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## **Left Ventricle to Left Atrium Shunt via a Paravalvular Abscess**

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## ABSTRACT

Intracardiac fistulas are rare complications of infective endocarditis that add to the complexity of surgical management, and impose an additional hemodynamic burden on the already challenged heart. We report on a case of successful surgical management of a paravalvular communication between the left ventricle and the left atrium via an abscess cavity.

## INTRODUCTION

The improvement in health care has not resulted in a meaningful decrease in the incidence of infective endocarditis (IE) (1). Surgery is of paramount importance in almost a third of patients suffering from IE (1,2). Paravalvular extension of the infection significantly contributes to the morbidity and mortality of the disease. Judicious timing of the surgical intervention is as critical to avoiding serious morbidity as is the virulence of the microorganism or the promptness of the diagnosis.

## CASE REPORT

We present a 60-year-old gentleman with mitral valve endocarditis caused by *Staphylococcus aureus* which was complicated by paravalvular extension of his infection. His previous medical history was remarkable for a paravertebral abscess which was, most likely, the primary origin of his subsequent endocarditis. His current presentation was one of congestive heart failure due to massive paravalvular regurgitation in addition to central mitral valvular insufficiency. The diagnostic algorithm included both a transthoracic and transesophageal echocardiogram, as well as left heart catheterization.

Echocardiographic imaging revealed a large paravalvular cavity with clear Doppler flow from the left ventricle (LV) to the left atrium (LA) via this paravalvular route (Figure 1 and Figure 2). In addition, there was a vegetation on the posterior mitral leaflet coupled with significant mitral insufficiency. The left heart catheterization revealed an abnormal LV contour consistent with an abscess cavity in continuity with the LV (Figure 3). Obstructive coronary artery disease was not present.

Radical debridement of all infected tissue was performed with the aid of hypothermic cardiopulmonary bypass and aortic crossclamping. Intraoperatively, destruction of the posterior mitral leaflet was evident with a vegetation located in the P3 segment. Upon removing the anterior and greater part of the posterior leaflet of the mitral valve it was possible to visualize the left ventricular side of the paravalvular cavity which was situated immediately adjacent to the postero-medial commissure. Local irrigation of the cavity was performed, followed by its obliteration by suturing a piece of gluteraldehyde treated bovine pericardium over its orifices on both the LV and the LA surfaces (Figure 4). The pericardial patch also served to reinforce the destructed

portion of the mitral valve annulus and thus provided safe anchorage for a mechanical prosthesis which was then inserted to conclude the surgical procedure. Intraoperative transesophageal echocardiography confirmed complete obliteration of the paravalvular shunt and a well functioning mitral valve prosthesis.

The patient enjoyed an uneventful postoperative course which included an additional six weeks of intravenous antibiotic treatment.

## DISCUSSION

The perplexing lack of reduction in the incidence of endocarditis over the past decades is testament of a changing disease that bears little similarity to the condition described in the pre-antibiotic era (1). Surgery is indicated in 25-30% of cases of native acute endocarditis, and is dictated by the development of congestive heart failure attributable to valve dysfunction, persistent sepsis, paravalvular involvement and recurrent embolization (1,2,3). The causative agent and the size of the vegetation also play a role in the decision to proceed with surgery. *Staphylococcus aureus* is currently one of the most prominent causes of infective endocarditis. It carries a more ominous prognosis than IE caused by most other pathogens, with the notable exception of fungal IE (2). Radical debridement of all infected tissue remains the foundation and the critical first step of surgical management (4). Timing of the surgical procedure is equally as important, and should not be delayed once any of the surgical indications have been documented. This principle should not be adhered to only in the setting of a newly diagnosed stroke. The patient reported on here was referred for surgery with clear evidence of a paravalvular abscess which led to a highly unusual finding of a paravalvular LV to LA shunt leading to congestive heart failure. The operative strategy entailed excision of all infected tissue, reconstruction of the destroyed mitral annulus and, finally, mitral valve replacement. We used bovine pericardium for the reconstruction of the damaged mitral valve annulus as it provided both structural integrity and safe anchorage for the mitral valve prosthesis. The patch extended over both the left ventricular and the left atrial orifices of the intracardiac fistula, thus effectively eliminating its hemodynamic sequelae. A low threshold for early surgical intervention should be implemented in cases of



Staphylococcus aureus endocarditis in order to prevent paravalvular extension of the infectious process, as was the seen in the presented case (4,5).

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Figure 1. Echocardiographic image of the paravalvular cavity. LA=Left atrium, LV=Left ventricle, A=Abscess cavity, Arrows=Left atrial and left ventricular orifices of the intracardiac fistula, respectively

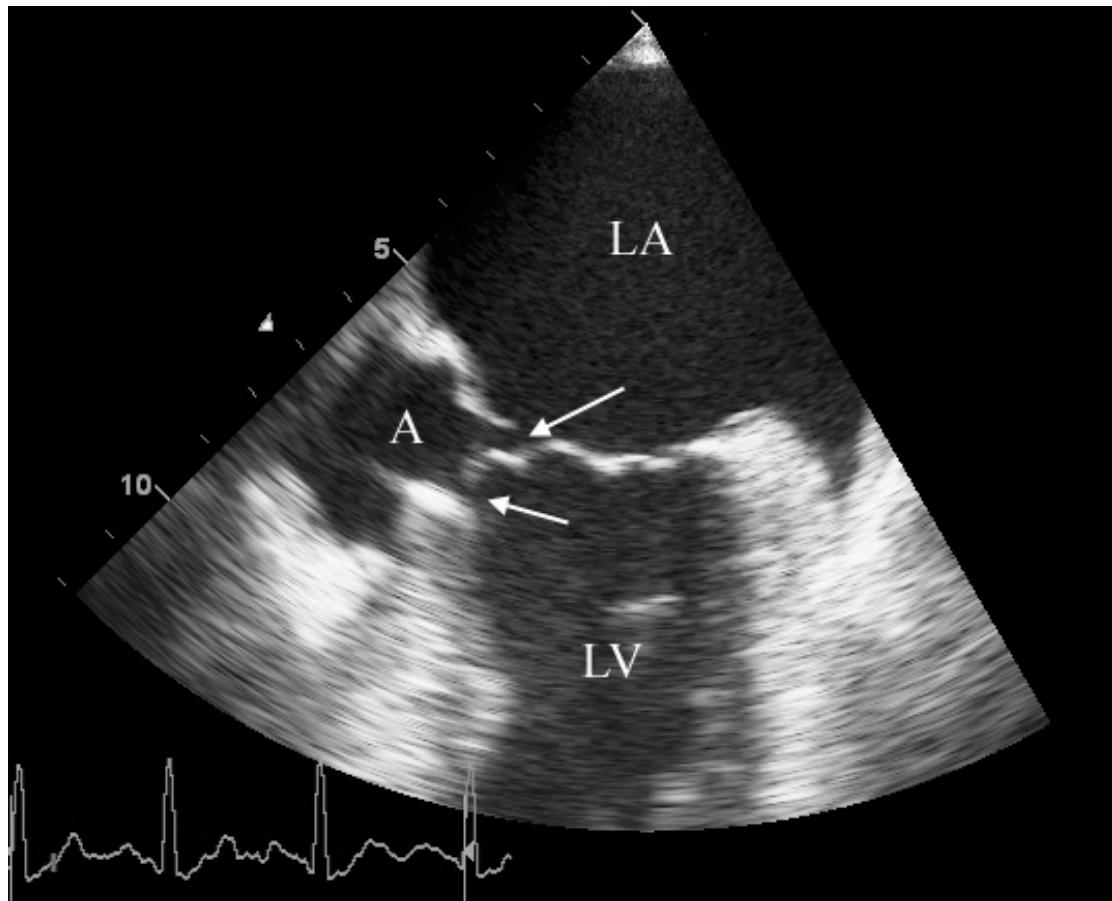


Figure 2. Doppler flow from the left ventricle into the left atrium via a paravalvular communication (arrow)



Figure 3. Left ventriculogram showing an unusual ventricular contour consistent with a paravalvular abscess (arrows)

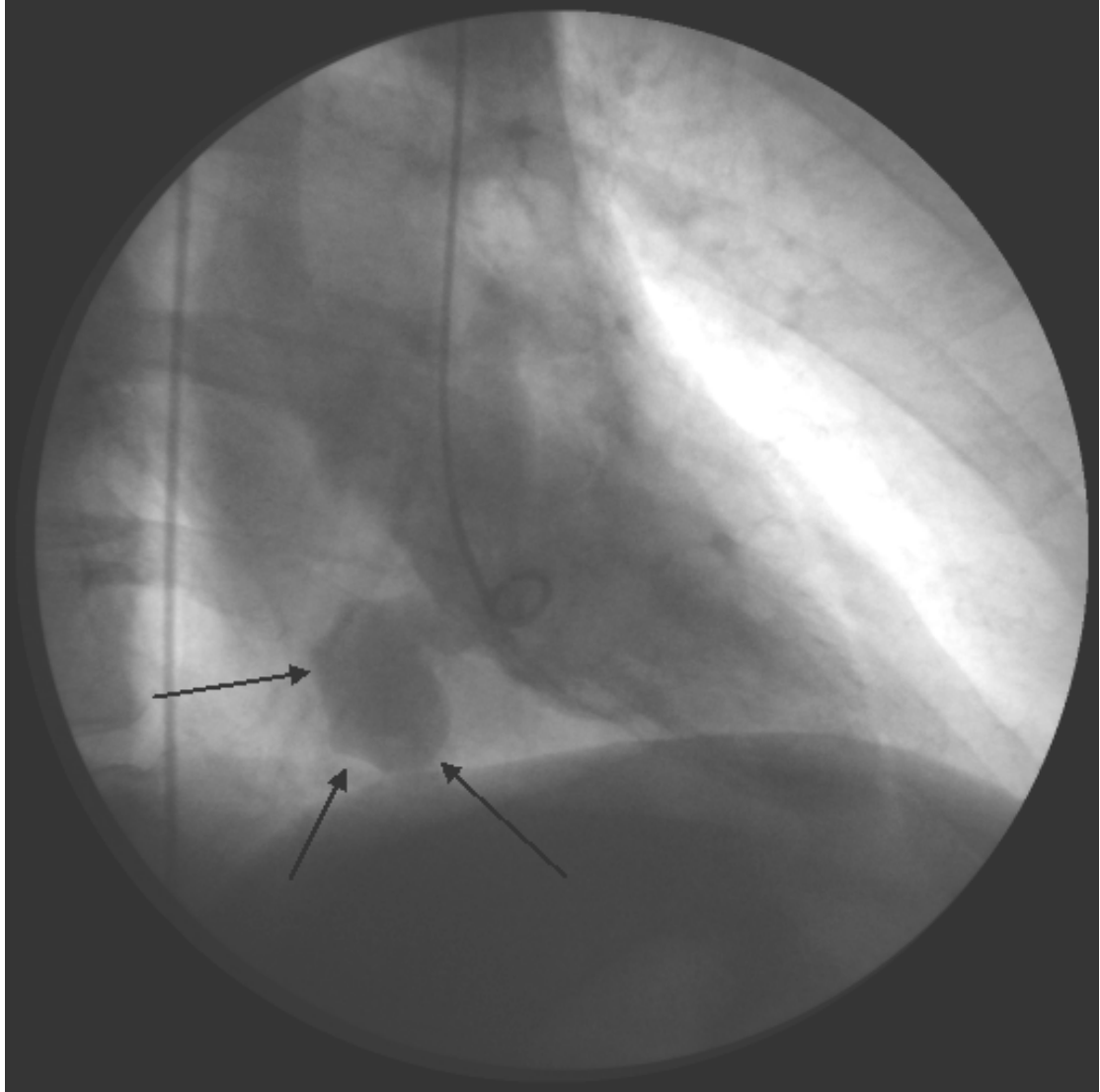


Figure 4. Intraoperative view of the paravalvular abscess cavity patched with bovine pericardium (arrows)

