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Case Report

Diagnosis of bronchial artery aneurysm by computed tomography: a case report

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ABSTRACT

Bronchial artery aneurysm is a rare vascular abnormality, with an incidence of <1% based on diagnosis by selective bronchial angiography. It is manifested in various forms, ranging from an incidental finding on radiologic examination to life-threatening hemorrhage resulting from aneurysm rupture. We report a case of a 60-year-old man with a mediastinal bronchial artery aneurysm which was incidentally detected on chest computed tomography.

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Introduction

Bronchial artery aneurysm is a rare vascular abnormality, with an incidence of <1% based on diagnosis by selective bronchial angiography [1]. The first case of bronchial artery aneurysm was reported in a patient with syphilis in 1930 [2,3]. The aneurysm varies in presentation, ranging from an incidental finding on radiologic examination to life-threatening hemorrhage resulting from aneurysm rupture [4]. Bronchial artery aneurysms are classified on the basis of lesion as mediastinal or intrapulmonary aneurysm [5]. However, computed tomography (CT) reports of mediastinal bronchial artery aneurysm are rare. Here, we report a case of a 60-year-old man with a mediastinal bronchial artery aneurysm which was incidentally detected on chest CT images. This report was approved by the Institutional Review Board of our institution.

Case report

A 60-year-old man was visited with suspected pneumonia at another hospital in December 2016. The volume of pleural effusion increased despite administration of antibiotics. Investigative CT findings revealed right pleural effusion with diffuse pleural enhancement (Fig. 1A). The right pleural effusion was removed by thoracentesis. Cytologic findings of the pleural effusion revealed the possibility of malignant cells.

The patients were transferred to our hospital for evaluation of pleural effusion and hidden malignancy in January 2017. The blood pressure, heart and respiratory rates, and body temperature at the time of admission were 110/70 mmHg, 70 beats/min, 20 breaths/min, and 36.5°C, respectively. The serum white blood cell and C-reactive protein levels were 6.1×10^3 cells/ μ L and 0.209 mg/dL, respectively. He

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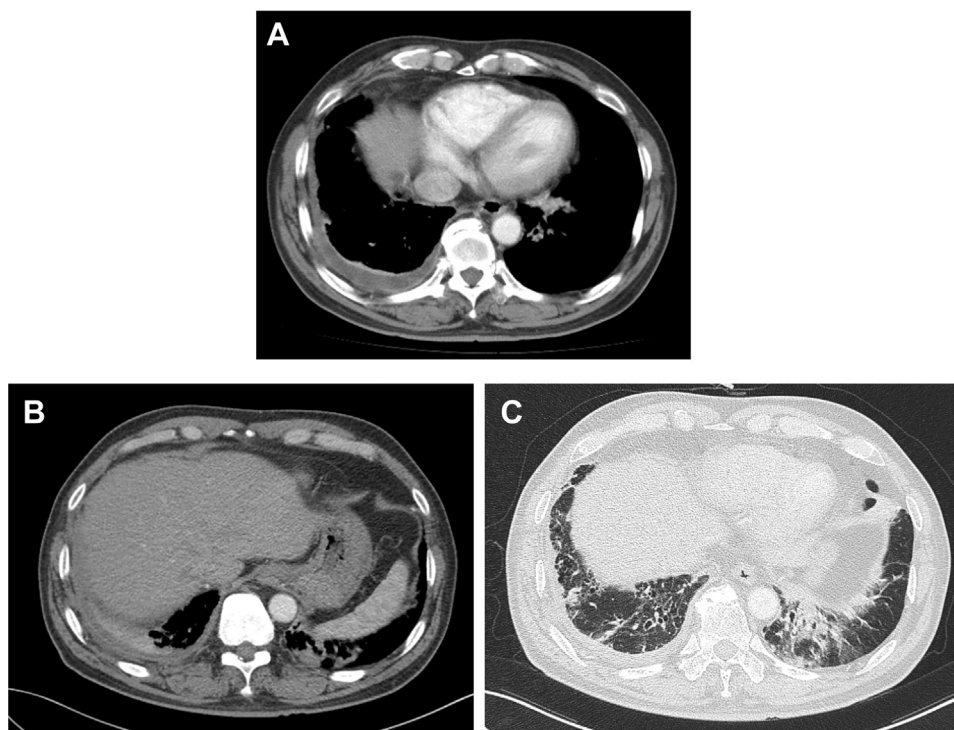


Fig. 1 – (A) Enhanced outside-chest CT image shows a small volume of right pleural effusion with pleural enhancement. (B, C) Follow-up enhanced axial CT findings revealed a decrease in the volume of right pleural effusion relative to the observed in the outside-chest CT image. (C) Bronchiectasis with bronchial wall thickening and mucoid impaction are observed in the both lower lobes. There were peribronchial and subpleural consolidations in the both lower lobes.

had a history of treatment with recurrent pneumonia and suspected diffuse panbronchiolitis. The patient was evaluated by CT with a contrast agent. Relative to the previous CT findings, contrast-enhanced CT findings revealed a decrease in the volume of the right pleural effusion (Fig. 1B). Axial and coronal reformatted images show tubular and varicoid bronchiectasis with bronchial wall thickening and mucous plugging involving the right middle lobe, left lingula, and both lower lobes that can be seen in cases of recurrent infection (Fig. 1C). In addition, a well-defined and round-shaped 11-mm lesion was observed adjacent to the descending aorta at the level of the left bronchus. The lesion exhibited a similar degree of contrast enhancement as the aorta, which indicated that the lesion was vascular (Fig. 2A). The contrast-enhancing lesion connected to the left bronchial artery on axial imaging (Fig. 2B). On evaluation of multiplanar reformatted (Fig. 3) and volume-rendered images (Fig. 4), the contrast-enhanced lesion was revealed to be a focal aneurysmal dilatation at the origin of the left bronchial artery. Both bronchial arteries were hypertrophied. On comparison of the preset CT findings with those acquired in September 2009 (Fig. 2C), the bronchial artery aneurysm was found to have slightly increased in size from 8 to 11 mm. Further evaluation by positron emission tomography–CT and endoscopy revealed no hidden malignancies. Because of his medical conditions, the patient was not administered any immediate surgical or nonsurgical intervention.

Discussion

Bronchial artery aneurysm is a rare disease [1]. Although the etiology of bronchial artery aneurysm is unclear, congenital and acquired medical conditions have been reported to be associated with this disease [1,5]. Most cases of this disease have been reported among patients with pulmonary tuberculosis, atypical mycobacterial infection, bronchiectasis, pulmonary sequestration and agenesis, sarcoidosis, silicosis, vasculitis, trauma, atherosclerosis, and arteriovenous malformation [5]. Our case had a history of recurrent infection and suspected panbronchiolitis, resulting in bronchiectasis and consequent bronchial artery aneurysm formation. The common causative factors of bronchial artery aneurysm among all these conditions include increased blood flow and pressure in the bronchial arteries, and focal weakening or injury to the vessel wall [1–3]. Bronchial artery aneurysms are classified on the basis of location as mediastinal or intrapulmonary lesions [5]. Most lesions are located in the mediastinum, adjacent to the descending aorta and esophagus where the bronchial arteries arise from the aorta [6].

The symptomology of bronchial artery aneurysm varies according to the location of the lesion. Hemoptysis is the most frequent symptom of intrapulmonary bronchial artery aneurysms. Mediastinal bronchial artery aneurysms might manifest as hemothorax, hemomediastinum, superior vena cava

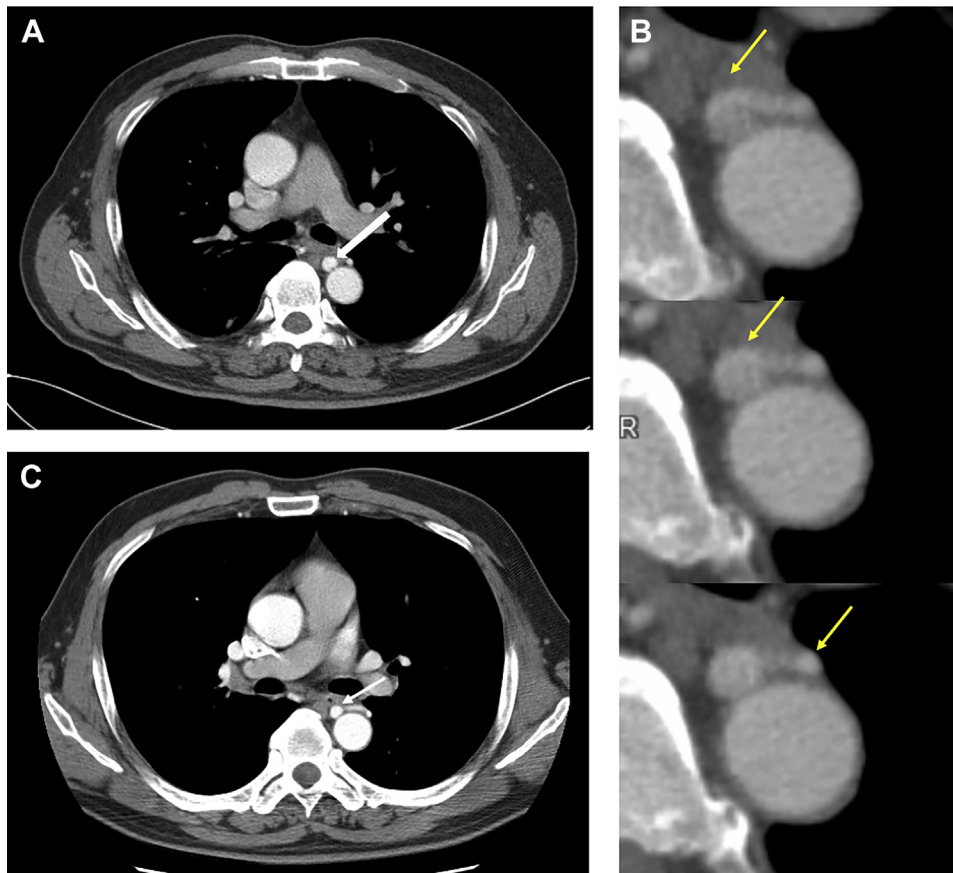


Fig. 2 – (A) CT findings acquired in January 2017 reveal an enhancing lesion (11 mm, thick white arrow) adjacent to the descent to the descending aorta at the level of the left bronchus, and slight increase in the size of this lesion (from 8 to 11 mm; thick white arrow). The lesion shows similar degree of contrast enhancement as the aorta. **(B)** The contrast-enhancing lesion connected to left bronchial artery (yellow arrows) and enhancing lesion was considered as bronchial artery aneurysm. **(C)** Enhanced axial CT image acquired in September 2009 showed a well-defined 8-mm lesion (thin white arrow).

obstruction, dysphagia, Horner syndrome, and hematemesis; these symptoms are associated with extrinsic compression or rupture of the aneurysm into contiguous anatomic structures

[1,3,7,8]. Bronchial artery aneurysms occasionally remain asymptomatic until rupture [3]. They might appear simply as mediastinal masses [6] and might be incidentally detected on

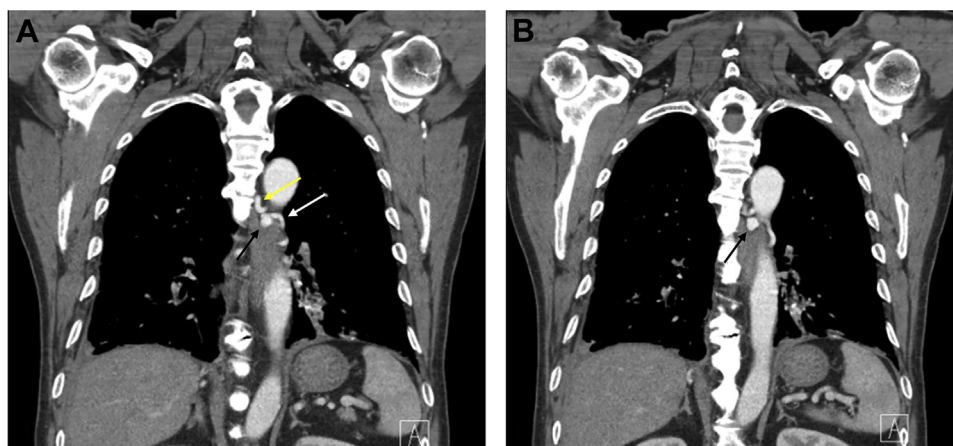


Fig. 3 – (A, B) Coronal reformatted image demonstrates an enhancing lesion (black arrows) connected to the left bronchial artery (thin white arrow), indicating a bronchial artery aneurysm. Right bronchial artery was hypertrophied (yellow arrow).

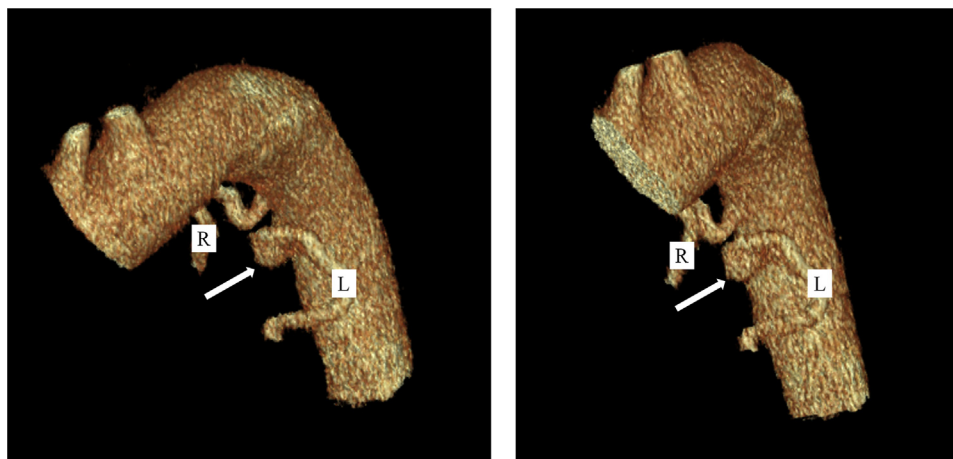


Fig. 4 – Volume rendering image clearly demonstrates the left bronchial artery aneurysm (white arrows). Both bronchial arteries were hypertrophied.

radiologic examination [3], as was the case in the present patient. Bronchial artery aneurysm rupture can lead to life-threatening hemorrhage and hemodynamic compromise [3,4]. Kalangos et al [9] summarized 12 cases of mediastinal bronchial artery aneurysms with a mean size of 12.8 mm (range, 5–30 mm) [7,9]. The causes of bronchial artery aneurysm rupture are not well known, and the risk of rupture is not dependent on lesion size [4,9]. The most typical CT finding of mediastinal bronchial artery aneurysm is the enhancement of lesions to a similar degree as the aorta [3]. Differential diagnosis includes saccular aneurysm of descending aorta and bronchial arteriovenous malformation [3,10]. In our case, there was no direct communication between bronchial artery and pulmonary artery or vein. In addition, there was a slight gap between the lesion and the descending aorta, and the lesion connected to the left bronchial artery. Therefore, we considered this lesion to be compatible with bronchial artery aneurysm.

Bronchial artery aneurysm rupture might mimic the symptoms of aortic dissection or aortic rupture with subsequent shock. CT angiography is an appropriate examination for diagnosis of bronchial artery aneurysm and exclusion of aortic dissection and rupture. Contrast-enhanced CT may be a useful modality for diagnosis and differential diagnosis of bronchial artery aneurysm because contrast-enhanced CT is more frequently performed in routine practice [4,9]. Diagnosis of bronchial artery aneurysm by contrast-enhanced CT and post-processing techniques has rarely been reported. In the present case, we were able to diagnose a bronchial artery aneurysm in asymptomatic patients by contrast-enhanced CT and 3-dimensional reconstruction. In addition, a previous study had reported magnetic resonance imaging as being a useful noninvasive modality for diagnosis of bronchial artery aneurysms [11].

Given that bronchial artery aneurysms of any size are prone to rupture, which can be life-threatening, the lesions should be treated regardless of size of symptoms [4,7]. There are 2 treatment approaches for bronchial artery aneurysms—surgical and nonsurgical interventions. The surgical approach, which involves ligation or resection of lesions, is an effective method for treatment of ruptured bronchial artery aneurysms. The

nonsurgical approach, which involves transbronchial artery embolization or aorta stent-graft placement, is being increasingly used for treatment of bronchial artery aneurysms [7,12]. Treatment of bronchial artery aneurysm depends on the hemodynamic state of the patients. If patient is stable, endovascular treatment is accepted as the first-line treatment of bronchial artery aneurysm because of the hospital stay and its noninvasive nature. Surgery should be considered in patients with contraindications to endovascular treatment, such as when the patient is allergic to the contrast medium or mediastinal artery is involved [8,13]. Recanalization by collateral arteries that connected with patent efferent bronchial arteries may cause recurrent aneurysm in patients with transbronchial artery embolization. Recurrent bronchial artery aneurysm should be treated with repeated embolization or surgical resection [1,4]. In the present case, although the aneurysm had increased in size by 3 mm over a span of 7 years, it had not ruptured. However, because of the medical condition of the patient, no immediate surgical or nonsurgical intervention was administered.

In conclusion, bronchial artery aneurysm is a rare disease, which could result in life-threatening hemorrhage. Contrast-enhanced CT is a useful modality for noninvasive diagnosis of bronchial artery aneurysms.

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