
Case report - Thoracic oncologic

Surgical treatment for patients with solitary metastasis in the mediastinal lymph node from renal cell carcinoma

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Abstract

We performed surgical treatment on two patients, each with a solitary metastasis in a mediastinal lymph node from a renal cell carcinoma (RCC). The first case was a 58-year-old male with a chief complaint of chest discomfort due to pretracheal mediastinal lymph node (#3) swelling. He had undergone a right nephrectomy for RCC 13 years previously. Because of difficulty in establishing the diagnosis, a mini-thoracotomy was performed, and this lymphadenopathy was judged to be metastasis from the RCC. The pretracheal lymph nodes were completely resected, and he has experienced no recurrence for two years postoperatively. The second case was a 60-year-old female who had undergone a left nephrectomy for RCC two years previously. Because of the Botallio’s lymph node (#5) swelling, a mini-thoracotomy was performed. This swollen lymph node was resected, and it was finally diagnosed to be metastasis from the RCC. Unfortunately, the tumor recurred in the mediastinal lymph nodes with multiple lung metastases five years later. A solitary metastasis in a mediastinal lymph node from a RCC is an unusual event, particularly in the absence of lung metastasis. The diagnostic and clinicopathological problems associated with this unique disease are herein discussed.

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1. Introduction

The most common site of the initial recurrence in patients who have undergone a radical nephrectomy for renal cell carcinoma (RCC) is the lung. However, solitary metastasis in a mediastino-hilar lymph node in the absence of lung metastasis is uncommon. We herein describe the surgical treatment of two patients with a solitary metastasis to a mediastinal lymph node from a RCC. We also discuss several diagnostic and clinicopathological problems associated with this unique disease.

2. Case report

2.1. Case 1

A 58-year-old male underwent a radical right nephrectomy for RCC (clear cell carcinoma G1, pT1b N0 M0) in October 1992. He had a medical history of hypertension and hyper-lithuria and had a one pack-per-day smoking history. No postoperative adjuvant chemotherapy was performed. Thirteen years later, he consulted his primary physician regarding chest discomfort. A computed tomographic (CT) scan demonstrated an anterior mediastinal mass, considered to be pretracheal lymphadenopathy (#3), which measured 2 cm in diameter (Fig. 1). A whole body Fluorine-18-2-fluoro-D-glucose positron emission tomography/CT (FDG-PET/CT) study revealed intense focal FDG uptake [standard uptake value (SUV) max = 2.6] in the anterior mediastinal mass and no other abnormal FDG uptake. No serum tumor marker, including carcinoembryonic antigen, was elevated. An exploratory mini-thoracotomy was performed on November 29, 2006, and the anterior mediastinal mass was removed. An intraoperative histological examination using a frozen specimen resulted in a diagnosis of metastatic RCC to the pretracheal lymph node (#3, Fig. 2). Immediately, the mediastinal lymph nodes (#1–#4) were completely re-resected, but metastasis was finally observed only in the swollen #3 node without extracapsular invasion. The patient had an uneventful postoperative recovery and was given no postoperative therapy. To date, at 21 months after the operation, he has experienced no recurrence of the RCC.

2.2. Case 2

A 60-year-old female underwent a radical left nephrectomy for RCC (granular cell carcinoma G2, pT2 N0 M0) in March 1999. Two years later, a follow-up chest CT-scan demonstrated a solitary swelling of the left Botallio’s lymph node (#5) which measured 3 cm in diameter, but no metastatic nodules in the pulmonary parenchyma were observed. Thereafter, only the swollen lymph node was removed through a mini-thoracotomy, and it proved to be
Metastases to the mediastinal lymph nodes from RCC are usually accompanied by lung metastasis. In 1965, Arkless [1] first reported patients showing such metastases associated with lung metastases. They reported that 11 of 152 patients with RCC had mediastinal lymph node involvement, and interestingly, all of them showed lung metastasis. In a necropsy series of 1451 patients with RCC [2], 75 (5%) had mediastinal lymphadenopathy, and surprisingly, more than 90% of these patients had lung metastases. Therefore, solitary metastasis in the mediastinal lymph nodes, in the absence of lung metastasis, is thus considered to be clinically uncommon.

The pathway by which RCC can metastasize directly to the mediastinal lymph nodes through the pulmonary parenchyma is interesting. Two possible pathways have so far been proposed. Firstly, the lymphogenous route via the thoracic duct or the inferior pulmonary ligament was presented. McLoud et al. [3] reported the lymphogenous route via the thoracic duct. They described that cancer cells pass through a retrograde flow to the peribronchial lymphatics from the thoracic duct because of its incompetent valves. In fact, reflux from the thoracic duct during lymphangiography occurs in 10–15% of all the tested patients, probably due to incompetent valves [4]. Interestingly, based on the recent study for renal lymphatic drainage, it was also shown that renal lymphatics always connect to the origin of the thoracic duct [5]. In addition, Wright [6] reported another lymphogenous route which passes through the retroperitoneal lymphatics into the inferior pulmonary ligament and finally reaches the mediastino-hilar lymph nodes. In contrast, as a second possibility, mediastinal lymph node metastasis has been reported to possibly occur as a second step from micrometastases in the lung. Specifically, pulmonary metastases, which usually spread through a hematogenous route from the RCC, are too small to be incidentally detected.

The metastatic lymph nodes in our cases were solitary and were limited to the upper part of the mediastinum without any involvement in the lower part, such as the subcarinal (#7) or inferior pulmonary ligament (#9) lymph nodes, at the time of the initial recurrence. In Case 2, considering the postoperative multiple recurrences in the lung and the mediastinal lymph nodes, it was likely that undetected micrometastasis in the tissues had remained behind at the time of the thoracotomy. In contrast, from our understanding of the clinical course of the Case 1 patient, the mechanism of a solitary metastasis remains to be elucidated. Considering the late recurrence at 13 years after the nephrectomy, it is difficult to explain the mechanism of recurrence in Case 1 with any degree of certainty. A postoperative follow-up may be required in the future, while careful attention must be paid to the lung and the regional lymph node status.

In these patients, we performed a mini-thoracotomy not only for diagnostic purposes but also to potentially effect a complete resection. Luckily, no extracapsular invasion was observed in the resected metastatic lymph nodes in postoperative histological examinations. Therefore, the metastatic lesions were judged to be completely removed in both patients. In cases of positive extracapsular nodal involvement, postoperative radiation therapy should therefore be considered in order to obtain complete local control. In Case 1, a diagnosis may have been possible by other methods, for example by a mediastinoscopy or an endobronchial ultrasonography (EBUS). However, since the pretracheal lesion was strongly contrasted according to the enhanced CT findings, such procedures were not chosen because of the risk of bleeding. In both cases, since we
had planned to perform a potentially radical resection, a mini-thoracotomy was intentionally selected.

Solitary or isolated metastatic RCC may generally be surgically resected, if possible. The 5-year survival rates of such patients have been reported to range from 30% to 60%, when a complete resection is possible [7]. In fact, in cases with solitary metastasis in the lymph nodes similar to ours, a favorable prognosis has been obtained by several authors. Recently, Whiston et al. [8] reported nine surgical cases for asynchronous renal cell carcinoma metastases to the mediastinal lymph nodes out of the 386 patients in their series. According to this report, there were no surgical complications, and interestingly, their median survival after resection of metastases was significantly longer than that of the other patients with stage IV disease. Therefore, surgical treatment for mediastinal lymph node metastases from RCC is considered to be a safe and effective modality, which appears to prolong the survival while also potentially curing the disease. In contrast, it is now thought that the therapeutic effect of conventional chemotherapy or radiation therapy might be poor. Recently, immunotherapy, such as the administration of recombinant human interleukin-2 and interferon-alpha, has developed as new modalities for such diseases, but the overall response rate is only 15%–20% [9, 10]. Therefore, in cases with a solitary enlarged mediastino-hilar lymph node occurring after a nephrectomy for RCC, surgery may be aggressively selected for both establishing the diagnosis and potentially to achieve a complete therapy. Therefore, the surgical approach for an isolated metastatic RCC disease may be appropriate, not only as a means of local control, but also to improve the understanding of this disease, itself.

References