Radiofrequency ablation of malignant renal tumor: report of three cases

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Abstract

Three cases of radiofrequency ablation of small malignant renal tumor performed at Clinica Internacional, in Lima, Peru, were presented. Two female patients aged 69 and 37; and a male patient (with only one kidney) of 65 years old, are reported. They presented incidental diagnosis of small single kidney tumor (less than 3 cm) by imaging studies, showing radiological signs of malignancy in all three cases. The patients did not receive surgical treatment for different reasons. A renal biopsy was performed for anatomopathological confirmation (AP) and, immediately after, the radiofrequency thermal ablation (RF) of such renal tumors with excellent results after the procedure and in the subsequent follow-up.

Key words: Ablation. Malignant renal tumor. Radiofrequency.

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Introduction

The techniques of image-guided ablation are increasingly accepted for the treatment of malignant and some benign tumors of the liver, kidneys, lung, thyroid, uterus, bones and other soft tissues. There are numerous methods of thermal and non-thermal ablation, including radiofrequency ablation (RF), microwave ablation, cryoablation, high-intensity ultrasound, laser ablation, irreversible electroporation, as well as chemical ablation (with ethanol and acetic acid).

Radiofrequency ablation, in Peru, is a very effective tool in the minimally invasive (non-surgical) treatment of malignant renal lesions, in selected cases.

Clinic case

Case 1

P69-year-old female patient, coming from the urology service, with lumbar pain as main complaint. Medical history of hypertension, diabetes mellitus, morbid obesity (BMI 40), with cholecystectomy, chronic liver disease.

Ultrasound scan (US) of abdomen shows a solid tumor of approx. 2.2 cm in the middle third of the left kidney. An urotomography (Uro-CT) and an uro-resonance (Uro-MRI) were performed, confirming tumor lesion with contrast of malignant neoformative appearance, as well as the existence of a cortical renal cyst (1.8 cm). (Figures 1-5)

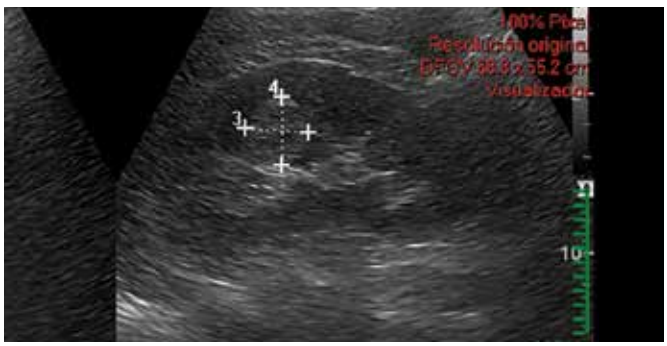

Figure 1. Renal Ultrasound (US).

Figure 2. Urotomography (Uro-CT) axial section in arterial phase.

Figure 3. Urotomography (Uro-CT) axial section in venous phase.

Figure 4. Urotomography (Uro-CT) axial section in excretory phase.

Figure 5. Urotomography (Uro-CT) coronal section in venous phase.

Due to the high surgical risk, it was decided to perform a biopsy and, immediately after, the radiofrequency ablation (RF) of the renal tumor was successfully performed with general anesthesia and ultrasound guidance.

The AP Diagnosis is clear cell renal carcinoma.

CT control with contrast is performed one month after the procedure, and the result shows a residual, hypodense, without contrast image. (Figures 6,7)

Figure 6. Urotomography (Uro-CT) axial section in venous phase.

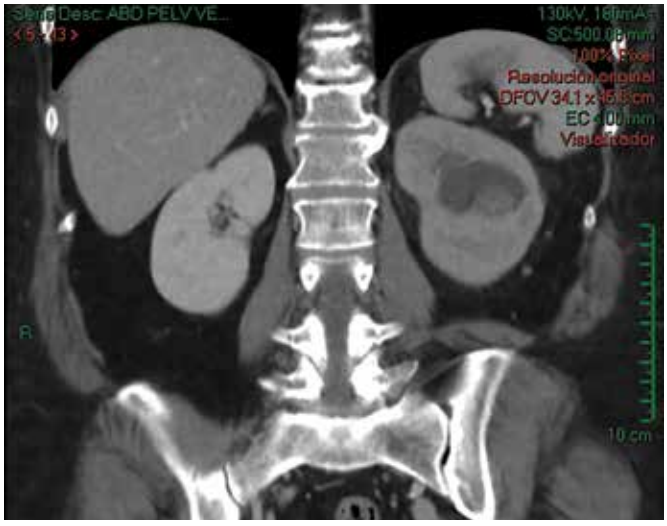

Figure 7. Urotomography (Uro-CT) coronal section in venous phase.

As a post-RF complication, left hydronephrosis occurs. This is satisfactorily solved with a double J stent placed by urology. (Figure 8)

Figure 8. Double J stent placed in proper position.

Case 2

Male patient, 65 years old, having only his right kidney, coming from the urology service, with lumbar pain of the right side as the main complaint, to rule out lithiasis.

Clinical history of left nephrectomy due to a history of lithiasis in another institution, hypertension and dyslipidemia.

Uro-CT and Uro-MRI are performed in which a solid-cystic complex cortical tumor lesion of approximately 2.2 cm was found in the upper pole of the right kidney, whose solid component shows contrast enhancement (Bosniak IV category). Malignant neoplasm is suspected. (Figures 9-13)

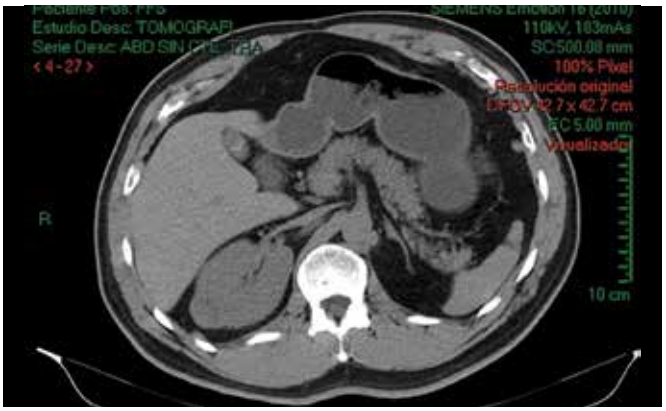

Figure 9. Urotomography (Uro-CT) axial section, without contrast.

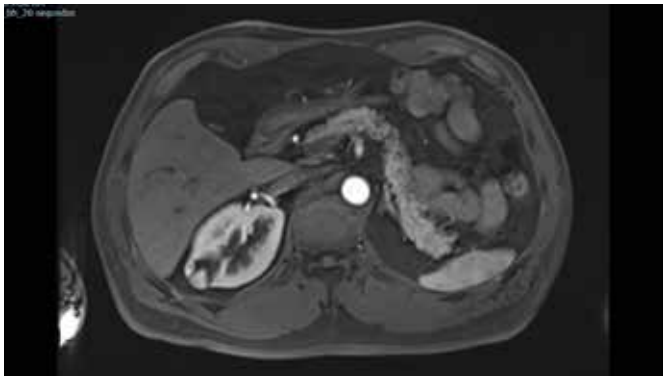

Figure 10. Uro-resonance (Uro-MR) axial section, sequence T1, at 20 seconds.

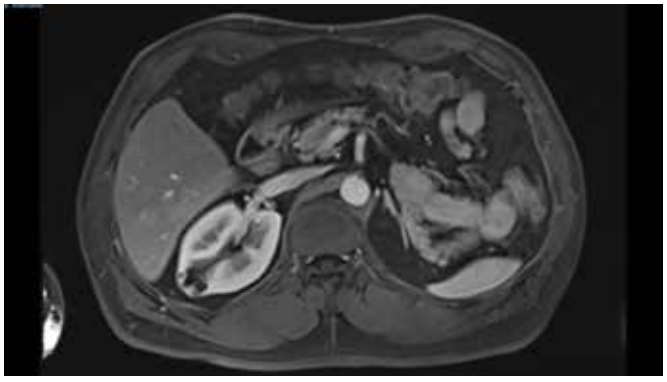

Figure 11. Uro-resonance (Uro-MR) axial section, sequence T1, at the minute.

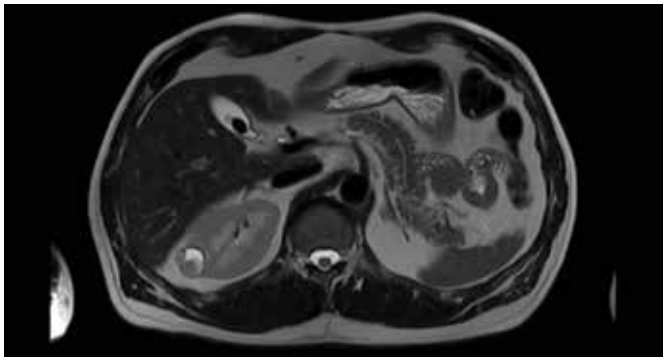

Figure 12. Uro-resonance (Uro-MR) axial section, sequence T2.

Figure 13. Urotomography (Uro-MR) coronal section, sequence T2.

Being a patient with a single kidney, it was decided to perform a FNAB, trucut biopsy and, immediately, RF ablation of the renal tumor, with general anesthesia and ultrasound guidance. (Figures 14,15)

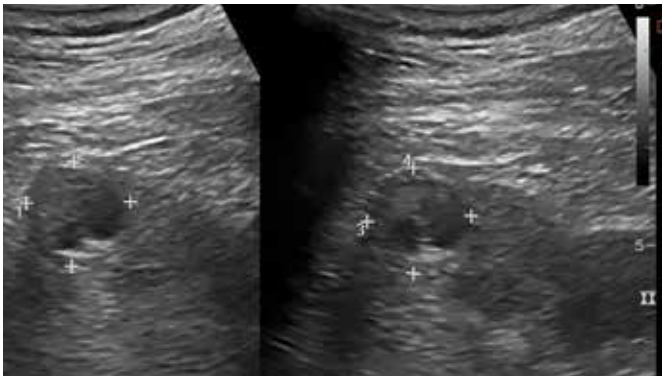

Figure 14. Ecography planning during kidney biopsy.

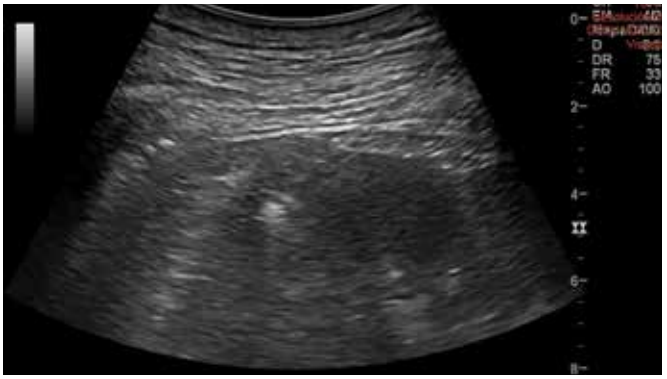

Figure 15. Radiofrequency ablation of renal tumor.

The result was successful and there were no complications after the procedure. The AP diagnosis was focal glomerulosclerosis.

CT with contrast is performed every three months (for control) and these ones show a hypodense, residual, wedge-shaped image, without contrast. The same result is observed in the subsequent periodic controls. (Figures 16-18)

Figure 16. Urotomography (Uro-CT) axial section, in venous phase.

Figure 17. Urotomography (Uro-CT) axial section, in late phase.

Figure 18. Urotomography (Uro-CT) coronal section, in venous phase.

Case 3

A 37-year-old female patient, with grade I obesity, comes from urology service due to an incidental finding of a right renal tumor in CT. She attended emergency service due to abdominal pain on the left side and left iliac fossa. She was evaluated by an emergency physician, who indicated CT with contrast to rule out diverticulitis. After the study, colonic diverticulitis and the incidental finding of a right renal tumor were confirmed.

In this abdominal CT with contrast, a solid-cystic complex cortical tumor of approximately 1.8 cm was located in the middle third of the right kidney, whose solid component shows contrast enhancement (Bosniak IV category). Malignant neoplasm is suspected. (Figures 19-22)

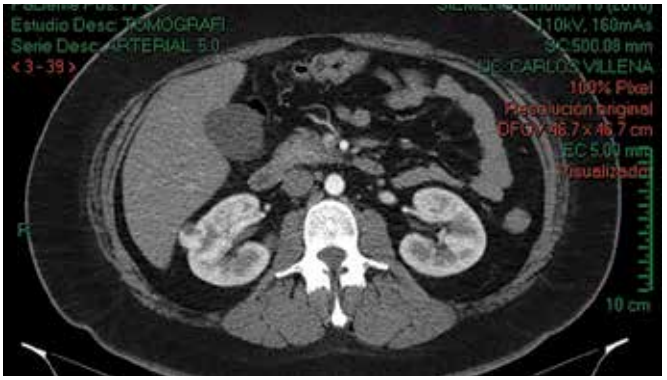

Figure 19. Urotomography (Uro-CT) axial section, in arterial phase.

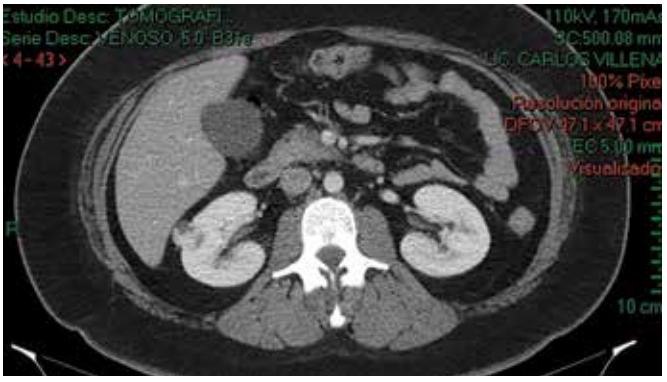

Figure 20. Urotomography (Uro-CT) axial section, in venous phase.

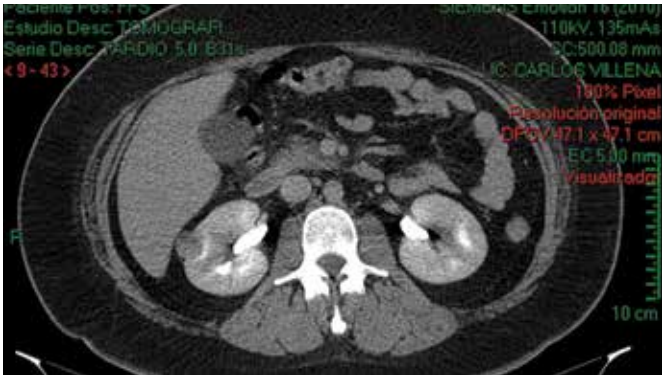

Figure 21. Urotomography (Uro-CT) axial section, in late phase.

Figure 22. Urotomography (Uro-CT) coronal section, in venous phase.

Due to the surgical risk, and by the will of the patient, it was decided to perform FNAB, trucut biopsy and, then, RF ablation of the renal tumor, with general anesthesia and ultrasound guidance. The procedure was successful, so there were no later complications. (Figures 23-25)

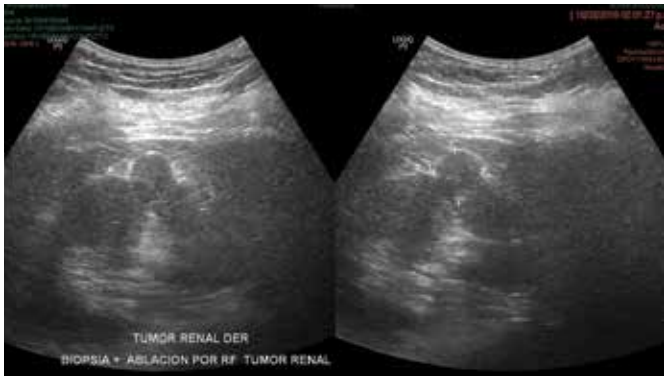

Figure 23. Planning of renal biopsy and radiofrequency ablation under ultrasound guidance.

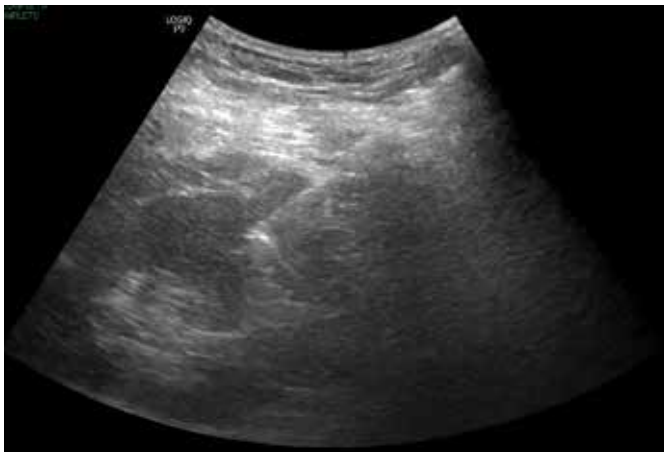

Figure 24. Kidney tumor biopsy under ultrasound guidance.

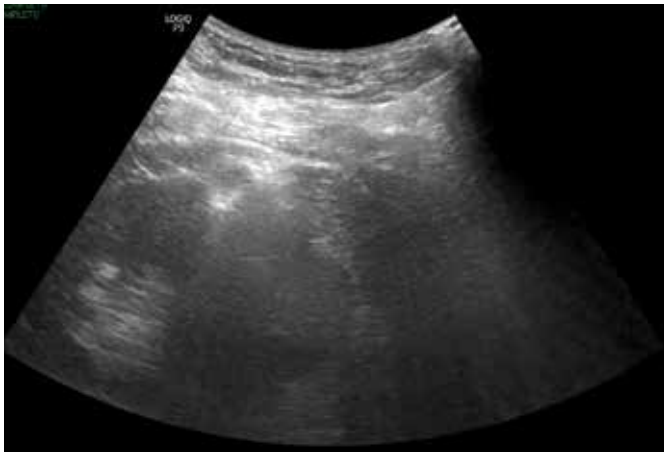

Figure 25. Radiofrequency ablation of renal tumor under ultrasound guidance.

The AP diagnosis is clear cell renal carcinoma.

CT with control contrast is performed every three months and shows a hypodense, residual, wedge-shaped image, without contrast. The same result is observed in the subsequent periodic controls. (Figures 26-27)

Figure 26. Urotomography (Uro-CT) axial section, in venous phase.

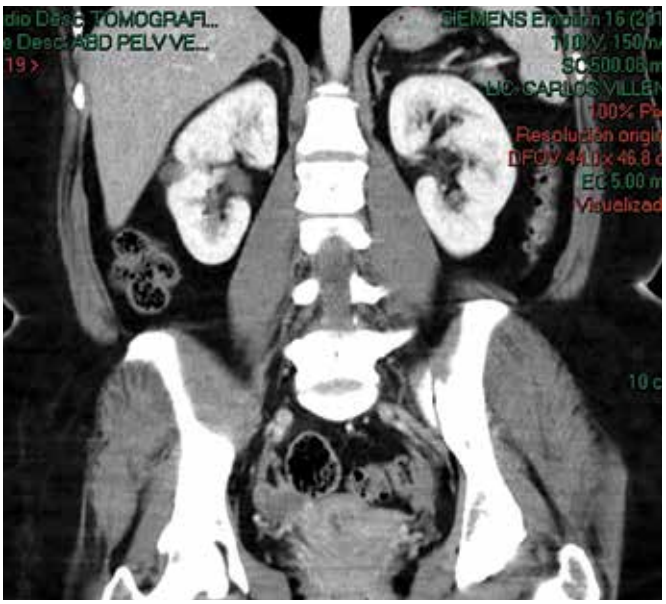

Figure 27. Urotomography (Uro-CT) axial section, in venous phase.

Discussion

Renal cancer represents approximately 4% of all malignant tumors, and most of them (85% to 90%) are renal cell carcinomas (adenocarcinomas) [1-5].

Recently, imaging diagnostic methods used for the detection of small tumors smaller than 2 cm (Small Renal Mass or SMR), such as CT and MRI, have greatly improved[3-5].

Surgical treatment (radical nephrectomy and partial nephrectomy) is the classic, referent and current treatment for this disease[1, 2, 5, 12, 23, 24].

However, the minimally invasive percutaneous techniques (radiofrequency ablation, cryoablation and microwaves) have been positioned as a good alternative for the management of renal cancer in selected patients, with clinical results (survival rates) similar to surgery, but with lower complication rate[1, 2, 6-21, 26].

Therefore, renal RF is currently included in the Guidelines of the American Association of Urology, as well as in the European Association of Urology (Editions 2018) for the management of renal cancer[1, 2].

RF ablation is indicated in selected patients (with high surgical risk), with small renal tumor <3 cm, of exophytic growth, with radiological signs of malignancy and confirmed with an immediately previous biopsy[1, 2, 9, 10, 12-20].

Radiofrequency ablation of the malignant renal lesions of our 3 patients was successful, with a minimal complication rate (hydronephrosis in one case). Therefore, we consider that radiofrequency ablation (RF) is a minimally invasive therapeutic tool of great usefulness, with low rates of complications and with great preservation of the healthy renal parenchyma, in comparison to the classical surgical therapy, improving the quality of life of the patients[12, 22-26].

It is important to stand out the valuable contributions of the subspecialty of interventional radiology in the solution of various medical problems through minimally invasive procedures, both in the urological area and in other medical specialties.

Likewise, it must be recognized that teamwork among the different medical specialties is of vital importance to achieve success for the benefit of the patient. In this case, we worked together with the specialties of Radiology, Urology and Interventional Radiology.

The Clinica Internacional reports three cases of kidney tumors smaller than 3 cm, treated with radiofrequency ablation (RF) with satisfactory results, working with the current standards of the International Guidelines of the American Association of Urology and the European Association of Urology.

Help or sources of finance
None

Conflict of interest
The authors report no conflicts of interest regarding this manuscript.

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