Paroxysmal Atrial Fibrillation due to Bronchogenic Cyst

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Abstract

A 62-year-old man presented newly developed tachyarrhythmia diagnosed as paroxysmal atrial fibrillation (PAF) and was treated with flecainide and enalapril. He underwent a whole-body F-18 fluorodeoxyglucose (FDG) positron emission tomography (PET) scan for cancer screening. The FDG-PET images showed a FDG non-avid lesion in the mid mediastinum. He was referred to our hospital for further examination under suspicion of a cardiac tumor in the left atrium. A chest computed tomography scan and magnetic resonance imaging revealed a bronchogenic cyst just under the carina and also compressed left atrium and pulmonary vein from its cranial portion. The cyst was completely excised. After the operation, PAF was stopped and sinus rhythm was preserved. PAF was thought to be due to compression by the bronchogenic cyst.

Key words: bronchogenic cyst, atrial fibrillation, positron emission tomography, F-18 FDG-PET, photon-deficient area, FDG non-avid lesion

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Introduction

Bronchogenic cysts are congenital lesions, which have been thought to be the result of abnormal budding of the ventral foregut and tracheobronchial tree (1). The majority of uninfected bronchogenic cysts cause no symptoms and are discovered by chance on chest X-rays in adults (1). Chest pain, discomfort, cough and dyspnea are common symptoms (2, 3). An arrhythmia is rare symptom due to bronchogenic cyst. We present a patient of bronchogenic cyst, who eventually recovered from paroxysmal atrial fibrillation (PAF) by removal of the cyst.

Case Report

A 62-year-old man presented newly developed tachyarrhythmia. PAF had been diagnosed at a local clinic by an electrocardiogram (ECG). The heart rate in the ECG was arrhythmic at 120 bpm; intermittently sinus rhythm was established. A chest X ray showed no abnormal shadow or cardiomegaly. Transthoracic echocardiography (TTE) showed no organic abnormality with normal ejection fraction, chamber size and valve. Flecainide and enalapril had been prescribed to this patient for the prevention of PAF. Those agents were partially effective for him. Two months later, the patient underwent a whole-body F-18 fluorodeoxyglucose (FDG) positron emission tomography (PET) scan for cancer screening after showing no symptoms or signs except for PAF. The FDG-PET images showed a FDG non-avid lesion in the mid mediastinum (Fig. 1). He was referred to our hospital for further examination under the suspicion of cardiac tumor in the left atrium. An ECG at rest revealed atrial fibrillation with heart rate of 190 bpm (Fig. 2A). This atrial fibrillation was paroxysmal and occasionally recovered to sinus rhythm (Fig. 2B). TTE showed no abnormal mass in the cardiac chamber and extracardiac compression. A chest computed tomography (CT)-scan showed a 45×34 mm oval mass with slightly high water density just inferior to and slightly right to the carina. The tumor was clearly defined and not enhanced by contrast media, suggesting that the inside was occupied with high viscosity liquid. That also compressed left atrium and right upper pulmonary vein from its cranial portion (Fig. 3). Magnetic resonance imaging (MRI) revealed a T1- and T2-weighted high intensity partial lobulated cystic lesion under the tracheal bifurcation, which was completely

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Figure 1. A fluorodeoxyglucose F-18 (FDG) positron emission tomography (PET) whole-body scan images showed a FDG-avid lesion in the mid mediastinum.

Figure 2. An ECG at rest showed atrial fibrillation with heart rate at 190 bpm (Fig. 2A). This atrial fibrillation was paroxysmal and occasionally recovered to sinus rhythm (Fig. 2B).

Discussion

Atrial fibrillation is one of the most common cardiac rhythms seen in clinical practice. The initial diagnosis of this case was PAF without organic disease such as valvular, ischemic heart disease and thyroid disorder because there were no abnormalities by routine examination such as chest X ray, TTE and biochemistry. The local physician prescribed flecainide and enalapril, which were partially effective for his symptom.

Cardiovascular manifestations of bronchogenic cysts have rarely been reported. There were 11 case reports of bronchogenic cyst and arrhythmia (4-14). In most reports bronchogenic cyst caused tachyarrhythmia, perhaps the potential mechanisms were cyst compression and irritation to the heart mechanically. A 2-month-old infant had a large bronchogenic cyst, which was intimately associated with the vagus nerve and had caused bradycardia by vagal stimula-
Figure 3. Chest computed tomography showed a solitary, thin-walled, unilocular, and roughly spherical mass just under the carina, which compressed the left atrium and right upper pulmonary vein from the cranial portion.

Figure 4. Magnetic resonance imaging (MRI) showed a T1- and T2-weighted high intensity partial lobulated cystic lesion under the tracheal bifurcation, which was completely separate from the heart and not enhanced by gadolinium contrast media.

tion (7). A 43-year-old man presented with complete atrioventricular block with a cyst located in the right atrium (13) and a 43-year-old woman presented with intermittent type II atrioventricular block with a cyst located within the interatrial septum (14), which might have involved the conduction system.

The 5 reported cases with PAF due to bronchogenic cyst are shown in Table 1. The time from the onset of symptoms to accurate diagnosis tended to require a long time, from 3 to 24 years. Only 1 of 5 cases could be identified by simple chest X-ray and the other cases needed further examination such as transesophageal echocardiography (TEE) and CT. Suen et al reported that the bronchogenic cysts can be identified on the chest radiograph in about 90% to 95% of cases and those not visible are usually in the subcarinal region (15). The cyst in the present case was adjacent to the atrium and in the subcarinal region, so it could not be diagnosed accurately by simple chest radiograph. The key diagnostic tools for bronchogenic cyst causing PAF were reported as CT and TEE, but not chest radiograph. We could get clues for an accurate diagnosis by FDG-PET imaging. Incidental bronchogenic cyst was reported on FDG-PET for staging lung carcinoma. It also described a focal photon-deficient FDG area in the carinal area (16). Here, FDG may not have accumulated because the cellularity in the cyst was extremely low.

Volpi et al (6), Sick et al (10) and Parambil et al (12) have reported a patient who recovered to sinus rhythm after surgery. Parambil et al (12) reported in detail a patient who had persistent normal sinus rhythm without evidence of asymptomatic PAF by 24-hour Holter monitoring ECG performed at 3-months, 6-months, and 1-year follow-up. These
findings also suggest that the cyst had directly irritated the atrium and pulmonary veins and caused the ectopic foci of PAF.

Complete surgical resection by thoracotomy or thoracoscopy should be recommended for all presumed mediastinal cysts even if up to one-third of patients are asymptomatic at the initial presentation in adults in operable candidates (1).

The possible reasons for this are as follows:

1. An operation can be hazardous when the cyst becomes symptomatic and the majority of adults with asymptomatic bronchogenic cysts eventually develop symptoms during the natural course of the disease (17) and the clinical behavior cannot be predicted (18).

2. A definite diagnosis can be established only on surgical specimen and surgery enables us to rule out malignancy.

3. Recurrence of mediastinal cyst has been reported after incomplete surgical removal (1, 19).

4. There are some reports of neoplasm occurring within these cysts (20, 21).

**Conclusions**

The present case shows that PAF was thought to be due to compression by bronchogenic cyst of the carinal type, which is a rare form of presentation. PAF completely recovered following cyst excision.

**References**