

## Case report: Aortic pseudoaneurysm following cardiac catheterization.

*Pseudoaneurisma gigante de aorta ascendente posterior a cateterismo cardiaco: presentación de caso clínico*

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### ABSTRACT

The ascending aortic pseudoaneurysm is a rare complication, it requires urgent surgical resolution due to the imminent life risk. It can occur from trauma, after cardiac surgery or infectious processes. We presented a 52-year-old woman who was admitted from another center due to a lower myocardial infarction. After performing a coronary angiography with apparent clinical good evolution, she presented chest pain and an echocardiographic image of aortic root dissection that required emergency surgery.

**Key Words:** Pseudoaneurysm, Aorta, Myocardial infarction, Rupture.

### RESUMEN

El pseudo aneurisma de aorta ascendente es una complicación rara, que requiere resolución quirúrgica urgente por el inminente riesgo vital que supone, puede ser debida a un trauma, posterior a una cirugía cardiaca o a procesos infecciosos. Presentamos el caso de una paciente de 52 años, que ingresó desde otro centro, con el diagnóstico de infarto miocárdico de cara inferior en evolución. Luego de realizada la cinecoronariografía, con aparente mejoría clínica, presentó un intenso dolor torácico con una imagen ecocardiográfica de aparente disección en raíz aórtica que requirió cirugía de emergencia.

**Palabras Clave:** Pseudoaneurisma, aorta, infarto del miocardio, ruptura.

**INTRODUCTION**

The most common location for a pseudoaneurysm is the ascending aorta, followed by the descending thoracic aorta and aortic arch. A pseudoaneurysm, also known as a false aneurysm, occurs when the intima and media layers of the arterial wall are disrupted, and the adventitia helps contain the vessel wall and the presence of perivascular clots.

The symptoms of aortic rupture, acute aortic valve insufficiency, embolism, or compression of adjacent structures may not be present in all cases of aortic issues. However, if symptoms are present, they may manifest as those conditions. Even though aortic endocarditis is mentioned as a potential cause, it is not shared. In our patient's case, a pseudoaneurysm was discovered in the aortic root during an examination of their angina following catheterization.

**CASE REPORT**

A 52-year-old woman with a history of hypertension presented with angina and ST-segment elevation in the inferior wall. After a cine coronary arteriography procedure, she experienced chest pain again and showed elevated troponin levels and ST-segment elevation. An echocardiogram detected a dissection of the aortic root. She was transferred to our hospital and admitted to the emergency room in cardiogenic shock. Further examination via coronary computed tomography angiography revealed a 4 cm ascending aorta at the aortic root level with a pseudoaneurysm measuring 9.6 cm in diameter (see Figure 1).

During surgery, a tumor was discovered in the para-aortic area that was compressing the right atrium and ventricle, resulting in hemopericardium and severe right ventricular dysfunction.



**Figure 1.** Angiotomography of the thoracic aorta, a large pseudoaneurysm is evident which arises from the aortic root.

After arterial aortic and bicaval venous cannulation, extracorporeal circulation with hypothermia was utilized to help with the surgery. After aortic cross-clamping, myocardial

preservation was achieved through the use of cardioplegia, which was then followed by circulatory arrest for ease of aortic exploration. The surgical team found a pseudoaneurysm in the ascending aorta with a loss of continuity in the supra- and infra-annular aortic wall between the right and non-coronary sinuses, indicating a previous infection that had formed a fistula into the pseudoaneurysm. The team also found severe aortic valve insufficiency and a detached right coronary ostium. The team used continuous 3.0 polypropylene sutures with the sleeve closure technique to close the defect in the aortic wall. The aortic ring was reconstructed. An intra-annular mechanical aortic valve was implanted, and the right coronary ostium was closed. The remaining pseudoaneurysm was closed using biplanar sutures (see Figure 2).

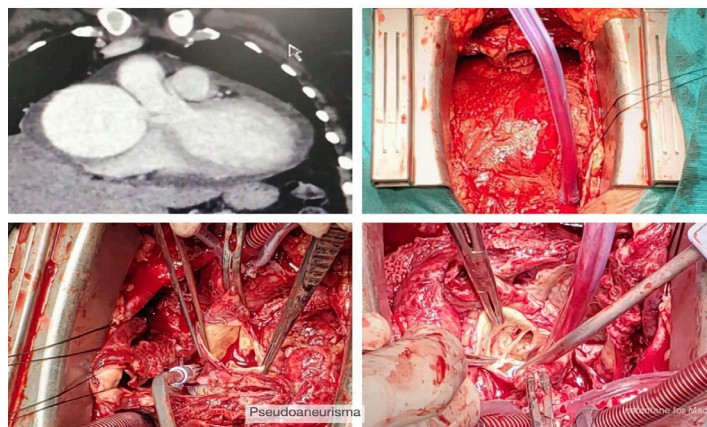
After the surgery, the patient experienced a cardiogenic shock that required high-dose inotropic support and the insertion of an intra-aortic balloon pump. The patient left the ICU on the fourth day. Improvement was seen in echocardiographic and angio-tomographic follow-up appointments. The patient continued progressing and was ultimately discharged 19 days after the surgery with good results.

**DISCUSSION**

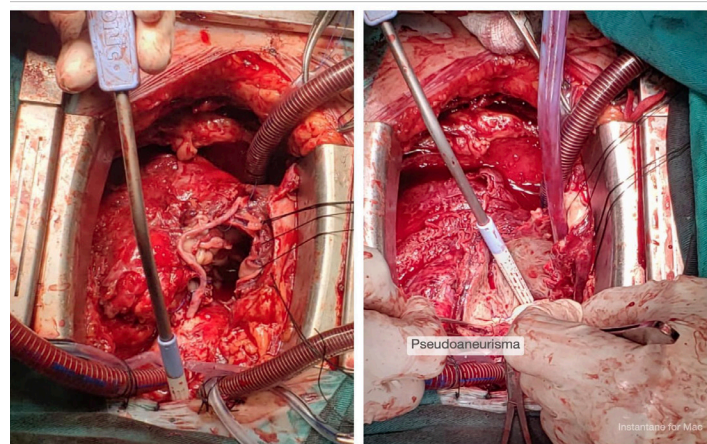
At times, the aorta may enlarge within the surrounding tissues, resulting in an aortic pseudoaneurysm. This can occur abruptly or gradually and is usually seen in the ascending aorta, followed by the aortic arch and descending aorta<sup>1,2</sup>.

Although the exact reasons for this condition are often unclear, many cases are linked to injuries during endovascular and surgical procedures. This group is at a high risk as there is a high likelihood of rupturing dissecting aneurysms of the ascending aorta<sup>3,4</sup>. Our patient was initially presented with what was believed to be a recent-onset condition that later ruptured. However, during surgery, it was discovered to be an old infectious process affecting the aortic annulus and valve, which led to a pseudoaneurysm that fistulized through the non-coronary sinus.

Unfortunately, during cardiac catheterization, trauma to the right ostium and adjacent commissure worsened the preexisting aortic valve insufficiency by detaching the already weakened wall of the ostium. The preoperative percutaneous assessment of a patient with unexplained hemodynamic instability after cine coronary arteriography lacked adequate echocardiographic tracking, which is highly advised<sup>4,5</sup>. Emergency procedures should be considered when the aortic diameter reaches 5.5 cm<sup>6</sup>.



**Figure 2.** Surgical procedure. It can be seen in the coronal reconstruction of a aortic giotomography, a large pseudoaneurysm arising from the aortic root. After sternotomy and pericardiotomy, a large para-aortic tumor was seen that collapsed the right cavities. Upon opening the tumor, we identified a pseudoaneurysm that arises from a defect in the aortic root wall that compromises the aortic annulus and the commissure between the right and non-coronary sinuses.



**Figure 3.** Surgical procedure: Closure of the wall defect, reconstruction of the aortic annulus, implantation of a mechanical aortic valve prosthesis, extraction of the stent in the proximal right coronary artery, closure of the ostium, right aortocoronary bypass with interposition of the saphenous vein and closure of the pseudoaneurysm with sleeve technique.

Recent improvements in imaging technology emphasize the significance of promptly identifying acute aortic syndrome, particularly when taking tomographic images within the relevant clinical setting to facilitate early diagnosis<sup>9</sup>.

Multiple surgical techniques can be used for the treatment of ascending aortic pseudoaneurysms. These techniques include pulmonary autograft, combined root replacement with changes, separate root replacement with the valve and ascending aorta, and valve-sparing surgery<sup>10</sup>. The success of each technique can vary depending on the individual case.

**CONCLUSION**

This particular case is noteworthy because even though developing an ascending aortic pseudoaneurysm is not common - whether it is caused by cine coronary arteriography or a prior infectious process - it can have a range of symptoms from no symptoms to sudden heart attack and unstable blood pressure, even resulting in death. As a result, emergency surgery becomes necessary. This research highlights the importance of closely monitoring patients after cardiac catheterization and conducting thorough preoperative coronary-aortic echocardiographic studies.

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