Pneumothorax Associated with Malignant Lymphoma

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Abstract

An 82-year-old man was diagnosed with lymphoplasmacytic lymphoma involving multiple lymph nodes and bone marrow. On radiological examinations no involvement of the lung was seen. He was treated with rituximab. Eighteen months later he was complicated with right pneumothorax, and surgery with bullectomy was finally performed. Histological examination disclosed the proliferation of abnormal B lymphocytes near the wall of the bulla and pleura. We conclude that the pneumothorax in this patient was associated with lymphoma. Thus, radiological examination does not disclose lymphomatous lesions, it is possible that lymphoma involves the pleura, and pleural involvement can cause pneumothorax. Surgery is an effective method of treating this rare complication.

Key words: pneumothorax, surgery, bullectomy, lymphoplasmacytic lymphoma, histology, immunophenotype

(Inter Med 49: 2337-2339, 2010)  
(DOI: 10.2169/internalmedicine.49.3531)

Introduction

Pneumothorax is defined as the presence of air in the pleural space. This disorder is divided into two categories: spontaneous, and traumatic pneumothorax. Spontaneous pneumothorax includes primary, secondary, and catamenial pneumothorax. Primary pneumothorax is strongly associated with bullae or blebs. Secondary pneumothorax is caused by airway, infectious lung, interstitial lung, connective tissue, and malignant disease (1). The association between pneumothorax and malignant lymphoma has rarely been reported (2-4). Concerning the respiratory tract, malignant lymphoma shows various clinical features including lung involvement, complicating infection, adverse effects of chemotherapeutic agents, and radiation pneumonitis. Therefore, the pathogenesis of pneumothorax in patients with malignant lymphoma is thought to vary. It is well-known that chemotherapy is effective for lymphoma; however, the optimal treatment for this rare complication is controversial. We describe herein a case of lymphoplasmacytic lymphoma complicated by pneumothorax.

Case Report

An 82-year-old Japanese man, who was a smoker, had been well until July 2004, when he developed anorexia. He consulted another hospital, and a gastric ulcer was diagnosed. Generalized lymphadenopathy was also detected, and he was referred to our hospital in August 2004. On physical examination, generalized lymphadenopathy was noted. The results of hematological examinations were as follows: red blood cell count: 262×10⁴/mm³; hemoglobin: 6.9 g/dL; white blood cell count: 5,100/mm³ (neutrophils: 49%, lymphocytes: 36%, atypical cells: 0%); platelet count: 26.3×10⁴/mm³; alanine aminotransferase: 15 IU/L; lactate dehydrogenase: 159 IU/L; creatinine: 1.1 mg/dL; albumin: 2.97 g/dL; immunoglobulin M: 1,247 mg/dL; C-reactive protein: 5.03 mg/dL; and soluble interleukin receptor-2 (sIL2R): 13,164 U/mL. Histopathological diagnosis of the biopsied inguinal lymph node was lymphoplasmacytic lymphoma (Fig. 1A). Proliferating lymphocytes were immunophenotypically positive for CD19 and CD20, and negative for T-cell-related antigens (data not shown). Computed tomography (CT) of the chest and abdomen disclosed multiple lymphadenopathy, bilateral bulla, low attenuation areas (LAA) in the bilateral lung field, and right pleural effusion. However, there was no
apparent pulmonary involvement (Fig. 2A). Gallium-67 scintigraphy identified no abnormal uptake. He was finally diagnosed with stage IV lymphoplasmacytic lymphoma according to the Ann Arbor system (5, 6), and was treated with rituximab. Although lymphadenopathy remained, the sIL2R values decreased to 4,960 IU/L, and right pleural effusion disappeared on chest CT. His clinical symptoms improved, and he intermittently received rituximab when lymphoma became exacerbated.

In February 2006, he complained of dyspnea and chest pain. Chest roentgenography and CT disclosed right pneumothorax (Fig. 2B). Air leak persisted for 12 days despite chest tube drainage. Finally, video-assisted thoracoscopic surgery with bullectomy was performed, and the pneumothorax was resolved. Histopathological examination of surgical specimens disclosed the proliferation of small lymphocytes near the wall of the bulla and pleura (Fig. 1B). Immunohistochemical staining revealed that proliferating abnormal lymphocytes were positive for B-cell-related antigens (Fig. 1C). Pulmonary and pleural involvement of the lymphoma was histologically confirmed, although such involvement could not be detected on radiological examinations. Pneumothorax never relapsed post-operatively; however, he developed recurrent pneumonia. His general status gradually declined and memory disturbance progressed. He died in December 2007. A postmortem examination demonstrated systemic lymphomatous involvement. Atypical lymphocytes diffusely infiltrated the interstitium of both lungs and the pleura including the area of bleb. Centrilobular emphysema, anthracosis, and bronchiolitis were also observed in both lobes. These findings were thought to be associated with smoking, although lymphomatous involvement could not be completely excluded. Shrinkage of pleural involvement could not be found on these specimens.

Discussion

Malignant lymphoma is a hematolymphoid malignancy that involves various extranodal organs and lymph nodes. Ann Arbor staging (5, 6) and extranodal involvement are strongly associated with the prognosis (7), and systemic examinations including CT of the chest and abdomen, gastric endoscopy, biopsy of the bone marrow, and nuclear medical examinations are performed at diagnosis. Tumorous lesions,
lymph node swelling, and organomegaly are considered to be due to lymphomatous involvement. Therefore, if lymphoma does not demonstrate tumorous lesions, involvement is not radiologically evaluated. In such cases, the association between concomitant disorders and lymphoma cannot be confirmed.

In the present case, CT of the chest disclosed bullae in the right apex, but there were no tumorous lesions in the lung. LAA were found on chest CT, and it was possible that he had chronic obstructive pulmonary disease (COPD). COPD is closely associated with pneumothorax (1), and we initially considered that rupture of the bullae was the cause of the pneumothorax. Yellin and Benfield reported eight cases of lymphoma complicated by pneumothorax. All patients had received radiation therapy, and 7 of 8 patients also received chemotherapy. The diagnosis in 7 of 8 patients was Hodgkin’s lymphoma. Histological findings were lymphomatous involvement, fibrosis, and infection with *Pneumocystis jiroveci* (2). A case of mediastinal non-Hodgkin’s lymphoma complicated by pneumothorax after chemotherapy has also been reported. The authors suggested that chemotherapy induced the shrinkage of the lymphoma and pneumothorax developed (3). Okam et al also reported a case of extranodal marginal zone B-cell lymphoma of the lung complicated by pneumothorax. The diagnosis of lymphoma was based on a surgical specimen obtained by open biopsy. Chemotherapy was not administered before pneumothorax developed (4). Unilateral pleural effusion was initially found in our patient. In lymphoma patients, pleural effusion in not an uncommon finding. The majority of lymphomas with pleural effusion belong to intermediate grade lymphoma (8), and the association between pleural effusion and lymphoplasmyacytic lymphoma has rarely been reported. However, marked hypoalbuminemia, and renal and hepatic impairment were absent in the present case, and the effusion was thought to be malignant effusion. Later pleural effusion disappeared after treatment, and pleural infiltration by lymphoma cells was confirmed through the histological examination of surgical specimens. An association between chemotherapy and pneumothorax has been reported (2, 3). The present patient had received rituximab (9); however, an association between rituximab and pneumothorax has not previously been reported to our knowledge. The case reported by Okam received no chemotherapy or radiation therapy before pneumothorax occurred (4). These findings suggest that pleural involvement by lymphoma caused the pneumothorax in the present case.

In conclusion, pleural involvement of a lymphoma may not be detected by a radiological examination and may cause pneumothorax. Therefore, surgical treatment for pneumothorax should be considered if chest tube drainage is not effective in a patient with lymphoma.

References