

# Radiofrequency ablation of renal allograft cancer: Case report

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## Abstract

Renal cell carcinoma of an allograft kidney is an extremely rare type of neoplasm and accounts for about 0.22-0.5% of all kidney recipients. Kidney recipients undergo routine check-up, including ultrasound examination of the graft. Renal cell carcinoma is often asymptomatic and can be an incidental finding on routine examination. In this case study, we describe a patient who developed clear cell carcinoma 9 months after the kidney transplantation from a living related donor. Radiofrequency ablation was chosen as the treatment option, considering small size solitary lesions in a renal allograft. The complete ablative response was achieved after one treatment. In a 4-year follow-up period patient did not show any new or recurrent tumor. Radiofrequency ablation is a good therapeutic option for kidney allograft carcinoma.

**Key words:** kidney transplantation, kidney ablation, immunosuppression, kidney transplant cancer

## Abbreviations

RCC- Renal cell carcinoma

ESRD- End-stage renal disease

CNI- Calcineurin inhibitors

MMF-mycophenolate mofetil

KTx- Kidney transplantation

PET-CT- Positron-emission tomography-computed tomography

CT – computed tomography

RFA- Radiofrequency ablation

MRI - Magnetic Resonance Imaging

## Introduction

Kidney recipients are at high risk of tumor development due to obligatory immunosuppressive therapy [1]. The incidence of de-novo cancer among kidney recipients was reported in 0.2-0.5 % cases, which is 15-30 times higher than in the general population [2]. Currently, there are no clinical guidelines on the treatment of kidney allograft neoplasm [3]. Ablative therapy was proposed as the treatment option for a patient with neoplasm in a transplanted kidney [4-6]. In this clinical case, we describe the successful treatment of clear cell carcinoma in a transplanted kidney.

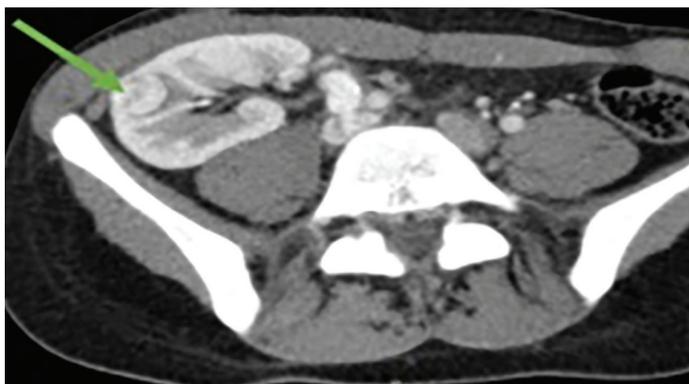
## Case presentation

A 25-year-old woman with end-stage renal disease (ESRD) secondary to glomerulonephritis underwent pre-emptive kidney transplantation from a living related donor in November 2015. In April 2016, 9 months after KTx, during a regular check-up, the patient underwent

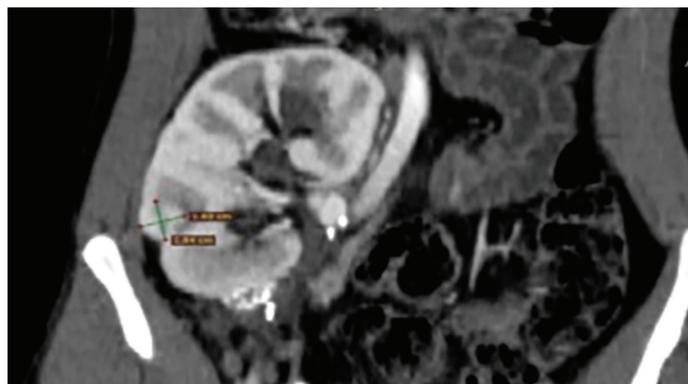
ultrasonography, which showed the lesion in the renal graft. The computed tomography (CT) was performed as a further evaluation, the size of the lesion- 1.7 cm (Figure 1). The lesion was biopsied, the pathological investigation showed clear cell carcinoma.

Positron-emission tomography-computed tomography (PET-CT) detected active growth of a renal transplant and no signs of regional and distant metastasis. The patient was diagnosed with clear cell carcinoma of the kidney graft. Considering the small size of the tumor and absence of regional and distant metastases, Radiofrequency ablation (RFA) therapy was chosen as a therapeutic option. Implantation of coordination markers into renal lesion prior to RFA was done. RFA was performed while the patient was sedated, in the outpatient department. 1 month after RFA the patient underwent Magnetic Resonance Imaging (MRI). Two experienced radiologists and a transplant surgeon interpreted MRI scans as complete necrosis (Figure 2). There were no new or metastatic lesions. The kidney function was good.

**Figure 1** -CT image before radiofrequency ablation

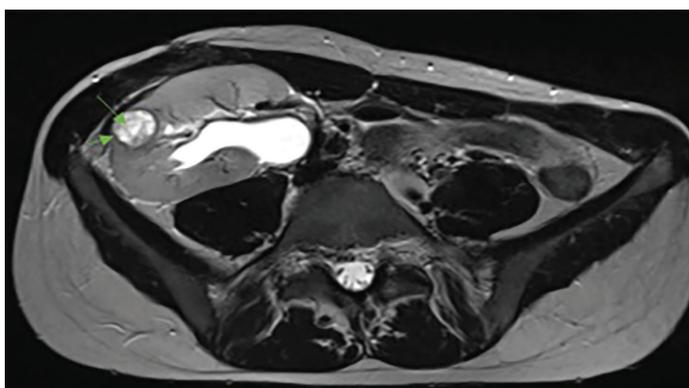


a) The size of the lesion (measured and marked with arrows)

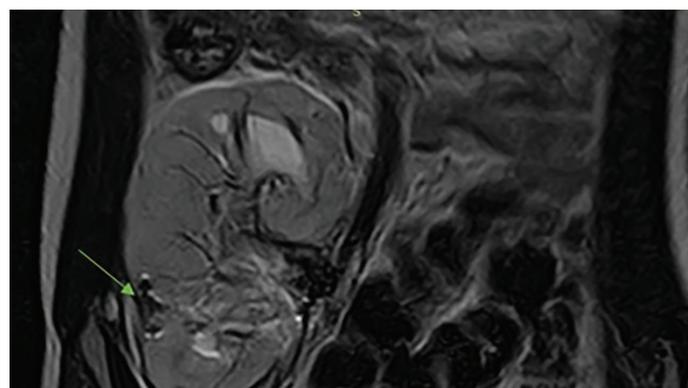


b) Lesion in renal allograft (marked with arrow)

**Figure 2** - Renal allograft after RFA, tumor with distinct borders (capsulated) with debris inside (necrosis)- marked with arrows



**Figure 3** - MRI image 4 years after radiofrequency ablation. Post-ablative tissue changes absence of cystic component



The oncologist and transplant surgeon monitored the patient's condition. The patient did not show any new or metastatic tumors during the follow-up period. 4 years after RFA MRI scans showed post-ablative renal tissue changes and no cystic component (Figure 3).

## Discussion

The success of modern immunosuppressive therapy led to better outcomes of kidney transplantation [7]. However, it also led to the incidence of various complications. Renal allograft tumor is one of the complications of immunosuppressive therapy [8]. Kidney recipients with de-novo cancer in renal allograft comprise a complex group of patients. The treatment option should be chosen in consideration of the preservation of the kidney allograft as much as possible. Radical removal of the allograft with the tumor increases the risk of death due to renal failure and return to dialysis [9]. For many years, nephrectomy was considered the only radical surgical treatment for patients with renal tumors. The desire to preserve the graft and its function stimulated the development of organ-preserving surgeries. It was reported, that patients after nephron-sparing surgery have similar outcomes as those after total nephrectomy [10]. However, partial nephrectomy is a challenging surgical procedure and has various complications [11]. The use of alternative options, such as cryoablation (CA); radiofrequency ablation (RFA); high-intensity focused ultrasound (HIFU) and microwave ablation (MWA) is increasing steadily [12].

RFA is a widely accepted technique for treating small renal tumors. It uses a high-frequency, alternating current within the targeted tissue to cause ionic agitation generating

frictional heat, which results in cancer cell destruction when the temperatures exceed 60°C. Numerous studies showed its clinical effectiveness. The technical success rate ranges from 90 to 100 %. Small tumor size (less than 3 cm) and exophytic location were independent predictors of complete necrosis of the lesion after the first ablation [13].

In our clinical observation, the patient had a small (1.7 cm) solitary renal tumor without regional or distant metastases. The pathologist could differentiate the type of tumor- clear cell carcinoma. Considering the above factors, as well as a normal graft function we decided to choose RFA for this patient. The complete ablation of the tumor was achieved after one procedure that is similar to previous reports.

In conclusion, we suppose that RFA is a good therapeutic option for recipients with RCC of the renal allograft. RFA is a minimally invasive procedure, preserving renal function and good clinical outcomes.

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