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Surgical management of pulmonary arteriovenous fistula in a female patient

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ABSTRACT

INTRODUCTION: We herein describe a rare case of a pulmonary arteriovenous fistula (PAVF).
PRESENTATION OF CASE: The patient was a 20-year-old asymptomatic female, admitted to our hospital because of an abnormal shadow in the right lung field on chest X-rays. Chest computed tomography (CT) revealed two nodules with well-defined margins in the right upper and lower lobes. Contrast-enhanced three-dimensional CT (3D-CT) revealed two enhanced solitary lung nodules which were connected with linear structures suggestive of feeding arteries and drainage veins, respectively. Based on these findings, we made a preoperative diagnosis of PAVF. We performed partial pulmonary resection of the right upper and lower lobes by video-assisted thoracoscopic surgery (VATS). The histopathological findings revealed small and medium-sized vascular channels composed of arteries with mild and irregularly thickened muscle walls and juxtaposed or seemingly anastomosing dilated veins. Based on these findings, a diagnosis of PAVF was confirmed. The patient had an uneventful postoperative course.
DISCUSSION: A PAVF is often associated with various complications, and pregnancy could be a risk factor for these complications because of the increase in the shunt fraction. Females with known PAVF should be maximally treated prior to becoming pregnant as complications of PAVF during pregnancy can have devastating consequences. Therefore, we thought that treatment should be recommended in this case in the event she might later choose to become pregnant.
CONCLUSION: Surgical resection using VATS for a limited number of ipsilateral isolated pulmonary arteriovenous fistulae is recommended due to its safety, low recurrence and low mortality rate.

1. Introduction

Most pulmonary arteriovenous fistulae have no symptoms and are detected as an abnormal shadow on the chest radiograph. A definitive diagnosis is made by means of pulmonary arteriography or three-dimensional computed tomography (3D-CT) angiography, although hypervascular lesions can mimic pulmonary arteriovenous fistulae.

A pulmonary arteriovenous fistula (PAVF) is often associated with various complications, and pregnancy could be a risk factor for these complications because of the increase in the shunt fraction. We describe a rare case of a young female with a PAVF treated with video-assisted thoracic surgery (VATS).

2. Case report

The patient was a 20-year-old asymptomatic female. During a physical examination, no cyanosis, clubbing of the fingers nor skin telangiectasia was detected. Her pulse oximetry oxygen saturation (SpO2) was 98% on room air. No significant murmur was audible in the right mammary area. Abnormal shadows in the right upper

Abbreviations: 3D-CT, three-dimensional computed tomography; PAVF, pulmonary arteriovenous fistula; VATS, video-assisted thoracoscopic surgery; CT, computed tomography.

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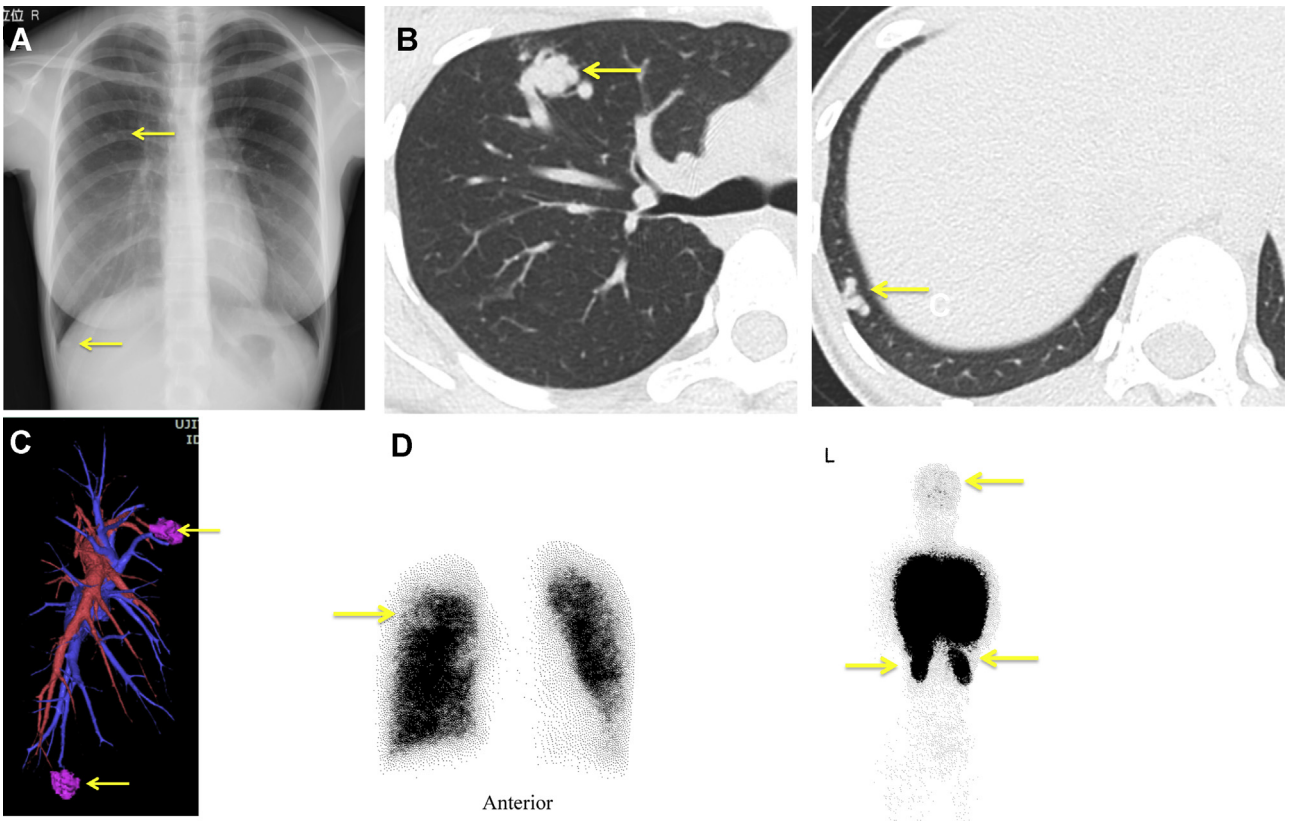

Fig. 1. (A) Chest X-rays showed abnormal shadows in the right upper and lower lung field. (B) Chest computed tomography revealed a 20 × 14 mm nodule with well-defined margins and smooth contours in the right upper lobe, and a 15 × 10 mm nodule with a similar form in the right lower lobe. (C) Contrast-enhanced three-dimensional CT revealed two enhanced lung nodules which were connected with linear structures suggestive of feeding arteries and drainage veins, respectively. (D) A right-to-left shunt fraction was 15.3% and abnormal uptake was detected in the brain and bilateral kidneys by lung perfusion scintigraphy.

and lower lung fields were detected on chest X-rays (Fig. 1A). Chest computed tomography (CT) revealed a 20 × 14 mm nodule with well-defined margins and smooth contours in the right upper lobe, and a 15 × 10 mm nodule with a similar form in the right lower lobe (Fig. 1B). Contrast-enhanced 3D-CT revealed two enhanced lung nodules which were connected with linear structures suggestive of feeding arteries and drainage veins, respectively (Fig. 1C). Although an arterial blood gas analysis showed no hypoxemia, with an arterial oxygen pressure (PaO2) of 80 mm Hg on room air, the right-to-left shunt fraction was 15.3% and abnormal uptake was detected in the brain and bilateral kidneys by the lung perfusion scintigraphy (Fig. 1D). We thus made a preoperative diagnosis of PAVF. We performed partial pulmonary resection by VATS.

During the procedure, the patient was placed in the left lateral decubitus position at the first time, and the right lung was deflated. A videothoracoscope was inserted through the seventh intercostal space. Intraoperatively, pulmonary nodules were not palpable in the right upper and lower lobes, and there was no significant bruit. A nodule, which was non-tortuous in shape and covered with the visceral pleura, was detected in the right lower lobe (Fig. 2), although neither a feeding artery nor drainage vein was obvious intraoperatively. Mild telangiectasis on the visceral pleura was also observed (Fig. 2). The location of the other nodule in the right upper lobe was predicted based on the blood vessel. The histopathological findings of hematoxylin–eosin stained sections revealed small and medium-sized vascular channels composed of arteries with mild and irregularly thickened muscle walls, and juxtaposed or seemingly anastomosing dilated veins (Fig. 3). Based on these findings, a diagnosis of pulmonary arteriovenous fistula was confirmed. It was difficult to preoperatively diagnose the PAVF, because hypervascular lesions such as those due to inflammatory changes, can also present as strongly enhanced nodules after injection of contrast material. Abnormal uptake in the brain and bilateral kidneys by the lung perfusion scintigraphy suggested a right-to-left shunt. The patient had an uneventful postoperative course and was discharged seven days after the operation.

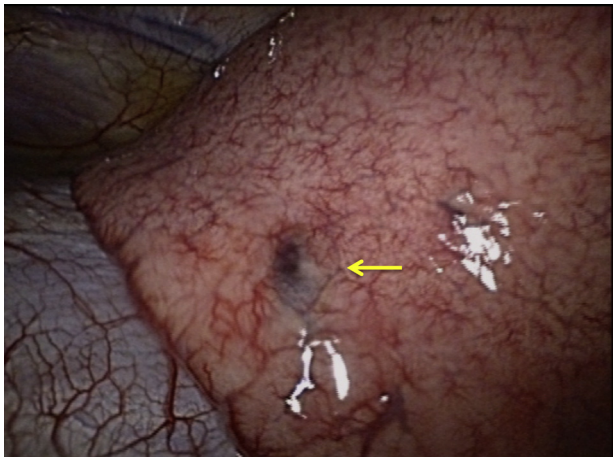

Fig. 2. A nodule, which was non-tortuous in shape and covered with the visceral pleura, was detected in the right lower lobe. Mild telangiectasis on the visceral pleura was also observed.