Tricuspid Stenosis in Prosthetic Valve Endocarditis

Diagnosis by Doppler Echocardiography

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Valvular stenosis is an uncommon finding in bacterial endocarditis involving native cardiac valves. Prosthetic valve endocarditis, however, is more commonly associated with obstruction. Bioprosthetic cardiac valves may be particularly prone to this complication. A case of bioprosthetic tricuspid valve endocarditis with stenosis diagnosed by Doppler echocardiography and confirmed by operative findings is presented.

The usual cause of valvular dysfunction in infective endocarditis involving native cardiac valves is valvular regurgitation. Valvular stenosis is rarely the major presentation. In contrast, valvular stenosis has been reported in 27 percent of infected cardiac prostheses.† These and other reported cases of infective endocarditis have all involved left-sided prosthetic valves. We present a patient with infective endocarditis involving a porcine tricuspid valve prosthesis with obstruction diagnosed by Doppler echocardiography.

CASE REPORT

A 30-year-old woman with a history of intravenous drug abuse for 15 years was admitted to another hospital in May, 1984 with typical presentation of bacterial endocarditis documented by blood cultures positive for Staphylococcus aureus. The hospital course was complicated by recurrent embolization to both the pulmonary and systemic circulations. The patient was transferred to this hospital for further evaluation and operative intervention after a ten-week course of antibiotic therapy.

Echocardiographic examination revealed a large tricuspid valve vegetation and dilatation of the right ventricle and right atrium. The interatrial septum appeared defective in the region of the fossa ovalis. At the time of the operative procedure, the tricuspid valve was found to have large vegetations involving all three leaflets. The valve was excised and replaced with a Carpentier-Edwards porcine prosthesis. A small defect in the region of the fossa ovalis of the interatrial septum was sutured closed. The postoperative course was uncomplicated, and the patient was discharged 12 days later. She was readmitted three months later with a three-day history of fever, chills, and continued intravenous drug abuse. Pertinent physical findings included blood pressure of 106/60 mm Hg, heart rate of 128 beats per minute, temperature elevation of 38.6°C (101.6°F) and a cardiac murmur—grade 3/6 mid-diastolic rumble with presystolic accentuation at the third left intercostal space. Echocardiogram showed large vegetations filling the orifice of the tricuspid prosthesis. Pulsed and continuous wave Doppler examination revealed the typical pattern of tricuspid inflow obstruction without regurgitation. The mean gradient across the prosthetic valve calculated from the continuous wave tracing was 11 mm Hg (Fig 1).

Blood cultures were positive for Staphylococcus aureus sensitive to therapy with vancomycin only. The therapeutic course was complicated by recurrent septic pulmonary embolization confirmed by ventilation perfusion lung scan. Following a six week course of vancomycin therapy, antibiotic therapy was discontinued. Three days later, the patient again developed fever, chills and marked leukocytosis. A repeat echocardiogram showed a remarkable increase in the size of the tricuspid valve vegetations, without significant change in findings from the Doppler study (Fig 2). Excision of the prosthetic valve was performed on the 48th day of hospitalization. The orifice of the excised valve was filled with large, obstructive vegetations.

DISCUSSION

Unlike infective endocarditis involving native valves, prosthetic valve infections are not uncommonly associated with stenosis of the valve orifice. In a review of 22 necropsy patients with endocarditis involving left-sided mechanical prosthetic cardiac valves, Arnett and Roberts§ found six cases with evidence of valvular stenosis. Nunez and associates‡ reviewed a series of 20 patients with infective endocarditis involving left-sided bioprosthetic valves and found (in the group of 11 patients who did not respond to medical treatment) evidence of leaflet thickening or vegetation formation by echocardiography, as well as large transprosthetic gradients by cardiac catheterization.

![Figure 1. Continuous wave Doppler tracing from the apex through the tricuspid valve. There is marked increase in the velocity of inflow (m/s = meters per second) with distortion of the tricuspid inflow pattern. No tricuspid regurgitation is seen. The calculated mean gradient is 11 mm Hg.](image-url)

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Pathologic findings included severe stenosis of the valves and extensive thrombotic vegetation formation. These authors suggested that bioprosthetic valves may be more prone to obstruction during infective endocarditis and that this complication may render medical therapy ineffective.

To our knowledge, our patient represents the first documented case of valve obstruction in association with tricuspid prosthetic valve endocarditis. Although two-dimensional echocardiography revealed the presence and growth of vegetations during serial evaluation, the magnitude of the obstruction induced by the vegetations was determined by Doppler examination. In fact, the continuous wave Doppler tracing was indistinguishable from that seen in native tricuspid or mitral stenosis.

CLINICAL IMPLICATIONS

In patients with prosthetic valve endocarditis, the presence of a murmur consistent with "increased flow velocity" across the involved valve and/or the finding by echocardiography of large vegetations should raise the suspicion of valvular obstruction. Doppler echocardiography can confirm the presence of obstruction and quantify its severity. Although the need for operative intervention should still be guided by the clinical course, the experience with our patient and that of previous reports suggest that medical therapy alone in these cases is likely to be unsuccessful.

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REFERENCES


Systolic Anterior Motion of the Mitral Valve in Patients with Hypertrophic Cardiomyopathy*

Disappearance after Treatment with Amiodarone

Francesco Enia, M.D.; Calogero Comparato, M.D.; Fiammetta Di Franco, M.D.; Antonietta Ledda, M.D.; and Giella Mitso, M.D.

We used amiodarone as the only drug in three consecutive patients with hypertrophic cardiomyopathy, marked systolic anterior motion of the mitral valve on M-mode echocardiogram, and paroxysmal atrial fibrillation. The effective control of atrial fibrillation was associated with good symptomatic relief and with reduction until disappearance of the systolic anterior motion of the mitral valve. These data were confirmed in a follow-up of 46, 30 and 30 months.

We used amiodarone as the only drug for treatment of three consecutive patients with hypertrophic cardiomyopathy, marked systolic anterior motion of the mitral valve on M-mode echocardiogram (SAM) and paroxysmal atrial fibrillation, obtaining effective anti-arrhythmic prophylaxis, progressive reduction, until disappearance, of the SAM, and evident relief of symptoms. These therapeutic results were confirmed in follow-up (46, 30 and 30 months). There were no side effects during amiodarone treatment (loading dose: 800 mg/day for a week; maintenance dose: 400 mg/day for five days a week).

CASE REPORTS

CASE 1

A 41-year-old man was well until five years earlier when dyspnea on effort developed. A diagnosis of hypertrophic obstructive cardiomyopathy was made and propranolol treatment started. During the four months before admission he had many episodes of paroxysmal atrial fibrillation with clinical impairment (NYHA class 3), while on treatment with propranolol. Physical examination showed a grade 3/6 apical systolic murmur. Echocardiogram confirmed the diagnosis of hypertrophic cardiomyopathy with marked SAM (Table I). Therapeutic benefit after amiodarone therapy persisted during a 46-month follow-up.

CASE 2

A 53-year-old woman complained of angina, syncope and dyspnea (NYHA class 2-3) for two years. She had had no cardiac diagnosis or treatment. One month before admission she had attacks of paroxysmal atrial fibrillation. On physical examination, a grade 3/6 apical systolic murmur was appreciated. An echocardiographic diagnosis of hypertrophic cardiomyopathy with marked SAM was made (Table I). Therapeutic benefit after amiodarone therapy persisted during a 30-month follow-up.

CASE 3

A 47-year-old woman had had dyspnea on effort (NYHA class 2-3) for several years, along with frequent episodes of paroxysmal atrial fibrillation.}

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