Endocarditis due to *Actinobacillus actinomycetemcomitans* of both a prosthetic valve and a native valve in the same patient[1]

John H. Wilson, M.D.
Irving Franco, M.D.
Thomas F. Keys, M.D.

A patient with *Actinobacillus actinomycetemcomitans* endocarditis, a rare cause of gram-negative endocarditis, is reported. This case is unique in that it is the only one in the literature with documented involvement of both prosthetic (aortic) and native (mitral) valves. The patient required surgical replacement of the aortic valve prosthesis and debridement of the mitral valve, as well as prolonged antibiotic therapy.

Index terms: Actinobacillus infections • Case reports • Endocarditis, bacterial

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Actinobacillus actinomycetemcomitans is a rare cause of gram-negative infection. It is a slow-growing, fastidious organism which requires a carbon-dioxide-enhanced atmosphere for growth on solid media.[1] Its name was derived from a frequent association with Actinomycosis infections. At one time, it was believed that infection with *Actinobacillus actinomycetemcomitans* occurred exclusively in conjunction with Actinomycosis infection[2]; however, it is now clearly established that *Actinobacillus actinomycetemcomitans* by itself can cause infection. The most common serious infection due to this organism is infective endocarditis.

Case report

A 57-year-old man was transferred from another institution with a diagnosis of possible prosthetic-valve endocarditis. Three weeks earlier, he reported the onset of periodic shaking chills and night sweats. A Carpentier-Edwards porcine valve had been inserted in the aortic position three years prior to admission because of calcific aortic stenosis and aortic insufficiency. Five weeks previously, the patient had received penicillin prophylaxis during excision of two basal cell carcinomas of the back. Gentamicin and vancomycin had been started the day before admission.

On admission, the patient was not in any acute distress. A blood pressure of 120/70 mm Hg was recorded. His heart rate was 60, and he was afebrile. The eye examination was unremarkable. No oral lesions were noted. The lungs were clear. Auscultation of the heart revealed a grade III/VI systolic ejection murmur along the left sternal border. There was no diastolic murmur. The abdominal examination was unremarkable.

An EKG and chest radiograph were normal. An admission echocardiogram revealed normal prosthetic valve function with no vegetations. The only echocardiographic abnormality was left ventricular hypertrophy. The white blood cell count on admission was 12,800 with 74% neutrophils and 3% band forms. A sedimentation rate was elevated at 57 mm/hr (Westergren).

Antibiotics were discontinued and additional blood cultures were obtained. Three days after admission, the patient began to have chills and low-grade fever. Two days later, his white cell count had increased to 17,800, and antibiotic therapy (gentamicin and vancomycin) was resumed. The following day, his temperature spiked to 40.9° C. A repeat echocardiogram showed a mass of echoes attached to the

[1] Departments of Cardiology (J.H.W., I.F.) and Infectious Disease (T.F.K.), The Cleveland Clinic Foundation. Submitted for publication Dec 1985; accepted Mar 1986.

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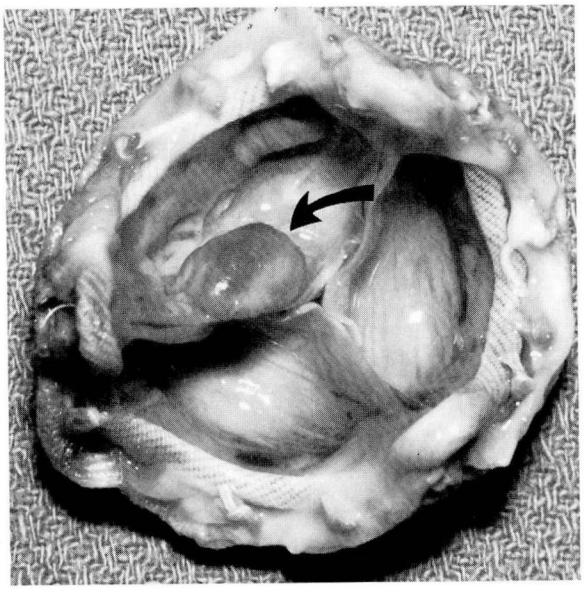

Figure. Surgical specimen, demonstrating a large vegetation (arrow) on the prosthetic aortic valve.

prosthetic valve. In retrospect, the vegetation was present on the admission study. The left atrium was dilated, and a Doppler examination showed mitral regurgitation. On the tenth day after admission, blood cultures from five days previously became positive for a gram-negative rod. Ampicillin was substituted for vancomycin, and gentamicin was continued. When sensitivities became available, it was found that the organism was more sensitive to cefamandole than ampicillin, with minimal inhibitory concentrations of 0.5 and 2.0 μg/mL, respectively. Cefamandole was substituted for ampicillin. Thirteen days after admission, the infecting organism was identified as *Actinobacillus actinomycetemcomitans*. Cefamandole (2 g every four hours) and gentamicin (60 mg every eight hours) were continued. An echocardiogram done 16 days after admission showed erratic motion of the mitral valve which was interpreted as evidence of a ruptured chordae. A Doppler examination at that time revealed severe mitral and mild tricuspid regurgitation.

The development of signs and symptoms of congestive heart failure prompted a recommendation for replacement of the prosthetic aortic valve and examination of the mitral valve. Surgery was undertaken 20 days after admission. The aortic valve was replaced with another tissue valve (Carpentier-Edwards). At surgery, a large vegetation on the prosthetic aortic valve was found (*Figure*). The mitral chordae were intact. The mitral valve was debrided of vegetation. Scrapings of the valve were positive for bacteria. Surgical cultures were negative.

The patient recovered rapidly from the operation without complications. Postoperatively, cefamandole was continued for an additional 28 days. The patient was observed in the hospital off antibiotics for four days. He felt well and continued to be afebrile. Six weeks after discharge, he was doing well. There was no fever. A white blood cell count was 6,700, a sedimentation rate was 15 mm/hr, and the hemoglobin value was 13.5 g. Repeat blood cultures were negative.

Discussion

The first cases of endocarditis due to *Actinobacillus actinomycetemcomitans* were reported in 1966 by Overholt[3] and Page and King.[4] Since then, there have been at least 60 cases reported. One series of 32 patients has been described.[4] Only four cases have involved a prosthetic valve.[5–8] To our knowledge, involvement of both a native and a prosthetic valve in the same patient has not been previously reported.

Actinobacillus actinomycetemcomitans is a gram-negative, unencapsulated coccobacillus and a member of the normal flora of the human mouth.[9] The organism may take as long as 16 days to grow in the laboratory.[10] When grown in broth, it forms clumps which attach to the wall of the culture bottle, leaving the broth clear[4,7]; this sometimes leads to the false assumption that the culture is negative. A blind subculture on agar plates will yield the organism. This observation has led to the suggestion that *Actinobacillus actinomycetemcomitans* may have been responsible for cases called "culture negative" endocarditis in the past.[11]

The predominant infection caused by *Actinobacillus actinomycetemcomitans* is endocarditis, but it has also been reported to cause periodontitis,[12] soft tissue infection,[4,13] and urinary tract infections.[4] The reason for a male predominance[4] in cases of endocarditis is unknown.

Actinobacillus endocarditis typically presents as a subacute illness with fever, chills, sweats, anorexia, lethargy, and myalgias. A delay as long as 10 months has been reported between the onset of symptoms and the diagnosis.[15] Physical findings may include lymphadenopathy and splenomegaly. Neither was present in the patient described here. Congestive heart failure occurs in as many as one-third of patients.[11] Infection involves a diseased heart valve in at least two-thirds of cases, with rheumatic heart disease being the most common etiology.[11] The involvement is usually left-sided, with the mitral valve being the most common site,[11] but one case of isolated tricuspid involvement has been reported.[16] As in other types of endocarditis, the sedimentation rate is usually elevated, anemia is common, and a positive test for rheumatoid factor may be recorded. Microscopic hematuria is mentioned in most case reports. The risk of cerebral emboli is significant.[15,17] A fatality rate as high as 33% has been reported.[4] The rate is even higher (63%) in those patients with congestive

heart failure.[10] Some patients have caries or other oral lesions which are the suspected portals of entry for the organism. Our patient had no oral pathology. Peters et al[18] reported a history of dental infection or manipulation in 35% of the cases they reviewed. Ellner et al[11] have emphasized the similarity of endocarditis due to this organism and endocarditis due to other slow-growing gram-negative rods such as *Hemophilus* sp and *Cardiobacterium hominis*.

Antibiotic susceptibility is variable. *Actinobacillus actinomycetemcomitans* is usually sensitive in vitro to streptomycin, tetracycline, and chloramphenicol, but relatively resistant to penicillin and ampicillin.[4] However, cures with use of ampicillin alone have been reported.[19] Cure of prosthetic valve endocarditis has been reported without valve replacement.[5]

Conclusion

Infection due to *Actinobacillus actinomycetemcomitans* usually presents as a subacute illness, similar to that produced by other slow-growing, fastidious, gram-negative rods. Special techniques, including holding blood cultures for several weeks, using carbon-dioxide enrichment, and obtaining a blind subculture from broth may be required for successful isolation. Morbidity and mortality may be high, but successful treatment is possible even in patients with prosthetic heart valves.

Irving Franco, M.D.
Department of Cardiology
The Cleveland Clinic Foundation
9500 Euclid Ave.
Cleveland, OH 44106

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