

Aortic pseudoaneurysm formation following multiple valve replacement

Multipl kapak replasmanı sonrası gelişen aortik psödoanevrizma

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Pseudoaneurysm formation at the ascending aortic suture line is a rare but life-threatening complication. After re-incisions of the ascending aorta as in re-aortic valve replacement, the patient should undergo regular echocardiographic studies and re-reoperation should quickly follow a diagnosis of pseudoaneurysm formation. Interposition of supra-avalvular aortic graft may be the surgical treatment of choice because its long term results are better when compared with those of other surgical techniques. We present a case with a giant pseudoaneurysm following re-aortic valve replacement and its treatment.

Key words: Aortic pseudoaneurysm; aortic valve replacement; graft interposition; redo surgery.

Aneurysms of the ascending aorta are rare entities that may occur after cardiac surgeries and that cause a significant rate of complication, usually developing as a consequence of dehiscent suture lines at the anastomotic sites. Depending on the location and the rapid development of the anastomotic dehiscence, seen especially following redo operations, the patients may be asymptomatic or present with cardiogenic shock.^[1] Additionally, the sternal contact of the aortic aneurysms in redo operations may require specific techniques to safely control bleeding during the sternotomy and the surgical dissection.

Here, we report the case of a patient with a giant pseudoaneurysm located on the ascending aorta following a re-aortic valve replacement (re-AVR) that was surgically repaired with success.

CASE REPORT

A 36-year-old woman was admitted to our institution for the further evaluation of the function of the mechanical SJM (St. Jude Medical, Inc. St. Paul, USA) valves implanted during the aortic and mitral valve replacement

Asendan aort sütür hattından kaynaklanan psödoanevrizma oluşumu çok nadir gözlenen fakat hayatı tehdit eden bir komplikasyondur. Tekrar aort kapak replasmanı sonrası yapılan multipl aort insizyonları sonrası her hasta düzenli olarak ekokardiyografik takip altına alınmalı ve psödoanevrizma tanısı konulunca tekrar ameliyat kararı geciktirilmeden verilmelidir. Tedavi olarak supra-avalvüler aortik interpozisyonu düşünülebilir çünkü uzun dönem sonuçları diğer cerrahi tekniklere göre daha iyidir. Bu olgu sunumunda tekrar aort kapak replasmanı sonrası asendan aortta gelişen büyük bir psödoanevrizma ve tedavisi sunuldu.

Anahtar sözcükler: Aort psödoanevrizması; aort kapak replasmanı; greft interpozisyonu; redo cerrahi.

(MVR) surgery four months ago. The patient presented with a four-month history of nausea, vomiting and dyspnea that began just after the operation. She had undergone a closed mitral valvotomy in 1984, followed by mitral and aortic valve replacements with Hancock bioprostheses (numbers 31 and 21, respectively) eleven years later. In her 3rd and last operation, she had undergone a re-replacement of the AVR and MVR for paravalvular leaks on both the previously replaced valves using St Jude Mechanical prostheses (numbers 21 and 27, respectively).

The general physical examination revealed pallor, jaundice and hepatomegaly. The cardiovascular examination revealed a diastolic murmur in the aortic area and a pansystolic murmur in the mitral area. The hemogram [complete blood count (CBC)] and the peripheral blood smear were consistent with hemolytic anemia. The echocardiogram revealed the mechanical aortic and mitral valves with severe paravalvular leaks together with a 3rd degree tricuspid regurgitation. The cardiac catheterization and angiography revealed paravalvular leaks with moderate aortic and severe mitral and

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tricuspid regurgitation with severe pulmonary arterial hypertension. The patient underwent surgery. The intraoperative findings were consistent with the preoperative diagnosis: Both the aortic and mitral prostheses were in situ and paravalvular leaks were present. The dehiscence margins were fibrous and covered by friable tissue. The detached sutures were removed and the friable material around the leak area was excised. 2-0 pledgeted braided sutures were used to fix the leaks and a DeVega annuloplasty was performed for the tricuspid repair. The patient had an uncomplicated postoperative course and was discharged from the hospital.

Forty days later, she was rehospitalized for dyspnea. The chest film on admission showed a large mass extending into the right hemithorax (Fig. 1). The computerized tomographic scan revealed a pseudoaneurysm of the ascending aorta (Fig. 2).

During the surgery that followed, the common femoral artery and vein were cannulated and extracorporeal circulation was installed with moderate hypothermia. A re-sternotomy was performed and the pseudoaneurysm on the ascending aorta was approached directly. A cross-clamp was placed just proximally to the innominate artery and a 22 mm Dacron graft (Intervascular SA, La Ciotat, Cedex, France) was interpositioned just above the coronary sinuses. The suture of the graft was strengthened with the pericardium. Surgery was completed in the conventional manner. The postoperative period was uneventful, and the patient was discharged from the ICU on the 3rd day. No leak was noted on the control echocardiography.

DISCUSSION

The frequency of paraprosthesis leakages following valve replacements ranges from 2 to 17%.^[2] The

techniques currently used are prosthesis replacement or more conservative procedures with patches or sutures,^[3] as in our case. Recannulation or reincision of the ascending aorta as in a re-AVR, either in a valve dysfunction or a paraprosthesis leakage, may lead to a rare (<1%) but highly morbid complication, namely the pseudoaneurysm of the ascending aorta.^[1] Most of the ascending aorta pseudoaneurysms occur after surgeries on the aortic valve, coronary revascularizations usually at the site of the proximal anastomoses of the grafts, aortotomies, or in the cannulation sites. A great percentage of the ascending aortic pseudoaneurysms result from a mechanical rupture of the aortic sutures.^[4]

Pseudoaneurysm formation can occur over a variable period of time, ranging from the early postoperative period to the late postoperative period.^[5,6] Since most ascending aortic pseudoaneurysms are asymptomatic like the one we presently report, it takes time to diagnose the existence of a pseudoaneurysm, unless it compresses important structures (i.e. coronary arteries, venous or arterial grafts, the superior vena cava) which leads to acute clinical manifestations. The risk of rupture of a pseudoaneurysm should be taken into consideration as an indication for emergency surgery, especially when acute manifestations occur.

The treatment of ascending aorta pseudoaneurysms remains a challenge, especially because of the danger of a rupture during the redo sternotomy or mediastinal dissection, when opening and sliding the sternum, which may cause a surgical catastrophe. Mortality has been reported as 29%-46%,^[2,3] and most of the time it is a consequence of a fatal hemorrhage due to the rupture of the pseudoaneurysm during the surgical maneuvers for its repair.



Fig. 1. Chest film showing large anterior mediastinal mass extending into right hemithorax.

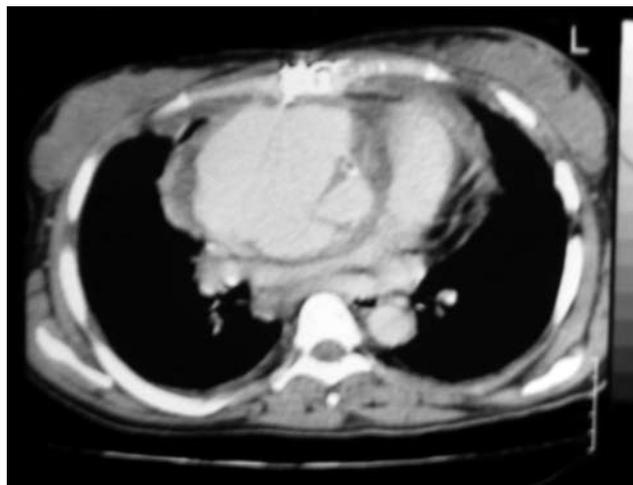


Fig. 2. Computed tomography of the chest showing the pseudoaneurysm of the ascending aorta.

Surgical intervention is the option for the treatment. The surgical techniques are various and an aneurysmectomy with the closure of the aorta with a patch (pericardial^[7,8] or polytetrafluoroethylene^[9]) is a widely used one. Another surgical technique used is the correction of the defect with a reinforced suture on the communication with the ascending aorta after the opening and aspiration of the pseudoaneurysm cavity with or without^[10] a cardiopulmonary bypass. Our surgical technique is a little more radical when compared to the current therapies since we believe that more than two surgical interventions on the aorta remains a very weak tissue around the aortic lumen.

Interposition of the supralvalvular aortic homograft avoids pseudoaneurysm reformation since the direct application of suture or patch on the weakened surface of the aorta to repair the pseudoaneurysm may lead to another detachment. Therefore, we performed a graft interposition to avoid the weakening the tissue, which may predispose the vessel to recurrent pseudoaneurysm formation. Interposition of a supralvalvular aortic homograft in a patient who underwent more than two surgical interventions in the same surgical area decreases the risk of new pseudoaneurysm formation and helps to deliver better long-term results.

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