*Case Report*

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# *Kidney Metastasis of Small Cell Lung Cancer Under Immunotherapy: Case Report*

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**Abstract**

Renal metastasis from small cell lung cancer (SCLC) is highly uncommon. A 60-year-old woman received chemotherapy and radiotherapy for metastatic SCLC. The patient remained in remission for 18 months on adjuvant atezolizumab. Follow-up radiological staging revealed a solitary renal mass. Then she underwent laparoscopic nephrectomy. The pathological examination confirmed SCLC metastasis. This case report suggested that isolated renal metastasis can be seen in patients with SCLC even under maintenance immunotherapy.
**Keywords:** Kidney tumors, lung cancer, metastases, nephrectomy, small cell carcinoma

## Introduction

The most common tumor types causing metastasis to the kidney are lung (43.7%), colorectal (10.6%), head and neck (6%), breast (5.3%), soft tissue (5.3%), and thyroid (5.3%) (1,2). Although renal metastasis has been reported in all types of lung cancers, squamous cell carcinoma (57.6%), adenocarcinoma (28.8%), and small cell lung carcinoma (SCLC) (5.1%) are frequent histological subtypes (3). On the other hand, renal metastasis of SCLC is extremely rare. Based on our review of the literature, this appears to be the first report demonstrating RM of SCLC under maintenance immunotherapy.

## Case Reports

A 58-year-old woman with diabetes and hypertension was found to have a mass lesion in the lower lobe of the right lung. There was no family history of renal or other genitourinary cancers. The patient, with a 30-pack/year smoking history, was diagnosed with limited-stage SCLC on biopsy in October 2021. The patient was treated with four cycles of cisplatin + etoposide, and concurrent radiation therapy: 150 cGy fractions given twice daily for 30 fractions over 3 weeks, administered during cycle 1 of chemotherapy (total dose: 4500 cGy). After treatment for limited-stage small-cell lung cancer, significant regression was detected in 18-fluorine-fluorodeoxyglucose positron emission tomography/computed tomography (FDG PET/CT), and the patient continued oncology follow-up. The patient did not receive prophylactic cranial irradiation.

Twelve months after treatment, only an 11 mm lesion was detected under the skin of the right thigh on PET/CT, without any other metastatic foci, and was excised. The pathology report following excision revealed SCLC metastasis. In addition, a 5 mm metastatic left frontal lesion was detected on brain magnetic resonance imaging (MRI). This lesion was treated with stereotactic radiosurgery. The patient with radiologic and pathologic extensive stage SCLC was treated with six cycles of carboplatin, etoposide, and atezolizumab in January 2023. The patient's treatment was resumed with maintenance atezolizumab after July 2023. No primary SCLC or metastatic lesion was detected on follow-up imaging for approximately 1.5 years

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under maintenance atezolizumab therapy. However, on follow-up, FDG PET/CT detected a 44x40 mm lesion ($SUV_{max}$=13.6) in the anterior lower pole of the left kidney, which was classified as T1b according to the tumor-node-metastasis staging system (Figure 1). At the time of renal mass evaluation, the patient's serum creatinine was 1.43 mg/dL; eGFR was 40 mL/min/1.73 $m^2$; C-reactive protein was 3.84 mg/L; white blood cell count was $6.06\times10^9$/L; hemoglobin was 12.3 g/dL; and platelet count was $298\times10^9$/L. Liver function tests and electrolytes were within normal limits. Her body mass index was 31.3 kg/$m^2$ (height: 160 cm, weight: 80 kg), and Eastern Cooperative Oncology Group Performance Status performance status was 1. Due to decreased renal function and the associated risk of contrast-induced nephropathy, contrast-enhanced MRI was performed instead of triphasic CT. The patient who also underwent MRI was discussed in the uro-oncology board. The tumor was considered a second primary renal tumor by the uro-oncology board. Surgical treatment was recommended, and due to its location and apparent attachment to the proximal ureter and renal pelvis on imaging, nephrectomy was likely considered necessary. During laparoscopy, partial nephrectomy was considered; however, due to the tumor's infiltrative nature and ureteral involvement, radical nephrectomy was performed to preserve oncological principles. Pathology of the 5.6 cm diameter renal mass was determined to be SCLC metastasis (Figure 2). Pathology showed that tumor cells invaded renal parenchyma, perirenal adipose tissue, and renal sinus. The patient had no residual lesions after nephrectomy, and her treatment was continued with atezolizumab based on the council's decision.

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

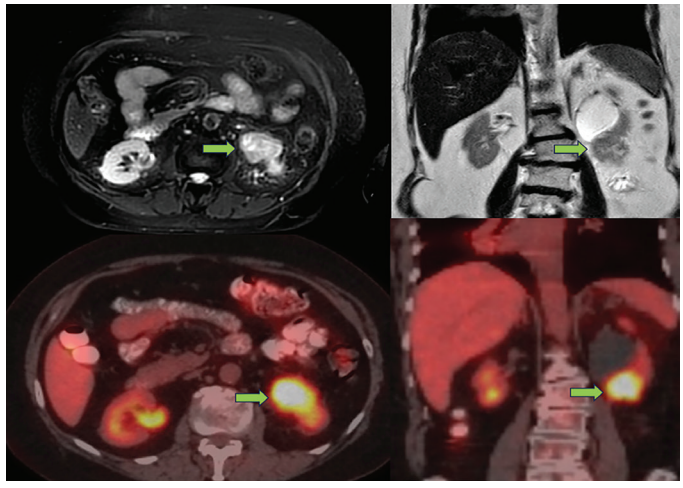

**Figure 1.** FDG PET/CT and MRI images of a kidney mass MRI (upper line) and FDG PET/CT (lower line) images of the kidney mass are shown. The green arrow indicates the kidney mass. MRI shows a lesion approximately 4 cm in size in the lower pole of the kidney. This lesion uptakes FDG ($SUV_{max}$=13.6)

FDG PET/CT: 18-fluorine-fluorodeoxyglucose positron emission tomography/computed tomography, MRI: magnetic resonance imaging

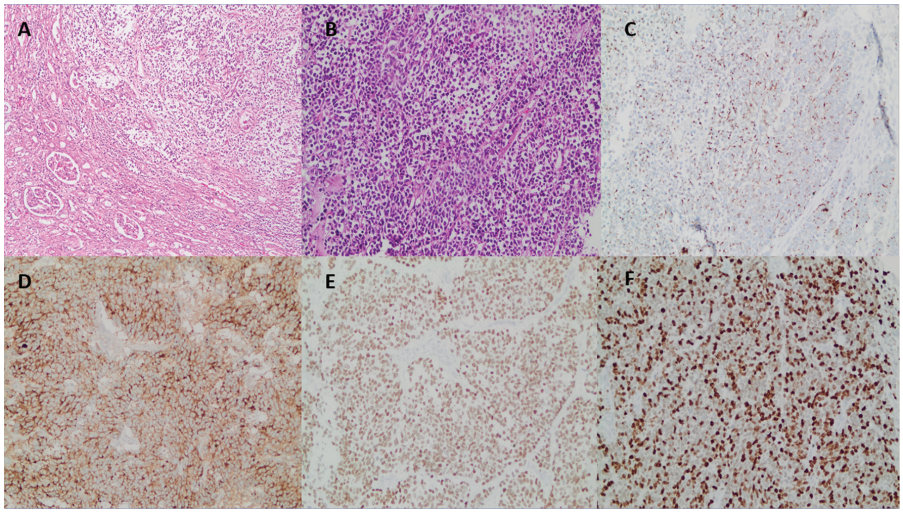


**Figure 2.** Histopathologic images of renal metastasis of small cell lung cancer

Microscopic examination revealed neoplastic cells with variable morphology, appearing round-to-oval in some areas and more spindle-shaped in others. These cells exhibited scant cytoplasm, hyperchromatic nuclei, granular chromatin, and an absence of prominent nucleoli. Features such as nuclear molding and crush artifacts were observed, along with a high mitotic index. Extensive areas of necrosis were present around the neoplastic cell clusters. Immunohistochemical studies demonstrated that the neoplastic cells were positive for PanCK, chromogranin, synaptophysin, and TTF-1. No immunoreactivity was observed with PAX-8. The Ki-67 proliferation index was approximately 70%.

A. Normal renal parenchyma is observed on the left side, while neoplastic cell infiltration is noted in the upper right area (hematoxylin and eosin, 100X).

B. Tumour cells have scant cytoplasm, poorly defined cell borders, and finely granular nuclear chromatin (hematoxylin and eosin, 200X).

C. A rim-and-dot pattern of PANCK expression is observed in the neoplastic cells (X200).

D. Diffuse synaptophysin expression is observed in the neoplastic cells (X200).

E. TTF-1 expression is observed in the tumor cells (X200).

F. Ki-67 proliferation index of approximately 70% is observed (X200).

PanCK: Pan-cytokeratin, TTF-1: Thyroid transcription factor-1, PAX: Paired box gene

## Discussion

Renal metastasis of cancers is typically observed as solitary lesions (77.5%) (2,4). In patients with solitary lesions in the kidney, it is difficult to distinguish between metastases and primary renal tumors. SCLC metastasis can occur in all organs. However, renal metastasis of SCLC is very rare and difficult to differentiate from primary renal cell carcinoma (RCC) without histopathology (5). Imaging modalities such as ultrasonography, CT, MRI, and PET are frequently used for lung and kidney tumors. Unfortunately, there is no pathognomonic finding to determine whether the mass is a primary renal tumor or lung metastasis in a patient with a renal mass (1).

Although imaging cannot definitively distinguish between primary RCC and renal metastasis, some features may provide clues. According to previous reports, primary RCCs are generally larger, exophytic, and heterogeneous on contrast imaging, whereas renal metastases tend to be smaller, endophytic, and homogeneous (6,7). Moreover, primary RCCs are generally solitary, while metastases are more likely to be bilateral or multifocal. In our case, the lesion also appeared solitary.

Percutaneous renal biopsy can reveal the histology of radiologically indeterminate renal masses and may be useful in differentiating between primary RCC and metastases. It is particularly useful in patients with a known history of malignancy and in determining the most appropriate systemic or surgical treatment strategy (8).

As in our patient, these solitary renal tumors may usually be considered secondary cancer, and treated surgically as primary renal tumors. Lung cancer patients with renal spread usually have concomitant liver, bone and adrenal gland metastases (3). However, our patient had bone and brain metastases and had been followed up without progression for about 1.5 years under maintenance atezolizumab treatment. Therefore, suspicion of renal metastasis should be considered when a renal mass is detected in patients with SCLC and previous multiple metastases.

Guidelines on the treatment of renal metastasis need to be clearer. Surgical treatment positively impacts survival in selected patients with lung cancer (2). Especially in unilateral isolated cases, when the primary tumor is controlled, nephrectomy may be an appropriate approach (3,9). A multidisciplinary approach is necessary to ensure proper treatment in these patients.

The impact of immunotherapy on the localization of metastases in SCLC remains unclear. Given the rarity of renal metastases, there are no definitive data regarding the specific effects of immunotherapy on renal involvement. A study discussing the challenges in predicting immunotherapy responses emphasized that, despite its established role in SCLC treatment, variability in therapeutic outcomes—particularly across different metastatic sites—highlights the need for biomarkers to predict efficacy (10).

Immunotherapy may suppress microscopic metastases by enhancing systemic antitumor immunity. However, at the molecular level, its effectiveness may be limited in organs with low immune cell infiltration, such as the kidney. Experimental models and translational studies are required to better understand how immunotherapy influences metastatic tropism. Literature suggests that the location of metastases can affect treatment outcomes. In a study involving patients with metastatic RCC (mRCC), those with lung-only metastases had better survival rates compared to those with liver or bone metastases. Although this study focused on mRCC, it supports the idea that organ-specific tumor microenvironments and immune infiltration may modulate the efficacy of immunotherapy. Further research is warranted to investigate how immunotherapy influences metastasis in uncommon sites such as the kidneys (11).

Renal metastasis of SCLC is very rare. Most patients are asymptomatic and are diagnosed incidentally by imaging methods. Since imaging alone cannot reliably distinguish between primary and secondary renal tumors, histopathological confirmation remains essential for accurate diagnosis. In unilateral isolated renal metastasis, nephrectomy is an appropriate approach when the primary tumor is under control. A multidisciplinary approach is crucial to ensure appropriate management policy for these unusual cases. Furthermore, as immunotherapy becomes more widely used in SCLC, further research is needed to clarify its role in shaping atypical metastatic patterns, including renal involvement.

### Ethics

**Informed Consent:** Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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**Publication:** The results of the study were not published in full or in part in form of abstracts.

**Contribution:** There is not any contributors who may not be listed as authors.

### Footnotes

### Authorship Contributions

Surgical and Medical Practies: G.Ö., M.K., Y.Ş., Concept: G.Ö., M.K., Design: G.Ö., M.K., Y.Ş., Data Collection or Processing: G.Ö., İ.T.C., M.H.T., Y.Ş., Analysis or Interpretation: G.Ö., Literature Search: G.Ö., M.K., A.Ç., Writing: G.Ö., İ.T.C., M.H.T., A.Ç., Y.Ş.

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## References

1. Bailey JE, Roubidoux MA, Dunnick NR. Secondary renal neoplasms. Abdom Imaging. 1998;23:266-274.
2. Zhou C, Urbauer DL, Fellman BM, et al. Metastases to the kidney: a comprehensive analysis of 151 patients from a tertiary referral centre. BJU Int. 2016;117:775-782.
3. Cazacu SM, SĂndulescu LD, Mitroi G, et al. Metastases to the kidney: a case report and review of the literature. Curr Health Sci J. 2020;46:80-89.

4. Becker WE, Schellhammer PF. Renal metastases from carcinoma of the lung. Br J Urol. 1986;58:494-498.
5. Lee JY, Kim J. Renal metastasis of small cell lung cancer with urothelial carcinoma of the bladder misdiagnosed as renal cell carcinoma. J Med Cases. 2019;10:253-256.
6. Karaosmanoglu AD, Onur MR, Karcaaltincaba M, et al. Secondary tumors of the urinary system: an imaging conundrum. Korean J Radiol. 2018;19:742-751.
7. Low G, Huang G, Fu W, et al. Review of renal cell carcinoma and its common subtypes in radiology. World J Radiol. 2016;8:484-500.
8. Ljungberg B, Albiges L, Bedke J, et al. Renal scell carcinoma. In: EAU Guidelines. Presented at the EAU Annual Congress, Paris 2024. Arnhem (The Netherlands): EAU Guidelines Office; 2024.
9. Adamy A, Von Bodman C, Ghoneim T, et al. Solitary, isolated metastatic disease to the kidney: Memorial Sloan-Kettering Cancer Center experience. BJU Int. 2011;108:338-342.
10. Tucker MD, Rini BI. Predicting response to immunotherapy in metastatic renal cell carcinoma. Cancers (Basel). 2020;12:3662.
11. Baston C, Parosanu AI, Stanciu IM, Nitipir C. Metastatic kidney cancer: does the location of the metastases matter? Moving towards personalized therapy for metastatic renal cell carcinoma. Biomedicines. 2024;12:1111.