Case report - Valves

Mechanical aortic valve without anticoagulation for twenty-three years

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Abstract

Current guidelines necessitate varying degrees of long-term anticoagulation in patients with mechanical heart valve(s) to prevent thrombotic and embolic complications. We describe a patient with a functioning aortic mechanical valve without anticoagulation for 23 years. A 68-year-old man had an aortic valve (St Jude Medical) replacement in 1984. His native valve was incompetent from infective endocarditis. He discontinued Coumadin three months after the surgery. He presented 23 years later with palpitations for one month. Further work-up revealed a NYHA class I function, normal sinus rhythm, normal sized heart on chest X-ray, normal systolic and diastolic function on echocardiography. Mean transaortic gradient was 19 mmHg and calculated valve area was 1.48 cm². Fluoroscopy showed normal excursions of the mechanical aortic valve. Exercise stress test did not show any limitation in effort tolerance or perfusion defects. He was discharged on daily aspirin and clopidogrel.

Keywords: Mechanical valve; Anticoagulation; Aortic valve; Thrombosis; Embolism; Bleeding

1. Introduction

Mechanical valves composed of metal or carbon alloys have the advantage of long-term durability, but they carry an increased risk of thrombo-embolism as well as definite risk of bleeding secondary to anticoagulation [1]. We describe a case of functioning mechanical aortic valve (St Jude Medical) without anticoagulant therapy for twenty-three years.

A 68-year-old African-American man with a history of systemic hypertension was hospitalized with frequent episodes of palpitation at rest for one month duration. He underwent aortic valve (St Jude Medical) replacement 23 years previously for infective endocarditis secondary to intravenous drug abuse. He discontinued coumadin following an ‘allergic’ reaction three months after surgery. He had no medical follow-up.

He was New York Heart Association functional class-1. Vital signs included a regular heart rate of 80 beats per minute and blood pressure of 150/90. Cardiac auscultation revealed a normal intensity first heart sound and loud mechanical component of aortic second heart sound and grade 3/6 systolic murmur at the aortic area. The rest of the physical examination was unremarkable.

His hemoglobin was 150 g/l and platelet count was 275×10⁹/l. Troponin of 0.02 µg/l and B-type natriuretic peptide of 42 ng/l were in normal range. Liver, kidney and thyroid function tests were within normal limits. His international normalized ratio (INR) was 1.2. Electrocardiography demonstrated normal sinus rhythm. Twenty-four hour Holter monitor did not reveal any evidence of arrhythmia. Chest X-ray showed a normal sized heart.

Transthoracic echocardiogram (TTE) showed normal left ventricular systolic and diastolic function. Prosthetic aortic valve was noted but reverberation artifact precluded valvular morphological assessment. Peak velocity across the aortic valve was 3.07 m/s, mean transaortic gradient was 19 mmHg and calculated aortic valve area was 1.48 cm². Pulmonary pressures were normal. Transesophageal echocardiogram revealed a bileaflet aortic mechanical prosthesis with normal excursions. There was no evidence of thrombus, pannus formation or regurgitation. Fluoroscopy showed normal movement of the mechanical aortic valve. Exercise stress test did not reveal any significant symptoms or hemodynamic abnormalities or EKG changes or perfusion defects, with excellent exercise capacity. The patient remained asymptomatic during the hospital course. He did not complain of shortness of breath. He was discharged on aspirin and clopidogrel as he refused to be placed on coumadin.

2. Discussion

Prosthetic valve thrombosis and subsequent systemic embolization are well-known complications of mechanical valves, which mandate the patient to receive long-term anticoagulant therapy [1]. However, most results of anti-
thrombotic prophylaxis are from non-randomized case series without controls [2]. Uncomplicated functioning without anticoagulation of various mechanical valves including Bjork–Shiley (B-S), Starr–Edwards (S-E) and Lillehei–Kaster (L-K) in aortic or mitral positions have been reported (Table 1) [3–8]. It is observed that mechanical valves at aortic position are durable without anticoagulation irrespective of type of valve used as Bjork–Shiley, Starr–Edwards or St Jude Medical as in our case [2–7]. Interestingly, Andersen and Alstrup followed 43 patients (mean age 52 years) who discontinued anticoagulation after 12 months of isolated mechanical aortic valve replacement and were followed for a mean period of 7.2 years without anticoagulation [3]. They noted after 10 years, 41% incidence of thromboembolic events and 17% mortality.

Bjork et al. postulated that all thromboembolic complications in mechanical heart valves start from a thrombus lining that covers the suture ring [9, 10]. The thrombus organizes to a fibrous white sheet over the suture ring, which then can protrude out over the polished surface of the valve ring flange. Pieces of the thrombus can be knocked off by the disc and cause emboli. To diminish thrombo-embolic complications, one must either prevent this thrombus from protruding into the groove between the suture ring and the valve flange or allow the thrombus to be organized as a thin covering with endothelium-like cells as a continuation from the suture ring over the valve flange. This type of covering was obtained during a short period of anticoagulation by applying a microporous surface to the Bjork–Shiley Monostrut mitral valve. They observed two goats with microporous surfaced B-S mitral valve without anticoagulation for five years. These animals had a total of six pregnancies with delivery of 14 newborns without any thrombotic complications [9, 10]. The same group in 1999 demonstrated the favorable outcome in 12 patients with Bjork–Shiley Monstrut mechanical mitral valve with a microporous surface without anticoagulation for 11–13 years [4]. It is unusual that a functioning St Jude Medical aortic valve is present without anticoagulation for over twenty-three years. The potential factors underlying in the normal valvular mechanics in our patient remains unclear. Guidelines are sorely needed in patients with mechanical valves who subsequently develop a contraindication and that this case, like many others, at the least gives some direction in patients with mechanical valves in the aortic position.

References


eComment: Anticoagulation for mechanical heart valves: a current assessment

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Reading your case report [1], I realize that you neither focused on the responsible underlying mechanism of your patients normal valvular mechan-
ics – by examining if he had traditional or non-risk factors for thromboembolism [2] – nor referred if your patient was under antiplatelet therapy after the discontinuation of anticoagulant due to allergic reaction. Furthermore, the guidelines you refer to are not updated (there are current guidelines – 10 years after yours). Also, you question the anticoagulation therapy following mechanical aortic valve replacement using data from the article of Andersen and Alstrup who recommend lifelong anticoagulation as the best postoperative treatment in isolated aortic valve replacement with a mechanical valve [3]. Cannegieter noted that, in the absence of oral anticoagulation, using antiplatelet therapy alone, there is an increase in both valve thrombosis and thromboembolism rates [2], fact that you do not mention despite the second reference in your article.

Generally, patients who undergo mechanical heart valve replacement require lifelong oral anticoagulants. Thromboembolism (TE), anticoagulation-related hemorrhage and a much rarer incidence of valve thrombosis are the major valve related events (VREs), which are the consequences of anticoagulation mismanagement, and account for more than 75% of all VREs [2]. These occur more frequently in the first 6 months following surgery, especially anticoagulant-related hemorrhage [2, 4]. Notably, VREs are less common in the aortic than in the mitral position while freedom from all VREs happens at approximately 8 years for mitral and 10 years for aortic valve prostheses [2, 4]. However, several long-term follow-up reports indicate that survival after valve replacement is due to patient-related factors rather than to the presence of the valve prosthesis itself. Recent data indicate this may be true for TE, as the rate of both major and minor TE will change depending on the risk factors in each individual patient [2].

Because of the fear of major TE events without a warfarin-based anticoagulation regimen and medical-legal implications of major events, antiplatelet therapy alone has not been pursued until recently. However, Garcia-Rinaldi is conducting a prospective non-randomized trial in which patients with mechanical aortic valves receive only aspirin and clopidogrel, loading immediately postoperatively when feasible [5]. The latest results indicate that one TE (cerebral vascular accident (CVA) at 48 h postop) and no valve thrombosis has occurred in 108 patients followed-up to 4 years, an average of 30 months postoperatively [2, 5]. TE and anticoagulant-related hemorrhage are not uncommon in the early postoperative period. Therefore, antithrombotic prophylaxis is recommended for at least 3 months for aortic valve replacement and chronically for mitral and tricuspid prostheses [2].

In conclusion, the use of antiplatelet agents alone currently can be recommended only if patients cannot take oral anticoagulation, yet low risk compliant patients would likely have a VRE rate at least equivalent to antithrombotic therapy [2]. The above prospective randomized trial in low-risk patients after AVR added to current medical advances is warranted and could provide evidence for substantive patient benefit [5].

References


