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Hemoptysis as a Presenting Symptom of a Distal Aortic Arch Aneurysm and Its Repair via an L-Shaped Thoracotomy

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ABSTRACT

A 61-year-old man presented with multiple episodes of hemoptysis. A computed tomography scan revealed a 70-mm saccular aneurysm of the distal aortic arch. During a surgical repair via a midline sternotomy and a left thoracotomy, a saccular aneurysm was found to protrude into the lung, which had chronically healed. The patient underwent replacement of the Dacron graft, and he recovered well postoperatively. This experience prompted us to report the findings of this unique case.

INTRODUCTION

Hemoptysis is a relatively uncommon symptom that can be attributed to many causes, including infection, malignancy, or trauma. Most often, patients who have thoracic aortic aneurysms present with pain secondary to expansion or erosion of the aneurysm into adjacent structures. Less commonly, such patients present with hemoptysis secondary to invasion into the tracheobronchial tree, which is often fatal. We recently cared for a gentleman who did not complain of any pain, but he did demonstrate hemoptysis. The intraoperative finding was that an aneurysm had invaded lung parenchyma. This experience prompted us to report the findings of this case.

CASE REPORT

A 61-year-old man was referred to our hospital for surgical repair of a distal aortic arch aneurysm. He had visited his family physician for multiple episodes of hemoptysis lasting for 2 weeks. His illness was diagnosed to be a distal aortic saccular true aneurysm on the basis of a computed tomography scan, but the causal link between the hemoptysis and the aneurysm was not clear. The family physician referred the man to our

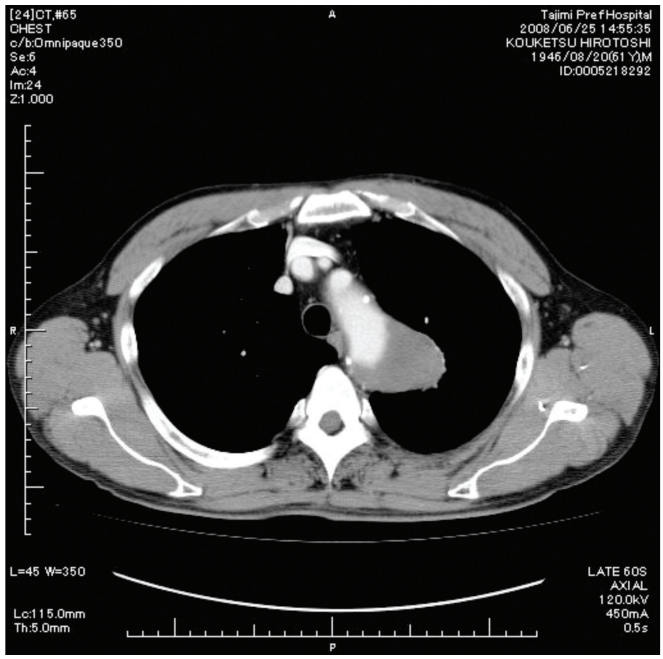

Figure 1. A computed tomography scan showing a huge saccular aneurysm at the distal aortic arch.

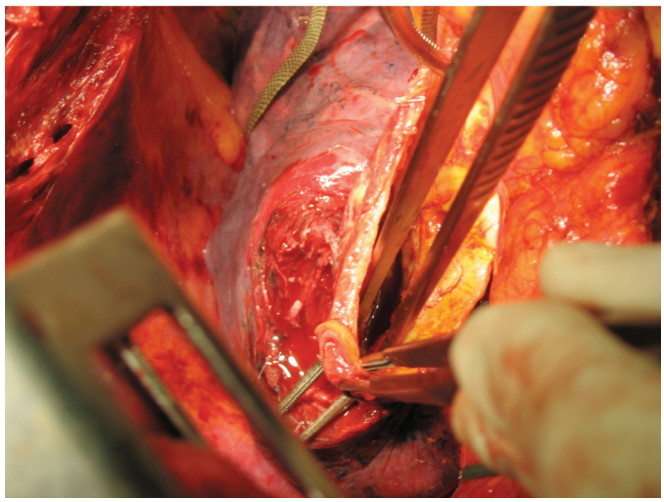

Figure 2. Intraoperative picture showing a rupture hole of the aneurysm.

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department for a further workup and possible surgery. He had a medical history of untreated hypertension and diabetes mellitus. He complained of hemoptysis every day for the previous 2 weeks, and he said he thought it might have been due to his working environment, namely, mine dust. He denied any chest or back pain. A computed tomography scan showed a 70-mm saccular aneurysm at the distal arch (Figure 1). To exclude the possibility of any lung malignancy, we performed a full bronchoscopy examination of the patient; however, we observed no lung lesions. He was therefore scheduled for a surgical repair of the aneurysm.

Under moderate hypothermic cardiopulmonary bypass, the patient underwent a resection of the aneurysm. Through a midline sternotomy with the addition of a left thoracotomy at the third intercostal space, the ascending aorta was first cannulated for the arterial inflow, and then the right atrial appendage was cannulated for the venous outflow. The aneurysm tightly adhered to the upper lung lobe, and we resected the aneurysm while leaving the aortic wall, which showed erosion into the pulmonary parenchyma, attached to the lung lobe (Figure 2). We cross-clamped the distal arch after making sure that the quality of the aorta was good according to an epiaortic echocardiography evaluation. We replaced the aneurysm with a 24-mm Gelweave graft (Vascutek, Terumo, Japan). The aortic cross-clamp time was 106 minutes. The cardiopulmonary bypass time was 233 minutes. The operation time was 458 minutes. The patient recovered from the surgery well, and he was discharged and returned home 2 weeks after the surgery.

COMMENT

Hemoptysis has numerous causes; most cases are associated with a chronic infectious process. Bronchitis is the most common infectious cause, followed by active tuberculosis and bronchiectasis, respectively. Hemoptysis occurs in more than 50% of all lung cancer cases, and it can be due to direct invasion of bronchial arteries, tumor manipulation during diagnostic bronchoscopy, or distal ischemia and avascular necrosis. Direct aortic invasion by an infectious process has also been described as a cause of hemoptysis [Johnston 1989].

An aortic aneurysm that ruptures the lung parenchyma or causes erosion in a bronchus can usually lead to acute and massive hemoptysis, which constitutes a surgical emergency. Such bleeding is frequently massive, but sometimes it can be relatively light [Coblentz 1988]. In this case, we found that a weakened aortic wall had ruptured into the lung parenchyma. The rupture was contained by the lung, which thus prevented the patient from developing massive hemoptysis.

Controversy remains regarding the optimal approach and exposure of a distal aortic arch aneurysm. The clamshell approach has been the preferred choice [Doss 2003]. We have been using a partial sternotomy with the addition of a left thoracotomy (L-shape incision) to obtain good exposure from the ascending aorta to the descending aorta [Maekawa 2007]. In the present case, the surgical exposure was sufficient to observe and manipulate the deep aortic arch aneurysm.

In summary, we report the findings of a case demonstrating a silent rupture of a distal arch aortic aneurysm into the lung parenchyma in which the patient presented with hemoptysis. Surgery was successfully performed with an upper part sternotomy and an anterolateral thoracotomy, which provided us with a very wide and good exposure.

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