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Case Report

Successful Single-Patch Commando Procedure for Extensive Aorto–Mitral Infective Endocarditis

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Abstract

Background: Invasive double-valve infective endocarditis (IE) requiring aorto–mitral curtain reconstruction is rare and technically demanding. Meanwhile, radical surgical interventions are essential for controlling infection and restoring structural integrity. **Case:** We report the case of a 77-year-old woman with pyogenic spondylitis who developed high fever and cardiogenic shock due to IE involving the aortic and mitral valves. Transesophageal echocardiography confirmed extensive infection extending to the aorto–mitral curtain. Emergency Commando surgery using a single bovine pericardial patch was performed, reconstructing the aorto–mitral curtain. The postoperative course was uneventful, and no recurrence of infection was observed at the 1-year follow-up. **Conclusions:** This case highlights the effectiveness of radical debridement and anatomic reconstruction using a single-patch Commando technique in extensive infective endocarditis involving the aorto–mitral curtain.

Keywords: endocarditis; aortic valve; mitral valve; heart valve prosthesis; pericardium

1. Introduction

Infective endocarditis (IE) involving both the aortic and mitral valves with destruction of the aorto–mitral curtain (AMC) represents one of the most complex and challenging conditions in cardiac surgery. Despite advances in antimicrobial therapy and diagnostic imaging, extensive IE that invades the fibrous skeleton of the heart continues to be associated with high morbidity and mortality. When infection extends to the AMC, conventional double-valve replacement is often insufficient because of the loss of structural support and the risk of residual infection or paravalvular leakage [1,2,3].

The Commando procedure, originally described by David et al. [1], offers an effective surgical option by enabling radical debridement and simultaneous reconstruction of the AMC with double-valve replacement. Although this technique can restore left ventricular outflow tract continuity and ensure infection control, it remains technically demanding and is typically reserved for highly selected cases [2,3,4].

Here, we report a case of extensive aorto–mitral infective endocarditis treated successfully with an emergency Commando procedure using a single bovine pericardial patch, resulting in favorable postoperative recovery and excellent mid-term outcomes.

2. Case Report

A 77-year-old woman was admitted to another hospital with a diagnosis of pyogenic spondylitis. While hospitalized, she developed a high-grade fever and respiratory distress. Blood cultures obtained before transfer grew *Streptococcus sanguinis*.Transesophageal echocardiography revealed IE involving the aortic valve, mitral valve, and AMC (Fig. 1A), with severe mitral regurgitation (Fig. 1B). Left ventricular ejection fraction (LVEF) was visually estimated to be approximately 60% based on an eyeball assessment. There was no significant past medical history, other than pyogenic spondylitis diagnosed shortly before the onset of IE. There were no significant pre-existing valvular abnormalities, and her cardiac function was preserved. She was subsequently transferred to our institution, where cardiogenic shock due to severe valvular destruction was noted. The EuroSCORE II predicted mortality was 31.47%, and the Society of Thoracic Surgeons (STS) predicted operative mortality was 39.6%, indicating an extremely high surgical risk. Emergency surgery was performed on the same day.

A standard median sternotomy was performed. Cardiopulmonary bypass (CPB) was established with arterial cannulation of the ascending aorta and bicaval venous drainage. After aortic cross-clamping, cold blood cardioplegia was administered for myocardial protection. The initial dose consisted of selective antegrade delivery (left coronary artery (LCA): 900 mL, right coronary artery (RCA): 900 mL), followed by retrograde cardioplegia for a total of 11 doses throughout the procedure. Upon opening the ascending aorta, the aortic valve was found to be tricuspid, with vegetations extending from the left coronary cusp and noncoronary cusp to the commissural region and an-

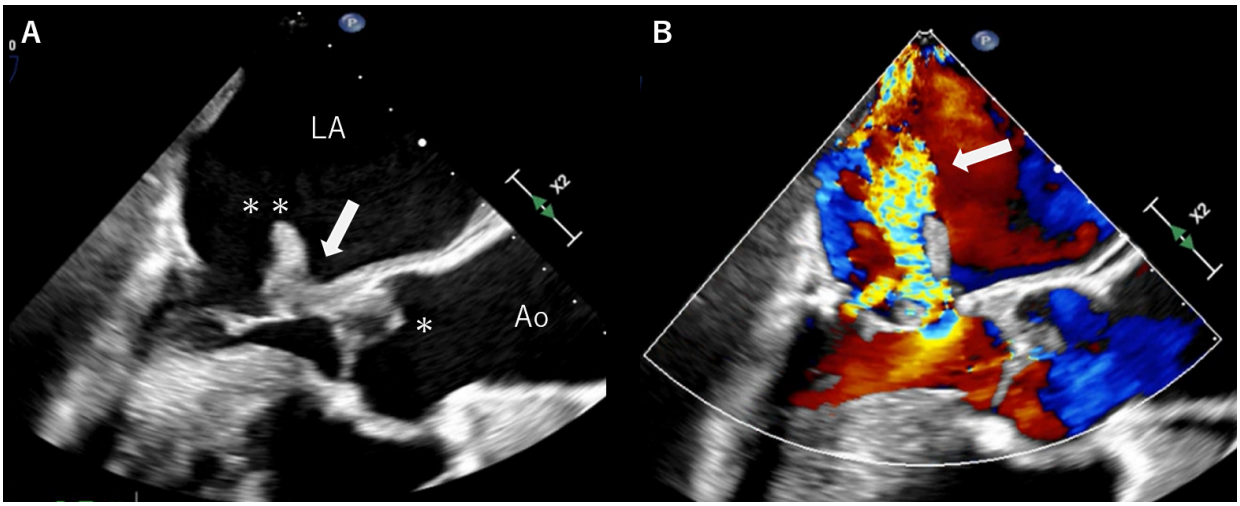

Fig. 1. Transesophageal echocardiographic findings before surgery. (A) Transesophageal echocardiography revealed infective endocarditis (IE) involving the aortic valve (asterisk), mitral valve (double asterisk), and aorto-mitral curtain (AMC) (white arrow). (B) Transesophageal echocardiography demonstrated severe mitral regurgitation (white arrow).

nulus (Fig. 2A). The mitral valve was inspected through a right-sided left atriotomy, revealing vegetations involving a portion of the posterior leaflet and the A1–A2 segment of the anterior leaflet, along with an abscess located in the aorto–mitral curtain (Fig. 2B). The aortic cusps were excised, and an incision was extended along the left–noncoronary commissure toward the roof of the left atrium and mitral annulus (Fig. 2C). From the atrial side, the infected anterior and posterior mitral leaflets and the involved AMCs were resected. The operative field was irrigated thoroughly with physiologic saline containing pyoktanin. Everting mattress sutures using 2-0 polyester were placed along the remaining mitral annulus. A bovine pericardial patch (Edwards Lifesciences, Irvine, CA, USA) was trimmed to a rectangular shape measuring 3 × 8 cm and sutured to reconstruct the roof of the left atrium (Fig. 3A), mitral annulus, and aortic annulus, thereby recreating the aorto–mitral continuity (Fig. 3B). Everting mattress 2-0 polyester sutures previously placed on the reconstructed patch were then used to implant a 27-mm SJM Epic bioprosthetic mitral valve (Abbott Laboratories, St. Paul, MN, USA) (Fig. 4A). Subsequently, non-everting mattress 2-0 polyester sutures were placed through the residual aortic annulus and the pericardial patch, and a 21-mm SJM Epic bioprosthetic aortic valve (Abbott Laboratories, St. Paul, MN, USA) was implanted (Fig. 4B). Finally, the aortotomy was closed using the pericardial patch. After meticulous deairing, spontaneous cardiac activity resumed. Intraoperative transesophageal echocardiography showed no paravalvular leakage. The total aortic cross-clamp time was 226 minutes, and the total CPB time was 280 minutes. The procedure was concluded successfully.

Postoperatively, intravenous antibiotic therapy was continued under the guidance of infectious disease specialists and maintained for a total of two months, with no evidence of recurrent infection observed. Transesophageal echocardiography performed on postoperative day 9 revealed no paravalvular leakage or signs of prosthetic valve endocarditis. The patient was extubated after 1 day of mechanical ventilation and remained in the intensive care unit for 8 days. The postoperative course was uneventful, with no atrioventricular block or other arrhythmias. The patient was discharged to a rehabilitation facility on postoperative day 37.

At the 1-year follow-up, transthoracic echocardiography showed no evidence of prosthetic valve endocarditis or recurrent infection, and prosthetic valve function remained satisfactory (Fig. 5A,B).

3. Discussion

IE involving both the aortic and mitral valves with destruction of the AMC remains one of the most formidable challenges in cardiac surgery. The Commando procedure, first described by David et al. [1], allows for en bloc replacement of the aortic and mitral valves with reconstruction of the AMC using a pericardial or Dacron patch. This technique restores the continuity of the left ventricular outflow tract and has become the standard approach for extensive double-valve IE.

Subsequent refinements have included the Hemi-Commando and mitral-sparing root-Commando procedures, which simplify reconstruction in selected patients. The Hemi-Commando, utilizing an incorporated aorto–mitral homograft, preserves part of the native mitral apparatus and has demonstrated favorable early outcomes, with 1- and 3-year survival rates of 91% and 82%, respectively [2,3].

Institutional series have reported hospital mortality rates of 7–15% and freedom from reoperation exceeding

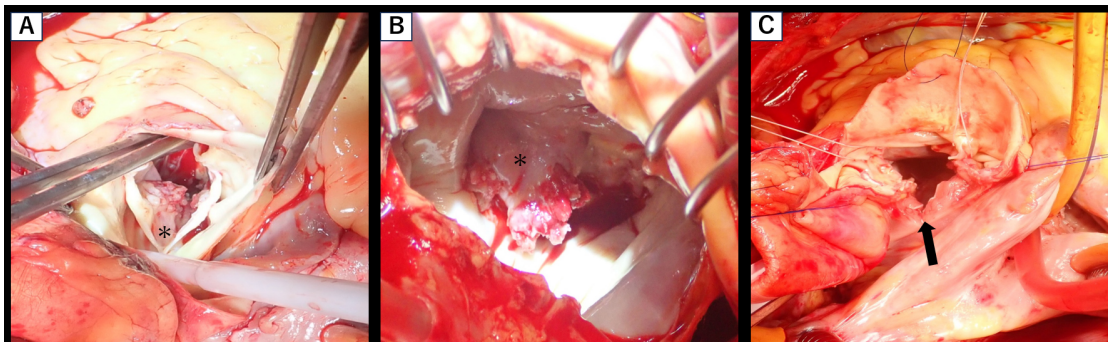

Fig. 2. Intraoperative findings of extensive aorto–mitral infective endocarditis. (A) Intraoperative findings showing vegetations extending from the noncoronary and left coronary cusps of the aortic valve to the anterior mitral leaflet through the aorto-mitral curtain (asterisk). (B) Intraoperative findings showing vegetations attached to the anterior leaflet of the mitral valve (asterisk). (C) The aortic valve was excised, and the incision was extended from the commissure between the left and noncoronary cusps toward the roof of the left atrium and along the mitral annulus, exposing the aorto-mitral curtain (black arrow).

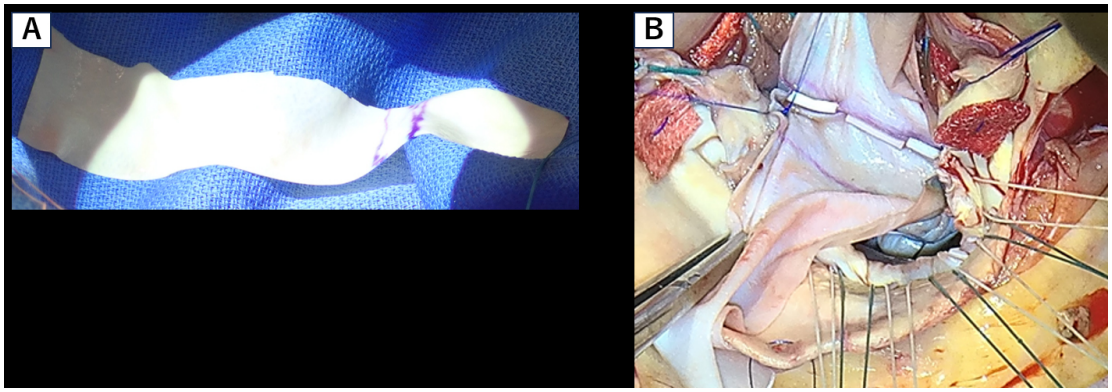

Fig. 3. Reconstruction of the aorto–mitral curtain using a bovine pericardial patch. (A) A bovine pericardial patch was trimmed into a rectangular shape measuring 3 × 8 cm. (B) The left atrial roof, mitral annulus, and aorto–mitral curtain (AMC) were reconstructed using a bovine pericardial patch.

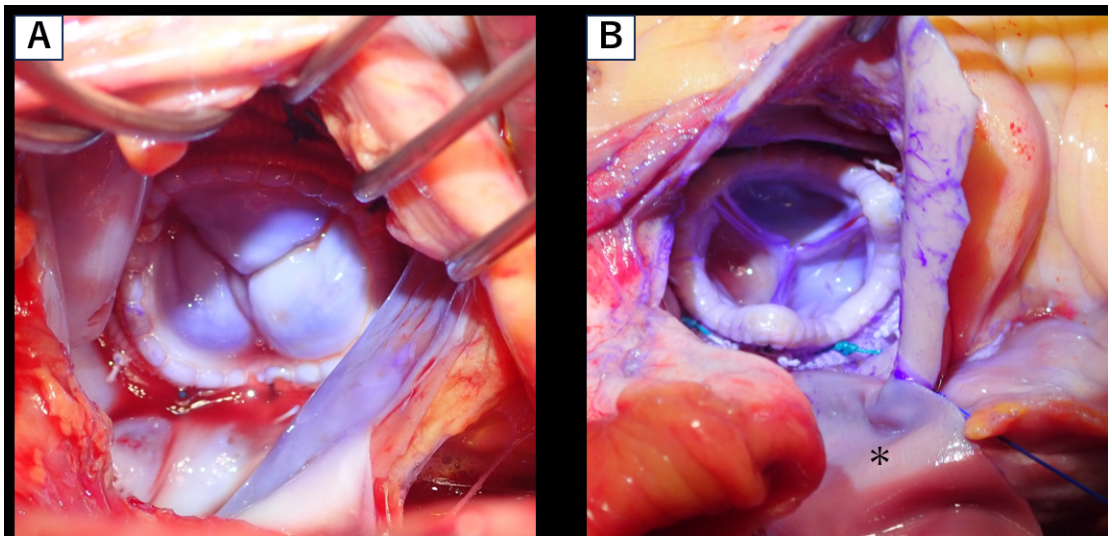

Fig. 4. Intraoperative findings after double-valve replacement with reconstruction of the aorto–mitral curtain. (A) A 27-mm bioprosthetic valve was implanted in the mitral position after reconstruction of the aorto-mitral curtain. (B) A 21-mm bioprosthetic valve was implanted in the aortic position following reconstruction of the aorto-mitral curtain (asterisk) and replacement of the mitral valve.

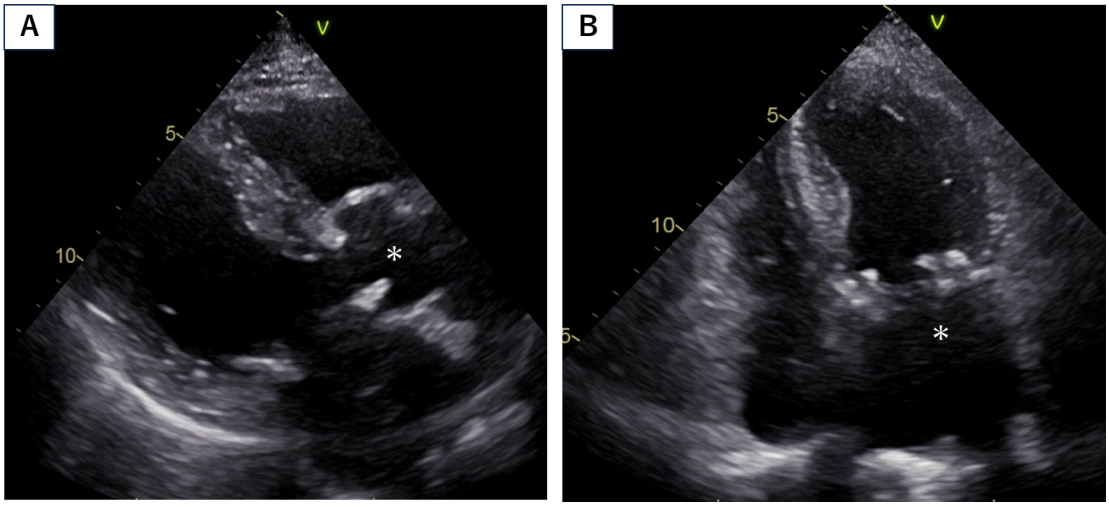

Fig. 5. Transthoracic echocardiographic findings at the 1-year follow-up. (A) No evidence of prosthetic valve endocarditis (PVE) after aortic valve replacement (AVR) (asterisk). (B) No evidence of PVE after mitral valve replacement (MVR) (asterisk).

90% at 3 years [4]. Complex cases such as prosthetic valve endocarditis or involvement of a transcatheter aortic prosthesis can also be effectively treated using Commando-type reconstruction [5]. In the recent Essen Commando experience, Zubarevich et al. [6] emphasized that this operation represents the ultima ratio for patients with extensive infective destruction of the intervalvular fibrous body, often associated with root abscess formation and paravalvular extension. Although early mortality remains 20–30%, the procedure enables radical debridement and anatomic reconstruction, which are indispensable for infection eradication and long-term survival [6]. Their modification using a stentless xenograft for aortic root replacement improved hemostasis and simplified the left ventricular outflow tract reconstruction while maintaining excellent hemodynamics [6].

In our case, a single rectangular bovine pericardial patch was employed to reconstruct the AMC, the roof of the left atrium, and both annuli. This simplified single-patch technique minimizes suture lines traversing infected tissue, reduces bleeding risk, and provides smooth left ventricular outflow geometry. Similar single-patch reconstructions have been reported with satisfactory mid-term outcomes and low recurrence of infection [4]. Furthermore, the surgical philosophy shared with the Essen group underscores the importance of complete radical excision of infected tissue and anatomical restoration of the cardiac skeleton to achieve durable results [6].

Alternative materials and configurations have been proposed, including homograft incorporation [7], aorto–mitral composites [8], and double-valve composite reconstructions through an aorto-annulo-septotomy [8]. Each technique must be tailored to the extent of infection and anatomic destruction.

Our patient underwent emergency surgery in the setting of cardiogenic shock and achieved complete recovery with no recurrence at one year. This outcome underscores the critical role of early surgical intervention, radical debridement, and meticulous anatomical reconstruction under a dedicated endocarditis team approach [3].

In summary, this case demonstrates that the single-patch Commando procedure using bovine pericardium provides a reliable, technically straightforward solution for extensive double-valve IE involving the AMC, with satisfactory hemostasis and anatomic reconstruction. Continued refinement of materials and surgical strategy, combined with early multidisciplinary management, is essential to improving long-term outcomes in this challenging population. Furthermore, ongoing registry-based analyses and multicenter collaboration will be crucial to define optimal timing and patient selection for this complex operation.

4. Conclusions

The Commando procedure with a single bovine pericardial patch is a viable and technically effective option for patients with extensive IE involving the AMC. Radical debridement and meticulous reconstruction are key to achieving durable outcomes. Further studies are warranted to assess long-term outcomes and refine material selection for AMC reconstruction.

Availability of Data and Materials

Data sharing does not apply to this article as no datasets were generated or analyzed.

Author Contributions

FK and MT conceived and designed the study. FK, YH, AH, YM, NE, and MT were involved in patient management and data acquisition. FK drafted the manuscript. MT critically revised the manuscript for important intellectual content. All authors contributed to editorial changes

in the manuscript. All authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki. Written informed consent for publication was obtained from the patient. Ethical approval was waived because this is a single-patient case report.

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Conflicts of Interest

The authors declare no conflicts of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.31083/HSF47548.

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