Case Report

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TANAFFOS

A Case of Pneumothorax Following Radiation Therapy for Small Cell Lung Cancer in a Patient with Scleroderma-ILD

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Connective tissue diseases, particularly scleroderma, pose a heightened risk for the development of malignancies such as breast and lung cancer. Stereotactic Body Radiation Therapy (SBRT) has emerged as an effective treatment modality for various cancers, including lung and breast cancers, due to its curative potential, especially for localized extracranial tumors. A 69-year-old patient with a 30-pack-year smoking history presented with shortness of breath and bilateral diffuse rales on chest auscultation during the outpatient clinic visit. Notably, the patient had not received scleroderma treatment for a year at the time of radiation therapy. Despite the recognized sensitivity of the lungs to radiotherapy, the occurrence of pneumothorax and pneumomediastinum following SBRT in this case raises concerns about the potential complications in scleroderma-ILD patients with lung cancer.

This report underscores the need for comprehensive risk assessment and careful consideration of alternative treatment strategies for lung cancer in scleroderma patients, particularly those with pre-existing lung involvement. Further research is warranted to elucidate the mechanisms and risk factors associated with complications following radiotherapy in this patient population, guiding clinicians in optimizing therapeutic approaches for improved outcomes.

Keywords: Lung cancer; SBRT; Scleroderma-ILD; Pneumothorax

INTRODUCTION

Malignant processes may develop as a complication of connective tissue disease. Breast and lung cancer rates are higher in scleroderma patients (1). Stereotactic body radiation therapy (SBRT) is currently used effectively in the treatment of lung cancer, breast cancer, chest wall cancers, and lymphoma. SBRT can be administered palliatively, curatively, or in combination with post-operative chemotherapy. SBRT can be curative, especially for localized extracranial tumors (2). It is currently known as the best alternative treatment for inoperable stage I non-small cell cancers (3). Moreover, it is preferred in oligometastatic lung cancers since it is less invasive than metastasectomy (4).

The lungs are one of the most sensitive organs to radiotherapy. Pneumonitis and pulmonary fibrosis are the most common radiotherapy complications. However, pneumothorax can occur infrequently after radiotherapy. The majority of pneumothorax cases developing after radiotherapy have been reported in lymphoma patients (5). In this paper, we present a case of pneumothorax, which developed after SBRT for lung cancer, in a scleroderma patient with lung involvement.

CASE SUMMARIES

A 69-year-old female was admitted to the outpatient clinic with the complaint of shortness of breath. On physical examination, bilateral diffuse rales were detected during the auscultation of the chest. The patient had a history of scleroderma with lung involvement and a smoking history of 30 packs per year. At that time, the patient had not been receiving any treatment for scleroderma for a year. However, she had previously been treated with methotrexate, plaquenil, nifedipine, pentoxifylline, cyclophosphamide, azathioprine, and lamivudine for scleroderma. Her family history was unremarkable.

A pulmonary function test showed that forced vital capacity (FVC) was 52%, forced expiratory volume in 1 second (FEV1) was 61%, and the diffusing capacity of the lung for carbon monoxide (DLCO) was 61%. A diffuse reticulonodular view was observed in the posterior-anterior (PA) chest radiograph. A pleural-based mass of 41 x 37 mm was noted in the apical segment of the right lower lobe on computed tomography (CT) images of the thorax (Figure 1). The positron emission tomography (PET CT) revealed a 37x53-mm mass (SUVmax: 15) in the right lower lobe, right hilar lymphadenopathy (15 mm, SUVmax: 8.5), and right paratracheal lymphadenopathy (SUVmax: 5.7). A hypodense lesion with an SUVmax of 6.9 was observed in the liver segment 7 (Figure 2). Biopsy specimens were collected from subcarinal and right hilar lymph nodes using endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA). Pathological examination results were interpreted as small-cell lung cancer (SCLC). Since the patient had liver metastasis, shSince the patient had liver metastasis, she was considered stage IVB.e was considered stage IVB.

Treatment with cisplatin and etoposide was started for SCLC. After six cycles of chemotherapy, the mass in the lower lobe of the right lung responded partially to the treatment, but the lesion in the liver showed a complete response. SBRT was started for the treatment of the lesion in the lung. Pneumothorax and pneumomediastinum were detected on CT when she presented to the outpatient clinic with the complaint of increased shortness of breath two months after SBRT (Figure 3). Since the general condition of the patient was good, supplemental oxygen therapy was given to the patient; no additional treatment was required. It was revealed that the pneumothorax and pneumomediastinum had completely regressed in the tomography taken one month later (Figure 4).

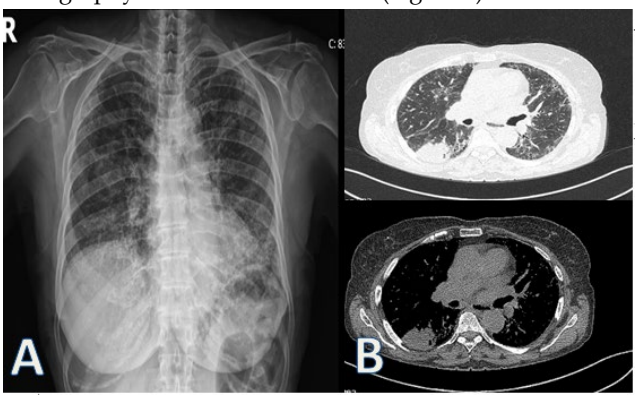

Figure 1. A. Chest radiograph: Diffuse reticulonodular view B. CT: The pleural-based mass in the apical segment of the right lower lobe

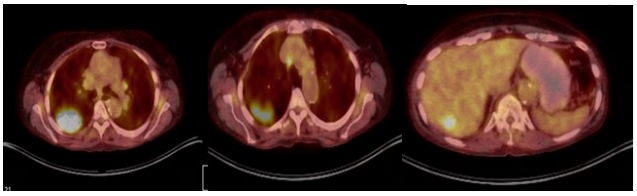

Figure 2. PET CT: The view of the mass in the right lower lobe, right paratracheal lymphadenopathy, and the liver

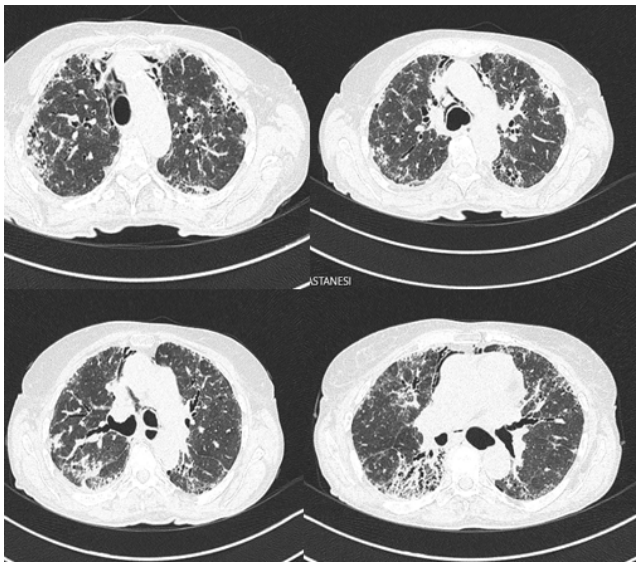

Figure 3. CT: Pneumomediastinum and minimal pneumothorax

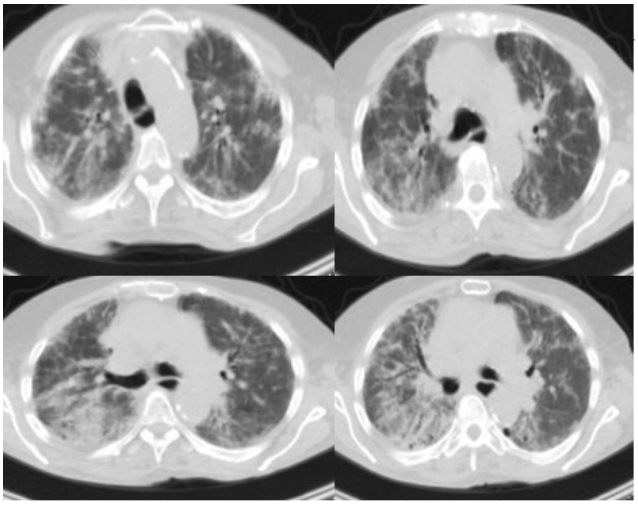

Figure 4. Chest CT-scan: Pneumothorax and pneumomediastinum completely regressed

DISCUSSION

Lung involvement occurs in two-thirds of scleroderma patients. Furthermore, the risk of developing lung cancer is high in patients with scleroderma (1,6). This risk is especially high in patients who have anti-Scl70 antibodies and low FVC values due to interstitial involvement (1). In a study from Italy, the risk of developing lung cancer was found to be 5% in patients with scleroderma (1). It has been observed that most of the scleroderma patients developing lung cancer are men below 65 years of age. It was concluded that smoking was not highly associated with lung cancer in these patients (1). Our patient in this case presentation was older than 65 years and has a history of smoking, and these clinical findings are different from those presented in the largest series in the literature.

Although spontaneous pneumothorax occurs very rarely, it may still develop at a rate of 0.026% when an underlying disorder, such as chronic obstructive pulmonary disease, was present. Treatment-related pneumothorax in lung cancer is very rare (2). In their study, Lai et al. (7) reported a 0.32% risk of developing spontaneous pneumothorax in patients with lung cancer. However, in a study investigating the rate of pneumothorax after SBRT, Asai et al. (2) reported the this risk occurred at a rate of 2.5%. In the latter study, pneumothorax occurred in a median of 18.5 months after SBRT, and the severity was grade 2 or lower in all patients. In our patient, a low-grade pneumothorax developed two months after SBRT. Compared to the literature, the earlier development of pneumothorax after SBRT in our patient may have resulted from the underlying lung involvement due to scleroderma.

In two different case series examining the effect of SBRT in cancer patients with connective tissue diseases, the most common complications were reported as pneumonitis and pulmonary fibrosis. Pneumothorax and pneumomediastinum were not reported in these studies (8,9). Our patient can be considered the first case, where pneumothorax and pneumomediastinum developed after SBRT for lung cancer in a patient with scleroderma.

In conclusion, malignancy may develop in connective tissue diseases, including scleroderma with lung involvement. Developing shortness of breath after SBRT should increase the probability of pneumothorax or pneumomediastinum in such patients.

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