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Case Report

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Longest Survival after Aortic Valve Replacement with Bioprosthesis: A 38 Year Follow-Up

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Abstract

Aortic valve replacement is the second most common cause for cardiac surgery. Over the last four decades, bioprosthesis have been widely used in aortic valve replacement. Though bioprosthetic valves are used to avoid long term anticoagulant therapy in patients post-surgery, the valves are at a risk of structural deterioration, requiring redo surgery. Various studies have reported both mortality and durability only for a single decade of follow-up of aortic valve replacement. Additional long term follow-up results are required especially in patients who had aortic valve replacement at younger age. Recent advancements in aortic valve replacement surgery are sutureless aortic valve replacement through percutaneous transcatheter heart valve technology. Since this technique also uses bioprosthesis, population demographic that can benefit from sutureless aortic valve replacement is unclear. Here, we report a patient who has been consistently documented follow-up for thirty eight years after a successful aortic valve replacement with bioprosthesis.

Keywords: Bioprosthesis; Aortic valve; Aortic valve replacement

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Introduction

The main query for the patients requiring aortic valve replacement (AVR) is to select between the kind of valve being either mechanical or bioprosthetic valve. The choice of valve the prosthesis is based on consideringseveral factors including valve durability, expected hemodynamics for a specific valve size, the potential need for long-term anticoagulation, and patient values and preferences [1,2]. Sixty percent of the patients undergoing AVR choose mechanical valve and the remaining forty percent choose bioprosthesis [3]. Follow-up of patients with bioprosthesis demonstrated structural valve detoriation (SVD) in implanted valves after six to eight years. According to various studies regarding the follow-up of patients with AVR, very few patientswith original valve in place remain alive beyond fifteen years post AVR [3,4]. Nonetheless, durability of the bioprosthetic valves remains consistent during the first decade; additional long term follow-up studies are required to make them suitable for use in the younger patients.

Case Report

A 73-year old male patient was referred to our cardiology department for evaluation. He had aortic valve replacement with Bioprosthetic valve in November 1980. He has a history of hypertension and hyperlipidemia. His physical examination was unremarkable. Electrocardiogram showed sinus rhythm with intraventricular conduction delay. His echocardiographic examination revealed an ejection fraction of 60-65%, mildly dilated ascending aorta of size 4.2 cm, and no evidence of either aortic stenosis or aortic incompetence. Follow-up to the date show that the patient had AVR with an appropriate prosthesis with the patient being clinically and hemodynamically stable, symptom free without experiencing any valvular dysfunction and having independence in activities of daily life.

Discussion

AVR was started in 1950's and the use of bioprosthesis for AVR was started in 1960's as an alternative to mechanical valves because of their low thrombogenicity and a goal to avoidlong term anticoagulant therapy. In 1982 Hancock II Bioprosthesis was available for clinical use which included a calcium retarding agent in tissue treatment process to reduce SVD. David et al. reported a decrease in 98% in Small vessel disease (SVD) with this bioprosthesis after two decades of follow-up [5]. Subsequently, in 1994 Medtronic Mosaic Bioprosthesis (MMB) was available for clinical use. Celiento et al. reported 63% survival, 91% freedom from endocarditis, and 85% freedom from SVD with MMB after thirteen years follow-up [6].

The choice of type of the prosthetic heart valve should be a shared decision-making process. A mechanical valve has an advantage of being durable and long lasting in comparison with bioprosthetic valve. However, mechanical valves are highly thrombogenic and

require life-long anticoagulation therapy which is associated with an increased risk for bleeding. Bioprosthetic valves are generally made from either porcine or bovine pericardium. These bioprosthetic valves are advantageous because they do not require anticoagulation and are preferred forAortic Valve Replacement (AVR) in patients with high risk of bleeding. However, bioprosthetic valve begins SVD within six to eight years after implantation. Some patients prefer to avoid repeat surgery and are willing to accept the risks and inconvenience of lifelong anticoagulant therapy. Other patients are unwilling to consider long-term anticoagulant therapy because of the inconvenience of monitoring, the attendant dietary and medication interactions, and the need to restrict participation in some types of athletic activity [7]. Age is important because the incidence of structural deterioration of a Bioprosthetic valve is greater in younger patients, but the risk of bleeding from anticoagulation is higher in older patients [8,9].

Considering the risk/benefit ratio of need of repeat surgery for SVD and avoidance of long term anticoagulation therapy that AHA guidelines recommends, bioprosthetic valve for patients of any age for whom anticoagulants are contraindicated (Class Ia), reasonable to implant an aortic mechanical valve for patients of age less than 50 years who can tolerate long term anticoagulation therapy (Class IIa), reasonable to individualize the choice of either a mechanical or bioprosthetic valve prosthesis on the basis of individual patient factors and preferences for patients of age between 50 and 70 years (Class IIa) and a bioprosthesis is reasonable for patients of age more than 70 years (Class IIa) [7,8]. Despite these recommendations, the use of bioprosthesis in aortic valve replacement surgeries has significantly increased in all age groups.

Until recently, AVR was the only surgical option available for most of the patients. With the recent advances in valve technology, AVR is replaced by sutureless aortic valve replacement through percutaneous transcatheter heart valve technology. This technique only uses bioprosthesis as the valves are compressed during the procedure [4]. Sutureless AVR have an advantage that it can be used in high-risk situations like the presence of a porcelain aorta, calcified aortic root, and in redo surgery. The patient population that can benefit from this procedure in not clearly defined, but due to the excellent results of this technique in intermediate to high risk patient population, the procedure is under consideration for low risk groups.

Conclusion

The main reason for the use of bioprosthetic valve is to avoid lifelong anticoagulation therapy. With the bioprosthetic valve showing good overall performance and freedom from redo operation in our patient;we recommend there is an increased durability in bioprosthetic valve.

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