Spontaneous Regression of Primary Lung Cancer Arising from an Emphysematous Bulla

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Bullous emphysema is an important risk factor for lung cancer. Here, we report the case of a 56-year-old man who underwent surgical treatment for primary lung cancer arising from the wall of a bulla. Chest computed tomography (CT) had revealed a nodule arising from the bulla wall. This nodule showed positive uptake of 18fluorodeoxyglucose (FDG) during positron emission tomography (PET)-CT. However, repeat CT performed after 2 months showed a spontaneous decrease in the tumor size. Exploratory resection revealed non-small cell lung cancer, which was confirmed by the findings of intraoperative frozen-section analysis; therefore, right upper lobectomy and mediastinal lymph node dissection were performed. The postoperative, pathological diagnosis was squamous cell carcinoma arising from the wall of a bulla. From this case, we infer that lung cancer arising from the wall of a bulla may spontaneously regress, and FDG/PET is a useful tool to diagnose lung tumor in patients with pulmonary bullous disease.

Keywords: lung cancer, bulla, PET-CT, spontaneous regression

Introduction

The preoperative diagnosis of lung cancer associated with emphysematous bullae is occasionally difficult.1) Bronchoscopy and percutaneous computed tomography (CT)-guided needle biopsy, which poses a risk of pneumothorax and hemothorax, are not always the appropriate diagnostic procedures for such a tumor. Repeated CT scans have been considered useful in the follow-up of such undiagnosed tumors. Here, we report the case of a primary lung cancer arising from the wall of a bulla that showed 18fluorodeoxyglucose (FDG) uptake on positron-emission tomography (PET), but its size was found to have reduced spontaneously during the next CT examination.

Case

A 56-year-old man with emphysema was a heavy smoker (40 cigarettes everyday for 36 years). CT examination showed a nodule at the inner surface of a bulla located in the right upper lobe of the lung (Fig. 1A–1C). Blood examination showed that the levels of the tumor markers, namely, carcinoembryonic antigen (CEA) and cytokeratin fragment (CYFRA), were all within the normal range, but that of pro-gastrin releasing peptide (Pro-GRP) was 188 pg/ml (normal range, <46.0 pg/ml). FDG-PET performed during the integrated PET-CT examination also showed FDG accumulation in this lesion (Fig. 2). The maximum standardized uptake value (SUVmax) of this nodule was 8.49. However, repeat CT examination conducted after 2 months showed a decrease in tumor size (Fig. 1D). No other tumors were detected in brain or
abdominal CT scans. Exploratory resection was performed, and the lesion was diagnosed as non-small cell lung cancer (NSCLC) on the basis of the findings of intraoperative frozen-section analysis; consequently, right upper lobectomy and mediastinal lymph node dissection were performed. The postoperative, pathological diagnosis was squamous cell carcinoma arising from the wall of a bulla. The disease stage was judged as T1N0M0 (stage IA). He had no recurrence at 2 years and 7 months after surgery.

**Fig. 1** Chest CT images showing a mass arising from the wall of a bulla. (A) July 2007; (B) September 2007; (C) February 2008; (D) March 2008

**Fig. 2** PET scan showing intense focal FDG uptake by the tumor.

**Discussion**

Bullous emphysema is a well-known important risk factor for lung cancer. Stoloff et al. reported that the relative risk of lung cancer in patients with bullous disease was 32 times higher than that in patients without bullous disease. In general, patients with both pulmonary bullous disease and primary lung cancer have a very poor prognosis, because they often receive treatment when the tumor is at an advanced stage. Hanaoka et al.
reported that prognosis of bronchogenic carcinoma associated with emphysematous bullae was similar to that of primary bronchogenic carcinoma associated with non-small cell lung carcinoma (NSCLC), if the tumor is resected at an early stage. However, the radiographic diagnosis of a bullous cancer may be difficult if the tumor is small and appears as an excrescence on the wall of the bulla.5)

FDG-PET has been established as a useful tool in the management of patients with NSCLC. PET has a high sensitivity (range, 79%–100%) and reasonable specificity (range, 40%–90%) for differentiating benign from malignant tumors.6) From our case, it may be inferred that PET-CT is a useful screening modality for lung cancer arising from the wall of a bulla. In our case, we noted a nodular lesion confined within the bullous disease, and the nodule was found to decrease in size during further examinations.

Spontaneous regression (SR) of cancer is defined as partial or complete disappearance of the malignant disease without any medical treatment.8) SR is a particularly rare event in lung cancer.9,10) Although the mechanism of SR remains unclear, the possibility of stimulation of an immunologic response by trauma, infection, endocrinological changes, or psychiatric mechanism has been reported.8) In our case, the patient had no history of trauma or infection. Pathological examination revealed mild necrosis in the tumor, but the cause of tumor regression remains unknown. We assume that bullous wall deformation and generation of phlegm might have led to the reduction in tumor size. Bronchogenic carcinomas associated with a bullous disease often lack the characteristic imaging findings of a malignant nodule because the tumor-lung interface and the shape of the tumor itself are markedly modified and deformed. Even in the absence of a clear, preoperative, histological diagnosis, appropriate surgical procedures should be considered in a PET-positive tumor.

References