

Repair of Gerbode defect and aortic neocuspidization by using bovine pericardium in aortic valve endocarditis

Aort kapak endokarditinde Gerbode defektinin ve aortik neokuspidizasyonunun sığır perikardı kullanımı ile tamiri

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ABSTRACT

Aortic valve endocarditis may be destructive and cause an acquired Gerbode-type defect. The use of biological material in the closure of the Gerbode defect and reconstruction of the aortic valve is essential for both early and long-term survival. Herein, we present a 62-year-old male patient whose Gerbode defect was repaired with bovine pericardium. Additionally, the aortic valve was reconstructed by using bovine pericardium with Ozaki neocuspidization technique.

Keywords: Aortic valve endocarditis, bovine pericardium, Gerbode defect, Osaki technique.

The Gerbode defect is usually congenital and rarely presents as an acquired defect due to a complication of endocarditis, myocardial infarction, trauma, or after previous cardiac surgery. Prifti et al.^[1] reported 25 cases with an acquired Gerbode defect without previous cardiac surgery, and endocarditis was the main causative factor in 22 of these patients. Primary aim during surgery of aortic valve endocarditis is debridement of all infected tissue and reconstruction of all heart anatomy by using biologic materials.^[2] Herein, we report Gerbode defect closure and Ozaki-type aortic valve neocuspidization with bovine pericardium in aortic valve endocarditis.

ÖZ

Aort kapak endokarditi oldukça destrüktif olabilir ve edinilmiş Gerbode tip defekte yol açabilir. Gerbode defektinin kapatılması ve aort kapak rekonstrüksiyonunda biyolojik materyalin kullanılması erken ve geç dönem sağkalımda oldukça önemlidir. Bu makalede, Gerbode defekti sığır perikardı ile tamir edilen 62 yaşında bir erkek hasta sunuldu. Ek olarak aort kapağı Ozaki neokuspidizasyon tekniği ile sığır perikardı kullanılarak rekonstrükte edildi.

Anahtar sözcükler: Aort kapak endokarditi, sığır perikardı, Gerbode defekt, Osaki tekniği.

CASE REPORT

A 62-year-old caucasian male was referred to our clinic for fever, severe dyspnea, fatigue, a mass in the right atrium just above the tricuspid valve attached to the interatrial septum, and severe aortic valve stenosis. Prior to referral, the patient was admitted to another hospital for left hemiplegia, and a stent was placed into the right middle cerebral artery. C-reactive protein, white blood cell count, and erythrocyte sedimentation rate were elevated. *Escherichia coli* was yielded in blood cultures. Severe aortic stenosis due to calcific and edematous aortic cusps and Gerbode-type defect were found in intraoperative transesophageal

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Figure 1. Necrotic materials around the Gerbode defect and aortic valve were completely debrided. The Gerbode-type defect was closed by using bovine pericardium with bovine pericardium pledgeted sutures.

echocardiography (TEE). The aortic valve area was 0.7 cm² and the transvalvular gradient was 75 mmHg. Median sternotomy was performed. The pericardium was thickened and inflamed. Ascending aorta and bi-caval cannulation were done. Aortotomy was done, and cusps were removed. All necrotic tissues beneath the right noncoronary commissures were debrided. Right atriotomy was done, and necrotic tissues around the Gerbode defect were removed. Eight 4-0 Prolene small bovine pericardium pledgeted sutures (Edwards Lifesciences Corp., Irvine, CA, USA) were placed around the Gerbode defect. These sutures were passed from the tailored bovine pericardium patch and tied (Figure 1). Ozaki technique was decided for the aortic valve. The sizing of each cusp was done. One size larger cusps were used for right and noncoronary cusps since we intended to take deep safety sutures around the defect. The cusps were tailored from bovine pericardium. The left coronary cusp was continuously sutured as in the Ozaki technique. Right and noncoronary cusps were sutured using 4-0 bovine pericardium pledgeted U-type sutures. Some of these sutures passed from the right atrium through the patch for the right side of the noncoronary cusp and the left

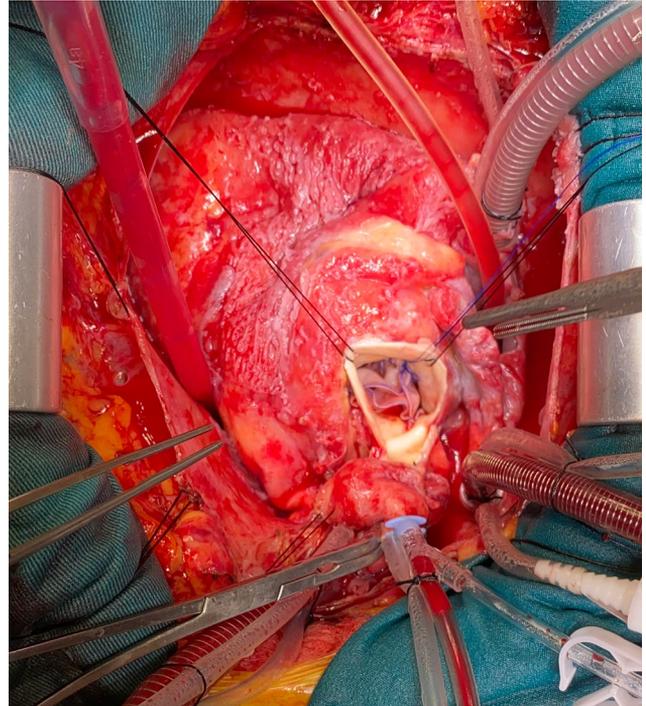


Figure 2. Neocuspidization was performed using the Ozaki technique. Bovine pericardium was used for cusp material as the autologous pericardium was not suitable due to previous pericarditis.

side of the right cusp to secure the suture. U-sutures were ligated (Figure 2). Then aortotomy and right atriotomy were closed. Complete heart block was detected, and pacing was done. Postoperative TEE revealed no residual Gerbode defect and mild aortic insufficiency (Video 1). The postoperative course was uneventful. A permanent pacemaker was placed on the postoperative 15th day. Antibiotic treatment was administered for four weeks. Patients were discharged on the postoperative 31st day.

DISCUSSION

Endocarditis affecting the aortic valve combined with abscess formation is particularly challenging to treat and requires aggressive diagnostic and therapeutic approaches due to its severe complications, such as heart block, destruction of intervalvular fibrosa involving the mitral valve, fistula to other cardiac chambers, aortic pseudoaneurysm formation, and extrinsic compression of coronary arteries. Kirali *et al.*^[3] reported the mortality rate for native aortic valve endocarditis and prosthetic valve endocarditis as 40.7% and 66.6%, respectively. The Gerbode defect may be caused by aortic valve endocarditis.^[1,2,4]

The primary objective for endocarditis is to remove all necrotic and infected tissues and restore functional anatomy. Prosthetic valves or homografts are used for aortic valve competency. Prosthetic valve replacement after massive debridement of necrotic/infected tissues still has high postoperative mortality. Homografts are not available in most cardiac centers. Ozaki et al.^[5] designed the neocuspidization technique, which is available for endocarditis. Ngo et al.^[6] utilized the Ozaki technique by using autologous pericardium for bicuspid aortic valve endocarditis with annular abscess. Biological materials are crucial for surgical repair in all types of endocarditis. We used bovine pericardium for the patch, cusp, and pledgeted sutures as the autologous pericardium was inflamed. We think that careful attention should be given to cusps size since deep and secure sutures may disorientate the cusp, causing the height of the tailored cusp to be short. We used one size larger cusps for right and noncoronary cusps. Single and continuous sutures may also be another issue. Loosening of the suture may cause massive aortic insufficiency. We have placed pledgeted U-type sutures to avoid this complication.

In conclusion, aortic valve reconstruction surgery using autologous pericardium by the Ozaki procedure is a good option for patients with infective endocarditis. For those with an aortic annular abscess, the use of bovine pericardium treated with glutaraldehyde to close the abscess is a way to avoid the use of foreign material.

Patient Consent for Publication: A written informed consent was obtained from the patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

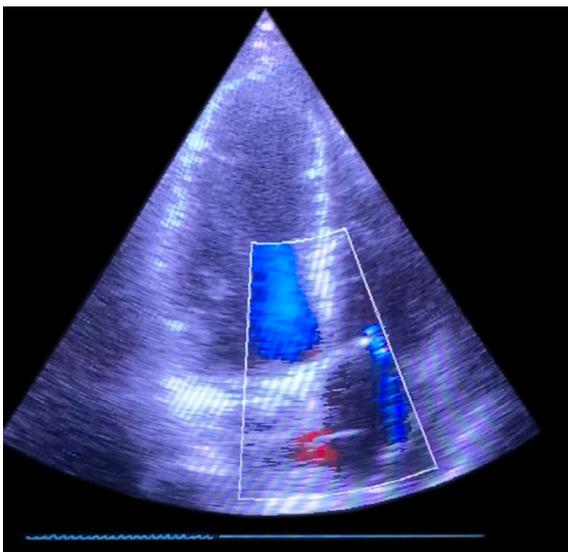
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Supplemental Video 1. Echocardiographic examination on the postoperative 30th day showing good aortic valve function and no residual shunt from the repaired Gerbode defect.