

# Mitral and Aortic Valve Endocarditis

Due to *Staphylococcus lugdunensis*

Attilio Renzulli, MD  
Alessandro Della Corte, MD  
Michele Torella, MD  
Giovanni Dialetto, MD  
Maurizio Cotrufo, MD

*Staphylococcus lugdunensis* is a recently described coagulase negative staphylococcal species involved in human infections. Endocarditis caused by *Staphylococcus lugdunensis* has been reported rarely: fewer than 50 cases have been described so far. The infection is frequently complicated by embolic events and carries a high mortality rate. We report a case of endocarditis due to *Staphylococcus lugdunensis* in which the native mitral and aortic valves were infected. The bacterium was isolated on cultures from the aortic and mitral vegetations. Appropriate medical and surgical treatment led to a good outcome of the infection. At 6-year follow-up, there was no evidence of recurrence, and the patient showed good functional recovery. He was in New York Heart Association functional class I. (**Tex Heart Inst J 2000;27:67-9**)

**R**ecent advances in microbiological diagnosis have enabled researchers to identify rare bacterial strains that were previously undiagnosed. The accuracy of modern cultural methods for bacterial identification has made it possible to isolate, either in blood or in explanted valve cultures, most of the pathogens responsible for cases of infective endocarditis that were formerly classified as culture-negative endocarditis. One of these recently isolated bacterial species is *Staphylococcus lugdunensis*, a coagulase negative species. The 1st description of human infection by *S. lugdunensis* dates back to 1988,<sup>1</sup> and fewer than 50 cases of endocarditis due to this organism have been reported since then. We report a case of endocarditis caused by *S. lugdunensis*, in which the native mitral and aortic valves were severely infected. The patient was treated surgically and has experienced good long-term results.

## Case Report

In August 1993, a 51-year-old man with no significant medical history was admitted to another hospital with lobar pneumonia. Empirical antibiotic therapy was started, and complete resolution of fever and other symptoms was obtained, after which the patient was discharged. Four months later, he complained of recurrent episodes of dyspnea at rest, requiring a 2nd hospital admission. Physical examination revealed no signs of infection, and the patient was afebrile.

Radiography and computed tomographic scan of the chest showed opacity in the anterior portion of the right lower pulmonary lobe and pleural thickening, both of which resulted from the previous pneumonia. Transthoracic echocardiographic studies (M-mode, B-mode, and color-flow Doppler) revealed severe aortic regurgitation. There was a tear in the right coronary cusp, and there were 2 vegetations (1 cm each) on the left and non-coronary cusps (Fig. 1). There were also several vegetations (ranging between 1.5 and 2 cm in size) on the anterior leaflet of the mitral valve. Mild mitral regurgitation due to annular dilatation was present. The left ventricle was dilated (end-diastolic diameter, 7.4 cm; end-systolic diameter, 5.1 cm), and the left atrium was also dilated (5.3 cm). Blood cultures did not show any bacterial growth. The patient was transferred to our institution on 2 January 1994 for surgery.

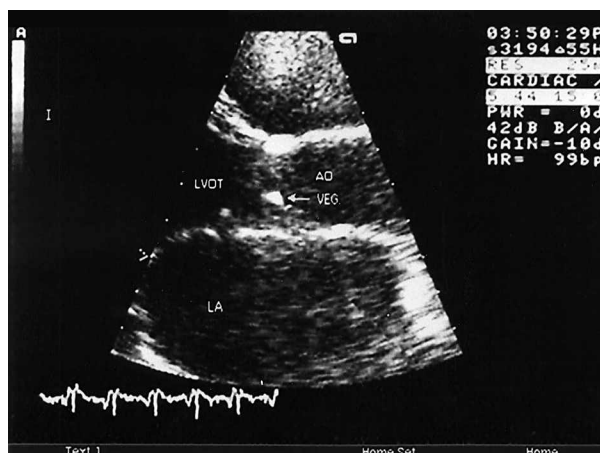
Median sternotomy was performed and hypothermic cardiopulmonary bypass was started. Myocardial protection was achieved with crystalloid St. Thomas's No. 1 cardioplegic solution into the coronary ostia and with cold saline solution in the

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**From:** The Institute of Cardiac Surgery, Second University of Naples, V. Monaldi Hospital, Naples, Italy

**Address for reprints:**  
Attilio Renzulli, MD,  
Via Aquila 144,  
80143 Naples, Italy

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**Fig. 1** Transthoracic echocardiogram (left parasternal long-axis view) shows vegetations on the aortic valve.

AO = ascending aorta; LA = left atrium; LVOT = left ventricular outflow tract; VEG = vegetations (arrow).

pericardial sac. The aortic valve was severely diseased. The right coronary cusp had a tear, and there were multiple vegetations on the other cusps. Moreover, a 2-cm vegetation on the ventricular aspect of the anterior leaflet of the mitral valve and chordal rupture of the anterior mitral leaflet were found. The aortic and mitral valves were excised and replaced, respectively, with Carbomedics 25-mm and Carbomedics 33-mm prosthetic valves (Sulzer Carbomedics Inc.; Austin, Tex). The patient's postoperative course was uneventful, and he was extubated on the day following the operation. The culture of the aortic and mitral vegetations showed growth of a coagulase-negative bacterial strain, which was identified as *S. lugdunensis*, susceptible to ampicillin, vancomycin, and gentamicin.

Postoperative antibiotic treatment with intravenous ampicillin 50 mg/kg/day and intramuscular gentamicin 3 mg/kg/day was initiated, and seven days later the patient was transferred to a medical unit. Intravenous ampicillin treatment was continued for another 3 weeks.

Six years after the operation, the patient was in New York Heart Association functional class I. Echocardiography showed normal function of the mitral and aortic prostheses and no signs of recurrence of the infection.

## Discussion

First described in 1988, *Staphylococcus lugdunensis*, a coagulase negative species, has been identified as a rare cause of endocarditis.<sup>2,3</sup> In 67% of such cases it involves native valves (of these, the mitral valve was infected in 67% of cases and the aortic valve in

33%), and the mortality rate reported in cases of endocarditis caused by this pathogen is high.<sup>3,4</sup>

Although little information is available about the epidemiology of *S. lugdunensis*, this bacterium is believed to be ubiquitous, similar to other species of coagulase negative staphylococci; therefore, it is likely that it could be found on human skin and mucous membranes.<sup>2,5,6</sup> However, in the majority of reported cases, the portal of entry was unidentified. Several cases of endocarditis caused by *S. lugdunensis* have been described in patients with chronic renal failure or neoplastic disease,<sup>4,7</sup> and some authors report this infection in patients with previous pneumonic episodes,<sup>8</sup> which was the case in our patient.

The high mortality rate associated with this infection can be explained by the ability of *S. lugdunensis* to destroy the native valve and thereby induce acute cardiac failure. This pathogen is able to bind vitronectin and fibrinogen to extracellular matrix proteins,<sup>9</sup> a trait typical of coagulase positive *Staphylococcus aureus*, and it seems to be more frequently emboligenic than other coagulase negative staphylococci.<sup>4</sup> Early surgical treatment of endocarditis caused by *S. lugdunensis* is required because of the destructive course of the infection.<sup>3,4</sup>

Koh<sup>4</sup> has pointed out that the use of commercial identification systems can lead the investigator to mistake *S. lugdunensis* for other staphylococcal strains. When a coagulase negative agent is isolated from diseased tissue, careful identification requires detection of coagulase fibrinogen affinity factor and ornithine decarboxylase activity.<sup>5,10</sup>

This report presents a case of a *S. lugdunensis* endocarditis that involved the native mitral and aortic valves. Cultures of vegetations from the explanted valves enabled precise identification of the pathogen, and with proper postoperative antibiotic treatment, the infection was completely cured. We suggest that it is important to remember that endocarditis due to *S. lugdunensis* has a different natural history and prognosis than does endocarditis caused by other coagulase negative staphylococcal strains. When coagulase negative staphylococcal growth occurs on infected tissue cultures, every effort should be made to obtain precise identification of the specific pathogen, so that the appropriate medical and surgical treatment can be established.

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