Case Report

DOI: 10.4274/uob.galenos.2024.2024.1.3

Bull Urooncol 2024;23(4):119-121

Simultaneous Partial Nephrectomy and Radiofrequency Ablation in a Solitary Kidney Patient

Ali Can Albaz, Murad Mammadzada, Talha Müezzinoğlu, Oktay Üçer, Gökhan Temeltaş

Manisa Celal Bayar University Faculty of Medicine, Department of Urology, Manisa, Turkey

Abstract

Renal cell carcinomas, which comprise the majority of primary kidney tumors, present diverse challenges in treatment planning. This case report explores the application of simultaneous partial nephrectomy and radiofrequency (RF) ablation in a patient with a solitary kidney, emphasizing the significance of specific interventions. A 52-year-old female patient who underwent radical nephrectomy presented with right flank pain and hematuria. Contrast-enhanced computed tomography revealed exophytic and calyceal system-extending lesions in the right kidney. A multidisciplinary approach involving interventional radiology and nephrology facilitated preoperative preparation. The patient underwent simultaneous partial nephrectomy and RF ablation in a single session, resulting in favorable outcomes. This meta-analysis highlighted radical nephrectomy's association with chronic kidney disease, emphasizing the need for specialized treatment approaches. Ablative treatment was associated with superior perioperative outcomes, whereas partial nephrectomy exhibited higher urological complication rates. Minimally invasive techniques are crucial, especially for solitary kidney cases and small renal tumors. Simultaneous partial nephrectomy and RF ablation are effective for managing exophytic and calyceal system-extending masses in solitary kidneys. The preservation of renal function is of paramount importance, prompting consideration of ablative treatment alongside partial nephrectomy. Despite limited evidence, ablative therapies offer a viable alternative for frail and comorbid patients, ensuring long-term oncological durability and superior preservation of renal function.

Keywords: Ablation, partial nephrectomy, radical nephrectomy, radiofrequency ablation, renal cell carcinoma, renal tumor, tumor

Introduction

Renal cell carcinomas (RCC) are tumors originating from the renal cortex, constituting approximately 80-85% of primary kidney tumors (1). The prognosis of RCC is primarily dependent on its anatomical spread, number, histopathology, molecular characteristics of the tumor, and clinical factors in patients (2). Radical nephrectomy is the gold standard treatment for patients with more than one tumor detected in RCC. However, for solitary kidney masses, those with inadequate kidney reserve, patients deemed high-risk for radical surgery, and small kidney masses, partial nephrectomy and ablative treatments can be considered (3). In this case, our goal was to apply simultaneous partial nephrectomy and radiofrequency (RF) ablation treatment in the same session.

Case Report

A 52-year-old female patient presented to our clinic with right flank pain and hematuria. Eleven years ago, the patient underwent right robotic radical nephrectomy due to the detection of a mass in the right kidney during investigations. Contrast-enhanced computed tomography (CT) of the entire abdomen revealed the absence of the left kidney. In the right kidney upper pole, an exophytic extension measuring 4 x 3.5 x 3 cm from the cortex and a growth from the para-pelvic area toward the calyces measuring 3.5 x 2.5 x 2 cm were observed. Both of these lesions were malignant in nature, with heterogeneous, dense cystic lesions and significant contrast uptake (Figure 1). The patient was evaluated with interventional radiology and nephrology in the preoperative period, and all preoperative preparations were completed considering the

Cite this article as: Albaz C, Mammadzada M, Müezzinoğlu T, Üçer O, Temeltaş G. Simultaneous Partial Nephrectomy and Radiofrequency Ablation in a Solitary Kidney Patient. Bull Urooncol. 2024;23(4):119-121.

Address for Correspondence: Ali Can Albaz, Manisa Celal Bayar University Faculty of Medicine, Department of Urology, Manisa, Turkey
E-mail: alicanalbaz@hotmail.com **ORCID-ID:** orcid.org/0000-0002-7725-1241
Received: 25.01.2024 **Accepted:** 08.11.2024

patient's anephric status. Subsequently, the patient underwent partial nephrectomy for a 4 cm exophytic mass in the upper pole and interventional radiology, including RF, for a 3.5 cm mass. All procedures were performed during the same operative session (Figure 2).

The duration of the operation was 130 minutes, and the ischemia time was 18 minutes. No complications occurred during the peri- and early postoperative periods. The patient had a preoperative creatinine level of 1.2 and demonstrated normal serum creatinine values in the early postoperative period, which were within the normal limits (creatinine 0.9). The patient was discharged on the 5th postoperative day. The patient was scheduled for a follow-up appointment in the first postoperative month and underwent a control contrast-enhanced whole abdominal CT scan. Although no distinct residual findings were discernible at the cortex-located lesion, the approximately 17 x 13 mm segment of the lesion located in the para-pelvic region was interpreted as residual tissue showing contrast enhancement (Figure 3). The pathological diagnosis was classic clear cell RCC. Based on the follow-up imaging results, a decision was made to perform re-RF ablation. Informed consent was obtained from the patient.

Discussion

In a meta-analysis published in 2016, radical nephrectomy was associated with the highest incidence of chronic kidney disease and the largest decrease in the estimated glomerular filtration rate among renal tumor treatment options. Ablative treatment was associated with the most favorable perioperative outcomes.

Figure 1. Pre-operative computed tomography images in the coronal section showing two malignant masses in the right kidney

Partial nephrectomy showed the highest rates of urologic complications, although overall minor/major complication rates were similar among interventions (4). It is necessary to consider minimally invasive techniques that preserve the kidney, especially in patients with a single kidney and small renal tumors.

Although the indications for ablative surgery in small renal tumors are not clearly defined, it can be categorized based on patient and tumor-specific characteristics. The fact that ablative methods can be applied multiple times without the need for renal ischemia is an important advantage (5). The other important group is patients with bilateral and multiple tumors or patients with syndromes such as von Hippel-Lindau and Birt-Hogg-Dubé, which are characterized by frequent tumor recurrence and multifocality. In patients requiring multiple interventions, partial nephrectomy has a negative impact on kidney function because of increased ischemia time (6).

Ablative therapies have similar long-term oncological durability, lower complication rates, and superior preservation of renal function compared with partial nephrectomy. Despite the low quality of evidence, ablative therapies are a reasonable alternative to partial nephrectomy in frail and comorbid patients (7).

In this case, we opted for this method to preserve the solitary kidney, considering the patient's age and comorbidities in accordance with the literature. One of the advantages of this

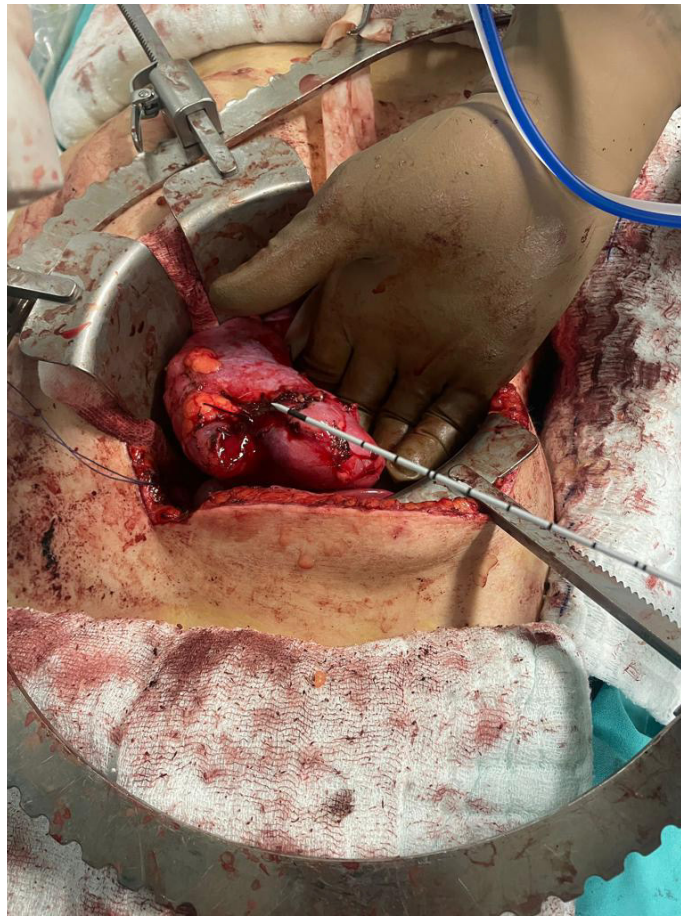

Figure 2. Intraoperative image of partial nephrectomy and radiofrequency ablation of the endophytic mass in the same session

Figure 3. Postoperative first-month computed tomography images of the coronal section of the right kidney

procedure is the reproducibility of the RF technique. At the first-month follow-up, CT scan was performed again to detect an intraparenchymal residual mass. The mass size was reduced by approximately 85%. Consequently, the RF was applied again. During the patient's final evaluation, we observed that he was completely free of tumors.

Partial nephrectomy and RF ablation can be performed in the same session for both the exophytic and calyceal systems extending masses in the solitary kidney that require close follow-up. The goal is to avoid anephric status and the need for dialysis; therefore, it is beneficial to consider other ablative treatment options along with partial nephrectomy, if possible, with the aim of preserving renal function.

Ethics

Informed Consent: Informed consent was obtained from the patient.

Acknowledgements

Publication: The results of the study were not published in full or in part in form of abstracts.

Contribution: There is not any contributors who may not be listed as authors.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.C.A., M.M., T.M., Concept: O.Ü., Design: T.M., Data Collection or Processing: M.M., Analysis or Interpretation: M.M., G.T., Literature Search: A.C.A., Writing: A.C.A.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Garfield K, LaGrange CA. Renal Cell Cancer. In: StatPearls. StatPearls Publishing, Treasure Island (FL).
2. Gallardo E, Méndez-Vidal MJ, Pérez-Gracia JL, et al. SEOM clinical guideline for treatment of kidney cancer (2017). Clin Transl Oncol. 2018;20:47-56.
3. Gumus BH, Albaz AC, Düzgün F, et al. Long term follow-up results of ablation treatment for patients with small renal mass. Int J Clin Pract. 2021;75:14130.
4. Pierorazio PM, Johnson MH, Patel HD, et al. Management of renal masses and localized renal cancer. ystematic Review and Meta-Analysis. J Urol. 2016;196:989-99.
5. Luciani LG, Cestari R, Tallarigo C. Incidental renal cell carcinoma-age and stage characterization and clinical implications: study of 1092 patients (1982-1997). Urology. 2000;56:58-62.
6. Volpe A, Blute ML, Ficarra V, et al. Renal Ischemia and Function After Partial Nephrectomy: A Collaborative Review of the Literature. Eur Urol. 2015;68:61-74.
7. Chan VW, Abul A, Osman FH, et al. Ablative Therapies versus Partial Nephrectomy for Small Renal Masses-A systematic review and meta-analysis of observational studies. Int J Surg. 2022;97:106194.