



Modified Hemi-Cabrol Coronary Reimplantation using Carotid Artery Homograft for Bio-Prosthetic Aortic Valve Endocarditis

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Abstract

We present a case of a 68-year-old female with a history of bioprosthetic strep mitis aortic valve endocarditis and peri-annular abscess formation, focused predominantly around the right coronary and non-coronary cusps requiring a modified Cabrol technique using a section of a carotid artery homograft.

Keywords: Hemi-Cabrol; Infective endocarditis; Aorta; Homograft

Introduction

Bioprosthetic valve Infective Endocarditis (IE) requiring re-intervention is typically associated with a high degree of perioperative mortality [1]. With the progression and varying morphology of a peri-annular abscess, anatomical distortion is expected, requiring modification of pre-existing surgical techniques to restore and optimize functional cardiac anatomy. Peri-annular extension of IE is more common in prosthetic aortic valves, accounting for a higher risk of mortality in this cohort [2]. To account for the potential displacement of the coronary button from the coronary ostia, the great saphenous vein and cryopreserved superficial femoral artery have been described as suitable conduits for a modified Cabrol-type anastomoses of the coronary arteries to a reconstructed aortic root homograft [3,4]. While modifications of the original Cabrol technique utilize Dacron grafts to reimplant the coronary arteries, the use of native tissue and limitation of foreign material is an important consideration in the surgical treatment of infective endocarditis. We present a case of bio-prosthetic aortic valve endocarditis with significant aortic root abscess deformation requiring utilization of a modified hemi-Cabrol technique with implantation of a left carotid artery homograft to approximate the right coronary button to its respective coronary ostia.

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Case Presentation

A 68-year-old female with a history bioprosthetic aortic valve replacement, represented acutely with significant chest pain with subsequent diagnosis of subacute *Streptococcus mitis* endocarditis following positive blood cultures and identification of vegetations on the bioprosthetic aortic valve on Transthoracic ECHO (TTE). Left heart catheterization demonstrated a significant progression of IE with evidence of aortic valve root dilatation and abscess formation surrounding the aortic valve. A Transesophageal ECHO (TOE) confirmed a large aortic root abscess with persistent vegetation, moderate Aortic Regurgitation (AR), and Mitral Regurgitation (MR). The findings concerning for aortic root abscess were better appreciated on Computed Tomography Angiography (CTA). The pseudoaneurysm appearance with surrounding soft tissue thickening of the aortic root described on CTA was a reflection of an extensive abscess surrounding the aortic root and bioprosthetic aortic valve. Of note, the right coronary artery was diminutive and coursed within the region of the peri-aortic soft tissue thickening. Following evaluation, the patient was booked for a Commando procedure with mitral valve replacement, aortic root and valve replacement, and tricuspid valve repair.

Following cardiopulmonary bypass and arrest of the heart, exposure of the aortic root was established and an aortotomy was performed. A large horseshoe abscess surrounding bioprosthetic aortic valve was identified with destruction of tissue surrounding the bioprosthetic aortic valve. The valve was removed and extensive infected tissue debridement was undertaken. The coronary buttons were heavily calcified and preserved carefully. The aortomitral curtain was resected due to abscess infiltration. The mitral valve was sized and replaced with a 31 mm bioprosthetic valve

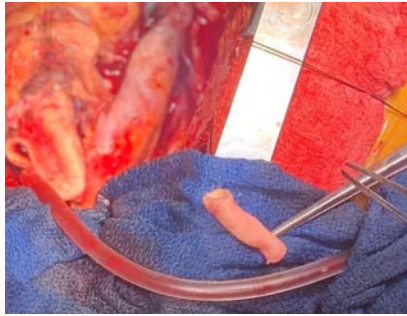


Figure 1: Distal section of the left carotid artery from the aortic homograft.

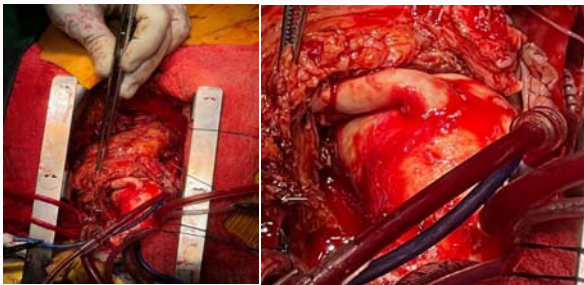


Figure 2: Modified hemi-Cabrol technique with implantation of a left carotid artery homograft to approximate the right coronary button to the coronary ostia of the aortic homograft.

taking into consideration the defect and later reconstruction of the aortomitral curtain following valve replacement. The aortomitral curtain was the reconstructed using a double patch of bovine pericardium. The aortic root was debrided and an aortic root with 23 mm aortic valve homograft was implanted. The left coronary button was approximated to the aortic homograft native coronary ostia.

Following the extensive deformation and destruction caused by the horseshoe aortic root abscess with subsequent surgical debridement of infected tissue, the calcified right coronary button was displaced an excessive distance from the aortic homograft, negating the possibility of directly approximating the button to the native homograft ostia. In order to reconstruct the right coronary circulation, utilization of a modified hemi-Cabrol technique was required. A distal section of the left carotid artery from the aortic homograft (Figure 1) was excised and used to approximate the immobile right coronary button to its respective coronary ostia. 5-0 Prolene was used to complete the anastomoses of both proximal and distal ends of the graft (Figure 2). The tricuspid valve was then repaired with 28 mm MC3 annuloplasty ring and the right atrium was reconstructed with bovine pericardium.

Postoperative CTA confirmed patency of the right coronary hemi-Cabrol type anastomosis. Postoperative serial TTEs demonstrated normal left and right ventricular systolic function, trivial MR, mild TR, and trivial AR. The patient's postoperative course was uncomplicated.

Discussion

Intra-operative adaptability is important when navigating the varying morphology produced by infected cardiac tissue. The use of a carotid artery homograft when reconstructing the coronary circulation provides a solution to a tension free re-implantation of the coronary button. Utilization of the distal portion of the left carotid artery from the aortic homograft, if available, serves as an efficient use of available tissue and avoids unnecessary graft harvesting from the femoral artery or great saphenous vein as described previously [2,3]. Furthermore, in patients with underlying saphenous vein or femoral artery pathology, a homograft carotid artery conduit can provide the necessary tissue to approximate immobile and displaced coronary buttons to their respective coronary ostia. Use of native tissue has the advantage of minimizing the extent of foreign material in a patient with IE. Native tissue, such as the carotid artery homograft used in this case, offers a suitable conduit when navigating distorted coronary anatomy.

Conclusion

Adopting a modified Cabrol-type approach using a section of carotid artery homograft to re-anastomose the coronary button to the coronary ostia serves as an efficient use of available tissue while also minimizing the potential risk for graft infective complications.

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