

An unusual late complication associated with the Bentall procedure: pseudoaneurysm caused by button total detachment and aorto-right atrial fistula

*Bentall işlemi ile ilgili sıradışı bir geç komplikasyon:
Aorto-sağ atrial fistül ve tam buton ayrılmasına neden olan psödoanevrizma*

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Pseudoaneurysm formation with aorto-right atrial fistula due to coronary button total detachment is a late and unusual complication of the Bentall procedure. In this article, we report a 43-year-old male case who underwent the Bentall procedure for bicuspid aortic valve and ascending aortic aneurysm 11 years prior. The connection on the right atrium was primarily sutured and the defect of the ascending aorta was closed with a Dacron graft. The thrombosed right coronary artery ostium was ligated with saphenous vein grafting. Normothermia was achieved and the patient was weaned from the cardiopulmonary bypass uneventfully.

Keywords: Atrial fistula; Bentall procedure; pseudoaneurysm.

Koroner buton tam ayrılmasına bağlı aorto-sağ atriyal fistül ile sonuçlanan psödoanevrizma oluşumu, Bentall işleminin geç ve nadir bir komplikasyonudur. Bu yazıda, 11 yıl önce biküspit aort kapak ve çıkan aort anevrizması nedeniyle Bentall işlemi uygulanmış 43 yaşında erkek bir olgu sunuldu. Sağ atriyumdaki bağlantı primer olarak dikildi ve çıkan aorttaki defekt Dakron greft ile kapatıldı. Tromboze sağ koroner arter ostiyumu safen ven grefti ile ligate edildi. Sonrasında normotermi sağlandı ve hasta kardiyopulmoner baypastan sorunsuz olarak ayrıldı.

Anahtar sözcükler: Atriyal fistül; Bentall işlemi; psödoanevrizma.

Detachment of the coronary button anastomosis after the Bentall procedure is a rare but serious complication following aortic root surgery.^[1] The usual clinical manifestation of this complication is the formation of a pseudoaneurysm around this root. Herein, we report a case of myocardial infarction (MI) and cardiogenic shock due to a giant pseudoaneurysm fistulized into the right atrium after the Bentall procedure that was successfully repaired.

CASE REPORT

A 43-year-old man was referred to our hospital for further examination after complaints of chest pain along with heart and multi-organ failure. The patient had undergone a Bentall operation for an ascending aortic aneurysm and a bicuspid aortic valve 11 years previously. One month prior to his admission, he had

acute onset chest pain that showed signs of inferior MI; however, the patient did not give his permission for coronary angiography to be performed. A few days before this most recent admission, he suffered progressive shortness of breath and severe weakness, and transthoracic echocardiography (TTE) showed right ventricular systolic dysfunction and dilatation. The initial differential diagnosis included MI, which was possibly due to the pathology of the right coronary artery. Computed tomography (CT) was performed, and a giant pseudoaneurysm was discovered that was caused by the button detachment of the right coronary artery. In addition, the pseudoaneurysm was fistulized to the right atrium (Figure 1). Therefore, the patient was transferred to the operating room for cardiogenic shock along with refractory high-dose inotropic support and diuretic therapy.



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In case of the need for emergency cardiopulmonary bypass (CPB), the right femoral artery and femoral vein were cannulated, and the bypass and cooling processes were initiated. The chest was then reopened at a temperature of 30 °C, and the giant pseudoaneurysm (90x75 mm) around the ascending aorta and the area around the right atrium was exposed. We were also aware that the pseudoaneurysm sac could have been injured should an attempt have been made to insert the retrograde cardioplegia cannula. After aortic cross-clamping, the right atrial fistula was externally occluded, the pseudoaneurysm sac was opened, and cardiac arrest was warranted with the aim of selective antegrade blood cardioplegia (warm induction) through the left coronary ostium. After the sac was opened, the thrombus was cleaned, and the right atrium fistula was primarily sutured (Figure 2). The ascending aortic graft anterior defect measured 11 mm in diameter, and the detached and totally thrombosed right coronary ostium could also be observed. The thrombosed right coronary artery ostium was then ligated, and the bypass was completed using the saphenous vein. After the anastomosis, cardioplegia infusion was repeated selectively for both coronary arteries. In addition, we noted that the aortic valve was functioning normally, and the suture line was intact. The defect in the ascending aorta was then closed with a Dacron patch, and the patient was weaned off of CPB with inotropic support. The multi-organ failure process began to improve daily during the postoperative course, and he was eventually discharged on the postoperative 30th day.

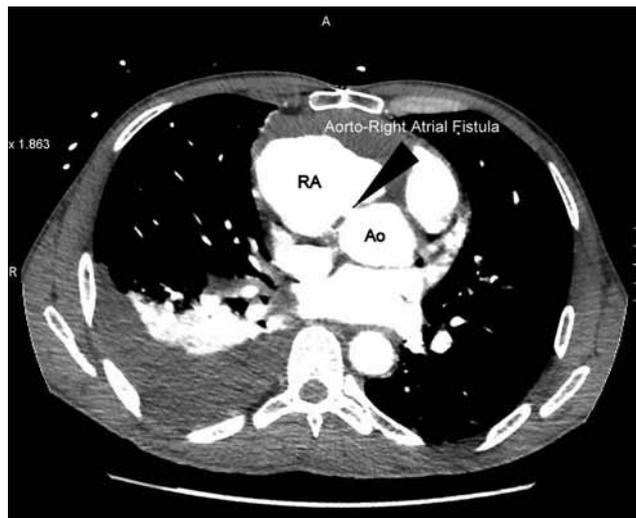


Figure 1. Computed tomography showing a fistula from the ascending aorta to the right atrium. RA: Right atrium; Ao: Aorta (asc.)

DISCUSSION

Detachment of the anastomosis between the coronary ostium and the prosthetic graft is a well-known late complication of the Bentall procedure in which the anastomosis between the native coronary ostium with the aortic wall and the graft is incomplete.^[2] The reoperation rate for coronary ostium detachment has been reported as 10%.^[3]

A pseudoaneurysm of the aorta usually appears following cardiac surgery at several locations in the aorta, particularly at sites where an aortotomy and graft anastomosis were performed because of a diseased aortic wall or a lack of attention paid to the anastomosis. In rare cases, infection adjacent to the aorta or prosthetic valve endocarditis may also cause this condition.^[4,5]

Additional fistulous connections between the pseudoaneurysm of the aorta and a cardiac chamber are an extremely rare complication following root replacement,^[6] with both right coronary artery total detachment/thrombosis and fistula-related left-to-right heart chamber shunts being the primary reasons for the poor clinical condition of patients.

A Cabrol shunt is a technique used for uncontrolled bleeding following aortic root operations. This shunt, which closes spontaneously but rarely stays open, can cause aorto-right atrial fistula. This complication is noted more frequently in patients who had Cabrol shunts and is a rarely seen in those for whom those shunts were not used. Many cases of pseudoaneurysms have been reported, but the symptoms that our patient displayed are

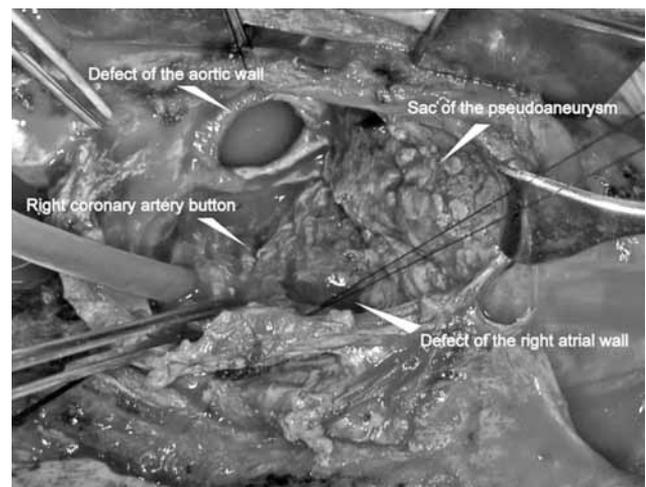


Figure 2. Intraoperative view showing the cardiac defects (arrows).

highly unusual.^[7] However, the case reported by Ömeroğlu et al.^[8] was similar except that their patient experienced no coronary artery thrombosis and a large left-to-right shunt was not used during the procedure. Despite these differences, the clinical signs, such as inferior myocardial ischemia, were very similar, and the condition of our patient was also poor. Due to the total detachment and ostial thrombosis of the right coronary artery, a bypass procedure was planned, and after distal anastomosis, the cardioplegia regimen was repeated.

In conclusion, the formulation of a pseudoaneurysm along with a right atrial fistula due to button total detachment is a late and unusual complication of the Bentall procedure, and patients that are scheduled to undergo this procedure who also have a history of MI must be evaluated with CT to exclude procedure-related complications.

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