A case report of minimally invasive surgical resection for pulmonary mucosa-associated lymphoid tissue

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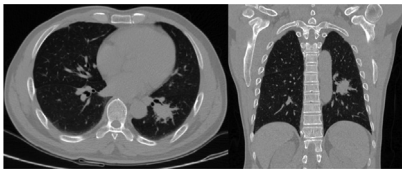

CT image of a 57-year-old male patient with a lung lesion of 27 × 29 × 50 mm in the LLL.

CENTRAL MESSAGE

A patient with pulmonary MALT lymphoma who was admitted to our hospital due to fever underwent complete resection and final diagnosis by minimally invasive VATS surgery.

CASE PRESENTATION

A 57-year-old man presented with fever for 1 day with a maximum temperature of 37.9°C. The patient had no other clinical discomfort and no associated exacerbating factors for remission. The patient has a smoking history of more than 30 pack-years, with no known medical conditions, recent travel history, or relevant family history. Physical examination revealed pharyngeal congestion, follicular hyperplasia of the posterior pharyngeal wall, and some wet rales in both lower lungs, but no other abnormalities were observed.

The patient underwent chest computed tomography (CT) scans without and with contrast on the first and third days of hospitalization, respectively. The examination results showed a 27 mm × 29 mm × 50 mm solid shadow with poorly defined margins in the left lower lung (LLL) hilar region, along with a superficial lobar sign and a vacuolar sign, and uniformly mild enhancement (Figure 1). No other abnormalities were found in the rest of the hilar region and mediastinum.

The operations of fiberoptic bronchoscopy and bronchoalveolar lavage were completed on the fourth day of admission. And the CT-guided lung biopsy was done on the 10th days of hospitalization. The patient underwent fiberoptic bronchoscopy combined with bronchoalveolar lavage on the 4th day of hospitalization, and CT-guided lung biopsy was performed on the 10th day. Pathological examination of the lavage fluid showed no abnormalities. Lung biopsy results showed proliferating lymphoid tissue without cancerous tissue. Immunohistochemical results were as follows: leukocyte common antigen+++; cluster of differentiation 3+; cluster of differentiation 20+; B-cell lymphoma-2++; B-cell lymphoma-6+; p53 wild type; Ki-67(+):5%. On day 15 of hospitalization, a positron-emission tomography–CT scan revealed an irregular soft tissue mass (2.7 cm × 2.5 cm × 3.2 cm) in the LLL (mainly in the basal segment). This mass had a uniform density with indistinct borders, elevated metabolism (maximum standardized uptake value [SUV_{max}], 6.2), and a high probability of granulomatous inflammation. There were no obvious hypermetabolic enlarged lymph nodes in the bilateral hilum and mediastinum, and no signs of malignant tumors were found in other parts of the body. After admission, the patient received 3 weeks of anti-infection treatment, including oral cotrimoxazole and intravenous levofloxacin, and then reexamination CT showed no significant change compared with the initial CT scan.

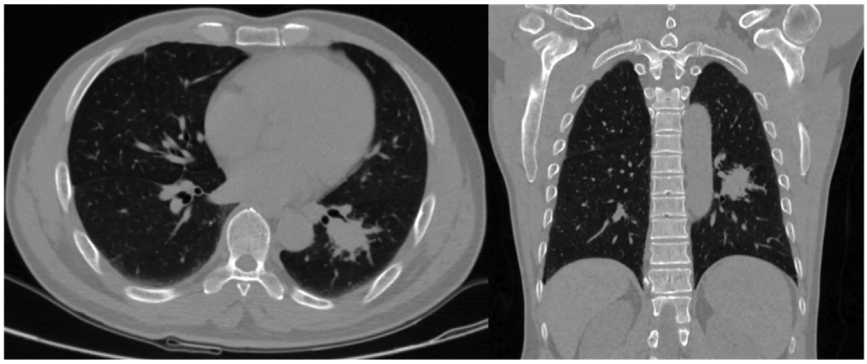

FIGURE 1. Computed tomography image of a 57-year-old male patient with a lung lesion of 27 × 29 × 50 mm in the *left lower* lung.

The patient's diagnosis of a malignant lung mass was believed to be likely after thorough multidisciplinary team (MDT) discussions among the thoracic surgeon, imaging specialists, and respiratory physicians. They also had a discussion with the patient and relevant family members about the MDT evaluation and relevant indications for surgery because the patient's lung function was sufficient to tolerate surgery and there were no severe contraindications. On day 30 of hospitalization, the patient underwent video-assisted thoracoscopic surgery LLL lobectomy and station 7.10.11 lymph node dissection. Combined with postoperative genetic recombination and immunohistochemistry, the patient's final diagnosis is LLL mucosa-associated lymphoid tissue lymphoma (MALT) (extranodal marginal zone lymphoma) with a stage of pT2a N0 M0 stage IB. On the fourth postoperative day, the patient was discharged with no significant discomfort or surgery-related complications.

DISCUSSION

This case report follows the CARE guidelines. Written informed consent was obtained from the patient for publication of this case report and any accompanying images, along with ethical approval from our center (ZSXL-LL2023-006; May 24, 2023).

The complexity and difficulty of the diagnostic process is the clinical importance of this case, which culminated in a minimally invasive surgery to achieve complete resection of the lesion and a final definitive diagnosis. Patients are admitted with unexplained fever, and in previous reports, about 60% to 70% of patients with MALT lymphoma presented with nonspecific clinical features (eg, cough and fever), which make it challenging to distinguish from other cancers, infections, or inflammatory lung diseases.[1]

The patient's age of onset was 57 years, which is generally consistent with the average age of onset of 60 years.[1,2]

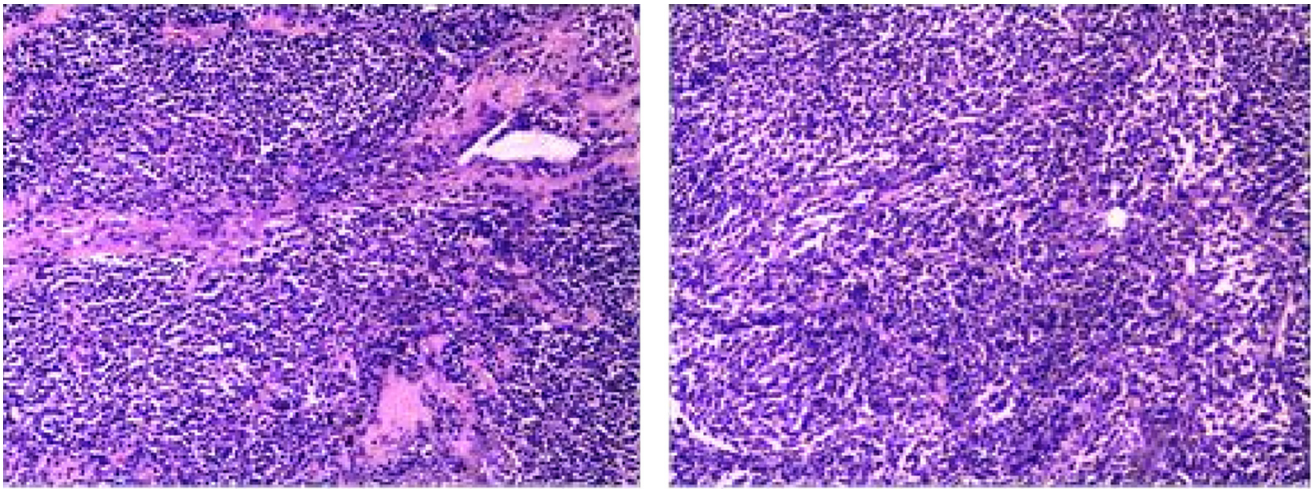

FIGURE 2. Histological examination of the lesion in the *left lower* lung. A large number of small lymphocytes infiltrated lung lesions. The combination of gene rearrangement and immunohistochemical findings is consistent with pulmonary mucosa-associated lymphoid tissue lymphoma. Immunohistochemical results were as follows: CD20, CD79a, Pax-5 diffusely positive; CD3, CD5 showed scattered positive T cells, CD43 many cells are positive; Bcl-2+; Ki-67:10%; vimentin−, Bcl-6−, p53 wild type. CD10−, CyclinD1−, kappa: a few are positive, lambda: a few are positive; *CD*, Cluster of differentiation; *Bcl*, B-cell lymphoma; *EBER*, Epstein-Barr virus (EBV)-encoded small RNA.

The patient has a long history of smoking, which may also be a risk factor for disease development.[3]

Pulmonary MALT lymphoma cannot be diagnosed by imaging findings alone, as demonstrated in this case. This entity can be easily misdiagnosed due to its nonspecific clinical symptoms and heterogenous imaging findings.[4,5,E1] A previous study[E2] showed that MALT lymphoma lesions often had a mildly elevated SUV_{max} value (0-6), which was consistent with the SUV_{max} value in this case report (6.2).

In this rare case, we can see that the entire diagnostic procedure was challenging. The preliminary fiberoptic bronchoscopy/bronchoalveolar lavage and CT-guided lung biopsy findings cannot make an accurate pathological diagnosis for the patient. Previous studies have illustrated that the diagnostic value of fiberoptic bronchoscopy and CT-guided aspiration biopsy for the diagnosis of pulmonary MALT lymphoma may be limited,[E3-E5] which is consistent with the reality of this case. This may be related to the small specimens obtained by biopsy. However, this step should not be ignored or omitted in clinical practice, and when multiple or disseminated lesions are present, the biopsy is a reasonably desirable approach to minimize patient trauma.

On the other hand, invasive pathological methods combined with postoperative genetic and immunohistochemical support are still necessary to diagnose MALT lymphoma.[E6] In this case, immunohistochemistry played an important role in the final and accurate diagnosis (Figure 2). Follicular dendritic cell markers CD21 and CD23 help to demonstrate the invasion of tumor B cells into the germinal center and immunoglobulin D-rich coat membrane region. Abnormal B-cell expression of CD43 is observed in 16% to 50% of MALT lymphomas and is important in distinguishing MALT lymphoma from pulmonary nodular lymphoid hyperplasia.

The current treatment for MALT lymphoma is multimodal; however, the best treatment for pulmonary MALT lymphoma remains unproven. Surgery can include diagnostic resection and treatment for complete resection. Previous studies[2,E7] showed that surgical treatment of patients with early MALT can provide a long-term clinical benefit.

Minimally invasive radical resection combined with lymph node dissection was adequate for this early-stage case. The prognosis is comparatively good for patients with pulmonary MALT lymphoma.[1,3] Patients do not need postoperative adjuvant therapy and should adhere to a specific routine of postoperative CT follow-up due to the natural property of inert tumors in MALT lymphoma and the early pathological staging.

The role of MDT in diagnosis and treatment should be emphasized. Malignancy was determined to be more probable following discussion in the MDT,[E8] and the postoperative pathology was also consistent with the diagnostic expectations of the MDT. The MDT in this case considered it reasonable to perform minimally invasive surgery on this patient.

CONCLUSIONS

In rare cases of pulmonary MALT lymphoma, a complete preoperative examination and MDT discussions are required. Minimally invasive thoracic surgery using the video-assisted thoracoscopic surgery technique can be performed in suitable patients to achieve a radical resection of the tumor with a more rapid recovery and a higher level of safety.

Conflict of Interest Statement

The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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