CLINICAL CASE

Simultaneous bilateral partial nephrectomy for bilateral renal tumor: a case report


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Abstract Eighty-five percent of solid renal tumors correspond to renal cell carcinoma, and only 1 to 4% of patients have the bilateral presentation. Open partial nephrectomy has become the gold standard for the treatment of T1 renal tumors. New surgical techniques have enabled this procedure to be performed on tumors > 4 cm, with a morbidity similar to that for smaller tumors, adequate oncologic results, and a lower incidence of long-term kidney failure, when compared with radical nephrectomy. We present herein the case of a male patient that underwent simultaneous bilateral open partial nephrectomy for bilateral renal tumor with favorable oncologic and functional results.

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Introduction

Malignant renal tumors make up 3% of the incidence of malignant diseases and cause 2% of the deaths-by-cancer in the United States.\(^1\) Renal cell carcinoma represents 85% of malignant kidney diseases at a rate of 4.4 to 11.1/100,000 years/person.\(^2\) Renal cell carcinoma incidence has increased by 2.3-4.3% each year since 1970, resulting in more than 35,000 new cases and 12,000 deaths annually.

Currently, more than 60% of renal tumors are diagnosed incidentally due to the increased use of non-invasive imaging methods. The majority of the tumors diagnosed by these methods are found in clinical stage I, and of these, 20% are benign and 80% are malignant, and 20-30% of the latter present with histologic characteristics with potential aggressiveness.\(^3\)^\(^-\)\(^4\)

Multiple management options are available for patients with small, localized renal tumors.\(^7\) Traditionally, these tumors have been treated aggressively through radical nephrectomy. However, this predisposes to the development of chronic kidney disease, leading to a greater risk for cardiovascular diseases and increasing the mortality rate. Therefore, nephron-sparing treatment should be considered in all patients with T1 renal masses.\(^6\)^\(^-\)\(^9\)

Open partial nephrectomy is an established alternative to nephrectomy.\(^10\) It was described by Wells in 1884 for the treatment of perinephric fibrolipoma, but it was not until 1887 that Czerny performed the first partial nephrectomy as therapy for malignant kidney disease.\(^11\)^\(^-\)\(^12\) This technique has been shown to have mid and long-term oncologic results that are equivalent to those of radical nephrectomy. It can be performed in specialized centers on patients with tumors measuring 4-7 cm at their largest diameters.\(^1\)

Today, open partial nephrectomy has become the criterion standard for the treatment of single, small renal tumors.\(^13\)

Case presentation

A 37-year-old man had a past history of smoking and chronic alcoholism. Symptom onset was lumbalgia of one-month progression that was initially evaluated by an orthopedist who ordered a magnetic resonance study of the lumbar spine that resulted in the finding of bilateral renal masses. Physical examination was unremarkable, and no abdominal tumors were palpated. Noncontrast and contrast computed tomography scans reported: right kidney with a 68 x 60 x 65 mm tumor in the interpolar region and no alterations in the right adrenal gland, renal cavities, or veins; the left kidney had a 39 x 53 mm tumor at the anterior apex, confined to the parenchyma, and not extending to the renal cavities or beyond the renal capsule, with normal renal veins and adrenal gland; there was no lymph node activity or metastasis toward the other organs (fig. 1). Laboratory test results were within normal parameters, with no anemia or hypercalcemia, and no alterations in the kidney or liver function tests.

Due to the presence of bilateral renal tumors, open bilateral partial nephrectomy in a single surgery was performed. A Chevron incision was made. After the Cattel and Mattox maneuvers were carried out to enter the retroperitoneum and expose both kidney units, the renal hilum was clamped with a Rummel tourniquet and complete resection of the right renal tumor was then performed. The renal parenchyma was repaired using absorbable suture. The same maneuver was carried out on the left kidney (fig. 2). Surgery duration was 2 h and 30 min, intraoperative blood loss was 860 ml, and warm ischemia time for the right kidney was 13 min and 20 min for the left kidney. Hospital stay was 3 days, and the patient tolerated food and was walking from the first postoperative day. The histopathologic report on the lesions stated clear cell carcinoma with negative surgical margins, PT2aNOMO.

Kidney function was evaluated through serum creatinine levels with a value of 1.1mg/dL at the third postoperative week.

Discussion

Bilateral renal cell carcinoma presents in 1-4% of the patients with kidney cancer, being either hereditary or sporadic. The hereditary form differs from the sporadic one because it tends to be multifocal in the same kidney and occurs at an earlier age. The sporadic form is usually associated with a better outcome and has an adequate response to partial nephrectomy management. The majority of bilateral tumors present synchronously, but they can also present asynchronously many years after the first surgery.\(^14\)

Open partial nephrectomy is the standard nephron-sparing treatment in patients suspected of presenting with malignant renal disease.\(^13\) A 5-year disease-free survival rate of 96% has been reported in patients with tumors 4 cm or smaller that have undergone either partial or radical nephrectomy, and no recurrence has been observed in either of the 2 groups.\(^7\)

The modern case series reporting on open partial nephrectomy show a positive surgical margin rate of 0-3.3%. However, it has been emphasized that this parameter should not be used for determining treatment safety and efficacy, due to the fact that several studies have shown that there is no association between positive surgical margins and disease recurrence or progression. With partial nephrectomy, 3 unique characteristics allow us to demonstrate the fact that positive surgical margins...
adversely affect clinical progression: the necessity of coagulating the surgical margins to carry out hemostasis, potentially eradicating any residue of cancerous cells; renal ischemia induced by the clamping of the hilum can directly affect the cancerous cells that present with elevated metabolic requirements; and the natural history of the microscopic residual foci that require long-term follow-up to observe their clinical manifestation.\textsuperscript{15}

The indications for partial nephrectomy can be absolute (in the presence of solitary kidney), relative (in the presence of contralateral kidney affected by a condition that can compromise kidney function in the future, including hereditary forms of renal carcinoma), or elective (in the presence of normal contralateral kidney).

The partial nephrectomy complication rate reported in the literature is variable (4.1-38.6%). Almost 50% of the complications are medical (kidney failure, myocardial infarction, deep vein thrombosis, pulmonary embolism, pleuritis, etc.). Urinary leakage is the most common surgical complication and presents in 3.9% of the cases, followed by hemorrhage that presents in 3.2% of the cases.

In relation to tumor size, a greater incidence of bleeding, need for transfusion, and urinary fistulas have been observed in patients with tumors above T1b.\textsuperscript{16}

Figure 1 Bilateral renal tumor. A and B. Right kidney with interpolar mass, heterogeneously dense with posterolateral protrusion. C and D. Left kidney with mass in the upper pole with heterogeneous density that does not deform the renal contour.

Figure 2 Simultaneous bilateral partial nephrectomy. A, B, and C. Resection of the left renal tumor. D, E, and F. Resection of the right renal tumor. In both procedures the renal hilum was clamped with the Rummel tourniquet.
tumors appear to have more possibility of developing urinary leakage, compared with tumors located on the periphery."17

Various predictive factors for kidney function deterioration after radical nephrectomy have been identified. The presence of basal chronic kidney disease is the greatest predictor for kidney function deterioration. The immediate loss of kidney function is a long-term predictor for renal function that remains relatively stable after recovery from the surgical procedure. Among the surgical factors, ischemia time is the main risk factor for kidney function deterioration.16 17 Therefore the surgeon must have the necessary level of experience to perform the tumor resection in the least amount of time possible, preferably in less than 20 min of warm ischemia, and to begin cold ischemia if the possibility of carrying out the tumor resection within the established time is compromised. The kidney can tolerate cold ischemia for up to 2 h, but the lowest possible ischemia time is recommended, ideally under 35 min.9, 20-22

Bilateral partial nephrectomy has gained ground in the management of T1 renal tumors. The new surgical techniques have enabled this procedure to be performed in tumors larger than 4 cm, with acceptable morbidity due to the adequate oncologic results and the lower incidence of long-term kidney failure.

In the case of our patient, we demonstrated that bilateral partial nephrectomy can be carried out safely in bilateral renal tumors in a synchronous manner, respecting the established ischemia time, with adequate oncologic and renal function results.

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Conflict of interest

The authors declare that there is no conflict of interest.

References