Pseudoaneurysm of the Subclavian Artery due to *Xanthomonas* Pneumonia in a Patient with Acute Myeloid Leukemia: Its Rupture Treated by Transcatheter Coil Embolization

Yasushi Ohkoshi, Haruhiko Ninomiya, Harumi Y. Mukai, Naomi Mochizuki, Mitsuo Hori, Toshiro Nagasawa, Tomoaki Jikuya* and Yukihisa Saida**

A 52-year-old male with acute myeloid leukemia developed pseudoaneurysm of the subclavian artery. Pneumonia due to *Xanthomonas maltophilia*, which was multi-drug resistant, progressed to a lung abscess even under administration of antibiotics. This lung infection contiguous to the left carotid and subclavian arteries was suggested to have caused the pseudoaneurysm of the subclavian artery. The rupture of the aneurysm by penetration to the trachea amounted to about 1,000 ml of bleeding; fortunately the bleeding ceased spontaneously. Nonetheless, an emergency transcatheter coil embolization prevented re-bleeding. Endovascular treatment should be considered especially for aneurysms which develop in patients with underlying diseases.

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**Key words:** lung abscess, *Xanthomonas maltophilia*, endovascular treatment

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**Introduction**

Aneurysms of the subclavian artery are relatively rare compared to other peripheral aneurysms (1, 2). The major causes of the aneurysms are atherosclerosis, trauma, poststenotic dilatation associated with thoracic outlet syndrome, mycotic aneurysm, and Ehlers-Danlos syndrome (1, 3). Mycotic aneurysms are generally caused by infections of normal or arteriosclerotic vessels related to bacteremia or originally related to bacterial endocarditis (4). Pseudoaneurysms, a consequence of direct invasion to the vessels from a contiguous and extravascular site of infection, are distinguishable from mycotic aneurysms (4); and this kind of infectious aneurysm is rare (5). Here, we report a case with acute myeloid leukemia (AML) complicated by pneumonia-associated pseudoaneurysm of the subclavian artery noted by its rupture after remission induction therapy against AML. The rupture of pseudoaneurysms is often fatal. We discuss the usefulness of transcatheter arterial embolization (TAE) for aneurysms which develop in patients with underlying diseases.

**Case Report**

A 52-year-old male was admitted to Tsukuba University Hospital on September 18, 1997, with fever, general fatigue and body weight loss. He was diagnosed as having AML classified as M2 according to the diagnostic criteria proposed by the FAB Cooperative Group (6). The karyotypic abnormality, 45, X, -Y, t (8;21) (q22;q22) in 20/20, was compatible with the diagnosis of AML-M2. Even before receiving chemotherapy, he was complicated by pneumonia on both lower lung fields. He started to receive remission induction therapy comprised of daunorubicin, cytosine arabinoside, mitoxantrone and etoposide from September 19, 1997, as well as antibiotics, cefozopran and isepamicin, for pneumonia due to *Xanthomonas maltophilia*. He obtained a complete remission (CR) on the 39th chemotherapeutic day (October 27, 1997) with no karyotypic abnormalities revealed in bone marrow cells (46, XY, in 20/20). Despite administration of broad-spectrum antibiotics, the pneumonia was exacerbated in the aplastic phase of the bone marrow and lung abscess developed in the bilateral apical and basal lung fields (Fig. 1). *Xanthomonas maltophilia* revealed in the multiple cultures of sputa was resistant even to imipenem, aminoglycosides, tetracyclines and new quinolones. The progression of respiratory failure required respiratory management with a ventilator from November 25 and tracheostomy was performed on December 1, 1997. On December 26, 1997, an abrupt and massive hemoptysis was seen. An emer-
Figure 1. CT of the chest (November 21, 1997). CT revealed bilateral abscess formation in the apex (Panel A) and right lower lung field (Panel B). It is noteworthy that the abscess in the left lung was contiguous to the left carotid and subclavian arteries (Panel A).

gency laryngoscopy revealed massive coagulum on the left-side wall of the trachea. After blood expectoration up to about 1,000 ml, the bleeding ceased spontaneously. An emergency angiography performed on the day revealed a pseudoaneurysm of the left subclavian artery, 4x3 cm in size (Fig. 2A), but no bleeding from the aneurysm was demonstrated by the angiography at that time. A TAE using metallic coils was performed as follows: first, blood flow to the aneurysm was intercepted at the proximal site of the subclavian artery by a balloon catheter inserted from the femoral artery; then the left vertebral artery and the aneurysm of subclavian artery were embolized using metallic coils inserted from the left axillary artery (Fig. 2B). Blood flow to the distal site of the left subclavian and axillary artery via collateral arteries was shown by angiography performed immediately after the TAE.

No further hemoptysis was seen after the TAE and the lung abscess improved gradually by the recovery of hematopoiesis under CR of AML, while Xanthomonas maltophilia was shown to be multi-drug resistant. During the follow-up of the patient under no further chemotherapy against AML, he complained of muscle weakness, coldness and pain in the left arm. There was muscle atrophy due to paralysis of the median and ulnar nerve after the TAE, probably related to the decreased blood flow. AML relapsed on June 4, 1998, and the patient died of multiple brain infarctions soon after remission-induction therapy against relapsed AML (Fig. 3). No autopsy was permitted by the family.

Discussion

Hemoptysis related to subclavian artery aneurysms is usually due to an erosion of infected aneurysms into lung parenchyma (5). The rupture of aneurysms to the tracheal wall as a cause of hemoptysis, as suggested in the present case however, is uncommon. This kind of hemoptysis is often fatal; emergency care and adequate treatment is necessary without delay. Surgical resection is generally chosen for mycotic aneurysm,
Figure 3. Multiple brain infarctions demonstrated by CT. Axial CT scan with contrast enhancement performed for the disturbed consciousness revealed multiple brain infarctions, at the level of the splenium (Panel A) and at the level above the corpus callosum (Panel B).

however, the poor general condition of our patient prompted us to try TAE first. The TAE successfully prevented re-bleeding and allowed him to be free from the symptoms related to the aneurysm for 6 months until his death, although he complained of symptoms probably due to decreased blood flow to the left arm. Because the aneurysm and the lung abscess distributed below the first rib and there was no phlegmon or subcutaneous hemorrhage in the supraclavicular fossa, the injury of the left brachial plexus was less possible as the cause of the central and ulnar nerve paralysis.

In the present case, it seemed that the aneurysm developed due to the prolonged abscess-forming inflammation of the lung due to Xanthomonas maltophilia surrounding the subclavian artery. Xanthomonas maltophilia has recently emerged as a nosocomial pathogen in those who are immunocompromised such as patients with cancer, recipients of transplantation, ventilated patients, or patients in the intensive care unit (7–10). Xanthomonas maltophilia has been demonstrated as a multi-drug-resistant strain and can cause bacteremia, pneumonia, and urinary tract infection (7). The multi-drug resistance of Xanthomonas maltophilia exacerbated pneumonia to an abscess in our patient, while we treated the infection intensively with antibiotics. The abrupt hemoptysis was suggested to be caused by a rupture of the pseudoaneurysm and its penetration to the trachea. The tracheal wall injury, due to mechanical compression of the endotracheal tube and inflammation which spread from the lung abscess, might have contributed to the rupture and penetration.

He died of multiple brain infarctions soon after a remission-induction therapy against relapsed AML. The infarctions were seen predominantly in the left hemisphere. The left vertebral artery had been embolized five months before and little blood flow had remained. Because atherosclerotic lesions in the left common carotid artery had been evident at the time of angiography before TAE (Fig. 2B), it was most plausible that the thrombi of the carotid artery caused shower embolism. TAE is one of the useful and effective methods for the treatment of pseudoaneurysms, and is recommended especially for patients with underlying diseases.

References
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