

CASE REPORT

Metastatic pulmonary nodule after a seventeen-year disease-free interval resected through thoracoscopic subsegmentectomy: A case report

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Abstract

The lung is the most common site of metastasis in patients with renal cell carcinoma (RCC). Metastatic RCCs, even those classified as stage I, can recur after >10 years. Therefore, it is critical to completely resect metastatic nodules. Here, we report the case of a 74-year-old man who underwent a nephrectomy for RCC and was diagnosed with lung metastasis 17 years later. The metastatic nodule was resected through complete thoracoscopic subsegmentectomy. He had previously undergone partial nephrectomy for clear cell renal carcinoma pT1bN0M0. During his annual follow-up, a computed tomography scan revealed a pulmonary nodule. The intraoperative frozen section revealed a metastatic clear cell RCC. Thus, additional lobectomy was not performed. The postoperative course was uneventful with no complications. This case demonstrates that even early stage metastatic clear cell renal carcinoma can recur after over 17 years. Thoracoscopic segmentectomy is less invasive and can preserve pulmonary function.

KEYWORDS

metastatic pulmonary nodule, renal carcinoma, segmentectomy, thoracoscopic surgery

INTRODUCTION

The lung is one of the most common sites of metastasis in patients with renal cell carcinoma (RCC). Metastatic RCCs, even classified as stage I, can recur after 10 years. Thoracoscopic surgery has become increasingly relevant because of its curative, function-preserving nature. Here, we report the case of a patient with metastatic lung cancer secondary to renal cancer that developed 17 years after nephrectomy. The metastatic nodule was resected through complete thoracoscopic S8b subsegmentectomy, achieving balance between radical cure and respiratory function preservation.

CASE REPORT

A 74-year-old man was referred to the Department of Thoracic Surgery for pulmonary nodule resection. He underwent partial

nephrectomy for a clear cell renal carcinoma pT1bN0M0. During his annual follow-up, a computed tomography (CT) scan detected a pulmonary nodule. A chest radiograph revealed no characteristic findings. A chest CT, however, revealed a solid nodule, measuring 1.2 cm in diameter, in the left S8 segment (Figure 1a). The borders of the tumor were clear and smooth. Positron-emission tomography (PET)-CT was not performed, but contrast CT did not detect any lymph nodes which were suspected of metastasis. The patient was diagnosed clinically with primary lung cancer or metastatic renal cancer. We planned a confirmatory nodule resection. Based on the three-dimensional CT findings, S8b subsegmentectomy was the most appropriate resection technique (Figure 1b). We discussed the procedure in the tumor board with physicians and radiologists, and it was approved. There was an idea that a wedge resection was effective, but there was some concern that the surgical margin would not be sufficient.

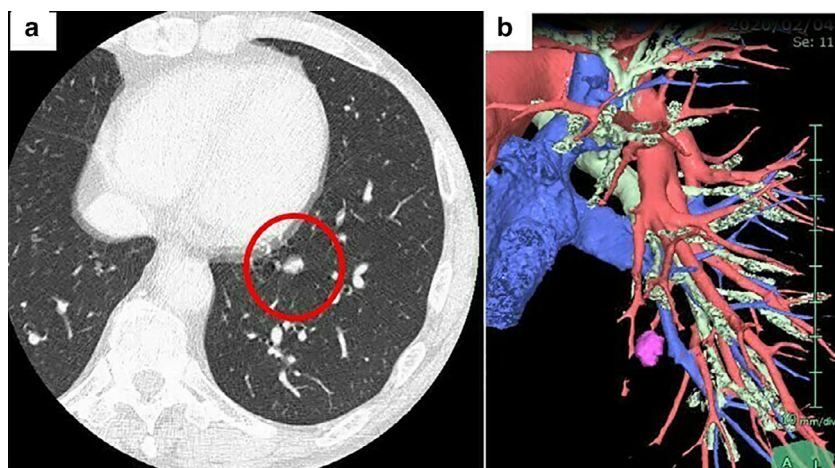


FIGURE 1 Computed tomography (CT) findings. (a) CT revealed a solid nodule in the left lower S8 segment. (b) A three-dimensional CT indicated that S8b subsegmentectomy was sufficient

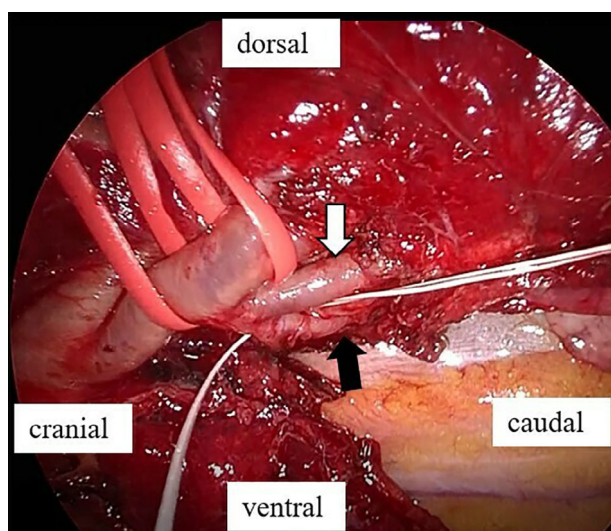


FIGURE 2 Intraoperative findings. The pulmonary artery was dissected to the branches of A8a (white arrow) and b (black arrow). On performing a segmentectomy, the pulmonary artery must be sufficiently dissected peripherally

Left lower S8b subsegmentectomy was performed via a four-port thoracoscopic surgery. With a length of 2.5 cm, the window was placed in the sixth intercostal space along the midaxillary line. Two 5-mm ports and one 12-mm port were placed in the fourth intercostal space along the anterior axillary line, the fifth intercostal space along the anterior axillary line, and the eighth intercostal space along the middle axillary line, respectively (Figure 2).

The pulmonary artery was identified between the upper and lower lobes and dissected up to the branches of A8a, and b. The central and peripheral sides of A8b were ligated with a 2-0 silk thread and sectioned. The bronchus was identified behind the pulmonary artery and dissected up to the branch of B8a and b. The central and peripheral sides of A8b were ligated with a silk thread and sectioned. The location of the tumor was confirmed

by palpation, and an intersegmental line was created with an automatic suture. The frozen tumor section was intraoperatively diagnosed as metastatic clear cell renal carcinoma, and the surgical margin was over 2 cm. Additional lobectomy was not performed. The postoperative course was uneventful with no complications. The RCC recurred in the lower mediastinal lymph node 9 months postoperatively, and the patient underwent immunochemotherapy with pembrolizumab and axitinib. This therapy led to a good partial response. The patient is currently doing well 13 months post-operation.

DISCUSSION

This case demonstrates that metastatic clear cell RCC, even in the early stages, can recur after more than 17 years. It highlights the effectiveness of thoracoscopic segmentectomy for treatment as it is minimally invasive and preserves pulmonary function.

An increase in health care facilities and diagnostic modalities have resulted in the earlier diagnosis of RCC. However, 20%–40% of patients undergoing nephrectomy for localized disease develop distant metastasis or a locally recurring tumor. The lung is one of the most affected metastatic sites.

Late recurrence, occurring more than 10 years after curative nephrectomy, is characteristic of RCC. Some studies report recurrences occurring as late as 30–45 years after initial surgery.^{1,2} Several theories have been proposed to explain the occurrence of delayed metastasis in RCC, including deterioration of host immunity, allowing uncontrolled tumor cell growth and change in hormonal levels.^{3,4} Metastatic RCC can appear in all organs. Thus, thorough monitoring for metastasis and recurrence are essential in patients with a history of RCC, and a metastatic tumor should be considered when evaluating a nodule in an RCC patient.

Second, thoracoscopic segmentectomy is a less invasive procedure, preserving pulmonary function. There are several published studies on surgical treatment of pulmonary

metastases secondary to renal carcinoma. The reported five-year survival rates range from 35.5% to 83.3%.^{5–8} Joachim et al. reported that complete surgical resection, disease-free interval, number of metastases, and presence of thoracic lymph node metastases were independent prognostic factors for survival after metastasectomy.⁹ Performing a complete surgical resection is the only factor in which the surgeon can be involved. Preservation of pulmonary function in patients, however, is critical, and striking a balance between radical cure and respiratory function preservation can be challenging. Segmentectomy enables tumor resection and preserves respiratory function more effectively than lobectomy. The distance between the tumor and the resection margin is longer in this method than in a wedge resection. We believe segmentectomy can be recommended for such cases to balance between radical cure and respiratory function preservation. Minimally invasive surgery can be performed through thoracoscopic surgery. In this case, lobectomy was unnecessary because the diagnosis was made using the specimen obtained from the segmentectomy.

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CONFLICT OF INTEREST

No authors report any conflict of interest.

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REFERENCES

1. Featherstone JM, Bass P, Cumming J, Smart CJ. Solitary, late metastatic recurrence of renal cell carcinoma: two extraordinary cases. *Int J Urol*. 2006;13:1525–7. <https://doi.org/10.1111/j.1442-2042.2006.01577.x>
2. Tapper H, Klein H, Rubenstein W, Intriere L, Choi Y, Kazam E. Recurrent renal cell carcinoma after 45 years. *Clin Imaging*. 1997;21:273–5. [https://doi.org/10.1016/s0899-7071\(96\)00042-3](https://doi.org/10.1016/s0899-7071(96)00042-3)
3. Ruiz JL, Vera C, Server G, Osca JM, Boronat F, Jimenez Cruz JF. Renal cell carcinoma: late recurrence in 2 cases. *Eur Urol*. 1991;20:167–9. <https://doi.org/10.1159/000471690>
4. Takatera H, Maeda O, Oka T, Namiki M, Nakano E, Matsuda M, et al. Solitary late recurrence of renal cell carcinoma. *J Urol*. 1986;136:799–800. [https://doi.org/10.1016/s0022-5347\(17\)45083-x](https://doi.org/10.1016/s0022-5347(17)45083-x)
5. Hofmann HS, Neef H, Krohe K, Andreev P, Silber RE. Prognostic factors and survival after pulmonary resection of metastatic renal cell carcinoma. *Eur Urol*. 2005;48:77–81; discussion 81–2. <https://doi.org/10.1016/j.eururo.2005.03.004>
6. Kawashima A, Nakayama M, Oka D, Sato M, Hatano K, Mukai M, et al. Pulmonary metastasectomy in patients with renal cell carcinoma: a single-institution experience. *Int J Clin Oncol*. 2011;16:660–5. <https://doi.org/10.1007/s10147-011-0244-0>
7. Chen F, Fujinaga T, Shoji T, Miyahara R, Bando T, Okubo K, et al. Pulmonary resection for metastasis from renal cell carcinoma. *Interact Cardiovasc Thorac Surg*. 2008;7:825–8. <https://doi.org/10.1510/icvts.2008.181065>
8. Ueno T, Yamashita M, Sawada S, Sugimoto R, Nishijima N, Sugawara Y, et al. Pulmonary metastasectomy from renal cell carcinoma including 3 cases with sarcomatoid component. *Gen Thorac Cardiovasc Surg*. 2016;64:149–52. <https://doi.org/10.1007/s11748-016-0623-6>
9. Pfannschmidt J, Hoffmann H, Muley T, Krysa S, Trainer C, Dienemann H. Prognostic factors for survival after pulmonary resection of metastatic renal cell carcinoma. *Ann Thorac Surg*. 2002;74:1653–7. [https://doi.org/10.1016/s0003-4975\(02\)03803-1](https://doi.org/10.1016/s0003-4975(02)03803-1)

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