Bacterial Pancarditis with Myocardial Abscess:

Successful Surgical Intervention in a 14-Month-Old Boy

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A 14-month-old boy with a structurally normal heart presented with signs of cardiac tamponade caused by purulent pericarditis. During his hospital stay, mitral and tricuspid valve endocarditis developed, and a ventricular septal abscess expanded despite appropriate, prolonged antibiotic therapy for methicillin-resistant *Staphylococcus aureus*. The day before scheduled surgical correction, the abscess ruptured, creating a septal aneurysm. Surgical intervention resulted in an excellent outcome. Throughout the patient's 67-day hospitalization, the use of echocardiography was crucial in monitoring and diagnosis.

In addition to reporting this case, we discuss our diagnostic and treatment considerations. To our knowledge, this is only the 4th report of *S. aureus* bacterial pancarditis with myocardial abscess. (*Tex Heart Inst J* 2015;42(1):55-7)

Bacterial pancarditis resulting in intramyocardial abscess is a rarely reported and potentially fatal condition. Even with treatment, the mortality rate of bacterial pancarditis can be as high as 40%.¹ We report a case of bacterial pancarditis and myocardial abscess in a child, and we discuss the diagnostic and treatment considerations in this challenging case.

Case Report

In May 2009, a 14-month-old boy, previously healthy except for eczema, presented with respiratory distress and a fever of 104 °F of 2 days' duration. On examination, he appeared to have toxemia, was irritable, and had a diffuse eczematous rash with a 1-cm ulcer on his right knee. Cardiac examination revealed a prominent friction rub and a systolic murmur. Blood, urine, and skin ulcer cultures were taken. The patient was admitted to the pediatric intensive care unit and was started on intravenous ceftriaxone, oral prednisone, albuterol, and high-flow oxygen.

An echocardiogram revealed a large pericardial effusion with signs of tamponade: inferior vena caval dilation, right atrial collapse, "heart dance" (a bouncing motion of the heart within the pericardial fluid), and Doppler velocity changes during respiration. Pericardiocentesis was performed, and 55 mL of purulent exudate was aspirated and drained; no residual fluid was seen on an echocardiogram. The patient's respiratory symptoms improved. The pericardial fluid, blood cultures, and skin ulcer cultures grew methicillin-resistant *Staphylococcus aureus* (MRSA); therefore, the patient's antibiotic therapy was changed to vancomycin and rifampin.

On hospital day 5, echocardiograms showed mild mitral regurgitation secondary to perforation in the anterior leaflet of the mitral valve. These findings remained unchanged until hospital day 9, when echocardiograms showed a return of pericardial fluid and a well-defined, 1.7 × 1.6-cm echogenic area in the posterior interventricular septum near the tricuspid valve (Fig. 1). During the next 2 weeks, the echogenic area developed into an expanding abscess with an aneurysm (Fig. 2).

Pericardial thickening and persistent drainage from the pericardial catheter prompted surgical subxiphoid drainage of the pericardial effusion and the creation of a pericardial window. The patient tolerated the procedure well and was extubated the next day.

A computed tomogram confirmed the abscess and the dilated aneurysm of the ventricular septum (Fig. 3). Rupture of the aneurysm appeared imminent, so surgery was scheduled for the next day. However, later that same day, the abscess ruptured into the left ventricle and created a septal aneurysm, with the return of fever, leukocytosis, and toxic symptoms.

Fig. 1 Echocardiogram (long-axis view) on hospital day 9 shows an echogenic abscess in the interventricular septum.

Ab = abscess; RA = right atrium; RV = right ventricle

Fig. 2 Echocardiogram (long-axis view) on hospital day 21 shows the enlarged abscess impinging on the tricuspid valve (arrow). Note the change in the echogenicity of the abscess.

Ab = abscess; RA = right atrium; RV = right ventricle

Urgent surgical intervention was performed through a sternotomy. A saccular aneurysm protruded between the inferior vena cava and the diaphragmatic surface of the left ventricle. The patient was placed on cardiopulmonary bypass with the use of bicaval cannulation, left ventricular venting, and antegrade administration of cardioplegic solution.

The right atrium was opened, and an obvious vegetation on the posterior leaflet of the tricuspid valve was resected. An incision made behind that leaflet enabled access to the abscess cavity. The incision was extended superiorly behind the septal leaflet of the tricuspid valve and radially, to enlarge the opening. The mitral valve, the aortic valve, and the neck of the aneurysm were then visible.

A moderate perforation in the anterior mitral leaflet was closed with use of autologous pericardium soaked in glutaraldehyde. After irrigation and débridement of

Fig. 3 Contrast computed tomogram (axial view) shows a hypodense abscess (arrow) in the interventricular septum.

the aneurysm, a GORE-TEX® patch (W.L. Gore & Associates, Inc.; Tempe, Ariz) was sewn to the intraventricular septum at the membranous level, to close the neck of the aneurysm. The incision in the intraventricular septum was closed with use of a running horizontal mattress suture and pericardial strips on both edges.

After the patient was weaned from cardiopulmonary bypass and was hemodynamically stable, a transesophageal echocardiogram showed an excellent repair. There was no residual defect in the septum, no mitral or tricuspid valve insufficiency, good biventricular function, and sinus rhythm.

Postoperatively, the patient recovered gradually on continued administration of antibiotic agents. His white blood cell count and all vital signs became normal. He was discharged from the hospital one week postoperatively, on hospital day 67, in excellent condition. An echocardiogram obtained at that time showed trivial mitral regurgitation. The patient's eczematous rash was successfully treated with topical steroids. As of November 2014, all subsequent clinical and echocardiographic examinations showed that the patient's condition remained stable.

Discussion

We found only 3 previous reports of *S. aureus* bacterial pancarditis with myocardial abscess.²⁻⁴ In children with *Staphylococcus* bacteremia, there is a 12% incidence of infective endocarditis,^{4,5} and 90% of the reported cases have occurred in children with congenital heart disease.⁴ The mortality rate in *S. aureus* pericarditis is as high as 40%, chiefly because of cardiac tamponade.¹

Our case exemplifies the difficulty in the diagnosis and treatment of such patients: our patient, who had a structurally normal heart, presented with signs of cardiac tamponade caused by purulent pericarditis, and during his hospital stay he developed mitral and tricus-

pid valve endocarditis and a ventricular septal abscess despite appropriate antibiotic therapy. The abscess was initially an echocardiographic curiosity that presented as a small, dense lesion in the septum. Later, the diagnosis became clearer as the lesion's size increased and its mass and center became demarcated with less echodense material. In view of the positive skin, blood, and pericardial cultures, the presumed nidus of the MRSA pancarditis was a skin infection secondary to eczema.

Surgical intervention for the ventricular septal abscess was initially postponed in the hope that antibiotic therapy would prove to be adequate—in particular, because the patient did not have florid heart failure, persistent septicemia, or conduction abnormalities. This approach was unsuccessful. On the basis of the clinical situation and developments, we recommend that, as soon as a myocardial abscess is identified, it should be surgically treated. In our patient, echocardiography was paramount, not only to monitor the events, but also to diagnose the intramyocardial abscess; the computed tomographic scan was confirmatory.

Bacterial pancarditis requires a high degree of suspicion to obtain a correct diagnosis. Medical therapy with antibiotic agents and close echocardiographic monitoring are appropriate. We conclude that surgical intervention is necessary as soon as an abscess is recognized.

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