CASE REPORT

Primary pulmonary adenocarcinoma presenting as a spontaneous massive hemothorax

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Summary

We present an unusual case of massive hemothorax caused by a primary pulmonary adenocarcinoma (PPA), in which hemostasis was secured with interventional radiology. A 76-year-old man was hospitalized for a large left pleural effusion. After drainage, about 3000 ml blood was obtained, and subsequent computed tomography of the chest showed a mass shadow on the left lower lobe. He then developed shock and was treated with selective embolization of the bronchial artery. A diagnosis of PPA was made based on pleural fluid cytology. He recovered and received chemotherapy, but died of brain metastases 7 months later. © 2007 Elsevier Ltd. All rights reserved.

Introduction

Lung cancers develop in various ways. Pleural involvement is common and the resulting pleural effusion is often bloody. While almost half of bloody pleural effusions originate from malignant neoplasms, only 11% of neoplastic effusions are bloody.\textsuperscript{1} Typically, neoplastic effusions collect gradually in the pleural cavity, so the effusion is commonly large when detected. A massive hemothorax originating from primary pulmonary adenocarcinoma (PPA) is rare. Here, we report an unusual case of massive hemothorax caused by PPA, which was treated with selective embolization of the bronchial artery to achieve hemostasis. To our knowledge, this is the first report of PPA causing a massive hemothorax in which hemostasis was secured with transcatheter arterial embolization (TAE).

Case

A 76-year-old man was referred to our hospital with a large left pleural effusion. Following a 1-month history of dyspnea...
in January 2005, the patient was diagnosed with common cold and received medical attention. He had no history of cardiac disease or chest trauma. On physical examination, his breath sounds were reduced significantly over the left chest. His heart rate was 122 beats per minute, blood pressure 131/76 mmHg, body temperature 36.5°C, and oxygen saturation 90% on room air. The laboratory data included a white blood count of 18,300 mm⁻³, hemoglobin 7.7 g/dL, platelets 261,000 mm⁻³, and C-reactive protein (CRP) 8.1 mg/dL. We observed no elevated tumor markers, such as carcinoembryonic antigen, squamous cell carcinoma antigen, or neuron-specific enolase.

The chest X-ray (Figure 1A) and computed tomography (CT) showed a massive pleural effusion of the left thorax, which shifted the mediastinum to the right. Aspiration of the effusion revealed fresh whole blood, with a hemoglobin of 7.1 g/dL. A chest tube was inserted, which drained 2700 mL of blood. The subsequent CT demonstrated a mass shadow at the periphery of the left lower lobe (Figure 1B). After drainage, his condition deteriorated gradually, and his blood pressure fell to 90/54 mmHg. The patient received five units of packed red blood cells, and his condition improved temporarily. We performed emergency arterial embolotherapy after no signs of bleeding cessation were observed. No remarkable extravasation of contrast material was noted, but arteriography of the bronchial arteries showed contrast in the vicinity of the tumor. Therefore, the arteries feeding the tumor were embolized. The next day, the chest tube drainage became blood-tinged and serous, and decreased gradually. The tube was removed on post-admission day (PAD) 10. After TAE, iodine-containing fluid was detected in the drainage, which suggested that the contrast material reached a point of bleeding. Pleural fluid cytologic examination yielded a diagnosis of poorly differentiated adenocarcinoma. The tumor cells had clear cytoplasm and crescent-shaped nuclei with atypia (Papanicolaou’s stain) (Figure 2A) and intracellular vacuole formation (Alcian blue stain) (Figure 2B). Whole body CT and bone scintigram did not find any extrathoracic lesion, and we confirmed the diagnosis as PPA, clinically staged as T4N0M0 (stage IIIB).

Beginning on PAD 17, the patient received four courses of chemotherapy consisting of paclitaxel (180 mg on day 1 and 140 mg on day 14) and carboplatin (225 mg on day 1). The tumor reduction rate was 41%. In July 2005, the patient suddenly developed insomnia and dementia, and magnetic resonance imaging (MRI) demonstrated multiple brain metastases. The patient was rehospitalized due to restlessness. Total brain irradiation was conducted, but discontinued because of disease progression. He deteriorated
gradually and died of multiple brain and liver metastases 7 months after the onset of the hemothorax.

**Discussion**

In addition to extrathoracic tumors invading the thorax, massive hemothorax can result from lung tumors. The reported causes include pulmonary angiosarcoma and blastoma, and trophoblastic tumor metastatic to the lung. All these tumors are very rare and have the potential to bleed as a consequence of abortive vessel formation, necrosis in many areas, and abundant blood vessels. How could a massive hemothorax result due to bleeding from a PPA into the pleural space? A search of the PubMed data bank disclosed one paper under the keywords massive hemothorax and primary lung cancer. This report stated that a 58-year-old man with a massive left hemothorax underwent an emergency thoracotomy after draining a total of 2 L, but died the next day. At surgery, active bleeding occurred from a tumor that ruptured into the pleural cavity. The bleeding also needed to be controlled in our patient. We thought that a thoracotomy would impose a heavy burden on the patient, which is why we opted for TAE. Although the point of hemorrhage was not identified clearly, we believe that the massive hemothorax originated from the peripheral mass in the left lower lung, since the pleural effusion contained contrast material after TAE and the pleural fluid essentially stopped draining completely.

We believe that the PPA, which usually does not have the potential to bleed, was the origin of the massive hemothorax, and that TAE is helpful for controlling the bleeding from a PPA in a critical situation.

**Conflict of interest statement**

The authors indicated no potential conflicts of interest.

**References**