

Bronchogenic Carcinoma Presenting as Spontaneous Pneumothorax Case Report with Review of Literature

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Abstract: Primary lung cancer with pneumothorax as a primary symptom is very rare. The case studied herein was male, sixty years old. The patient had a complaint of chest pain and dyspnea and was diagnosed as having pneumothorax on the radiograph. At the same time, a shadow of tumor was recognized around the upper lobes of the left lung and accordingly bronchoscopy was performed. As a result of transbronchial biopsies, malignant cells were detected. The left upper lobectomy was performed and it was diagnosed to be large cell carcinoma. Mechanism of the pneumothorax was thought to be caused by the burst of the visceral pleura because of the abrupt enlargement of the tumor.

Key Words: Spontaneous Pneumothorax, Primay lung cancer

Introduction

As pulmonary tumors which cause pneumothorax, metastatic tumors, in particular metastasis of osteosarcoma to the lung are well known. However, the primary lung cancer complicated with pneumothorax is very rare and furthermore surgery was performed to a few cases. Recently we have treated a case in which attack of pneumothorax led to perform radiography of the chest, and it revealed the shadow of tumors enlarging abruptly. Accordingly macroscopic and histological examinations were performed with surgery. We hereby report the case with a review of the literature.

Case Report

Case: Male, sixty years old, company employee.

Chief complaint: Chest pain and dyspnea.

Family history: Nothing in particular.

Past history: Hypertension since age 55 years, with Brinkman Index 850.

Present illness: In April 1990, manifestation of chest pain and dyspnea without inducing causes brought the patient to consult at a hospital. The chest x-ray film examination revealed pneumothorax of the left lung and the patient

was transferred to this hospital.

Symptom at the hospitalization: Medium physique and nutrition. Pulses 96/min., blood pressure 130/80 mmHg, respiration 16/min., clear breath sound, but decreased to weak sound, in the upper portion of the left lung. Abdomen was flat with no enlargement of the liver and the spleen detected. With no extraordinary symptom of the limb peripheries noticed. No enlargement of the superficial lymphnodes was recognized.

Findings at the hospitalization: No extraordinary findings in the general biochemical examinations of blood were noticed, but serum CEA showed increased value of 9.5 ng/ml. Pneumothorax of the left lung was recognized on the radiograph of the chest and also the shadow of a tumor sized 3.5 x 2.0 cm was noticed (Fig. 1). Bronchoscopy performed after the continued aspiration in the thoracic cavity showed no extraordinary sites within the visualized areas, but malignant cells were detected from

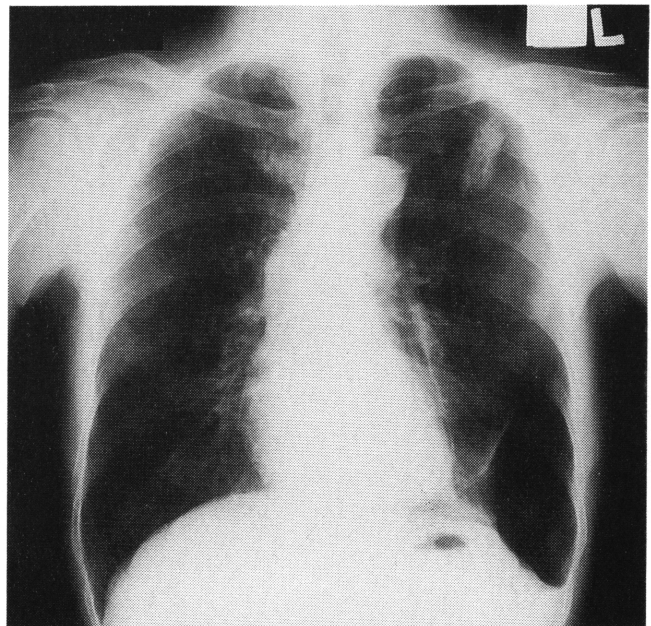


Fig. 1. Radiograph of the chest at the time of hospitalization. Pneumothorax in the left lung shown.

B¹⁺² by trans-bronchial biopsies. Thereafter the tumor enlarged rapidly, and after confirming no metastasis existing with CT and other various scintigram, operation was performed on May 12, 1990.

Operative findings: The right postero-lateral thoracotomy was performed at the fifth intercostal space. Tumor reaching the visceral pleura was recognized at S¹⁺² of the left lung. The left upper lobectomy and mediastinal lymphnode dissection were performed. Macroscopic findings of the resected specimen have shown the 4 x 3.5 cm tumor which reached the visceral pleura and destroyed partially the pleura (Fig. 2). Histological findings of low-power magnified pictures revealed that the tumor was proliferating, destroying the visceral pleura, and the center of it was on the stage of necrosis (Fig. 3). The high-power magnified pictures revealed that remarkably atypical and hyperplastic and comparatively large tumor cells were proliferating sheetshapedly and were diagnosed as the large cell carcinoma (Fig. 4).

The post operative process after the surgery: The remission process was good and on the seventh day the drain of the pleural cavity was removed and on the thirty-fifth day the patient was freed from the hospital. Thereafter, he returned to the normal daily life working in the office. However, in October 1991, the manifestation of pleural effusion and metastases to the brain and the bone were observed, and the chemotherapy with Cisplatin and Vindesin was performed. In spite of these treatments the symptoms were exacerbated and the patient died from the original diseases on January 21, 1992.

Discussion

It is well known that among the lung tumors, the metastatic tumor is proliferating, invading just under the visceral pleura and, as proliferating, it destroys the pleura and also the tumor itself necroses and thus manifestation of pneumothorax ensues. It is rare, however, to have the primary lung cancer with pneumothorax as the primary symptom. Thus, approximately only seventy cases have been reported since 1955, when Heimlich et al.¹⁾ reported the lung cancer cases complicated with pneumothorax. According to Hyde,²⁾ the case in which the primary lung cancer is complicated with pneumothorax is only one case among 3,000 lung cancer cases. Wright³⁾ reported that 0.05% of lung cancer complicated with pneumothorax, and Steinhauslin et al.⁴⁾ reported 0.46% of lung cancer complicated with pneumothorax. In our hospital, we have had only one case among the 216 cases of lung cancer resection surgery in the past five years. The mechanism of pneumothorax is explained in the literature that the pneumothorax is induced by 1) the burst of bulla, bleb coinciding accidentally with lung cancer,^{5,6)} 2) stenosis or occlusion of the central bronchus induced by the cancerous cells and thus over-

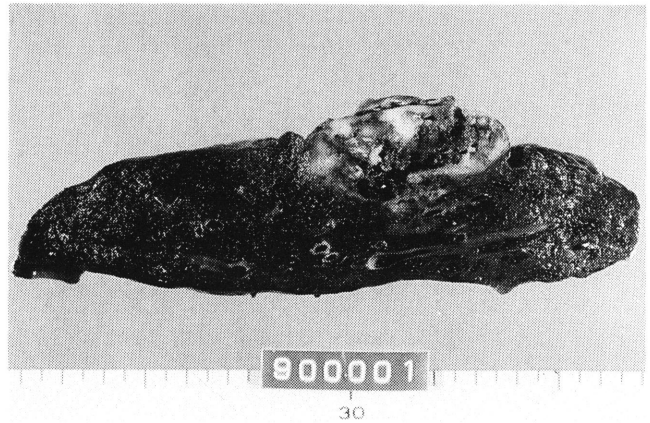


Fig. 2. Resected specimen.

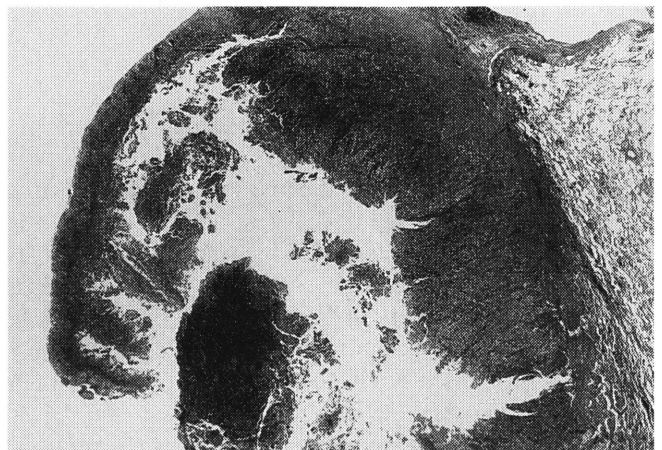


Fig. 3. Histological picture (HE × 10)

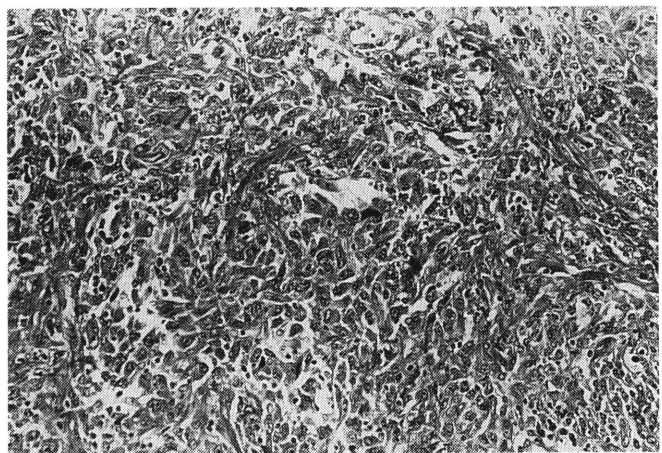


Fig. 4. Histological picture (HE × 200)

inflation of the pulmonal peripheral sites is induced and accordingly the burst of the bleb under the pleura is induced due to the check valve mechanism.^{1,4,7)} 3) Owing to the necrosis of the carcinoma cells invading into the pleura and the bronchus, the pleura and the bronchus were destroyed.^{8,9,10)} In the cases in this hospital, macroscopic and

histological observation of the resected specimen revealed that the tumors which occurred just under the pleura enlarged rapidly until at last the pleura was destroyed, thereby resulting in pneumothorax formation. Thus, it appeared that this case should be classified into the third mechanism mentioned above.

The lung cancer cases complicated with pneumothorax reported in Japan is shown in Table 1. Among these 24 cases, surgeries were performed in 20 cases and the ages of the patients ranged from 27 to 80 years old (average 58 years old), including 3 cases of under forty years old. The lesioned site was on the right side in 14 cases and on the left side in 10 cases, more cases on the right side. Regarding the histologic type of the lung cancer, 11 cases of squamous cell carcinoma were the most, and 7 cases of undifferentiated cancers such as large cell and small cell cancer were recognized considerably. Squamous cell carcinoma belonged to the central type, and its mechanism has been explained that it was frequently induced by the inflation of the lungs peripheral sites due to occlusions and stenoses of the central bronchi as mentioned above. In the peripheral type, there seemed to be many undifferentiated cancers which were highly malignant and destroyed the pleura by rapid proliferation. As to the anamnesis, 10 of 17 cases had descriptions of heavy smoking, more than 1000 of brinkman index, and this fact must be paid attention to as the high risk group. Fujisawa et al.¹¹⁾ have reported that in two of six cases no inflation of the lungs has been gained, or even when the inflation was gained recurrences occurred repeatedly in the early stage. This suggests that in the elderly patients with unsuccessful pleura cavity drain-

age, various examinations should be performed in consideration of the malignant tumor invasion. Regarding the therapies, surgeries were performed in 20 of 24 cases and radiation was performed in 11 of 24 cases, including the cases of radiation therapy after surgery. Because of squamous cell carcinoma prevalence, probably many needed radiation treatment. According to the reports in Japan, exitus after the treatment was shown to be worse, 10 mortal cases within six months after the surgery and only six cases of survival more than one year. In this connection, according to the reports from Europe by Steinhäuslin et al.,⁴⁾ it was shown that one year survival in the lung cancer complicated with pneumothorax was 17% and the average survival period was 5.2 months, thus showing extremely poor prognosis of the lung cancer complicated with pneumothorax.

Conclusion

We had one case of primary lung cancer in which manifestation of pneumothorax was observed as the primary symptom, and hereby we have reported the mechanism of its occurrence with review of the literature attached.

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Table 1. The report of the lung cancer complicated with pneumothorax in Japan.

Author	(year)	Histology	Cases
Simizu, et al.	(1975)	squamous	1
Hayashi, et al.	(1975)	large	1
Matsushima, et al.	(1978)	small	2
		adeno	2
		squamous	1
		large	1
Ohiwa, et al.	(1979)	carcinoid	1
Okada, et al.	(1984)	adeno	1
		large	1
Fujisawa, et al.	(1987)	large	1
		carcinoid	1
		squamous	4
Kinoshita, et al.	(1987)	adeno	1
Takeda, et al.	(1988)	large	1
Takagi, et al.	(1990)	squamous	3
Ashizuka, et al.	(1991)	squamous	2
Total			24