

Clear Cell Renal Carcinoma Presents as a Solitary Pulmonary Nodule Fifteen Years After Nephrectomy

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INTRODUCTION

Renal cell carcinoma (RCC) accounts for more than 80% of primary renal neoplasms.¹ It originates from the cortex and is the most common type of renal cancer in adults, particularly in men above the age of 50. In the U.S., there are over 60,000 new cases of RCC reported, with almost 14,000 deaths annually. RCC can be classified into different subtypes based on histopathologic variations, including clear cell (the most common), chromophilic masses, chromophobic lesions, oncocytoma lesions, and collecting duct.^{1,2}

The treatment of RCC requires careful consideration of several factors, including tumor stage, size, location, and patient comorbidities.³ Surgery is the primary treatment for localized RCC, with partial or radical nephrectomy being the standard of care for most patients. Surgical resection has demonstrated long-term survival benefits, particularly for those with low-risk tumors.⁴ For patients with advanced or metastatic RCC, the treatment landscape rapidly has evolved in recent years. Targeted therapies, such as tyrosine kinase inhibitors (TKIs) and mammalian target of rapamycin (mTOR) inhibitors, have shown significant improvements in progression-free and overall survival in clinical trials. The recent introduction of immune checkpoint inhibitors also has brought about a paradigm shift in the management of RCC, with these agents demonstrating durable responses in a subset of patients with metastatic disease. Combination therapy, using targeted agents and immunotherapy, has emerged as a promising approach to improve outcomes in metastatic RCC. Neoadjuvant or adjuvant therapy in patients with high-risk localized RCC is also an area of active investigation.^{5,6}

The overall risk of RCC recurrence after nephrectomy is around 25-30%, with most recurrences occurring within the first five years after surgery.⁷ However, this rate can vary widely depending on the specific case. For example, if the cancer is diagnosed early and is confined to the kidney, the five-year survival rate is over 90%, and the risk of recurrence is lower. In contrast, if the cancer has spread beyond the kidney, the five-year survival rate drops significantly, and the risk of recurrence is much higher. A few cases of metastasis in the lungs have been reported occurring more than 10 years after nephrectomy.^{8,9} In this case report, a patient with a renal cell carcinoma was found 15 years after remission to have a solitary metastatic pulmonary nodule.

CASE REPORT

A 63-year-old male with a past medical history of chronic obstructive pulmonary disease (COPD), asthma, and grade 3 (T3 NX M0) left renal clear cell carcinoma without sarcomatoid features status post nephrectomy 15 years prior presented with shortness of breath. On physical examination, the patient had diffuse wheezing and ronchi on lung auscultation. Vital signs revealed hypoxia on room air and tachypnea.

Work-up included referral to a pulmonologist, ordering a spirometry study, and obtaining a low dose chest computed tomography (CT) scan to screen for lung cancer. The scan revealed a 2 cm left lower lobe lung mass. Positron emission tomography (PET) from skull base through the upper thighs showed mild hypermetabolism associated with the 2 cm subpleural nodule in the left lower lobe and measured the maximum standardized uptake value (SUV max) at 5.1 (Figure 1). CT-guided biopsy of the mass was positive for pancytokeratin, PAX8, and RCC while being negative for CK 20, CK7, and TTF-1. Pathology confirmed the diagnosis of clear cell renal carcinoma, high grade nuclei with focal necrosis, and negative margins. CT scan of the chest-abdomen and pelvis failed to identify a current primary renal mass. Surgical wedge resection was performed to excise the mass.

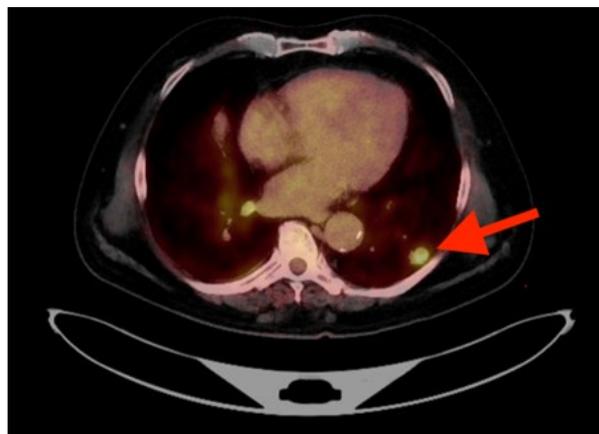


Figure 1. PET scan revealed a 2 cm subpleural nodule in the left lower lobe.

DISCUSSION

Renal cell carcinoma (RCC) is a type of kidney cancer that can recur after nephrectomy. The rate of recurrence of RCC depends on various factors such as the stage of the cancer at the time of diagnosis and the type of nephrectomy performed. Local recurrence after nephrectomy ranges from 1-10% while distant recurrence to other parts of the body, such as the lungs, bones, or liver ranges from 20-50%.¹⁰

Most recurrences happen within the first five years after the nephrectomy.¹¹ Screening for recurrence of renal cell carcinoma (RCC) after nephrectomy involves regular imaging tests and follow-up appointments with a healthcare provider. The exact screening protocol may vary based on individual factors such as the patient's medical history and the stage of the cancer at diagnosis. However, a general guideline for RCC recurrence screening after nephrectomy includes a CT scan of the chest, magnetic resonance imaging, or CT scan of the abdomen usually performed three to six months after nephrectomy. Subsequent imaging tests typically are performed every six months for the first three years after nephrectomy, then annually in years four and five.^{12,13} Regular physical exams with a healthcare provider are also an

important part of the screening protocol. These exams can help to detect any changes in the body that may suggest a recurrence of the cancer.¹⁴

RCC metastasis to the lungs post-nephrectomy affects a small percentage of patients. Many of these patients present with symptoms of cough, dyspnea, pleuritic chest pain, and hemoptysis.¹⁵ In such patients, a CT scan can aid in the diagnosis. The different treatment methods of RCC depends on its staging, ranging from partial nephrectomy in localized small tumors in stage I to radical nephrectomy in stages II and III. Metastatic and/or recurrent RCC can be treated with surgery in case of oligometastasis, and this may be curative in 20-30% of patients.¹³ Complete surgical resection of metastases provided a better prognostic factor and longer survival period compared with incomplete resection.¹² Early detection of these lesions is key to determine prognosis.¹³

CONCLUSIONS

For patients with renal cell carcinoma, physicians must keep in mind the risk of recurrence in the lung even in patients with curative nephrectomy. This can occur decades after surgery and must be considered when someone with a history of RCC presents with respiratory symptoms such as cough, chest pain, or hemoptysis. It is crucial to be able to detect recurrence early as it will increase the chances of curative surgical resection of the metastatic lesions. Therefore, clinicians should adhere to a surveillance schedule for these patients after nephrectomy, so that in the unfortunate cases where recurrence is detected, survival and prognosis can be enhanced.

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