A 44-year-old woman underwent mitral valve and tricuspid valve (TV) replacement 6 years earlier using an ATS bileaflet tilting disc prostheses (ATS Medical Inc., Minneapolis, MN) for combined valvular stenosis and regurgitation because of rheumatic heart disease. On a routine clinic visit, the patient reported progressive fatigue and pedal edema over the previous few weeks. On physical examination, she was hemodynamically stable with evidence of elevated jugular venous pressure, hepatomegaly, and 3-mm pitting ankle and leg edema. Cardiac auscultation revealed closing and opening mechanical clicks; however, mitral and tricuspid clicks could not be distinguished. A grade 2/6 holodiastolic rumble and a grade 2/6 systolic murmur were audible at the left lower sternal border. An ECG showed atrial fibrillation with a ventricular rate at 75 beats per minute. Baseline laboratory investigations showed an international normalized ratio level of 1.8 with white cell count of 4960/mm³, erythrocyte sedimentation rate of 9 mm/h, and C-reactive protein level of 4 mg/L. Blood cultures were negative. A transthoracic echocardiogram showed both mechanical tricuspid discs stuck in a fully open position throughout the cardiac cycle (Figure 1A and 1B and online-only Data Supplement Movies I and II). A mobile structure was intermittently noted in the medial inflow portion of the tricuspid prosthesis suggestive of either a thrombus or vegetation (Figure 1C and online-only Data Supplement Movie III). Color Doppler showed diastolic turbulence across the TV with evidence of transvalvular tricuspid regurgitation (Figure 1D and online-only Data Supplement Movie IV). On spectral Doppler, TV gradients were significantly elevated with absent valve clicks and prolonged pressure half-time at 235 ms. Tricuspid regurgitation is also evident (arrow).

Figure 1. Transthoracic echocardiogram of the mechanical tricuspid valve prosthesis. A, Systolic and (B) diastolic frames show that both discs are stuck in an open position (arrows). C, A mobile structure is intermittently noted in the medial inflow portion of the prosthesis suggestive of either a thrombus or vegetation. D, Color Doppler shows a turbulent diastolic jet across the prosthesis.

Figure 2. Spectral Doppler recording of tricuspid valve flow. There is absence of opening and closing clicks of the tricuspid valve with markedly elevated gradients (peak/mean gradients = 26/16 mm Hg at heart rate of 72 beats per minute) and significant prolongation of the pressure halftime at 235 ms. Tricuspid regurgitation is also evident (arrow).
mobile structure on the TV and significant tricuspid regurgitation (online-only Data Supplement Movie VII). The mechanical mitral valve showed optimal function with normal disc motion and no evidence of thrombi (online-only Data Supplement Movie VIII).

The patient was given the diagnosis of mechanical TV thrombosis and treated with intravenous streptokinase (250,000 U over 30 minutes followed by 100,000 U per hour of infusion).1 Daily echocardiograms showed resolution of visible thrombi and resumption of normal opening and closure of both discs (online-only Data Supplement Movies IX and X) with resolution of tricuspid regurgitation (online-only Data Supplement Movie XI) after 48 hours of infusion. This was accompanied by a significant drop of TV gradients and resumption of valve clicks on spectral Doppler (Figure 5). A follow-up fluoroscopy showed normal motion of both TV discs (online-only Data Supplement Movie XII).

TV replacement with a mechanical prosthesis poses a number of challenges to the treating physician. Mechanical TVs carry the highest risk of thrombosis of any cardiac valve with an incidence of 3.3% of patient-years.2 This was evident in our patient because thrombosis of the mechanical TV was not associated with a similar event on the mitral side. Although there are no published guidelines for the prevention of thrombosis in patients with mechanical TV, warfarin therapy aiming for a high therapeutic international normalized ratio value is often recommended with or without additional antiplatelet therapy.3 Our patient’s international normalized ratio was subtherapeutic at presentation, and chronic atrial fibrillation has likely increased her risk of valve thrombosis. As expected in most patients with mechanical TV thrombosis, thrombolytic therapy was successful in our patient, as evidenced by findings on fluoroscopy and echocardiography.1 However, she remains at risk of thrombosis recurrence.

Insertion of right heart catheters or pacemaker leads across a mechanical TV is contraindicated because of interference with disc motion and proper prosthesis function. Options for ventricular pacing include surgically implanted epicardial leads or transvenously inserted leads through the coronary sinus.4 Bioprosthetic valves provide a good alternative to mechanical prostheses in patients requiring TV replacement. Mechanical valves carry a higher rate of thrombosis, whereas bioprosthetic valves have a higher rate of structural deterioration.2 Reoperation and short- and long-term survival rates are similar among both valve types.2

Disclosures

None.

References

Stuck Mechanical Tricuspid Valve Prosthesis: The Valve That Does Not Move

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