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Case Conference

A Tale of Three Surgeries: Management of a Massive Recurrent Mycotic Aortic Pseudoaneurysm

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ASCENDING AORTIC pseudoaneurysms are rare complications of cardiac surgery that present with variable timing and often occur at sites of cannulation, aortotomy, or anastomoses from previous grafting or repair.[1] Historically reported only in small case series, they complicate fewer than 0.5% of cardiac surgical cases.[2] Surgical approach and perioperative management can be particularly challenging when the pseudoaneurysm is large; infected; or has significant mass effect on the airway, right heart, or pulmonary vasculature. Anesthetic management of these patients necessitates significant planning and communication between the surgical and anesthesia teams to ensure patient safety. The ideal approach for surgical repair is debated in the setting of mediastinitis or infection, further complicating surgical planning. In some cases, endovascular surgery may be indicated to exclude the pseudoaneurysm as a bridge to definitive surgical repair or in lieu of traditional surgical repair in high-risk patients. Transesophageal echocardiography (TEE) is an important component of intraoperative management.

Case Report[*]

A 55-year-old female 8 months after coronary artery bypass grafting (CABG) presented with persistent left ear pain radiating to the neck and swelling and pain at the site of her sternotomy incision. She was started on antibiotics for presumed incisional cellulitis. Computed tomography angiography demonstrated a 4.5 × 3.2 cm aortic pseudoaneurysm (Fig 1) and mediastinitis; the origin was suspected to be the previous aortic cannulation site. Notably, her initial CABG procedure was complicated by methicillin-resistant *Staphylococcus aureus* sternal infection and mediastinitis, which required multiple courses of antibiotics and hyperbaric oxygen therapy.

At the time of the first attempted repair, the patient denied experiencing orthopnea or symptoms of intrathoracic tracheal obstruction, and imaging did not indicate tracheal compression by the pseudoaneurysm. As such, her airway was secured with a standard intravenous induction and direct laryngoscopy without complication. Because this was a high-risk surgery with an expected long cardiopulmonary bypass (CPB) duration, a pulmonary artery catheter (PAC) was placed without difficulty for intraoperative and postoperative monitoring.

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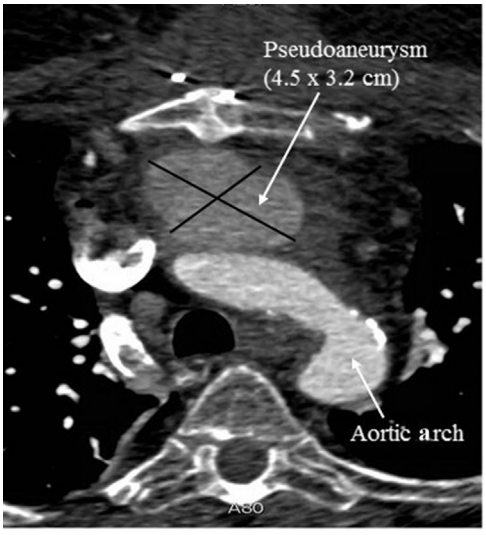

Fig 1. Preoperative computed tomography angiogram demonstrating a 4.5 × 3.2 cm aortic pseudoaneurysm effacing the right lateral wall of the main pulmonary artery and with presternal and periaortic fluid collections consistent with mediastinitis.

Intraoperative TEE subsequently confirmed a large pseudoaneurysm in the proximal ascending aorta with flow from the aorta into the pseudoaneurysmal sac (Fig 2) and compression of the main pulmonary artery (PA) (Fig 3). PAC readings demonstrated right ventricular (RV) systolic pressures to be greater than the PA systolic pressures, suggestive of functional pulmonic stenosis (PS). Consistent with the suspicion for functional PS, precipitous hypotension occurred when the patient's legs were raised during surgical preparation, suggesting intolerance of an acute, drastic increase in preload to the RV. The hypotension resolved after her legs were lowered and the administration of a modest dose of phenylephrine (Baxter, Deerfield, IL).

Given the proximity of the pseudoaneurysm to the sternum, femoral arterial and venous CPB cannulas were placed, CPB was initiated, and the patient's body temperature was cooled to 20°C for potential circulatory arrest before sternotomy. The pseudoaneurysm was breached with sternotomy, but bleeding was contained with digital control. Inflamed mediastinal tissue and the pseudoaneurysm were debrided. With the patient under brief circulatory arrest, the pseudoaneurysm neck was closed with 2 pledgeted sutures. The location of the pseudoaneurysm neck corresponded with the presumed location of a previous aortic cannulation site from her CABG. Aortic grafting was considered but deferred given the risk of recurrent infection. After rewarming, the patient was weaned successfully and separated from CPB. Total CPB time was 170 minutes. Circulatory arrest time was 1 minute. The sternum was left open with a wound vacuum–assisted closing (VAC) device in place with the intention to return to the operating room for a repeat mediastinal washout and debridement before definitive sternal closure in order to minimize her risk of wound dehiscence and recurrent mediastinitis. She returned to the operating room on postoperative day (POD) 1 for delayed sternal closure and her airway was extubated on POD 2. The patient had an uneventful postoperative course, was discharged on POD 9, and completed 6 weeks of intravenous (IV) antibiotics.

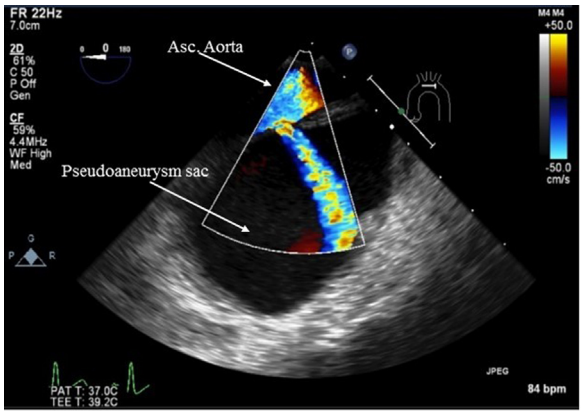

Fig 2. Midesophageal ascending aorta long-axis view with color-flow Doppler. Flow is visualized from the ascending aorta into the pseudoaneurysm sac.

Three months later, the patient returned to the emergency department with wound dehiscence, fevers, and hemoptysis. She was found to be in septic shock with methicillin-resistant *S. aureus* bacteremia. Computed tomography angiography revealed a 9.2 × 8.7 cm recurrent pseudoaneurysm, mediastinitis, and sternal osteitis. Preoperative TEE was negative for endocarditis and confirmed the presence of a large, recurrent aortic pseudoaneurysm with flow from the aorta to the pseudoaneurysm sac.

Given the large size and clinical concern for rupture, vascular surgery was consulted to assist in isolation and control of the pseudoaneurysm before definitive surgical repair. Options considered included thoracic endovascular aortic repair, endovascular plug, or septal occlusion device placement. Thoracic endovascular aortic repair would have been ideal; however, the patient's aortic diameter and distances between the coronary vessels and the innominate artery were too large and short, respectively, for available endovascular devices. Even though investigational devices are available at the authors' institution for use, the time required for approval

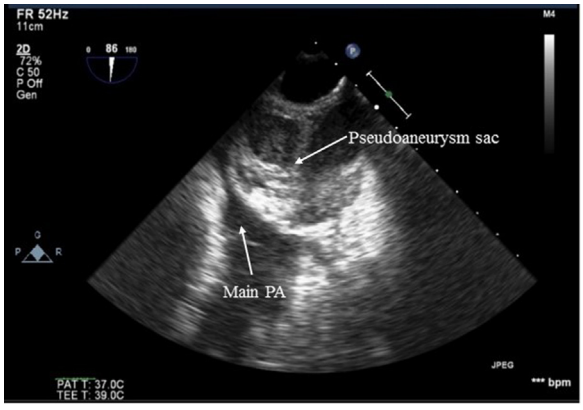

Fig 3. Upper esophageal aortic arch short-axis view. The pseudoaneurysm sac can be seen compressing the main PA just proximal to the pulmonic valve. PA, pulmonary artery.

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