Infectious Endocarditis: "the Microbe Makes the Difference"

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Infectious endocarditis, although infrequent, continues to cause substantial morbidity and mortality. Only 1 in 1000 hospital admissions is due to infectious endocarditis and its incidence is estimated at 40-60 cases per 1 000 000 persons/year. Despite decreased incidence of rheumatic fever, better treatment of focal infections and systematic use of antibiotic prophylactics, incidence of infectious endocarditis has not diminished in the last 30 years.[1] More than one single disease, what we commonly call infectious endocarditis is, rather, a group of infections differing greatly in terms of epidemiology, clinical management, prognosis, and course, but sharing location, in the valvular or mural endocardium, and the fundamental lesion, vegetations consisting of fibrin-platelet material, barely inflammatory, and full of microorganisms. It is the type of microbe more than the patient's characteristics that determines the clinical management, course and prognosis of the infection.

The last two decades have seen great advances in our knowledge of infectious endocarditis and new diagnostic procedures have been introduced, both in the field of imaging techniques, and in microbiology.[2,3] Different medical societies, including the European Society of Cardiology, have published consensus documents aimed at spreading knowledge of the infection, the clinical-microbiological basis of diagnosis, and the improved medical and surgical treatment available currently.[4] However, these innovations have not improved the prognosis of patients with endocarditis and some infections still have mortality rates in the order of 40%-50%.[5] Without a doubt, prosthetic valve infections and those caused by highly virulent organisms are associated with the highest mortality rates, and these are definitely among the very highest for infectious diseases.

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In our judgment, the introduction of new antibiotics with faster, more intense, bactericidal action will not substantially improve prognosis for patients with infectious endocarditis. We believe only faster detection of high-risk patients and early surgery, prior to the development of severe complications,[6] can avoid what would otherwise be an inexorably fatal course. Here lies the greatest interest of the article published in the present issue of *Revista Española de Cardiología* by Manzano et al.[7]

The authors present a sharply-focused analysis of acute coronary syndrome in an extensive series of patients with endocarditis, despite the limited bibliography, and general lack of information about the characteristics of these patients. Manzano et al[7] offer a detailed, clinical and pathologic description that improves our understanding of a problem which, although infrequent, has great prognostic importance. The observation that patients with acute coronary syndromes died with significantly greater frequency than did patients in the control group (64% vs 32%) is new and has practical implications. These patients, who often present with fever and chest pain, had aortic valve infections; half presented prosthetic endocarditis, and more frequently had large vegetations, and infection extending beyond the valvular annulus.

However, the present study does not enable us to learn whether presence of acute coronary syndrome is, in itself, an independent risk factor predicting mortality in endocarditis, even though this does seem highly likely. We should be able to establish an association between coronary syndromes and the development of cardiogenic shock and death in some patients in the series, but the conjunction of risk factors in many patients – heart failure, periannular complications, pseudoaneurysms, fistulas, atrioventricular block, and systemic embolisms – prevents us from understanding the role of coronary syndrome in what amounts to a fatal course for most of them. Possibly, only a larger series with a different statistical treatment could answer that question. However, the data available do reveal another factor which is crucial to understanding the rapid development of such extensive cardiac lesions and the complications found: "the microbe factor." Some 64% of patients diagnosed in this series had infections caused by staphylococcus and, to a lesser degree, yeasts.

Among pathogens of the endocardium, *Staphylococcus aureus* most frequently produces the most extensive, severe lesions affecting valve leaflets and extending to the valvular annulus, underlying myocardium, and support apparatus. When the microbes infect a prosthetic valve, invasion of the myocardium is a certainty.[8] A similar invasive capacity can be observed in endocarditis caused by coagulase-negative staphylococcus when microbes infect a prosthetic or a natural valve.[9,10] This invasive capacity, together with the dissemination of the infection thru the blood-stream with cerebral and myocardial embolisms, explains the high mortality of staphylococcal endocarditis. Consequently, we believe that isolation of *S aureus* in a patient with left-sided endocarditis constitutes the principal, and sometimes earliest, indication that we are faced with a patient at high risk of mortality and are obliged to act rapidly, which often means treatment including urgent valve replacement.

Nine of the 14 patients studied by Manzano et al[7] underwent surgery, most of them urgently, and 5 of them died. In another 3, valve replacement could not be performed for various reasons and all died. Only 2 patients did not need surgery and survived; both had infections from much less virulent organisms. These data suggest that in patients with staphylococcal infections, heart surgery offers a chance of survival, although risk of mortality remains high. As was reported almost 30 years ago,[11] very early indication for surgery, even before the development of heart failure, and other predictable complications could, given the current state of the art, be the only way to reduce mortality caused by staphylococcal endocarditis.

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