

## A Rare Complication: Aorta-Cutaneous Fistula with Abundant Bleeding

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### ABSTRACT

Pseudoaneurysm and aorto-cutaneous fistula following surgical procedures of the aorta are rare complications with potentially catastrophic results that require rapid diagnosis and urgent surgical treatment. We performed a successful life-saving operation using hypothermic circulatory arrest with femoral artery and vein cannulation. The patient had undergone open heart surgery in our clinic twice, and there was active and abundant bleeding from aorta-cutaneous fistula that occurred 5 years after the last surgery.

### INTRODUCTION

After open heart surgeries, mediastinal pseudoaneurysm and aorta-cutaneous fistula are rarely seen but fatal complications with catastrophic outcomes, which require immediate intervention [Auriemma 2006; Kim 2008]. The predisposing factors are infection, aortic dissection, connective tissue disorders, chronic hypertension, and aorta calcifications [Auriemma 2006]. As in other aortic aneurysms, pseudoaneurysms may cause life threatening complications such as rupture, formation of fistula, compression of adjacent organs, thrombosis, and embolism [Mohammadi 2005; Auriemma 2006; Jung 2011]. Aorto-cutaneous fistula is a less frequent complication and a fatal situation that also requires rapid diagnosis and aggressive surgical treatment [Kim 2008].

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### CASE PRESENTATION

A 67-year old male patient who underwent coronary bypass operation 5 years before and whose ascending aorta was replaced with a dacron tube graft due to DeBakey Type-II aortic dissection 6 months after the initial operation was discharged with recovery. The patient, who had no complaints until the last year, was followed up due to continuous leakage from a skin defect of 2 x 2 cm size over the sternal scar tissue. The patient, who had a history of frequent use of antibiotherapy, was operated on, and a sternum wire was evacuated, the area was debrided and closed, and no relapse of infection was observed on the wound site and blood cultures. The patient, whose wound healed and has had no complaints until the last 3 months, applied to our clinic with pulsatile mass with a size of 10 x 10 cm. Following sternal bleeding, the patient developed cardiac arrest and was resuscitated (Figure 1). Following stabilization of hemodynamic parameters, the patient was rapidly taken to the computerized tomography and angiography laboratories. A mediastinal pseudoaneurysm associated with saphenous vein graft and proximal anastomosis was clearly shown with contrast-enhanced thoracic computerized tomography (Figure 2). Coronary angiography was also performed to clarify the situation of the coronary arteries and the probability of an endovascular intervention, which showed the patent saphenous vein graft and a suspicious portion inclined underneath the sternum from the distal portion of the supracoronary aorta graft; however, pseudoaneurysm could not be shown (Figure 2). Due to recurrent bleeding from the skin and hemodynamic deterioration of the patient in the angiography theater, the patient was taken to emergent operation with finger compression on the fistulized section. Cardiopulmonary bypass was established with femoral artery and vein cannulation and 20°C of systemic hypothermia, and the fistula tract was seen as soon as the skin over the sternum was opened (Figure 1). To control bleeding, finger compression was applied continuously onto the fistula tract (Figure 1). After median sternotomy, mediastinal pseudoaneurysm was opened; hematoma and coagulum were removed, and aorta graft was explored. There was no sign of infection, and no proliferation was determined in postoperative cultures. Cardiopulmonary bypass was continued by protection of the myocardium with application of cross-clamping and

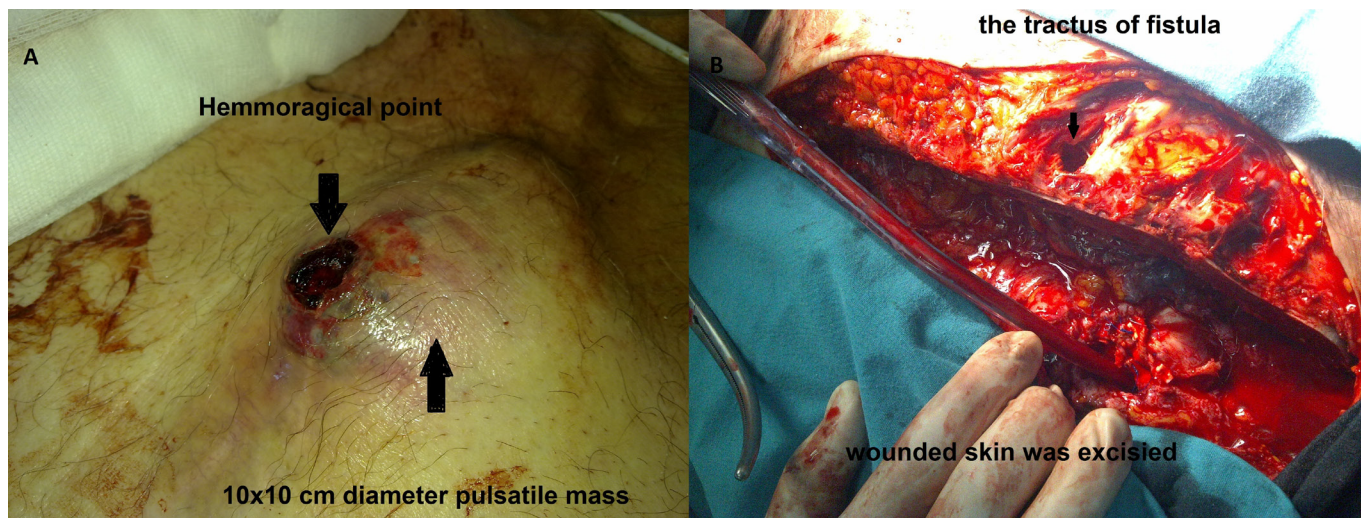


Figure 1. A, Preoperative image; point of hemorrhage; pulsatile mass. B, Intraoperative image; the fistula tract.

administration of antegrade cold blood cardioplegia into the aortic graft. Aneurysm was seen to arise from the suture line of the proximal anastomosis of the saphenous vein graft and was repaired primarily. The patient had no proliferation in his peroperative cultures and was extubated on the third postoperative day, and his medical inotropic agents were stopped. The patient developed right sided hemiplegia and renal failure postoperatively. The hemiplegia recovered on the fifth postoperative day, but hemodialysis still continues.

### DISCUSSION

Inevitably, reoperation for mediastinal pseudoaneurysm has a high degree of mortality. Pseudoaneurysms may be detected between 2 to 10 months following surgery.

Pseudoaneurysms show rare symptoms such as fever, thoracic wall disorders, effects of compression, intermittent retrosternal pain, or embolism [Auriemma 2006; Kim 2008]. They usually occur on graft suture lines and aortotomy and cannulation sites, and infection is an important reason [Arsan 2004; Mohammadi 2005; Auriemma 2006; Jung 2011]. Graft infection or mediastinitis, Marfan syndrome, previous Stanford Type-A acute aortic dissection, trauma, and tuberculosis have been defined as predisposing factors [Bachet 2007]. In our patient, no infection was detected, but pseudoaneurysm occurred on the anastomosis line of the saphenous vein graft placed on the aortic graft.

Aorto-cutaneous fistula is a very rare complication with a high degree of mortality and may develop as a complication of pseudoaneurysm. It requires rapid diagnosis and urgent

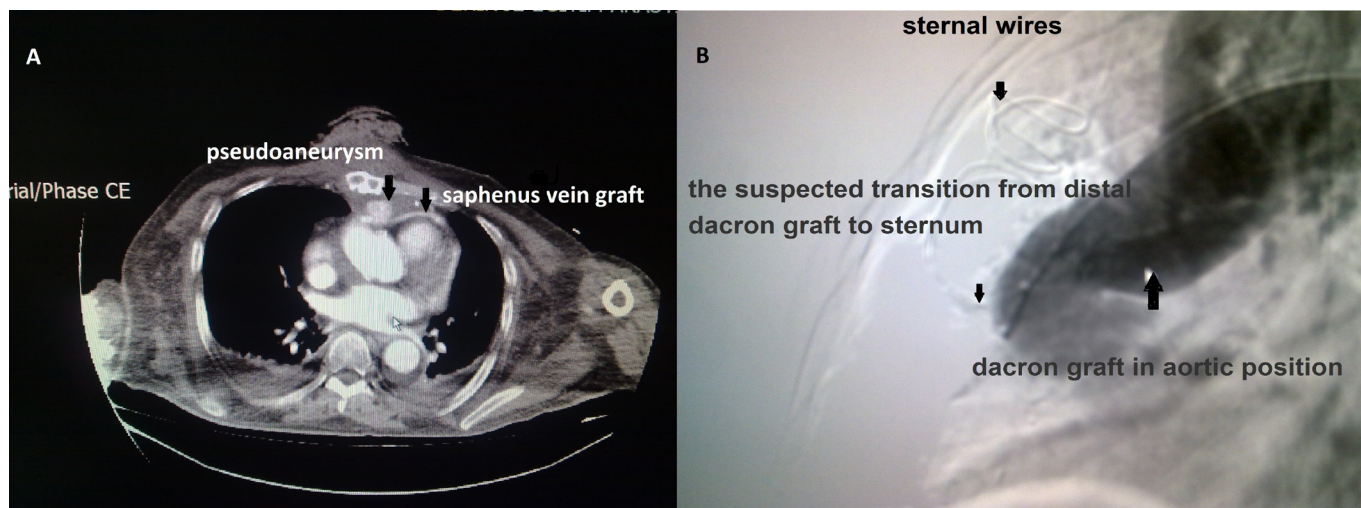


Figure 2. A, Preoperative computed tomography image. B, Preoperative angiographic image.

surgical treatment [Arsan 2004; Kim 2008]. If the patient's hemodynamic condition permits, especially in the presence of an aorto-cutaneous fistula, urgent diagnosis and necessary intervention should be made. Computerized tomography is very important for early diagnosis and treatment [Auriemma 2006; Jung 2011]. As with our patient, pseudoaneurysm was not detectable with transthoracic echocardiography and angiography; however, it was clearly shown by contrast-enhanced tomographic study.

Like our case, direct suture repair may be sufficient if the pseudoaneurysm has a small passage [Olearchyk 1998; Kim 2008]. In conditions of infection, total or partial resection of the graft may be required [Arsan 2004; Mohammadi 2005; Kim 2008].

In active mediastinitis situations of high mortality, endovascular intervention is also a treatment option in suitable patients [Chapot 2002]. For our patient, our first treatment option of choice was endovascular intervention because of his high degree of mortality as third time open heart surgery patient and his unwillingness; however, the patient was taken to operation emergently due to recurrence of active bleeding and hemodynamic deterioration in the angiography laboratory.

In such patients, it is very important to protect the brain and systemic organs prior to sternotomy because opening the pseudoaneurysm may cause fatal bleeding intraoperatively. Therefore, systemic perfusion should be provided by femoral or axillary cannulation prior to sternotomy. Selective carotid cannulation for brain protection is also recommended because of a possible prolonged period of cardiopulmonary bypass and risks of air embolism and long-term cardiac fibrillation [Mohammadi 2005; Auriemma 2006; Bachet 2007]. In our patient, femoral artery and vein cannulation were performed during continuous finger compression prior to sternotomy to prevent fatal intraoperative bleeding. Although the duration of cardiopulmonary bypass was short, hemiplegia developed in our patient postoperatively, which might result from air embolism or insufficient brain protection. Selective carotid cannulation is recommended as a safer method [Mohammadi 2005; Bachet 2007].

As a result, recurrent skin infection and fistulas, despite intensive antibiotherapy and debridement on sternum incision after open heart surgeries, usually depend on chronic osteomyelitis or sternal wire reactions. As in our patient, aorta-cutaneous fistula and mediastinal pseudoaneurysm should be kept in mind for patients with similar symptoms. What makes our case interesting is the fact that the patient had undergone open heart surgery twice before and applied to our clinic with active bleeding on the sternum after development of pseudoaneurysm on the saphenous anastomosis line over the dacron graft without an evidence of infection and fistulization to the skin 5 years following the final surgery.

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