Active surveillance after positive surgical margins following partial nephrectomy for clear cell renal cell carcinoma. A case report

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Case Report

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Background: The clinical significance of microscopic positive surgical margins after nephron-sparing surgery for renal cell carcinoma remains controversial. Although traditionally considered a risk factor for local recurrence, increasing evidence suggests that margin status alone should not dictate postoperative management.

Case Presentation: We report the case of a 62-year-old woman with a localized left renal mass who underwent nephron-sparing surgery. Histopathological examination revealed pT1b WHO/ISUP grade 1 clear cell renal cell carcinoma without lymphovascular invasion and a microscopic positive surgical margin. Considering the patient's favorable pathological profile, active surveillance was selected instead of immediate completion nephrectomy. At one-year follow-up, contrast-enhanced computed tomography showed no evidence of local recurrence or metastatic disease.

Conclusion: This case supports the growing evidence that active surveillance is an appropriate management strategy for carefully selected patients with low-risk renal cell carcinoma and microscopic positive surgical margins, emphasizing the importance of individualized decision-making based on the overall pathological risk profile rather than margin status alone.

KEYWORDS: Clear cell renal cell carcinoma, Nephron-sparing surgery, Positive surgical margin, Renal cell carcinoma, Urology

Renal cell carcinoma (RCC) is the most common malignant tumor of the kidney, with clear cell RCC accounting for approximately 70% of all cases [9]. Nephron-sparing surgery has become the preferred treatment for localized renal tumors whenever technically feasible because it preserves renal function while maintaining oncologic outcomes comparable to radical nephrectomy [9]. However, microscopic positive surgical margins may occasionally be identified after nephron-sparing surgery, and their prognostic significance remains controversial [5]. Although positive surgical margins have traditionally raised concern for residual disease, not all patients develop local recurrence or disease progression, and the optimal postoperative management remains a matter of debate [1,7]. Current international guidelines recommend intensified postoperative surveillance for patients with microscopic positive surgical margins because of their increased risk of recurrence [5,7]. The present case describes the successful management of a patient with low-risk clear cell renal cell carcinoma who was found to have a microscopic positive surgical margin following nephron-sparing surgery and remained free of radiologic recurrence after one year of active surveillance.

Case report

A 62-year-old woman with a medical history of chronic colitis, previous bilateral salpingo-oophorectomy, and allergy to diclofenac and naproxen was referred to the Urology Department after the incidental detection of a left renal mass during abdominal ultrasonography. She had no history of diabetes mellitus, hypertension, or other significant comorbidities. Renal ultrasonography demonstrated a well-defined solid nodule measuring approximately 30 × 30 × 22 mm located in the mid-portion of the left kidney. Subsequent contrast-enhanced computed tomography confirmed a 30 × 19 × 33 mm enhancing renal mass with central necrosis, highly suggestive of renal cell carcinoma. Preoperative evaluation classified the patient as Goldman cardiac risk class I, and surgical treatment was indicated.

The patient underwent elective open nephron-sparing surgery through a left subcostal lumbotomy. After entering the retroperitoneal space, the left kidney was mobilized and the renal mass was identified arising from the inferior pole. Figure 1. Given the favorable location of the lesion and the feasibility of preserving the remaining renal parenchyma, complete tumor excision was performed. The tumor was

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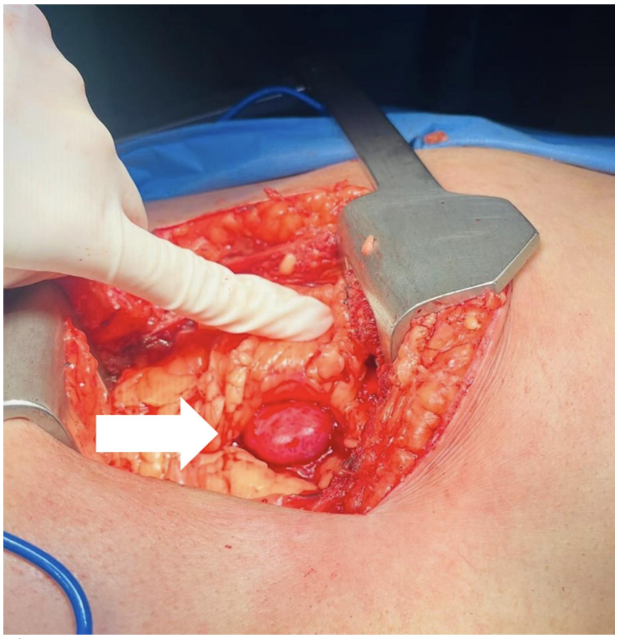

Figure 1. Intraoperative photograph demonstrating a renal mass measuring approximately 4 × 3 cm, consistent with the preoperative imaging findings. The lesion appeared firm, indurated, non-mobile, and well circumscribed at the time of surgical exploration.

resected en bloc using monopolar electrocautery, achieving satisfactory macroscopic excision. Hemostasis of the tumor bed was reinforced with absorbable gelatin sponge (Gelfoam®) and fibrin sealant (Tisseel®), followed by closure of Gerota's fascia. A Penrose drain was placed adjacent to the surgical bed before layered abdominal closure. Estimated blood loss was approximately 100 mL, and no intraoperative complications occurred.

Histopathological examination revealed clear cell renal cell carcinoma, WHO/ISUP grade 1, staged as pT1b, without evidence of lymphovascular invasion. However, microscopic examination demonstrated tumor nests in contact with the inked surgical margin, consistent with a positive surgical margin (Figure 2).

Following multidisciplinary evaluation, immediate completion nephrectomy was not considered mandatory because of the patient's favorable pathological characteristics, including low-grade histology, absence of lymphovascular invasion, and lack of radiologic evidence of residual disease. Therefore, an active surveillance strategy with periodic clinical and radiological follow-up was selected.

The postoperative course was uneventful. The patient recovered without complications and was discharged in stable clinical condition. At one-year follow-up, contrast-enhanced computed tomography demonstrated no evidence of local recurrence or distant metastatic disease, supporting the decision to continue surveillance.

Discussion

Positive surgical margins (PSMs) remain one of the main oncologic concerns following nephron-sparing surgery because they have traditionally been associated with an increased risk of local recurrence [1]. However, increasing evidence suggests that microscopic margin positivity does not necessarily translate into worse overall or cancer-specific survival, indicating that residual microscopic disease may not always have clinically significant oncologic consequences [4]. Moreover, PSMs are relatively uncommon after nephron-sparing surgery, with reported rates ranging from 0% to 7%, making this an infrequent but clinically relevant finding that continues to generate controversy regarding its optimal management [8,9].

As the understanding of the biological behavior of microscopic PSMs has evolved, postoperative management has progressively shifted toward a more conservative and individualized approach. Current evidence supports active surveillance rather than routine completion nephrectomy for carefully selected patients with microscopic positive surgical margins [1,7]. Several contemporary studies have demonstrated that many patients remain free of recurrence during follow-up and that immediate completion nephrectomy has not consistently improved recurrence-free, metastasis-free, or overall survival [2,4]. Likewise, residual viable tumor is not identified in many patients undergoing secondary surgery, suggesting that microscopic margin positivity does not necessarily represent persistent disease [7]. Accordingly, the European Association of Urology recommends closer radiologic surveillance rather than routine reoperation in appropriately selected patients with microscopic positive surgical margins [9].

Nevertheless, not all patients with PSMs share the same oncologic risk. The prognostic significance of microscopic margin positivity appears to depend largely on the biological behavior of the primary tumor rather than on margin status alone. Patients with high-stage or high-grade tumors have a substantially greater risk of recurrence, whereas those with low-stage, low-grade tumors frequently demonstrate recurrence-free survival comparable to that of patients with negative surgical margins [3]. More recent evidence likewise supports individualized postoperative surveillance based on pathological risk factors rather than surgical margin status in isolation [5,7].

The present case closely reflects these principles. Our patient presented with a pT1b ISUP grade 1 clear cell renal cell carcinoma without lymphovascular invasion, representing a favorable pathological profile despite the presence of a

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microscopic positive surgical margin. Considering the absence of additional adverse pathological features, a surveillance strategy was selected instead of immediate reoperation. Contrast-enhanced computed tomography performed one year after surgery demonstrated no evidence of local recurrence or metastatic disease. This favorable outcome is consistent with current evidence indicating that carefully selected low-risk patients with microscopic PSMs can achieve excellent oncologic outcomes through structured surveillance alone [1-3].

Several mechanisms may explain why many patients remain disease-free despite microscopic margin involvement. Tissue coagulation, ischemic injury, and reconstructive techniques performed during nephron-sparing surgery may eliminate residual microscopic tumor cells, partially explaining why not every positive surgical margin represents persistent viable disease [4]. Therefore, microscopic PSMs should be interpreted within the overall pathological context rather than as an isolated indication for additional surgery.

Although our patient experienced an excellent short-term outcome, longer follow-up remains necessary to exclude late local recurrence or metastatic progression. Nevertheless, this case adds to the growing body of evidence supporting active surveillance as a safe and appropriate management strategy for carefully selected patients with low-risk renal cell carcinoma and microscopic positive surgical margins.

Conclusion

This case highlights that microscopic positive surgical margins should not be interpreted as an isolated indication for additional surgery. In carefully selected patients with low-risk clear cell renal cell carcinoma, active surveillance can provide favorable short-term oncologic outcomes while avoiding unnecessary reintervention. Individualized management based on tumor stage, histological grade, and other pathological risk factors remains essential, and long-term follow-up is necessary to confirm durable oncologic control.

Conflicts of interests

The authors declare no conflicts of interests.

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