Case Report

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Endocarditis Due to a Penicillin-tolerant Streptococcus bovis: Microbiological Findings and Echocardiographic Follow-up

Summary: We are presenting a case of endocarditis due to a penicillin-tolerant Streptococcus bovis in a 65-year-old patient. The minimal bactericidal concentration of penicillin (40 mg/l) was more than 100-fold the minimal inhibitory concentration (0.08 mg/l). The MBC of penicillin was 0.31 mg/l in the presence of 1.25 mg/l gentamicin. Cross-sectional echocardiography revealed endocarditis of the anterior leaflet of the tricuspid valve and a vegetation on the aortic valve which appeared to be pedunculated and which prolapsed into the left ventricular outflow tract during diastole. During therapy, the pedunculated part of the vegetation disappeared without signs of embolization. After initial clinical improvement, the patient died of cerebral bleeding caused by a mycotic aneurysm of the left median cerebral artery. The patient's final outcome suggested an asymptomatic embolus. Cross-sectional echocardiography was distinctly superior to M-mode echocardiography in estimating changes in the size and shape of the valve vegetation. The results of the post-mortem examination of the aortic and tricuspid valves corresponded to the echocardiographic findings.

Introduction

Penicillin tolerance is defined as a substantial difference between the minimal inhibitory concentration (MIC) and the minimal bactericidal concentration (MBC). This phenomenon was first reported in Staphylococcus aureus (1) and subsequently in various species of streptococci. Although penicillin tolerance has been studied extensively in vitro, reports on serious infections are still rare (2) and streptococcal endocarditis due to tolerant strains has only been recorded occasionally (3-5).

In this paper we are presenting a fatal case of endocarditis caused by a penicillin-tolerant Streptococcus bovis. Although earlier reports indirectly refer to a few cases of endocarditis due to apparently tolerant S. bovis strains (6, 7), to our knowledge there have been no previous reports since the introduction of the term "penicillin tolerance".

Microbiological Methods

To determine MIC and MBC values, five colonies of the test strain were transferred into Iso-Sensitest (IST) broth (Oxoid) and incubated for 6h at 37°C. The broth culture was adjusted to approximately 5 × 10^5 colony forming units (cfu)/ml. Antibiotic powders were reconstituted and further diluted in IST broth. Equal volumes (0.5 ml) of the adjusted broth culture and the antibiotic dilutions were mixed and the MIC results were read after incubation for 18h at 37°C. To determine the MBCs, 0.01 ml were removed from each test tube and subcultured on...
sheep blood agar (for 18h at 37°C). The MBC was defined as the lowest concentration of the antibiotic which prevented growth on the subculture.

To determine bactericidal titers, serial two-fold dilutions of the patient's serum were made in IST broth. The remaining steps in this procedure were the same as those described above for measuring MIC and MBC values. The bactericidal titer was defined as the highest dilution of the serum which prevented growth of the test strain on the subculture.