Case Report

Hemoptysis due to Pulmonary Arteriovenous Malformation after Coil Embolization during Long-Term Follow-Up

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A 28-year-old man with a history of coil embolization of multiple pulmonary arteriovenous malformations presented with hemoptysis 11 years after initial embolization. A cavity lesion in the left upper lobe, which was accompanied by deformed coils and ground-glass opacity, was considered responsible for hemoptysis. Embolization of the bronchial artery was performed.

1. Introduction

Pulmonary arteriovenous malformations (PAVMs) are abnormal communications between the pulmonary arteries and veins without any intervening capillary beds, which cause hypoxemia, cyanosis, and dyspnea [1]. They are often associated with an autosomal dominant genetic disorder, hereditary hemorrhagic telangiectasia (HHT) [1–5]. This disorder is characterized by recurrent epistaxis, mucocutaneous telangiectasia, and visceral vascular involvement, including arteriovenous communications that may develop in any organ, especially the lung [1, 2]. PAVMs include no capillary filters, and as a result, small blood clots, bacteria, and occasional air or clotted blood within intravenous tubing can pass directly through a PAVM and into systemic circulation. Thus, neurologic complications, such as transient ischemic attack, stroke, and brain abscess, can occur. Therefore, treatment for PAVMs is justified even in asymptomatic cases. Previously, PAVM had been treated with pneumonectomy. From the late 1970s transcatheter embolization has been widely performed and is now considered the first-line therapy for this condition [6]. Thus, complications related to embolization are an important issue.

We herein report an occurrence of an unusual complication related to embolization of PAVM.

2. Case Report

A 28-year-old man presented with hemoptysis. Eleven years earlier, he was diagnosed with HHT because he had multiple PAVMs, epistaxis, and positive family history. The genetic test for HHT was not performed, because it was not covered with medical insurance in our country. He underwent coil embolization of multiple PAVMs. During the follow-up, chest radiograph images showed that the coils in the left upper lobe became deformed (Figure 1). To evaluate the reason for hemoptysis, he underwent chest CT (Figure 2). We observed a cavity lesion at the left upper lobe, which also showed deformed coils and ground-glass opacity around the cavity lesion. In a previous CT, which was performed 10 years earlier, the cavity lesion and ground-glass opacity were not observed. We suspected that the ground-glass opacity represented the cause of the bleeding.

Thereafter, angiography of both the left bronchial artery and pulmonary artery was performed to confirm which
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Chest radiograph images during follow-up showed that the coils used in embolization of the pulmonary arteriovenous malformation of the left upper lobe became deformed. (a) 11 years before, (b) 4 years before, (c) 2 years before, (d) latest examination.

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CT shows a cavity lesion including the coils in the left upper lobe (arrow) and ground-glass opacity around the cavity lesion (arrow heads). We suspected that the ground-glass opacity might represent the source of the bleeding. (b) CT performed 10 years earlier shows no cavity lesions.

Figure 1: Chest radiograph images during follow-up showed that the coils used in embolization of the pulmonary arteriovenous malformation of the left upper lobe became deformed. (a) 11 years before, (b) 4 years before, (c) 2 years before, (d) latest examination.

Figure 2: (a) CT shows a cavity lesion including the coils in the left upper lobe (arrow) and ground-glass opacity around the cavity lesion (arrow heads). We suspected that the ground-glass opacity might represent the source of the bleeding. (b) CT performed 10 years earlier shows no cavity lesions.
vessel was responsible for the symptoms (Figure 3). An 8-Fr. sheath was introduced into the right femoral vein, and a 4-Fr. sheath was placed at the right femoral artery. An 8-Fr. catheter (Optimo; Tokai Medical Products, Kasugai, Japan) was introduced into the pulmonary artery. Pulmonary angiography showed no extravasation or hypervascular inflammatory parenchymal lesions around the coils of the cavity lesion. Then, a 4-Fr. catheter (Broncho; Medikit, Tokyo, Japan) was placed into the left bronchial artery. Angiography showed hypervascular inflammatory parenchymal lesions around the coils of the cavity lesion. We concluded that the left bronchial artery was the vessel most likely to be responsible for the hemoptysis symptoms. The microcatheter was advanced to the target branch of the left bronchial artery. Angiography showed hypervascular inflammatory parenchymal lesions around the coils of the cavity lesion (arrows) and bronchial–pulmonary artery shunt (arrow head). Embolization was performed using gelatin sponge. (d) Angiography of the left bronchial artery showed a complete occlusion of the target branch.

Figure 3: (a) Coils of the cavity lesion were confirmed (arrow), but pulmonary angiography showed no extravasation or hypervascular inflammatory parenchymal lesions. (b) Angiography of the left bronchial artery showed hypervascular inflammatory parenchymal lesions around the coils of the cavity lesion (arrows). Thus, the left bronchial artery was the vessel most likely to be responsible for the hemoptysis symptoms. (c) The microcatheter was advanced to the target branch of the left bronchial artery. Angiography showed hypervascular inflammatory parenchymal lesions around the coils of the cavity lesion (arrows) and bronchial–pulmonary artery shunt (arrow head). Embolization was performed using gelatin sponge. (d) Angiography of the left bronchial artery showed a complete occlusion of the target branch.

3. Discussion

Technical complications during embolization of PAVM have been reported to include PAVM perforation, migration of an embolic device into systemic circulation, air embolism, and coil reflux to the other pulmonary artery [4, 7]. PAVM perforation can cause hemoptysis or hemothorax. In addition, the migration of an embolic device into the systemic circulation and air embolism can induce cerebral ischemia. Therefore, a
4. Conclusions

Hemoptysis can occur due to chronic inflammation around the placed coils, and a careful follow-up is necessary.

Conflicts of Interest

The authors do not have any conflicts of interest and financial disclosures or acknowledgments.

References


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