

Retroperitoneoscopic Partial Nephrectomy of Bilateral Renal Masses in One Session

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ABSTRACT

Introduction: Occurrence of synchronous bilateral sporadic renal masses is rare. Retroperitoneoscopic partial nephrectomy of bilateral renal masses in one session can be a technically challenging procedure due to ischemia time, parenchyma preserved and perioperative complications.

Case Description: We present a case where bilateral renal masses were synchronously excised via retroperitoneoscopy in a 53-year-old woman. There were five masses excised in all and pathology revealed chromophobe renal cell carcinoma with histologic concordance. No recurrence or metastasis was detected after 2 years of follow-up and renal function was optimal with glomerular filtration rate (GFR) 76.3 ml/min/1.73 m², compared to the preoperative GFR of 77.5 ml/min/1.73 m².

Conclusions: Retroperitoneoscopic partial nephrectomy is a feasible and effective procedure for bilateral renal masses in one session under experienced hands.

Key Words: Retroperitoneoscopy, Partial nephrectomy, Bilateral renal masses, Synchronous.

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INTRODUCTION

Occurrence of synchronous bilateral renal masses is rare. It was reported to be present in <4% of renal cell carcinoma (RCC) patients.¹⁻⁵ The bilateral and multifocal development of RCC are more common in patients with heredity, including von Hippel-Lindau syndrome, Birt-Hogg-Dube syndrome, tuberous sclerosis, familial clear-cell carcinoma, and hereditary papillary carcinoma.¹ Until now, there is still no consensus on the systemic treatment strategy of synchronous bilateral RCC.

Surgery is the preferable treatment for synchronous bilateral RCC. To our knowledge, there is currently no standardized surgical approach to manage synchronous bilateral renal masses. The surgery can be performed in one session or in a two-step approach. There are four kinds of

surgical combination reported: radical nephrectomy (RN) followed by contralateral partial nephrectomy (PN), PN followed by contralateral RN, bilateral PN, and bilateral RN.^{4,6} Nowadays, the bilateral PN is the preferable treatment for bilateral renal masses, for this procedure provides satisfactory preservation of renal function and adequate local tumor control.^{6,7} In clinical practice, retroperitoneoscopic partial nephrectomy (RPN) of bilateral renal masses in one session can be a technically challenging procedure due to ischemia time, parenchyma preserved, and perioperative complications. In this study, we present a case where sporadic bilateral RCC, 5 masses in all, were synchronously excised via retroperitoneoscopy in a 53-year-old woman. We share the experience about surgical procedure and outcomes of oncology and renal function.

CASE REPORT

A 53-year-old female patient was found with bilateral renal masses during routine checkup. Computed tomography showed 2 masses (both 2×2 cm) on the right kidney, and 3 masses (3×3 cm, 2×2 cm, and 1×1 cm) on the left kidney (**Figure 1, A–F**). She denied the hereditary disease in her family. Laparoscopic bilateral retroperitoneal PN (not robotic assisted) was recommended based on thorough evaluation. Acute isovolemic hemodilution was applied at the initiation of anesthesia to decrease intraoperative blood loss. After general anesthesia, the patient was first placed in lateral decubitus position with a 90° tilt, right side facing upward. Once right RPN was successfully completed, the patient was repositioned to a 90° tilt, left side facing upward position. The 2 right-sided masses were excised first without renal artery clamping, then the remaining 2 left-sided upper pole masses were excised next with main left renal artery clamped for 24 minutes. After reperfusion of the left kidney, the inferior pole mass was excised off-clamping. Operative time from skin incision to closing was 98 minutes on the right side and 93 minutes on the left side. The duration to complete the entire procedure was 230 minutes including anesthesia induction, reposition, and resanitization. Estimated blood loss was 1000 mL. The preoperative hemoglobin/hematocrit was 135 g/L and 0.393, and

postoperative hemoglobin/hematocrit was 85 g/L and 0.259 on day 1. In consideration of 1000 mL blood loss and no blood transfusion during surgery, the patient received blood transfusion of 300 mL plasma and 3 units of red blood cell on day 1.

Postoperative pathology diagnosed chromophobe renal-cell carcinoma in all masses with negative margins (**Figure 2, A–C**). The patient was discharged on postoperative day 5 without perioperative complications. At the third month of followup, glomerular filtration rate (GFR) was $56.4 \text{ mL/min/1.73 m}^2$, compared to the preoperative GFR of $77.5 \text{ mL/min/1.73 m}^2$. By 2 years of followup, the renal function almost recovered back to preoperative level with GFR of $76.3 \text{ mL/min/1.73 m}^2$. No recurrence or metastasis was detected after the 2 years of followup.

DISCUSSION

There are several issues regarding bilateral RCC, which involve the surgical protocol, pathology, renal function preserved, and oncological outcomes.

Nowadays, more researchers considered that the bilateral PN is the preferable treatment for bilateral renal masses. Several authors evaluated the feasibility of laparoscopic PN for bilateral renal masses.^{5–7} Laparo-

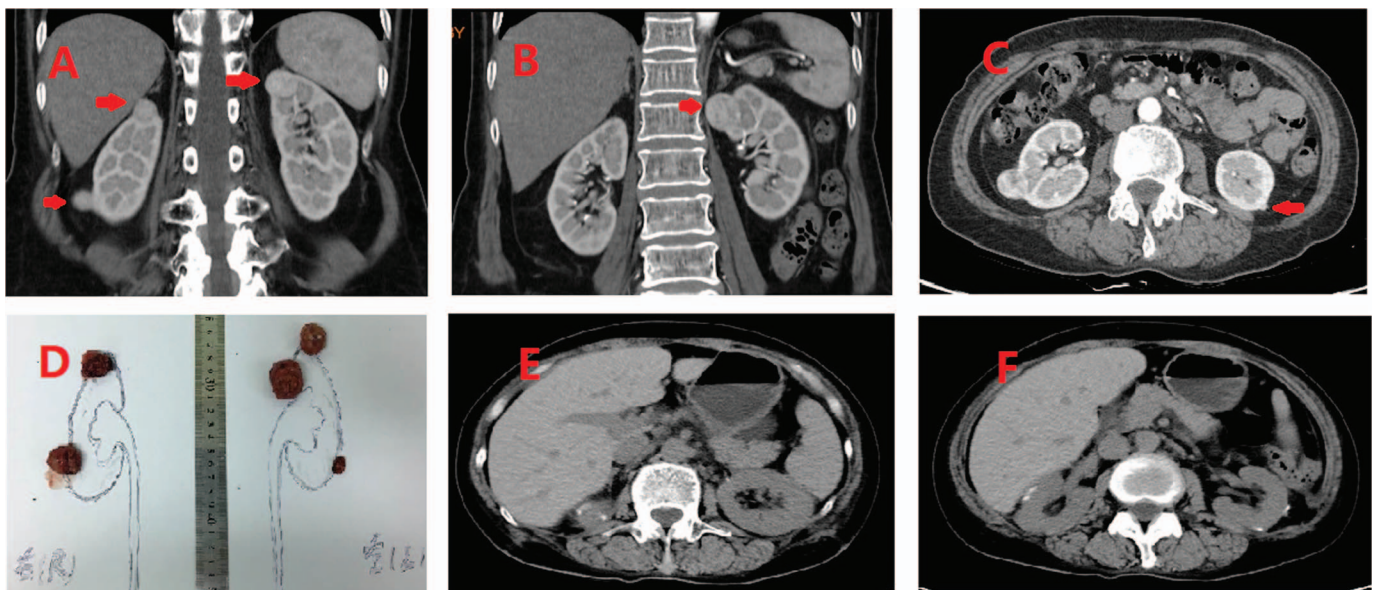


Figure 1. (A) Coronal plane of left kidney mass (arrow) and right renal masses (arrow) on computed tomography (CT) scan. (B) CT scan shows a 3×3 -cm upper pole mass (arrow) in the left kidney. (C) CT scan shows a 1×1 -cm inferior pole mass (arrow) in the left kidney and a 2×2 -cm middle pole mass in the right kidney. (D) The surgical specimen consists of 5 masses in the simulation background. (E, F) Postoperative CT scan 2 years after operation.

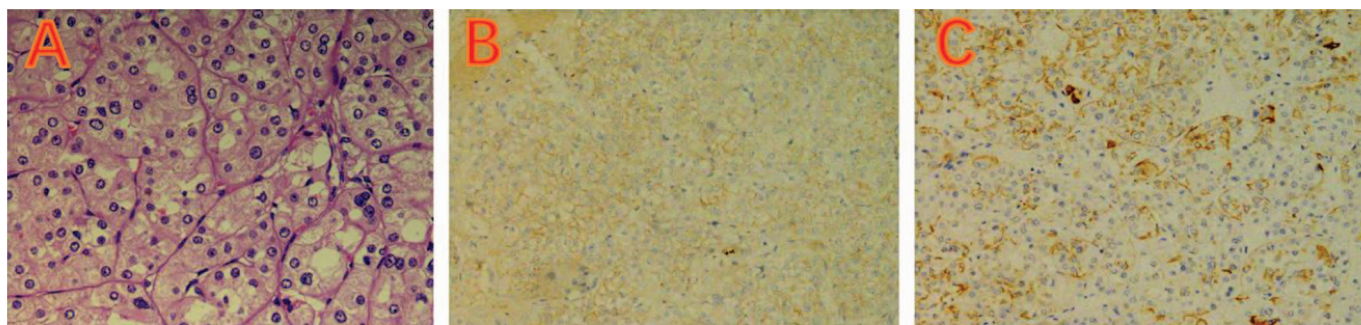


Figure 2. (A) The renal carcinoma cells are oval or polygonal chromophobe cell with inconspicuous nucleoli. Hematoxylin and eosin stain (400 \times). (B) Immunohistochemically CD117(+). (C) Immunohistochemically CK7(+).

scopic PN can be performed via a transperitoneal or retroperitoneal approach. More urologists are familiar with the retroperitoneal approach that could avoid the intestinal interference.⁸ The advantages of synchronous bilateral RPN are reduced psychological stress of patients, single anaesthesia, shorter hospital stay, and convalescence, and considerable cost effectiveness. However, the disadvantages of RPN in one session are the position change which could increase the probability of bleeding and prolonged ischemia time which could delay the recovery of renal function. In this case, we performed the RPN on the right side without clamping firstly, and then changed position tenderly to avoid surgical wound oozing or bleeding. On the left side position, we excised the 2 left-sided upper pole masses in 24 minutes' warm ischemia. After reperfusion of the left kidney, the inferior pole mass was excised off-clamping. It did avoid the prolonged ischemia time at the cost of 1000 mL estimated blood loss.

Research was performed to categorize the histologic subtypes of bilateral RCC. Klatter et al.⁹ studied 120 patients with metachronous bilateral RCC who were treated at 12 international academic centers and found that the most common histological subtype was bilateral clear-cell RCC (89% of cases). However, as for the synchronous bilateral RCC, some authors reported that the papillary-type RCC had a relatively higher rate compared with the metachronous bilateral or unilateral renal tumors.^{6,10,11} Patel et al.¹¹ reported RCC concordance of histologic subtype was exhibited in 222 of 249 (89%) of patients. Given the high concordance of RCC, bilateral PN was recommended whenever possible. In our case, the histopathologic results revealed chromophobe RCC in all masses with negative margins.

Preservation of renal function is an effective method that avoids the morbidity of dialysis for synchronous bilateral

RCC. Mir et al.¹² studied that ultimate renal function after PN primarily correlated with parenchymal preservation, whereas ischemia time played a secondary role. In this case, maximal parenchymal preservation with a precise PN was accomplished, meanwhile ischemia time was limited to 24 minutes by the combination of on-clamping and off-clamping technique. At the third month of follow-up, GFR was 56.4 mL/min/1.73 m², compared to the preoperative GFR of 77.5 mL/min/1.73 m². The percentage of renal function preserved was 69% on left side and 74% on right side, respectively, which was similar to the results of unilateral PN.¹³ By 2 years of followup, the renal function almost recovered back to preoperative level with GFR of 76.3 mL/min/1.73 m².

Novick et al. reported the 5-y survival rate in patients with bilateral RCC was lower compared with unilateral RCC during 1950s to 1980s.¹⁴ However, during 2000s to 2010s, several reports demonstrated that the cancer-specific survival and the progression-free survival of patients with bilateral RCC were similar in patients with unilateral tumors.^{3,15,16} The main reason for this phenomenon may be the development of technology, i.e., early detection of renal tumor by computed tomography, and techniques of minimally invasive surgery. In this case, no recurrence or metastasis was detected after 2 years of followup. Corresponding literature reviews recommend the necessity of genetic counseling and long-term surveillance in this sort of patients.^{2,11,16,17}

Our case proved that RPN in one session was a feasible and effective procedure for bilateral renal masses in specific population under experienced hands. The principle of treatment should be the preservation of renal function and subjecting the patient to as few surgeries as possible while achieving a cancer-free result.

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