounding area of the tumor had well-enhancement, suggesting a partial infarction of the tumor. CE-CT 3 months after TAE revealed that the tumor had slightly shrunk to a maximal diameter of 45 mm and most areas of the tumor had well-enhancement (Fig. 2a). CT value of the tumor was 35 HU in the nonenhanced phase, 179 HU in the arterial phase (Fig. 2a), and 100 HU in the venous phase. This CT finding was considered to correspond to poor embolic effects of TAE. Therefore, we administered sunitinib maleate before CA based on the literature previously published [8–10]. The regimen was 37.5 mg/day of sunitinib maleate for 2 weeks, with a rest of 1 week. The course was repeated 5 times. No serious adverse events were noted during or after sunitinib maleate administration.

CE-CT immediately after completing sunitinib maleate administration demonstrated that the tumor had shrunk to a diameter of 38 mm, which corresponded to downstaging from stage 1b to 1a. The tumor had a 16% decrease in diameter compared to before sunitinib maleate administration and a 22% decrease in diameter compared to before TAE (Fig. 2b). In addition, the tumor was poorly enhanced, suggestive of tumor devascularization. CT value of the tumor was 28 HU in the nonenhanced phase, 47 HU in the arterial phase (Fig. 2b), and 50 HU in the venous phase. The value in the arterial phase markedly decreased compared to before TAE or before sunitinib maleate administration. The result corresponded to a 70% tumor density reduction rate in the arterial phase of CE-CT.

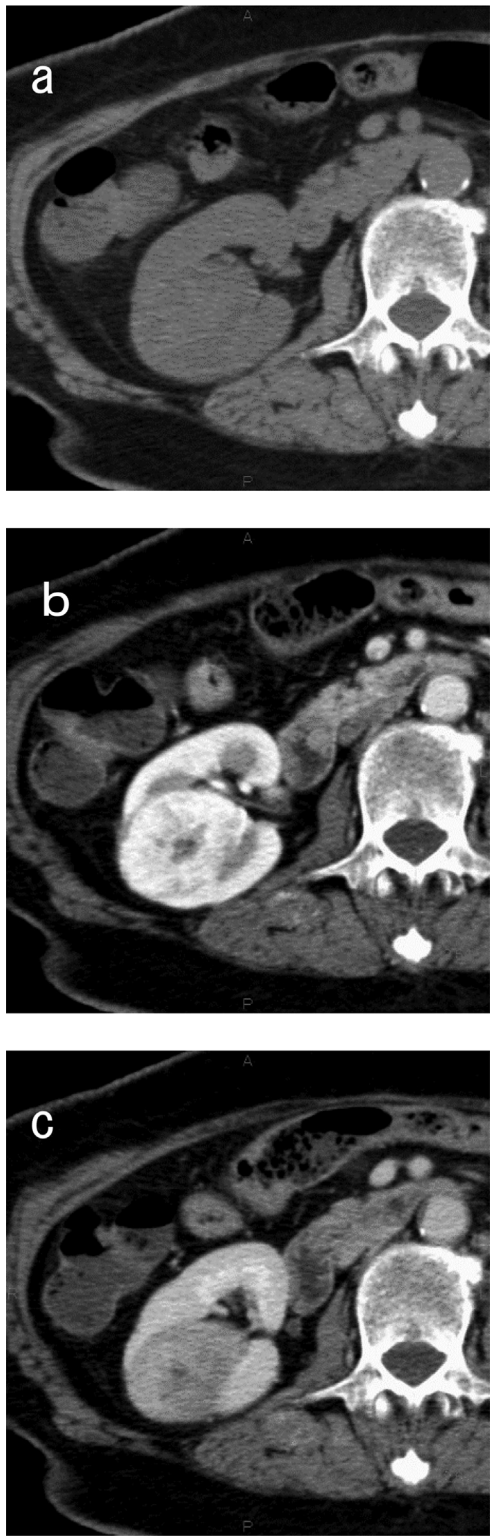

Fig. 1 – Initial axial non-contrast-enhanced (a) and contrast-enhanced computed tomography (CE-CT) (b, c) demonstrates a renal tumor 50 mm in size, located at the middle pole of the right kidney. The tumor has heterogeneous well-enhancement in the arterial phase of CE-CT (b) and washout in the venous phase (c). The findings suggest the tumor is renal cell carcinoma.

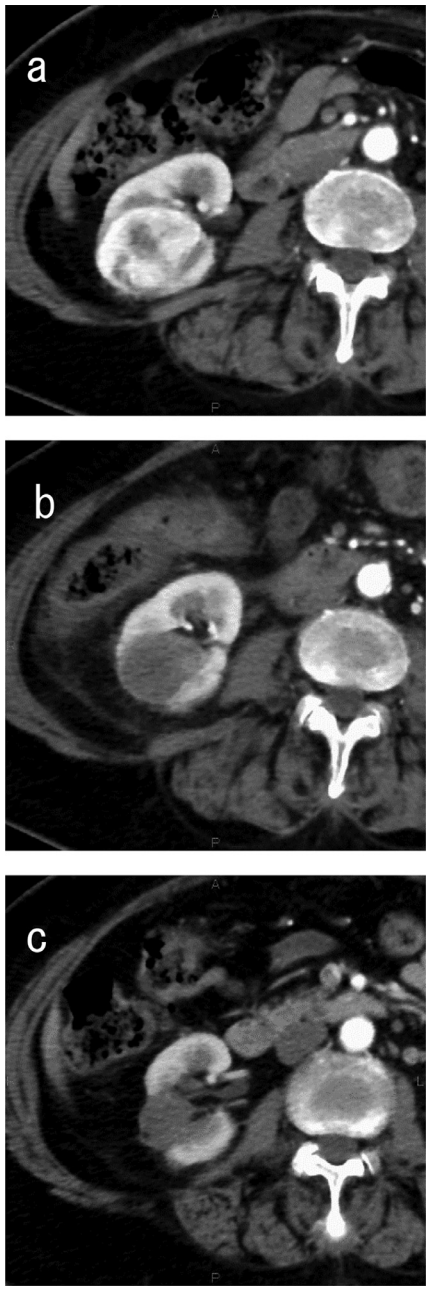

Fig. 2 – (a) Arterial phase of contrast-enhanced computed tomography (CE-CT) 3 months after transcatheter arterial embolization (TAE) reveals 45 mm maximal tumor diameter and well-enhancement (179 HU). These findings suggest poor embolic effect of TAE. (b) An arterial phase of CE-CT after completion of sunitinib maleate shows 38 mm maximal tumor diameter and poor enhancement (47 HU). These findings suggest good tumor volume reduction and devascularization. (c) Arterial phase of CE-CT 2 years after CT-guided cryoablation shows that the tumor had shrunk to a maximum diameter of 30 mm with no tumor enhancement, suggestive of no tumor recurrence.

Two weeks after the last sunitinib maleate administration, percutaneous CT-guided CA was successfully performed with no serious hemorrhagic complications. CE-CT 2 years after CA demonstrated that the tumor shrank to a diameter of 30 mm with no local recurrence (Fig. 2c). The patient has been free from tumor recurrence for 2 years and 6 months after CA.

Discussion

The present case demonstrated that sunitinib maleate administration achieved significant tumor volume reduction, which corresponded to downstage. Additionally, the administration provided good tumor devascularization. The effects contributed to successfully performing subsequent percutaneous CT-guided CA for advanced RCC, with no serious hemorrhagic complications. Therefore, as seen in the present case, when TAE before CA is not effective, preoperative sunitinib maleate administration may be an alternative to conventional treatments. To the best of our knowledge, there is no report of sunitinib maleate administration before percutaneous CT-guided CA for advanced RCC.

The present case revealed that sunitinib maleate administration provided a 16% decrease in tumor diameter. This value was similar to those of previous reports (18%–27%) [4–6, 11]. The present case also demonstrated a 70% tumor density reduction rate in the arterial phase of CE-CT. We considered that devascularization in the tumor contributed to preventing serious hemorrhagic complications. The tumor density reduction rate was higher than that in a previous study that reported a 30% mean tumor density reduction rate [12]. Further studies are needed to elucidate the reason for the higher devascularization of the tumor in the present study.

Sunitinib malate is a selective inhibitor of receptor tyrosine kinases, including VEGF-R types 1 to 3, PDGF-R-α, and PDGF-R-β. Inhibition of receptor tyrosine kinases prevents tumor angiogenesis, promotes apoptosis, and stimulates antitumor immune responses, leading to tumor shrinkage [11, 13]. The objective response rate for sunitinib malate is reported to be as high as 31%, with progression-free survival of 11 months and overall survival of 26.4 months [11]. It has been reported that sunitinib malate is effective for clear cell renal cell carcinoma, but not effective for non-clear cell renal cell carcinoma [14,15]. The most common adverse events of sunitinib malate include rash, fatigue, diarrhea, vomiting, mucositis, hypertension, blood cell loss, and liver and kidney damage [16,17].

There are some limitations to this study. First, this is a single case report. Further studies are needed to confirm whether combined treatment of sunitinib maleate administration and CA is effective in other cases. Second, although we used a modified regimen of sunitinib maleate administration previously reported [8–10], the appropriate regimen of sunitinib maleate administration before CA remains is unknown. Also, the proper timing of performing CA after the last sunitinib maleate administration is not established. Further studies are necessary.

In conclusion, sunitinib maleate administration for advanced RCC provided good tumor volume reduction and

devascularization. The effect contributed to successfully performing subsequent percutaneous CT-guided CA. Further studies with a large sample size are needed to confirm the usefulness of sunitinib maleate administration before CA for advanced RCC.

IRB approval

Institutional review board in the institution approved the publication of this case.

Patient consent

We obtained written and informed consent for the publication of this case from the patient.

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