Echocardiographic Detection of Fungal Vegetations in Candida Parasilopsis Endocarditis

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A case of primary Candida parasilopsis endocarditis in a heroin addict involving the aortic valve is presented. Abnormal echoes in the aortic root during diastole and in the aortic valve during systole and diastole produced by fungal vegetations were found. The demonstration of fungal vegetations by echocardiography in the absence of positive blood cultures and systemic embolization is a useful diagnostic tool which should be utilized when fungal endocarditis is suspected.

Since its original description by Friedman and Donaldson in 1939 [1], the incidence of Candida endocarditis has been increasing. Prior to the era of surgical therapy, this condition had a mortality of 89 per cent [2]. Because fungal endocarditis is frequently associated with negative blood cultures and because of the reported observation that positive cultures for Candida may not be associated with valvular involvement [3], recognition of this disorder by noninvasive technics has become important. The hallmark of Candida endocarditis is the production of bulky exophytic vegetations. Recognition of these vegetations in patients with Candida endocarditis might therefore be critical in the absence of other clues for the prompt institution of effective and aggressive therapy. Our purpose here is to report on the echocardiographic identification of such vegetations found prior to surgery in a patient with C. parasilopsis endocarditis, whose blood cultures were negative prior to surgery.

CASE REPORT

A 55 year old black man, a known heroin addict for 30 years, was admitted to the medical service of the Bronx VA Hospital because of generalized weakness and malaise of three months' duration, a fleeting rash over the lower extremities and trunk, and progressive dyspnea on exertion for three weeks. He denied experiencing fever or rigors. There was no past history of cardiac murmurs, diabetes mellitus or hypertension.

On physical examination the pulse rate was 110/min, the blood pressure 120/70 mm Hg and the temperature 103°F. There was a purpuric rash over the lower extremities and trunk, and progressive dyspnea on exertion for three weeks. He denied experiencing fever or rigors. There was no past history of cardiac murmurs, diabetes mellitus or hypertension.

A purpuric rash over the lower extremities and trunk, all peripheral pulses were palpable. Examination of the heart revealed a grade 2/6 ejection systolic murmur and a grade 2/6 decrescendo diastolic murmur over the aortic area. Auscultation of the lungs revealed few bilateral basilar rales. The liver and spleen were palpable and enlarged. Laboratory data showed a hemoglobin level of 11 g/100 ml and a white blood cell count of 4,400/mm³ with a differential count of 3 per cent stab forms, 49 per cent segmented neutrophils, 45 per cent lymphocytes and 3 per cent monocytes. Other laboratory findings were within

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normal limits. An electrocardiogram showed sinus tachycardia at a rate of 115/min, abnormal left axis deviation, and nonspecific S-T segment and T wave changes. A chest film showed a slight increase in the transverse diameter of the heart. After obtaining blood for several cultures, therapy with cephalothin, gentamycin and methadone was instituted. The patient became afebrile on the third hospital day, and blood cultures previously obtained were reported to be negative. On the fourth hospital day, a right pleural effusion and evidence of left ventricular failure developed. The patient was promptly treated with digoxin and diuretics.

On the eighth hospital day the patient became febrile and tachypneic, with a pulse rate of 170/min and a blood pressure of 180/160 mm Hg. Cardiac auscultation revealed a grade 4/6 diastolic murmur at the aortic area and apex. A holosystolic murmur was also heard along the left sternal border with radiation towards the apex. A chest film showed pulmonary congestion and increased heart size. Echocardiography was performed using a Unirad Ultrasonoscope, Model 175B and an unfocused transducer, employing piezoelectric crystal 0.5 of an inch in diameter with a resonant frequency of 2.5 MHz. The echocardiograms were recorded on a Cambridge phonocardiogram recorder coupled to the Unirad Ultrasonoscope. Because of the patient's worsening hemodynamic status and the appearance of a distinct holosystolic murmur, he underwent cardiac catheterization and emergency open heart surgery.

At surgery all three cusps of the aortic valve were found to be involved and covered on the aortic as well as the ventricular surface by polypoid vegetations which extended into the ventricular endocardium or the aortic root. There was a 2 mm hole in the right coronary cusp of the aortic valve. The aortic valve was replaced with a Björk-Shiley prosthesis. The administration of amphotericin B, 5 mg/kg/day intravenously, and 5-fluorocytosine, 2 g orally every 6 hours, was started immediately after surgery.

ECHOCARDIOGRAPHIC FINDINGS

Figure 2 shows the aortic root and aortic valve echograms from a normal subject. Aortic leaflet echoes are sharp, free of any thickening and there are no abnormal echoes. Figure 3 shows the aortic root and aortic valve echoes found in the patient. An abnormal cluster of echoes are seen in the aortic root (Figure 3A). The mobility and the high intensity of these abnormal echoes is evident. Abnormal echoes are also visualized on the aortic valve in systole and diastole (Figure 3B). After reduction of gain setting, abnormal echoes are still visible on the aortic valve in systole and diastole (Figure 4). The aortic valve excursion was normal. There was premature closure of the mitral valve and diastolic fluttering of the anterior mitral valve leaflet.

CARDIAC CATHETERIZATION DATA

Right atrial pressure was normal. Pulmonary artery pressure was 57/30 mm Hg with a mean of 30 mm Hg. Aortic pressure was 152/46 mm Hg with a mean of 106
mm Hg. Left ventricular pressure was 152/46 mm Hg. The pulmonary artery wedge mean pressure was 25 mm Hg. There was no gradient across the aortic or pulmonary valves. Cardiac index was 3.36 liters/min. Ejection fraction was 56 per cent. There was no oxygen step-up in the right-sided cardiac chambers.

A high supra-aortic angiogram revealed 4+ aortic regurgitation. The left ventriculogram showed a dilated left ventricle but no mitral insufficiency.

COMMENDS

The diagnosis of Candida endocarditis is frequently difficult, particularly in the absence of positive bacterial cultures and systemic embolization. The accepted methods of diagnosis are blood cultures and Candida serology [4-6]. However, the organism may be only sporadically recovered despite multiple blood cultures and requires prolonged incubation [2]. Frequently, when the Candida organism is recovered, particularly from a single culture, the tendency has been to regard it as a contaminant [2]. In our patient, not until the 10th hospital day were the blood cultures diagnostic of C. parasiliosis, a common organism in heroin addicts [7,8].

The use of echocardiography in assessing the location and size of bacterial and fungal vegetations has not been fully established. Dillon et al. [9] undertook a study to visualize vegetations by echocardiography and to determine what size these vegetations had to be in order to be seen on echograms. In eight patients with autopsy or surgically proved bacterial endocarditis, they found nonuniform thickening of the valve but unrestricted motion of the involved leaflets. The ability to recognize these echoes depended on the size of the vegetations being at least 2 mm in diameter. Their observations were recently confirmed by De Maria et al. [10]. Since fungal vegetations are large and bulky, then, theoretically, they would more likely be detected by echocardiography than bacterial vegetations. In our patient, abnormal echoes were found in the aortic root in dias-
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tole and in the aortic valve in both systole and diastole. At surgery, bulky vegetations were found that would explain these findings.

Recently, Gotlieb et al. [11] reported two cases of Candida endocarditis in which abnormal "shaggy" echoes were demonstrated in the aortic root only in diastole. They, however, were unable to visualize the location of these echoes in systole. Shelbert and Muller [12] also detected fungal vegetations on a Starr-Edward mitral prosthesis. Thus, these studies and our findings show that there are echocardiographic features that suggest primary fungal endocarditis: (1) Abnormal echo clusters are visible intermittently in the aortic root; (2) valve leaflets are thickened with abnormal "shaggy" echoes that may be visible in both systole and diastole; (3) leaflet excursion itself is generally normal, except, perhaps, in those cases in which the valve leaflets are extensively damaged. The presence of normal leaflet mobility would distinguish the echocardiographic findings of primary endocarditis from those of calcific aortic stenosis, a disorder in which abnormal echoes are also present but leaflet excursion is reduced.

Thus, echocardiography appears to be a sensitive noninvasive technique for detecting fungal vegetations in endocarditis. Use of this diagnostic tool in the absence of systemic emboli and negative blood cultures may provide enough information so that early diagnosis can be made. It is recommended that drug addicts, patients receiving multiple antibiotics and immunosuppressive therapy, and those undergoing hyperalimentation should be screened by echocardiography when endocarditis is suspected.

REFERENCES