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RESEARCH ARTICLE

SAFE RENAL TUMOR ABLATION USING PERINEPHRIC FAT HYDRODISSECTION TO DISPLACE THE COLON: A 12-MONTH IMAGING FOLLOW-UP IN A HIGH-RISK ONCOLOGY PATIENT

***Vitoria de Queiroz Vasconcelos, MD, Macello Sampaio Maciel, MD, Francisco Lima Filho, MD, Evanildes Barros Muniz, MD, Gabrielle de Moura Ferreira, MD and Hudson Martins de Brito, MD**

Instituto do Câncer do Ceará Universidade Federal do Ceará

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***Corresponding author:**
Vitoria de Queiroz Vasconcelos, MD,

ABSTRACT

Purpose: The purpose of this case report is to highlight the successful use of percutaneous renal ablation combined with hydrodissection of perinephric fat to safely displace the colon and achieve effective tumor control in a high-risk oncology patient with multiple comorbidities. This technique offers a potential solution for patients with renal masses located near critical structures, such as the gastrointestinal tract, where thermal injury is a significant concern. **Case Summary:** A 78-year-old female patient with a history of coronary artery disease and previous breast cancer was referred for management of an incidental renal mass. Initial imaging revealed a 2,2 cm enhancing mass located in the left kidney, with a distance of approximately 1,4 mm from the descending colon. Given her complex medical history, including ischemic heart disease and advanced age, she was deemed high-risk for surgery. Due to the tumor's proximity to the colon, a decision was made to proceed with image- guided radio frequency ablation (RFA), incorporating a hydrodissection technique to ensure safe tumor ablation without compromising surrounding tissues. Conclusion: This case illustrates the efficacy of using hydrodissection in conjunction with radiofrequency ablation to treat renal tumors located near critical structures, such as the colon. The technique allowed for safe tumor ablation without thermal injury to the surrounding organs, providing a successful outcome in a high-risk patient. The 12-month imaging follow-up showed complete tumor necrosis, demonstrating the potential of this approach in enhancing the safety and efficacy of percutaneous renal tumor ablation.

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INTRODUCTION

Renal tumor ablation is an increasingly utilized option for patients who are poor surgical candidates. However, tumors in close proximity to the colon present a challenge due to the risk of thermal injury. Hydrodissection allows for the safe displacement of adjacent organs. This report describes a case of successful renal ablation using hydrodissection in a 78-year-old female with significant comorbidities, including coronary artery disease and prior breast cancer.

CASE REPORT

A 78-year-old female with a history of coronary artery disease (CAD) and breast cancer was referred for evaluation of an incidental renal lesion. Contrast-enhanced CT revealed a 2,2 cm enhancing solid mass in the left kidney (renal score 5a) (Figure 1). Due to the patient's comorbidities, she was deemed high-risk for surgery. The lesion's proximity (1,4 mm) to the descending colon raised concern for potential thermal injury during ablation (Figure 2).

Figure 1. Solid mass in the left kidney

Figure 2. Lesion's proximity to descending colon

Under conscious sedation and CT guidance, a 17G needle was used to infuse approximately 400mL of sterile 5% dextrose in water (D5W) into the perinephric fat, achieving displacement of the colon by 17.9 mm (Figure 3). A radiofrequency was deployed in the center of the lesion, and 3 overlapping ablation cycles were performed (Figure 4).

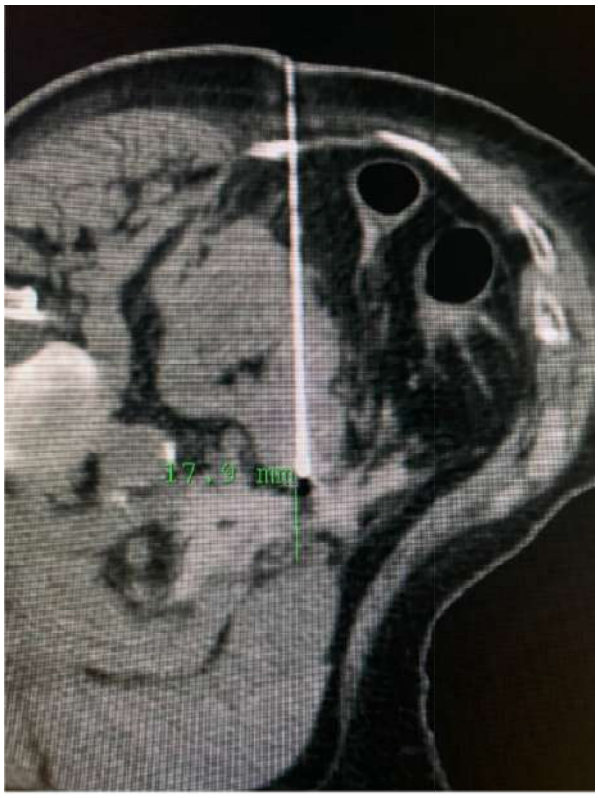

Figure 3. Imaging post hydrodissection of perinephric fat

Figure 4. Radiofrequency deployed in the center of the lesion.

The patient tolerated the procedure well and was discharged the next day. No peri- procedural complications were reported.

Follow-Up: Follow-up imaging with contrast-enhanced CT was performed at 4 months post-procedure (Figure 5). Each follow-up confirmed stable post-ablation changes, and the 12 month scan showed a non-enhancing ablation zone with no signs of residual or recurrent disease (Fugure 6). The adjacent colon remained intact and unchanged, with no evidence of thermal damage or delayed complications.

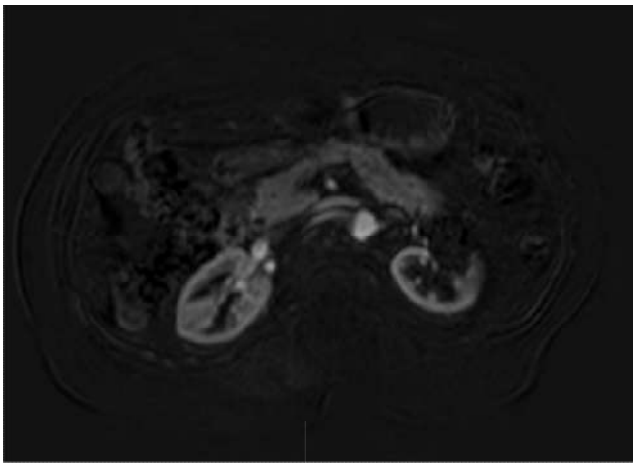

Figure 5. Four month follow-up

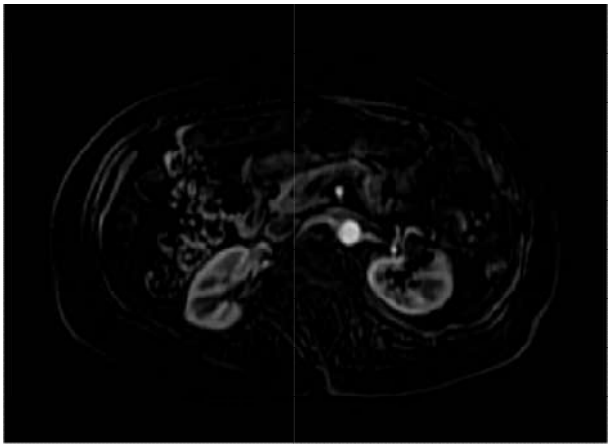

Figure 6. 12 month follow-up

DISCUSSION

Minimally invasive thermal ablation has become a well-accepted treatment option for small renal masses (SRMs), particularly in patients who are poor surgical candidates due to comorbidities or previous malignancies. According to the 2017 AUA guidelines, image- guided ablation is recommended as a treatment alternative to partial nephrectomy for cT1a renal tumors (<4 cm) in select patients, particularly those with high anesthetic risk or solitary kidneys (Campbell et al., 2017). This recommendation is supported by accumulating data demonstrating comparable oncologic outcomes and lower complication rates when compared to surgery in this subgroup. In the present case, the patient had significant cardiovascular comorbidities and a prior history of breast cancer, placing her at elevated surgical risk. The decision to proceed with percutaneous radiofrequency ablation (RFA) was consistent with guideline-based, patient- centered care. The lesion's proximity to the descending colon posed a significant technical challenge, which was safely addressed with hydrodissection of the perinephric fat using D5W.

Hydrodissection has been well described in interventional radiology literature as an effective method to displace adjacent organs and prevent collateral thermal injury. The Society of Interventional Radiology (SIR) guidelines underscore the utility of hydrodissection, particularly when ablating tumors near bowel loops, the ureter, or other vulnerable structures (SIR QI Guidelines, 2010). In this case, the technique successfully displaced the colon by over 2 cm—well beyond the thermal margin of concern—and maintained that separation throughout the ablation. The European Association of Urology (EAU) guidelines further support the use of ablative therapies in patients with localized renal tumors who are unfit for surgery, emphasizing that oncologic control is acceptable when proper patient selection and technique are observed (EAU RCC Guidelines, 2023). Additionally, retrospective studies have shown that the risk of bowel injury without hydrodissection ranges from 1–3%, especially in tumors <1 cm from the gastrointestinal tract, but drops significantly when displacement techniques are used (Georgiades et al., 2010).

The use of 5% dextrose in water (D5W) is preferred over saline in hydrodissection during RFA, as it is non-ionic and less likely to conduct heat, thereby providing better thermal protection. Furthermore, D5W has been associated with lower impedance and less current dispersion, improving the efficacy of the ablation zone (Hinshaw et al., 2014).

This case also highlights the importance of longitudinal imaging follow-up. At 12 months, contrast-enhanced CT demonstrated a non-enhancing, avascular ablation zone, consistent with complete tumor necrosis. This aligns with expectations for successful RFA, as described in the literature, where absence of enhancement is a key indicator of treatment success (Silverman et al., 2010). Taken together, this case reinforces the role of hydrodissection as a safe, effective, and reproducible adjunct in the thermal ablation of renal tumors, especially in high-risk populations and anatomically complex cases.

CONCLUSION

Hydrodissection of perinephric fat using D5W allowed for safe and effective radiofrequency ablation of a renal mass in close proximity to the colon in a high-risk oncology patient. Twelve-month imaging follow-up demonstrated complete local control with no complications. This technique should be considered in similar high-risk and anatomically challenging cases.

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