Aortic Root Abscess With Fistula Formation*

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Aortic root abscess is a common complication of aortic valve endocarditis. However, aortic root abscess and formation of a fistula from the aortic root to the right ventricular outflow tract in the setting of a native aortic valve and previous repair of an aortic dissection with a Dacron graft is an uncommon event. Transesophageal echocardiography is superior to transthoracic echocardiography for the diagnosis of aortic root abscess. To our knowledge, no studies have compared the diagnostic value of cardiac MRI with transesophageal echocardiography for this condition.

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Key words: abscess; aortic root; endocarditis; magnetic resonance imaging; transesophageal echocardiography

CASE REPORT

A 41-year-old man with a history of injection drug use developed severe chest pain and was found to have a type I aortic dissection. He underwent repair of the dissection with a Dacron graft and made an uneventful recovery. Four years later, at the age of 45 years, he was admitted to the hospital with Staphylococcus aureus endocarditis due to continued injection drug use. Transthoracic echocardiography at the time of hospital admission revealed no valvular vegetations or abscesses formation. During his fourth week of IV antibiotic therapy, the patient developed chest pain resembling the pain he had experienced with his acute aortic dissection. Cardiac examination revealed a hyperdynamic precordium and a new harsh murmur throughout systole and diastole.

Cardiac-gated T1-weighted spin-echo MRI was done to rule out recurrent aortic dissection. Images in the coronal plane (Fig 1) and the axial plane (Fig 2) revealed abscess cavities at the aortic root communicating with the main pulmonary artery. Gradient-echo flow-sensitive images demonstrated blood flow in these spaces. Inflammatory exudate is seen surrounding the aortic graft. Transthoracic two-dimensional echocardiography (parasternal short axis view at the base, Fig 3) demonstrated that the abscess cavities were located in the right sinus of Valsalva. The noncoronary sinus is seen, but the left sinus of Valsalva is foreshortened in this view. Continuous turbulent flow originating in the aortic root and traveling through an abscess cavity to the right ventricular outflow tract was observed.

Cardiovascular surgeons at two different institutions declined to operate on the patient because of his poor prognosis and his ongoing injection drug use in the setting of a previous vascular operation. The patient died of a cardiac arrest 10 days after this image was obtained. His family refused permission for an autopsy.

DISCUSSION

Aortic root abscess is a common and frequently lethal complication of infectious endocarditis involving the aortic valve. In one autopsy series, 24 of 59 patients (41%) with aortic valve endocarditis were found to have a valve ring abscess.1 A more recent study of 34 patients with aortic valve endocarditis found that 32% had an aortic root abscess confirmed at either surgery or autopsy.2 In a large case series of patients who had undergone combined aortic root and aortic valve replacement at a single institution, endocarditis was the most common late complica-
Figure 1. MRI in the coronal plane showing an abscess cavity (white arrow) at the aortic root (A) adjacent to the main pulmonary artery (PA). Inflammatory exudate (black arrow) surrounds the aorta.

Figure 2. MRI in the axial plane showing the abscess cavity (white arrow), which forms a fistula between the aortic root (A) and the main pulmonary artery (PA). Inflammatory exudate (black arrow) surrounds the aorta.
tion, with an actuarial incidence of 7% at 5 years after surgery. In another group of patients who developed infectious endocarditis after this procedure, 9 of 12 (75%) were found to have an abscess involving the aortic annulus at the time of surgery. The patient described herein developed endocarditis following repair of an aortic dissection with a Dacron graft that left his native aortic valve intact; the incidence of aortic root abscess in this particular setting is unknown.

Transesophageal echocardiography has been shown to be clearly superior to transthoracic echocardiography for the diagnosis of abscesses associated with endocarditis. In a study of 34 patients with aortic valve endocarditis, 11 of whom were subsequently proven to have aortic root abscesses, all 11 abscesses were detected by transesophageal echocardiography, whereas only four were detected by transthoracic echocardiography. Correlation of echocardiographic and pathologic findings suggests that perivalvular cavities such as those seen in this patient may often represent blood-filled pseudoaneurysms rather than true abscesses with pus accumulation.

Transesophageal echocardiography has also been successful in detecting fistula formation, most often communication between the aortic root and the left atrium due to perforation of the mitral-aortic inter-

valvular fibrosa. Communication between the aortic root and the right ventricular outflow tract has been less commonly described. In the patient described herein, transthoracic echocardiography did not detect any abnormalities when endocarditis was first diagnosed, but both the abscess and fistula were seen 4 weeks later. Transesophageal echocardiography was never performed and might have detected an abscess if one were present at the time of his initial presentation. In this patient, however, the additional information that might have been obtained from transesophageal echocardiography probably would not have affected his treatment or clinical course.

The role of cardiac MRI in the diagnosis of aortic root abscess in patients with endocarditis is unclear. In one series of 14 patients with endocarditis, cardiac MRI correctly diagnosed the condition in all five patients who had an aortic root abscess at the time of surgery; transthoracic echocardiography diagnosed the condition in only three of the five patients. To our knowledge, however, no study has compared transesophageal echocardiography with cardiac MRI for the detection of aortic root abscesses. In the absence of definitive data, the choice between these two diagnostic tests will depend on local availability and individualized clinical decision making.

REFERENCES

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