



ORIGINAL ARTICLE

Ultrasound-guided percutaneous radiofrequency ablation for treating small renal masses[☆]



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KEYWORDS

Small renal tumor;
Radiofrequency
ablation;
Renal cancer

Abstract

Introduction: The objective of this study was to analyze and assess the experience with radiofrequency ablation of small renal masses using a contrast-enhanced, ultrasound-guided percutaneous approach for patients who are not suitable for surgical resection and/or who refused surveillance or observation.

Material and method: From January 2007 to August 2015, 164 treatments were performed on a total of 148 patients. We present the patients' clinical-radiological characteristics, oncological and functional results in the short and medium term.

Results: The overall technical success rate was 97.5%, with a successful outcome in 1 session in 100% of the lesions ≤ 3 cm and 92% in lesions measuring 3–5 cm. The mean tumor diameter in the patients for whom the treatment was ultimately successful was 2.7 cm, while the mean diameter of these in the unsuccessful operations was 3.9 cm ($p < .05$). There were no statistically significant differences in the serum creatinine levels and estimated glomerular filtration rates.

Conclusions: Despite the low rate of positive renal biopsies in the series, ultrasound-guided percutaneous radiofrequency ablation for treating small renal lesions appears to be an effective and safe procedure with a minimum impact on renal function, an acceptable oncologic control in the short and medium term and a low rate of complications.

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PALABRAS CLAVE

Tumor renal pequeño;
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Radiofrecuencia percutánea guiada por ecografía en el tratamiento de masas renales pequeñas

Resumen

Introducción: El objetivo del presente estudio ha sido analizar y evaluar la experiencia en ablación por radiofrecuencia de masas renales pequeñas mediante abordaje percutáneo guiado por ecografía con contraste en pacientes no aptos para la resección quirúrgica, y/o que no aceptaron vigilancia u observación.

Material y método: Desde enero de 2007 hasta agosto de 2015 se han realizado 164 tratamientos en un total de 148 pacientes. Se presentan las características clínico-radiológicas de los pacientes, los resultados oncológicos y funcionales a corto y medio plazo.

Resultados: La tasa de éxito técnico global fue del 97,5%, con éxito final en una sesión en el 100% de lesiones ≤ 3 cm y el 92% en lesiones entre 3–5 cm. El diámetro medio de los tumores en los que el tratamiento fue finalmente exitoso fue de 2,7 cm, mientras que el diámetro medio de estos fallos fue de 3,9 cm ($p < 0,05$). No se observaron diferencias estadísticamente significativas en la creatinina sérica y en el filtrado glomerular estimado.

Conclusiones: A pesar de la baja tasa de biopsia renal positiva en la serie, la aplicación de radiofrecuencia percutánea ecoguiada en el tratamiento de lesiones renales pequeñas parece un procedimiento eficaz y seguro, con un mínimo impacto sobre la función renal, un aceptable control oncológico a corto y medio plazo, con una baja tasa de complicaciones.

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Introduction

We are currently witnessing an increase in the diagnosis of small renal masses (<4 cm). This is due to the increase in incidental detection in imaging studies performed for other reasons. Another cause for this increase in diagnosing may be relating to factors such as tobacco use or obesity in developed countries.^{1–4}

Experience in renal partial surgery has allowed more and more urologists to perform complex procedures with excellent oncological and functional results. However, partial nephrectomy is still considered a complex surgical procedure, which is not free of complications and occasionally may require high ischemia times.^{5–7} Another element to take into account is the increase in the diagnosis of small renal masses in the 70–90 age groups, where in a high proportion they have a non-aggressive behavior, low growth rates (1–3 mm per year), low Führman grades and low metastatic potential. In this case, we can propose active surveillance as an alternative, or conduct an active therapeutic attitude in specific cases. The European Association of Urology and AUA support the use of minimally invasive techniques (grade A recommendation) in patients with small tumors or who have a severe comorbidity and are not candidates for surgery, or have affections of hereditary syndromes such as von Hippel Lindau disease and Birt-Hogg-Dubé,^{7–9} where they may require several surgical procedures.

Therefore, ablative techniques could represent a valid option in specific patients with oncologic results comparable to surgery in the short- and medium-term.^{10–12} Our objective was to evaluate the initial experience in a single center with a program of radiofrequency ablation of small renal masses with a percutaneous approach and guided by contrast ultrasound.

Study design and population

Between January 2007 and August 2015, a total of 164 procedures were performed in 148 patients diagnosed with small renal tumor (T1a) who were not candidates for surgery. The criteria followed were: life expectancy ≤ 5 years and/or 75 years old and/or associated high comorbidity (ASA III–IV) and/or patients with a single kidney with tumors difficult to locate for the surgical approach. We have also included endophytic renal lesions ≤ 1.5 cm, of posterior leaflet and upper pole of difficult approach by laparoscopy, regardless of patient age and/or associated comorbidity.

Prior assessment and description of the technique

After the preoperative evaluation (blood count with coagulation tests and calculation of the estimated glomerular filtration rate according to the Cockcroft-Gault formula) and the signing of the informed consent, the candidates were submitted to a baseline abdominal computed tomography (CT). After the administration of intravenous contrast, a contrast-enhanced renal ultrasound was also performed to accurately determine tumor size and location, and their relationships to urinary tract and adjacent organs.

All cases were performed percutaneously and with ultrasound contrast exam. Ablation was performed using a 15-cm-long Cool-tip TM RF ablation system, with different ablation diameters depending on tumor size (Fig. 1). The position of the patient (supine/lateral/prone) depended on the location of the mass, and all procedures were performed by conscious sedoanalgesia through intravenous

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