Cardiac Findings in Childhood Staphylococcal Sepsis

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SUMMARY

The clinical and laboratory findings of eight (20%) cases of cardiac involvement of 39 patients with sepsis caused by *S. aureus* (*Staphylococcus aureus*) were reviewed retrospectively. Our purpose was to emphasize the importance of the cardiac findings in patients with sepsis caused by *S. aureus* in childhood. The ages of the patients ranged from 6 to 14 years. All patients had pericardial effusion which was confirmed by echocardiographic (ECHO) examination in all cases except the one in whom ECHO examination could not be performed because he died 2.5 days after admission to the hospital. This patient also had myocarditis and heart failure. Aside from these, mitral insufficiency was diagnosed in the other patient; it was accepted as a sequela of rheumatic fever acquired previously. Open pericardial drainage was conducted successfully in the case who had a progression to cardiac tamponade. In the other patients pericardial effusion completely resolved with supportive and antibiotic therapy one to two weeks. Two of eight patients died from sepsis and septic shock; the mortality rate was 25%. Our findings show that cardiac involvement was fairly high (20%) in *S. aureus* sepsis in childhood. Therefore, it is suggested that children with *S. aureus* sepsis should be carefully monitored for cardiac involvement. (*Jpn Heart J* 2002; 43: 9-11)

Key words: *Staphylococcus aureus*, Cardiac finding, Childhood

STAPHYLOCOCCUS *aureus* (*S. aureus*) is a major cause of infection in infants, children, and adults. It may cause pyogenic infections of the skin, osteomyelitis, septic arthritis, wound infection, abscesses, pneumonia, empyema, endocarditis, pericarditis, meningitis, toxin-mediated diseases, and sepsis.¹⁻⁵⁾ In this article, the clinical and laboratory findings of eight (20%) cases of cardiac involvement of 39 patients with sepsis caused by *S. aureus* were reviewed retrospectively. Our purpose was to emphasize the importance of the cardiac findings in patients with sepsis caused by *S. aureus* in childhood.

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MATERIALS AND METHODS

In this retrospective study the data were obtained from medical records and patient charts with hospital discharge codes indicating staphylococcal sepsis. A total of 39 patients with staphylococcal sepsis were admitted to the Erciyes University Department of Pediatrics between 1982 and 1997. None of the 39 patients had a history of congenital heart disease or rheumatic heart disease. Patients with acute or subacute endocarditis caused by *S. aureus*, who were diagnosed in the same period, were not included in the study. The study includes eight children with cardiac involvement developed during staphylococcal sepsis.

Physical examination, routine blood and urine analyses, sedimentation rate, chest radiograph, blood culture analysis, electrocardiogram and echocardiogram (ECHO) (could not be performed in case 1 because he died 2.5 days after admission to the hospital) were performed in all children. In addition, surgical intervention to the bone, arthrocentesis, thoracentesis and pericardiocentesis were performed in some cases.

Initial treatment consisted of cefazolin + aminoglycoside (frequently gentamicin). On follow up, the antibiotics were changed if necessary. While the discharged patients were controlled one week later, blood culture analysis, cerebrospinal fluid investigation, and histopathological examination of the lung and liver were performed in the deceased patients.

RESULTS

The clinical and laboratory findings of the patients are given in Table I. There was a positive trauma history in six cases (cases 1,2,3,4,6 and 8), and three children (cases 1,4 and 6) received antibiotic therapy before admission to the hospital. Physical examination revealed systolic murmur in three cases, and friction rub and an enlarged cardiac shadow in seven patients. The cause of the murmur was mitral insufficiency (it was accepted as a sequela of rheumatic fever acquired previously) in case 3, but in the other two patients the murmurs were silent. In ECHO examination, pericardial effusion was diagnosed in all cases except case 1 in whom ECHO could not be performed. In case 1, the electrocardiogram revealed sinus tachycardia, reduced QRS complex voltage, and ST depression, but normal heart enzymes (creatinine phosphokinase and lactate dehydrogenase). None of the patients had clinical and ECHO findings of infective endocarditis such as splenomegaly, Osler nodes, Janeway lesions, splinter hemorrhage or valvular vegetation. Open pericardial drainage was successfully applied in case 2 who had progression to cardiac tamponade, and histopathological examination of the pericardial material revealed chronic pericarditis in this case. In the other six

patients, pericardial effusion was completely resolved with supportive and antibiotic therapy in one to two weeks. The ECHO findings normalized in all children, except case 3 who had mitral insufficiency. Two of eight patients died from sepsis and septic shock; the mortality rate was 25%. Postmortem examinations (including blood and cerebrospinal fluid cultures, histopathological examination of the lung and liver necropsy material) of the children who died were unremarkable.

DISCUSSION

Acute bacterial endocarditis, perforation of heart valves, myocardial abscesses, heart failure, conduction disturbances, acute hemopericardium, purulent pericarditis, and sudden death may be observed during staphylococcal bacteremia.⁵⁾ In a series of 281 cases of true bacteremia due to *S. aureus*, metastatic staphylococcal foci related to joint, renal and central nervous system were demonstrated in 75 (27%) patients. In the same series, the microorganism was demonstrated in the myocardium of 17 cases and in the pericardium of one case.⁶⁾ In the other series of staphylococcal sepsis in adolescents, of the nine cases, eight had pulmonary disease, seven bone and/or joint involvement, and one purulent pericarditis.⁷⁾

In our series, aside from bone, joint, pulmonary and renal involvement, cardiac involvement (mostly pericarditis) was diagnosed in 20.5% of 39 children who acquired the infectious agent from outside the hospital. Based on our findings we believe that all children with *S. aureus* sepsis, even if there are no cardiac symptoms or signs, should be carefully examined for cardiac involvement by ECHO, since most children are admitted with non-cardiac symptoms.

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