low-molecular-weight heparin in preventing thrombus formation on mechanical heart valves in an vitro model. McKellar and associates [3] reported that dabigatran prevented valve thrombus and platelet deposition on St. Jude mechanical valves in a porcine heterotopic model. However, in these 2 reports, dabigatran could not completely prevent valve thrombosis. Actually, Stewart and colleagues [5] described a patient with a St. Jude aortic valve replacement who experienced valve thrombosis and an embolic stroke when undergoing anticoagulation with dabigatran. Price and associates [6] reported 2 patients with mechanical heart valves, 1 in the aortic position and the other in the mitral position, who had been switched from warfarin to dabigatran, leading to thrombosis of their prosthetic valves. They required valve replacement, although they recovered without any complications.

In our patient, multiple factors might have contributed to the thrombus formation. First, his prosthetic valve was placed in the mitral position, which is more thrombogenic than the aortic position. Second, his cardiac function was so bad that the ejection fraction of the systemic ventricle was 35%. Third, the fact that his systemic ventricle was the morphologically RV played a role. Among ccTGA patients, it is known that thrombus is sometimes formed in the RV/systemic ventricle because of its prominent trabeculae. Fourth, he had a history of paroxysmal atrial fibrillation.

Considering the fact that he had never experienced a thromboembolic event during warfarin use although he had these risks of thrombus formation, dabigatran might not be effective in preventing thrombosis in patients with mechanical heart valve replacements. Actually, Toeg and coworkers [7] warned that off-label use of dabigatran leads to catastrophic complications and jeopardizes patient care. Further study is required to ascertain whether dabigatran has the capacity for thrombophylaxis in the patient who has undergone mechanical valve replacement.

References


Transcatheter Aortic Valve Implantation for Degenerative Aortic Valve Regurgitation Long After Heart Transplantation

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Transcatheter aortic valve implantation (TAVI) has become a feasible therapeutic option for the management of high-risk patients with severe degenerative aortic stenosis. Recently it has been extended to high-risk patients with severe aortic regurgitation. Degenerative aortic valve disease is generally uncommon in heart transplant recipients. We report the case of a 75-year-old man in whom severe degenerative aortic regurgitation developed 14 years after heart transplantation (HTx). Because of multiple comorbidities and high surgical risk, TAVI was preferred. A 29-mm CoreValve prosthesis (Medtronic Inc, Minneapolis, MN) was successfully implanted using a transfemoral approach.

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In the past 30 years, heart transplantation (HTx) has become the only definitive therapy for end-stage heart failure. Long-term survival of heart transplant recipients has significantly improved. However, the incidence of valvular heart diseases late after HTx is growing, leading to the need for reintervention in a group of patients with high surgical risk. Tricuspid regurgitation (TR) is the most common valvular heart disease after HTx, whereas left-sided valve disease occurs less frequently. Cases of degenerative mitral and aortic valve disease after HTx are only anecdotal [1–3].

We describe a case of degenerative aortic valve regurgitation that occurred long after heart transplantation and was successfully treated with transcatheter aortic valve implantation (TAVI).

A 75-year-old white man was admitted to our institution because of a recent onset of dyspnea on mild exertion.
Fourteen years earlier he had undergone HTx because of refractory congestive heart failure in dilated cardiomyopathy as a result of previous aortic and mitral valve replacement.

Three years after HTx, he underwent percutaneous transluminal coronary angioplasty of the circumflex coronary artery because of cardiac allograft vasculopathy. His comorbidities were severe chronic renal failure, with a serum creatinine value of 2 mg/dL, a left fibrothorax, and severe chronic obstructive pulmonary disease.

Maintenance immunosuppressive therapy consisted of cyclosporine 80 mg plus prednisone 5 mg daily. He was treated chronically with antiplatelet therapy and antihypertensive drugs, and he remained asymptomatic until the current hospital admission.

Previous 2-dimensional transthoracic echocardiography showed mild thickness of the left coronary aortic cusp with mild valve regurgitation.

The transthoracic echocardiogram performed at admission showed a mild dilatation of the left ventricle (end-diastolic diameter, 60 mm; end-systolic diameter, 48 mm) with global hypokinesia and a moderate decrease in ejection fraction (left ventricular ejection fraction, 40%). The aortic valve was tricuspid with thickened cusps. A marked deformation and retraction of the left coronary cusp with loss of central diastolic coaptation and severe valvular regurgitation were seen (holodiastolic regurgitation with pressure half time of 200 msec and flow reverse in the descending thoracic aorta).

Coronary angiography showed mild intrastent restenosis of the left circumflex coronary artery. Aortic angiography confirmed the presence of severe aortic regurgitation (Fig 1A).

Kidney function progressively worsened during hospitalization because of contrast-induced nephropathy (serum creatinine level rising to 4.8 mg/dL), and hemodialytic treatment was administered.

The patient was evaluated jointly by the cardiovascular team. According to preoperative clinical characteristics and comorbidities, the patient was judged to be at very high risk for conventional aortic valve replacement (logistic EuroSCORE, 36%) and was therefore considered for TAVI. A computed tomographic scan of the chest and the aortoiliac-femoral axis revealed a mean aortic annulus diameter of 24 mm with a circumference of 78 mm and normal-sized iliac and femoral arteries bilaterally.

To limit renal dysfunction from contrast-induced nephropathy, cyclosporine was stopped a few days before the procedure, leaving methylprednisolone 20 mg intravenously as the sole immunosuppressant agent.

TAVI was performed using general anesthesia and a right transfemoral approach. A 29-mm CoreValve prosthesis (CoreValve ReValving System, Medtronic Inc, Minneapolis, MN) was advanced in a retrograde fashion and deployed under angiographic and fluoroscopic guidance during rapid ventricular pacing (150 bpm) (Fig 1B). Immediately after valve deployment, arterial pulse pressure was normalized. An ascending aorta angiogram confirmed the adequate positioning of the prosthesis, with preserved coronary artery ostia and the absence of significant paravalvular or valvular regurgitation (Fig 1C). Hemodynamics were stable throughout the entire procedure.

The patient was extubated on the first postoperative day and discharged from the intensive care unit on the fourth postoperative day. Forty-eight hours after TAVI, a definitive cardiac pacemaker was implanted because of the onset of third-degree atrioventricular block. His subsequent hospital stay was characterized by the onset of atrial fibrillation and by lower respiratory tract infection that was successfully treated with a short course of antibiotics. Renal function gradually returned to the preoperative level. Cyclosporine treatment was resumed orally with increasing doses to reach the target blood levels according to renal function.

The echocardiogram obtained before discharge showed proper functioning of the prosthetic valve, with peak and mean transvalvular gradients of 16 and 10 mm Hg, respectively, and a mild paravalvular leak. Improvement in left ventricular systolic function (50%) and mild mitral
regurgitation were noted. On the 18th postoperative day the patient was discharged home.

Comment

Long-term survival of heart transplant recipients has increased significantly over the past decades, mainly because of the improvement of surgical techniques and the increasing availability of effective immunosuppressive drugs. The incidence of cardiac allograft vasculopathy and valvular disease and the need for reoperation long after HTx have consensually increased [1].

TR is the most common valvular heart disease. It is frequently observed within the first months after HTx and seems to be correlated with pulmonary hypertension. Although TR can be severe in the acute phase of HTx, it usually improves over time. Conversely, late TR is mainly the consequence of multiple endomyocardial biopsies and frequently requires surgical treatment [1]. Left-sided valve disease after HTx occurs less frequently [1–3].

Most early left-sided valve disease consists of valvular regurgitation. It occurs as a consequence of abnormal atrial configuration or valvular edema in the first postoperative days or bacterial endocarditis weeks or months after HTx [2, 3].

Late left-sided valve disease is very uncommon because grafted aortic and mitral valves seem to be less susceptible than grafted coronary arteries to degenerative processes [2, 3]. Very few cases of aortic and mitral valve replacement have been reported in the literature [4, 5].

Nevertheless, when reintervention is needed, it should be considered that heart transplant recipients represent a special cohort with high operative risk for conventional surgical procedures because of their specific characteristics and comorbidities. In our case, the patient’s risk profile was prohibitive because of the 2 previous cardiac operations, the presence of left ventricular dysfunction, and the preexisting comorbidities.

TAVI has become a safe and effective treatment for patients with severe aortic valve stenosis who are considered at high or prohibitive surgical risk. Recently TAVI has been extended to high-risk patients with severe aortic regurgitation. There are 2 published cases of degenerative aortic stenosis successfully treated with TAVI, in 1 case using the transapical approach and in the other case using transfemoral access [6, 7]. In another case, the patient underwent transfemoral TAVI for severe aortic regurgitation secondary to Impella device (Abiomed, Inc, Danvers, MA) placement early after HTx [8].

To our knowledge, this is the first reported case of successful transfemoral TAVI performed in a heart transplant recipient because of late degenerative aortic valve regurgitation. TAVI seems to represent a safe and effective therapeutic option for aortic valve disease in high-risk or inoperable heart transplant recipients; however, longer follow-up and more experience are necessary to recommend it worldwide.

References


Sutureless Perceval Aortic Valve Replacement in Aortic Homograft

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We report a case of aortic valve replacement with a sutureless valve in a degenerated aortic homograft. This technique allows rapid aortic valve replacement in a heavily calcified aortic root. It avoids the problems of postoperative prosthetic disinsertion frequently encountered after aortic valve replacement in a calcified annulus. It is particularly suitable in redo procedures for homograft degeneration. It avoids performing a redo Bentall operation with its known morbidity.


Homografts and pulmonary autografts are mostly used in the aortic position in adults, although they account for less than 1% of aortic valve replacements in most large databases. Homografts are subject to structural valve dysfunction. A propensity-matched analysis found that homografts did not provide better

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