



ORIGINAL ARTICLE

Prospective study of ultrasound-guided percutaneous renal cryotherapy: Case selection as an optimization factor for a technique[☆]



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KEYWORDS

Cryotherapy;
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Abstract

Objective: To evaluate the technical and oncological effectiveness of ultrasound-guided percutaneous renal cryotherapy (PRC) in a selected group of patients with renal cancer.

Materials and methods: We conducted a prospective study of 28 patients with posterior-facing T1a renal tumors with middle and inferior external borders. All patients underwent ultrasound-guided PRC. Follow-up was conducted with computed tomography at 1 month and then every 6 months, with a good result defined as the total absence of contrast incorporation. We performed a descriptive and survival study using the Kaplan–Meier estimator.

Results: The 28 patients had a mean age (SD) of 68.3 (10.1) years, and the group underwent 28 procedures. The mean (SD) size of the tumors was 25.5 (7.5) mm, the mean nephrometry score was 1.41 (0.52) and the mean preoperative creatinine level was 133.5 (144.1) mmol/L. There were no intraoperative complications. In terms of postoperative complications, there was only 1 case (3.5%) of a skin lesion resulting from treating a tumor in a transplanted kidney (Clavien II). The median follow-up was 25 months, and the mean (SD) postoperative creatinine level was 135.5 (110.3) mmol/L. Two cases presented radiological recurrence (93% efficacy), with a mean time to recurrence of 12 and 19 months, respectively. There were no tumor-related deaths.

Conclusions: Our series (the largest on PRC in our country to date) shows that, with an appropriate selection of tumors, PRC is a safe technique with minimal morbidity. Ultrasonography enables the controlled performance of the procedure and saves the patient from radiation and reduces costs.

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PALABRAS CLAVE

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Estudio prospectivo de crioterapia renal percutánea ecoguiada: selección de casos como factor de optimización de una técnica

Resumen

Objetivo: Evaluar la efectividad técnica y oncológica de la crioterapia renal percutánea (CP) ecoguiada en un grupo seleccionado de pacientes con tumor renal.

Material y métodos: Se realizó un estudio prospectivo de 28 pacientes con tumores renales T1a de cara posterior y de borde externo medio e inferior. A todos se les realizó CP ecoguiada. El seguimiento fue con TC al mes y después cada 6 meses, considerándose como criterio de buen resultado la ausencia total de incorporación de contraste. Realizamos un estudio descriptivo y de supervivencia mediante Kaplan-Meier.

Resultados: Se trata de 28 pacientes con una edad media (DE) de 68,3 (10,1) años, en los que se realizaron 28 procedimientos. La media (DE) de tamaño fue de 25,5 mm (7,5) *nephrometry score* 1,41 (0,52) y creatinina preoperatoria 133,5 mmol/l (144,1). No hubo ninguna complicación intraoperatoria. Como complicaciones postoperatorias solo un caso (3,5%) de lesión cutánea al tratar un tumor en riñón trasplantado (Clavien II). La mediana de seguimiento fue de 25 meses, y la creatinina media (DE) postoperatoria fue de 135,5 mmol/l (110,3). Presentaron recurrencia radiológica 2 casos (eficacia del 93%), con un tiempo medio hasta la recurrencia de 12 y 19 meses respectivamente. No se produjo ninguna muerte relacionada con el tumor.

Conclusiones: Nuestra serie, hasta el momento la más larga de CP en nuestro país, muestra que con una adecuada selección de tumores la CP es una técnica segura y con mínima morbilidad. La ecografía permite realizar el procedimiento de forma controlada, además de ahorrar irradiación y costes.

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Introduction

The extensive use of ultrasound scans and CT in recent years has increased by 60% the incidental diagnosis of small renal masses (≤ 4 cm).¹ However, many of such lesions are benign ones and are diagnosed in people over the age of 70. Besides, most of them behave in an asymptomatic manner with a growth rate of 3–4 mm/year.²

Active surveillance in these cases through a series of imaging tests is an option for elderly patients or those with comorbidity, but it is not free of financial cost, and sometimes of a psychological impact on the patient.³ Still, in younger patients, partial nephrectomy for stage T1a is the standard indication for treatment.⁴

Cryotherapy (CT) is considered as a minimally invasive technique allowing to better preserve renal function and to minimize complications arising from major surgery in these cases. At our center, we have gained extensive experience with laparoscopic cryotherapy (LC) in monorenal patients, or with previous surgery for renal tumors or in high-surgical-risk patients. Results showed a low percentage of complications.⁵

It is for this reason that we considered that posterior tumors and those in the outer inferior edge could benefit from a less invasive percutaneous approach, so a prospective study was designed to assess the technical and oncological efficiency of PC in a selected group of patients.⁵

Materials and methods

Since October 2008, we conducted a prospective study approved by the hospital ethics committee. All patients were informed about the details of the technique,

therapeutic alternatives (partial and radical nephrectomy) and signed informed consent forms.

Inclusion criteria were as follows: renal masses ≤ 4 cm, located in the posterior side and in the inferior or middle edge of the kidney, masses in the anterior side and in the outer edge (only those in the lower polar region). Exclusion criteria were cystic renal masses or in the anterior side or upper pole, and masses showing in the radiological study irresolvable contact with peritoneal structures, the liver, the spleen or the pleura. Postoperative complications were collected and classified according to the Clavien-Dindo classification system.⁶ A descriptive survival study was done using Kaplan–Meier methods.

Surgical technique

Access to the kidney was performed through an echo-guided percutaneous approach by the interventional surgery service, and assisted by an urologist throughout the entire procedure; preoperative ultrasound was performed in all cases to confirm the existence of good access to the kidney and tumor visualization. A renal biopsy was also performed in all cases. CRYOcare™ equipment (Endocare®) was used by applying a double freezing cycle⁷: a first freezing cycle for 12–20 min, until the tip of the cryoprobe reaches from -185 °C to -195 °C and then a passive defrosting process. Subsequently, a second similar cycle until the cryoprobe reaches 8 – 10 °C, at this moment it is removed.

Follow-up

Within the first 24 postoperative hours, follow-up ultrasound was performed in all patients. Follow-up was conducted with

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