

Acute Myocardial Infarction and Severe Prosthetic Dysfunction after Bentall Procedure

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Introduction

Coronary artery anastomotic dehiscence is a rare complication following aortic procedures. A 59-year-old male previously underwent replacement of the ascending aorta and aortic valve because of ascending aorta aneurysm and severe aortic regurgitation. Eight years after the procedure, he presented with acute myocardial infarction. Transesophageal echocardiography (TEE) and coronary angiography revealed coronary artery dehiscence. This finding rarely occurs after a Bentall procedure; however, if it does, it usually occurs in the early postoperative period and is associated with an infectious etiology. In this case, coronary dehiscence presented with myocardial infarction years after the procedure and was first suspected after TEE.

Case Report

A 59-year-old male presented with chest pain and breathlessness of three days' duration, which was rapidly deteriorating. Eight years ago, he had undergone a classical Bentall procedure because of ascending aorta aneurysm and severe aortic regurgitation. He had been treated with beta blockers, angiotensin-converting enzyme inhibitors, statin for systemic arterial hypertension and dyslipidemia control, and oral anticoagulants.

On physical examination, blood pressure was 130/40 mmHg and heart rate was 74 beats/minute. On cardiac auscultation, a mechanical click with a systolic murmur and a high-pitched aortic diastolic murmur at the left sternal border radiating toward the apex was noted. Electrocardiogram revealed left bundle branch block. Chest X-ray showed mild pulmonary congestion, enlarged mediastinum, and aortic mechanical prosthesis. There was an increase in myocardial necrosis markers. A thoracic computed tomography (CT) angiogram was performed to evaluate aortic dissection, which was inconclusive, and a TEE was performed.

Keywords

Myocardial Infarction; coronary ostium dehiscence, Bentall procedure, prosthetic aortic valve dysfunction

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Transthoracic echocardiogram showed moderate left ventricular systolic dysfunction due to anterior and apical akinesia and severe dysfunction of the aortic mechanical prosthesis (severe aortic regurgitation). TEE evaluation evidenced solutions of continuity causing turbulent leakage flow between the Dacron graft on the ascending aorta and the aneurismal native aorta (Figure 1) was also observed. Moreover, severe aortic central and periprosthetic regurgitation was noted.

The oral anticoagulant therapy was withdrawn, and low-molecular-weight heparin (enoxaparine) therapy was initiated. After normalization of the international normalized ratio, coronary angiography was performed and showed no significant lesions on the coronary arteries. On the 12th day after acute myocardial infarction, the patient underwent a Cabrol procedure (Figure 2A); intraoperative findings revealed disconnection of both the left and right coronary ostium from the graft and a periprosthetic leak.

The patient was discharged on the 14th postoperative day without complications.

Discussion

Coronary ostial anastomoses dehiscence is a rare complication following aortic procedures¹⁻⁶. Regarding the etiologies related to this unusual finding, infection of aortocoronary vein graft suture lines is the most common cause of this condition and some cases may be associated with early postoperative *Staphylococcus aureus* superficial wound infection. In this case, the patient presented with late clinical features several years after the surgical procedure; and the anatomopathological examination^{7,8} revealed no signs of infection in the aorta specimen and Dacron prosthesis (Figure 2B).

Dehiscence of the coronary ostial anastomoses may also occur more frequently in patients with connective tissue diseases or other genetically defined aortopathies like Marfan syndrome. In these patients, recurrence of life-threatening cardiovascular manifestations is not uncommon. Other aspects related to dehiscence of the coronary graft concern to technical details during the Bentall procedure like increased bleeding or difficulties of hemostasis, limiting the reestablishment of coronary flow, a crucial aim of the composite graft-valve procedures like Bentall De Bono technique.

In this case, the patient had an unremarkable evolution after the Bentall procedure. Subclinical manifestations of early infection after the first procedure may have passed unnoticed and may have been associated with periprosthetic

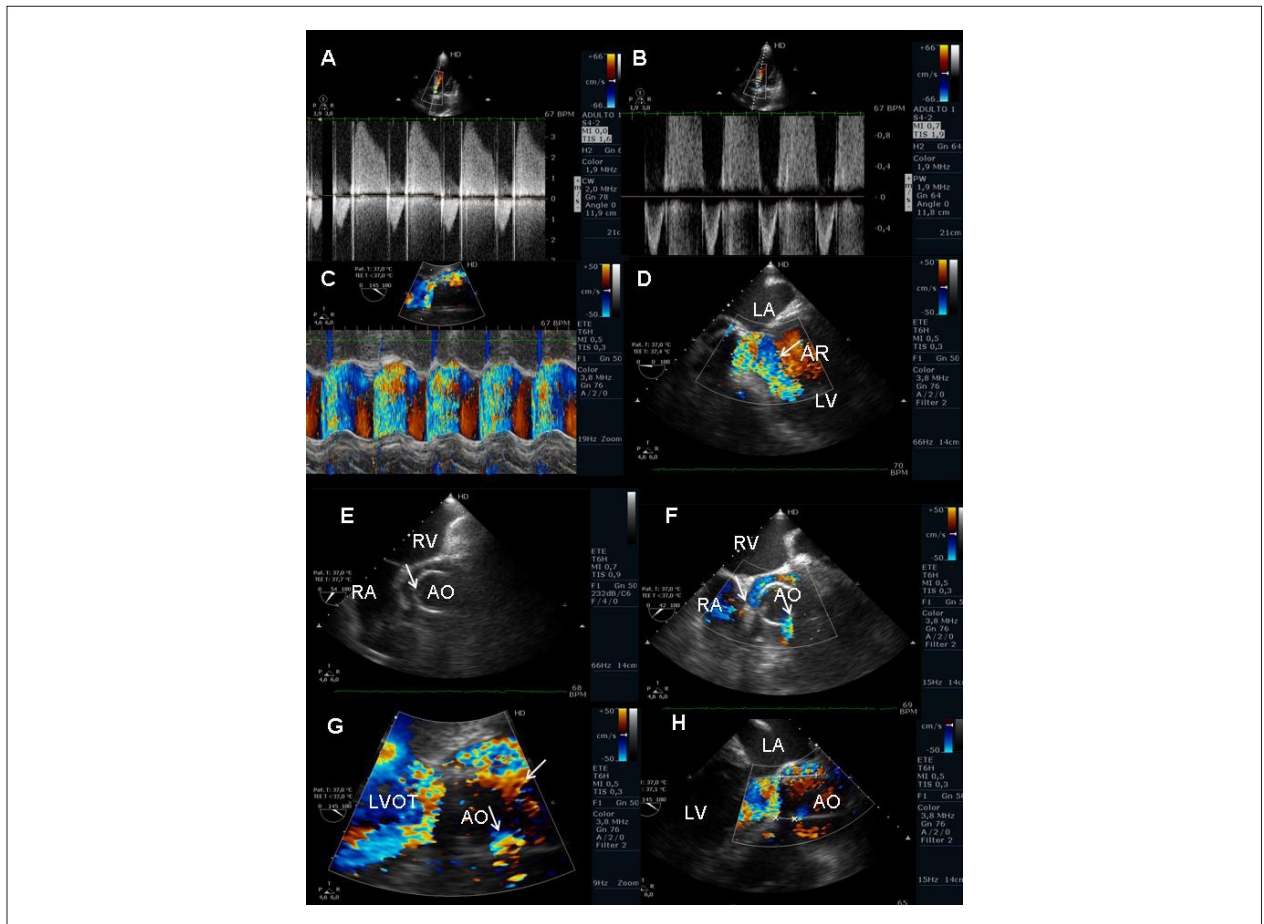


Figure 1 – TTE images showing severe regurgitation of the aortic prosthesis on continuous (A) and pulsed wave Doppler (B) mappings in the apical five-chamber view. TTE images of the color M-mode of the left ventricular outflow tract (LVOT; C) and color Doppler study (D) evidencing severe aortic prosthetic regurgitation. TTE transverse plane imaging showing the solutions of continuity between the Dacron prosthesis and native aorta (E and F, arrows). TTE imaging, at 145°, depicting the LVOT and color Doppler study (G and H). TTE: transthoracic echocardiography; TEE: transesophageal echocardiography; LA: left atrium; LV: left ventricle; RV: right ventricle; RA: right atrium; AO: Aorta; LVOT: left ventricle outflow tract; AR: Aortic regurgitation.

leaks. Moreover, technical problems may have contributed to dehiscence formation. Small leaks can progress along the years and evolve late after surgery into pseudoaneurysms and other variable clinical features depending on the site of the aortic dehiscence and involvement of the surrounding structures.

In this patient, dehiscence of the coronary ostium was diagnosed due to an acute myocardial infarction secondary to inadequate coronary flow resulting from graft dehiscence since atherosclerotic coronary artery disease was excluded by coronary angiography. Late postoperative aortic graft dehiscence may occur rarely after Bentall procedure and in this case, it was first suspected after TEE evaluation.

Advantages of the classical Bentall technique are graft cover up using the remaining aortic tissue and immediate protection against bleeding during the perioperative period;

disadvantages include pseudoaneurysm formation. This is why the modified Bentall procedure is currently the most used operation for aortic root reconstruction using a valved graft. CT aortography can be helpful in the diagnosis of this complication⁹, but in this case, it was inconclusive. TEE showed solutions of continuity on the Dacron graft in the ascending aorta and the native aorta, raising the suspicion of coronary ostium dehiscence that was further confirmed by intraoperative examination. The patient underwent a Cabrol procedure with no complications (Figure 2A).

Complete coronary artery dehiscence is an exceptional cause of pseudoaneurysm after a Bentall procedure. So far, there are very few case reports with this disorder presenting as acute myocardial infarction. Additionally, in our case, there was no evidence of infection and diagnosis was possible by means of TEE.

Case Report

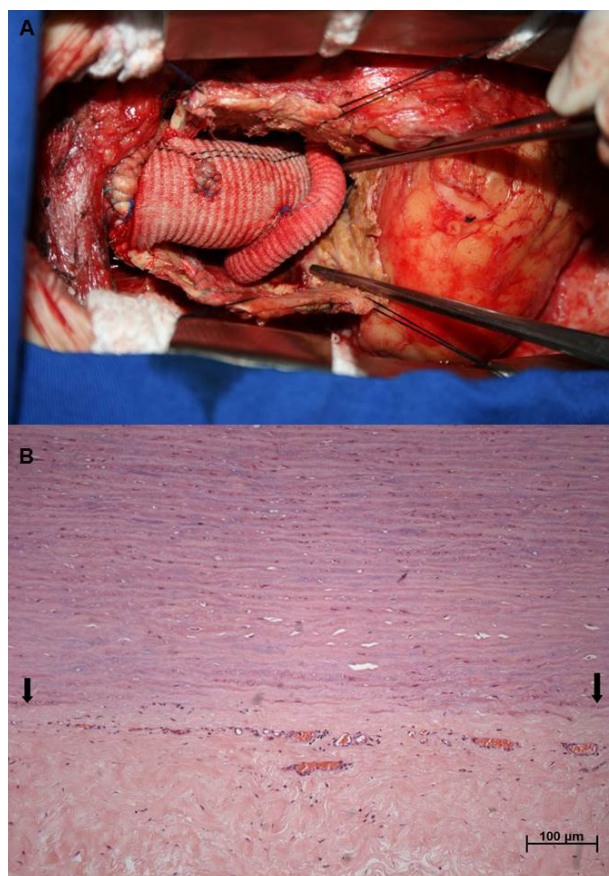


Figure 2 – A) Post operative aspect after Cabrol procedure. B) Histological section of a fragment of the aorta removed during surgery, showing fibrosis at the adventitia (indicated by arrows) and very mild mononuclear inflammatory infiltrate (hematoxylin & eosin staining).

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