

Peripheral Micronodular Squamous Cell Carcinoma of the Lung Unexpectedly Discovered after an Operation for Spontaneous Pneumothorax —A Case Report—

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The occurrence of lung cancer in patients suffering with pneumothorax is very rare, especially in the absence of any radiological changes that would suggest neoplasia after the pulmonary reexpansion. We have experienced a case of a 60-year-old male who presented with lung cancer that was discovered by chance after an operation for his pneumothorax. The resected lung tissue showed a 0.3 cm-sized, peripheral squamous cell carcinoma associated with a bulla. The tumor was not macroscopically detected on the first thoracotomy that was performed for the treatment of the pneumothorax. The micronodular cancer was diagnosed after the histological examination of the resected bulla. The patient has been doing well with no evidence of tumor recurrence during the fifteen months follow-up. This case shows that we should always be vigilant for associated lung cancer when we examine the lung tissue after the operation for pneumothorax.

Key Words : Pneumothorax; Carcinoma, Squamous cell; Lung

It is well known that emphysematous bulla is thought to be often associated with lung cancer. However, the pneumothorax that occurs late in the course of the lung cancer rather than as an initial manifestation, and the occurrence of spontaneous pneumothorax, especially as a presenting feature, must be exceedingly rare.¹⁻⁵ Subcentimeter lung cancers still belong to a rare category of tumor size, and peripheral micronodular lung cancer comprises only 2.5% of the total lung cancers. Many of these lung cancers are more likely to be adenocarcinoma.⁶ We herein report a case of a micronodular squamous cell carcinoma that was fortuitously discovered at the site of an air-leak in a patient who had presented with spontaneous pneumothorax.

CASE REPORT

A 60-year-old male was hospitalized in February 2004 because of dyspnea and right-sided chest pain. The patient had smoked

one to two packages of cigarettes a day for 40 years. Chest X-ray revealed pneumothorax on the right side. Closed thoracostomy was performed. After two weeks, the pneumothorax resolved completely. A month after discharge, he was readmitted because of hemoptysis. Although bronchial artery embolization was performed, the hemoptysis persisted. After the apical segmentectomy of the left upper lobe was carried out, the histological diagnosis was consistent with tuberculosis and bulla. However, the patient was readmitted 1 month later with complaints of severe dyspnea and right-sided chest pain. Chest X-ray and computed tomography revealed a recurrence of right pneumothorax, but there was neither mass nor lymph node enlargement that would have been suggestive for malignancy (Fig. 1A). Four separate cytologic examinations of the sputum failed to disclose any malignant cells. No endobronchial lesion was found on the bronchoscopic examination. Closed thoracostomy was immediately performed. The next day, a wedge resection of the posterior segment of the right upper lobe was carried out. Two bullae were

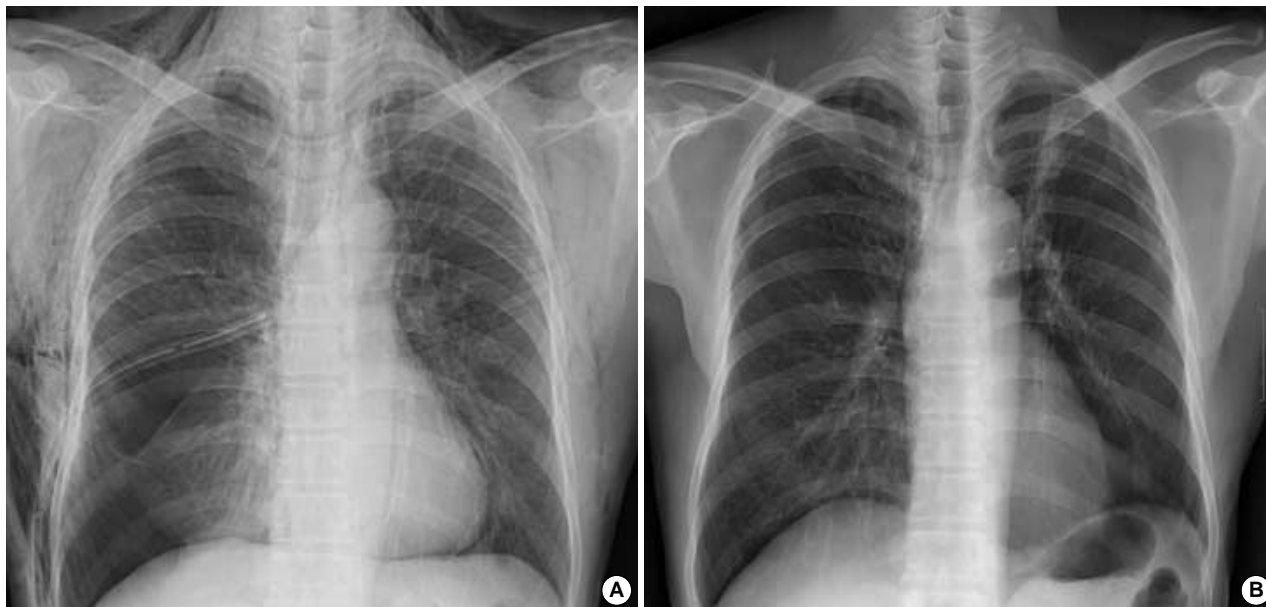


Fig. 1. (A) Preoperative chest X-ray shows a pneumothorax in the right hemithorax with no evidence of tumor. (B) Follow-up chest X-ray shows no evidence of recurrent tumor.



Fig. 2. Resected lung shows two bullae with no solid tumor.

found in the posterior segment of the right upper lobe adjacent to a continuous leak in the lung. There was no evidence of tumor in the right upper lobe at this time and the adjacent lung had a normal appearance. The lung re-expanded well and the postoperative course was unremarkable. On gross examination of the specimen, the lung showed two bullae, measuring 3×3 cm and 4×3 cm, respectively (Fig. 2). However, there were no definitive tumor nodules on the cut surface. Microscopically, a small lung cancer was unexpectedly discovered at the interlobular septal wall adjacent to the bullae, but not in the wall of the bullae. This tumor was a moderately differentiated squamous cell carcinoma that measured 0.3 cm in diameter, and it showed a solid growth pattern and stromal invasion. Lymphovascular invasion was not

seen (Fig. 3A). The tumor cells showed a strong positive immunoreaction (Fig. 3B) for p53 (1:100, DakoCytomation, Glostrup, Denmark). No further subsequent surgical resection was done. At the fifteen months follow-up, the patient has been doing well with no evidence of tumor recurrence (Fig. 1B).

DISCUSSION

Spontaneous pneumothorax accompanying primary lung cancer is a rarely seen malady and this generally occurs late in the course of the lung cancer rather than as an initial manifestation. So, those lung cancers diagnosed after spontaneous pneumothorax are usually in the advanced stage and the occurrence of spontaneous pneumothorax, especially as a presenting feature like our case, must be exceedingly rare.³

The occurrence of spontaneous pneumothorax in patients with bronchogenic carcinoma can be ascribed to the following mechanisms: 1) direct invasion of tumor into the pleura with necrosis, rupture or perforation and bronchopleural fistula; 2) rupture into the pleural space of the dilated alveoli that are distal to the site of stenotic bronchogenic cancer; 3) rupture into the pleural space of the alveoli that have become distended to compensate for the atelectasis that is due to obstructive bronchogenic cancer; and 4) unknown causes.⁴ In our case, however, definite pleural invasion, necrosis, rupture or perforation was not observed, and the tumor was too small to cause obstructive emphysema. There-

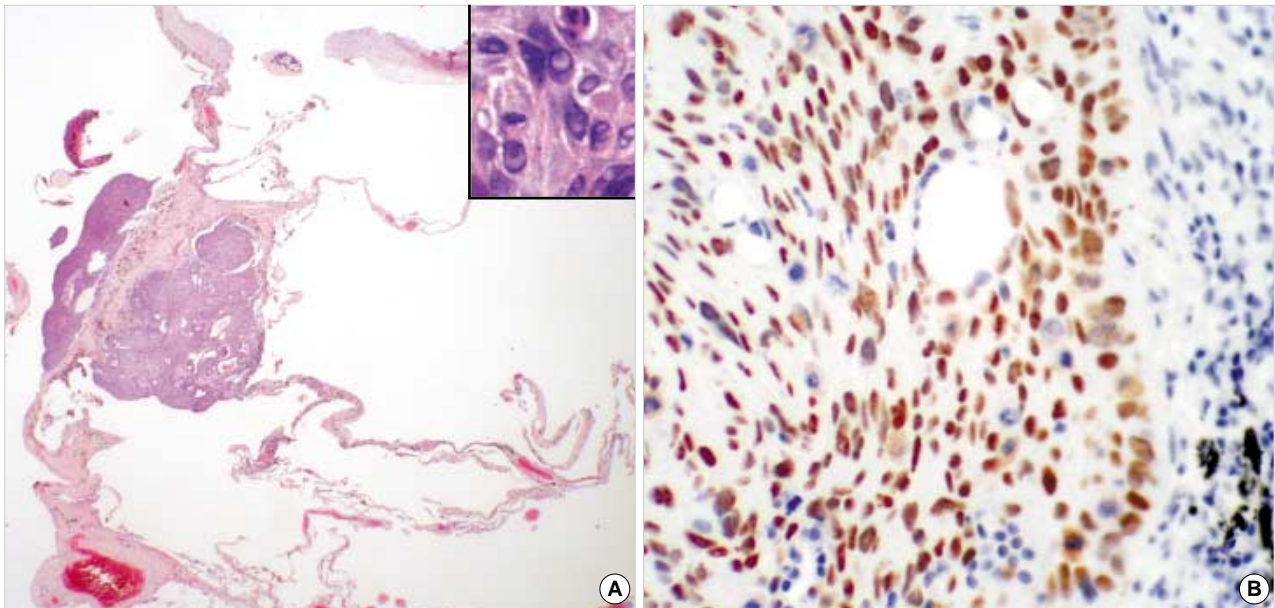


Fig. 3. (A) A moderately differentiated squamous cell carcinoma (inset) with a solid growth pattern and stromal invasion, measuring 0.3 cm in diameter, is unexpectedly discovered at the interlobular septal wall adjacent to the bullae on the microscopic examination of the bullae. (B) The tumor cells show strong positive immunoreaction for p53.

fore, it doesn't seem reasonable that the occurrence of our patient's spontaneous pneumothorax can be ascribed to the peripheral small lung cancer.

On the other hand, peripheral subcentimeter lung cancer comprises only 2.5% of the total lung cancers, and many of these lung cancers are more likely to have an adenocarcinoma histology (72.7%), with the rest being squamous cell carcinoma in 9.1% of the cases and atypical adenomatous hyperplasia in 18.2% of the cases.⁶ Peripheral squamous cell carcinoma was defined as that cancer arising from the subsegmental branches of other distal bronchi and bronchioles. Although we have frequently observed features of dysplasia or carcinoma in situ adjacent to the small central type of squamous cell carcinomas, we have rarely encountered any morphologic evidence of the dysplasia-carcinoma sequence in the cases of the peripheral type of squamous cell carcinoma. This finding indicates the presence of a different carcinogenic pathway between the central type and peripheral type of squamous cell carcinoma. This condition has been related to a differential accumulation of smoke components in the lung.⁷ Scannell⁵ has suggested that blebs, bullae and recurrent spontaneous pneumothorax might cause a primary lung cancer. Some controversy has arisen as to whether the scar precedes the appearance of the carcinoma or whether the fibrosis represents a desmoplastic host reaction to the tumor. In this case, given the common risk factors of heavy smoking, old age and pulmonary scarring, it is reasonable to conclude that any paren-

chymal lesion in association with large bullae or spontaneous pneumothorax should be viewed with more than ordinary suspicion of carcinoma.

Micronodular lung cancers still belong to a rare category of tumor size for lung cancer, and most of them are expected to be in an early disease stage. The pathobiological behavior and management of small-sized peripheral lung cancer has not been fully defined. Asamura *et al.*⁶ reported that lymph node metastasis was seen in three (15%) of 48 patients suffering with subcentimeter lung cancer and furthermore, two patients had tumor recurrence. These observations clearly indicated that a "tumor size less than 1 cm" does not simply mean the absence of the tumor spread through lymphatic or hematogenous pathways. Actually, some of these tumors were already in the advanced stage and the lesser resection such as wedge or segmentectomy displayed three times more local recurrence than did lobectomy.⁶ In the present case, no subsequent surgical resection was done after the wedge resection. At the fifteen months follow-up, the patient has been doing well with no evidence of disease recurrence. However, it seems that further careful and watchful follow-up is necessary.

In conclusion, the authors suggest that localized bullous disease and spontaneous pneumothorax in individuals of the 'cancer age' may be a clue to the early diagnosis of peripheral carcinoma of the lung and that all large blebs, bullae, or recurrent spontaneous pneumothorax in these patients necessitate extensive exploration to exclude the possibility of early occult carcinoma.

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