Commentary: Surgical outcome for infective endocarditis in children during long term follow-up

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Infective endocarditis (IE) has been increased in the adult population because of an increase of the number of drug users. In children, there has been an increase in cases of IE associated with congenital heart disease (CHD), because most patients with CHD survive much longer than they did several decades ago. Early surgical correction of lesions that were major risk factors for IE in the past has also changed the substrate for this disease. Increasingly, IE is seen to develop in the absence of CHD. This circumstance is often associated with central indwelling venous catheters (central lines). Many important clinical questions addressed in the guidelines do not lend themselves to clinical trials. It has been reported that in the case of IE in the structurally normal heart, the infection usually involves the aortic or mitral valve secondary to *Staphylococcus aureus* bacteremia.¹ Because a large study may be difficult to conduct in the pediatric population, current recommendations for treatment of the pediatric population with IE are extrapolated from the guidelines for adults.

In this issue of the *Journal*, Khoo and associates² describe the surgical outcomes of children with IE in a single institution. One hundred thirty-eight patients were involved in this study, including infants (20% of all patients with IE). Of these, 10 patients had univentricular circulation and 128 patients had biventricular circulation. This includes 43.5% of patients with left-sided IE and 42.7% of patients with right-sided IE, with the remaining 6.5% of patients having lesions on both sides. Valvular IE lesions were seen in 65.2% of the patients with a native valve IE and 20.3% of patients with a prosthetic valve IE. Nonvalvular IE was seen in 14.4% of all patients. Relative to a previous study on culture-negative IE,³ the blood culture-positive rate in the study of Khoo and associates² was relatively high (79%). Among those 109 patients, gram-positive infection was more frequent (85.3%) than gram-negative infection (14.4%). *S aureus* was the most commonly found organism (25.3%), whereas coagulase-negative staphylococcus had a stronger impact on mortality or morbidity, a finding consistent with adult data.⁴ In 31.2% of patients,

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Central Message

Good long-term survival and less recurrence of infective endocarditis can be achieved by early surgical intervention without increased risk of mortality.

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the antibiotic regimen had to be changed during the treatment. The median times for an embolic event from the date of the surgery were 5 days in patients with left-sided IE, and 28 days in patients with right sided IE. Aortic valve IE, which was the most frequent form of IE, carried a higher operative mortality (12.8%). Khoo and associates² showed higher mortality in left-sided IE, which was similar to the findings of a previous report.⁵ Early surgery was safe and did not increase the risk of mortality. Catheter-associated infections occurred in 77% of children younger than 10 years of age. Younger children were more likely to undergo surgery while still receiving antibiotics. Coagulase-negative staphylococcus is becoming the most common infectious organism.⁶ It has been recognized that coagulase-negative staphylococcus causes increased morbidity and mortality in the case of prosthetic valve IE. It would seem reasonable to recommend early surgical intervention, because freedom from recurrence of IE was 95% at a 25 years of follow-up, suggesting that surgery is highly effective in curing IE in children. The reoperation rate not directly related to IE was also high (45% of patients requiring reoperation by 25 years), particularly in patients with preexisting heart defects and perivalvular abscesses.

Although there are several limitations, including time bias, which may have allowed a change in antibiotic regimen and surgical indications, wide age distribution, and selection bias (surgical case only), the report of Khoo and associates² provides useful information about pediatric

patients with IE. The results with regard to causative organisms, the location of IE, and the severity of IE were similar to those seen in adult populations. Early surgical intervention is recommended in left-sided IE, particularly in aortic valve endocarditis. A strategy to reduce reoperation not directly related to IE may be a key for success in the future.

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