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Transfemoral aortic valve implantation in the case of pre-existing mitral prosthesis and pure aortic regurgitation: A case report

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Abstract

BACKGROUND

Transcatheter aortic valve replacement (TAVR) is recommended in patients with severe aortic stenosis who have high surgical risk. However, in the pre-existing mechanical mitral valve prosthesis and natural pure aortic regurgitation, TAVR is relatively contraindicated. In this report, we described one case of TAVR with native aortic regurgitation in the presence of mechanical mitral valve prosthesis.

CASE SUMMARY

A 64-year-old man with a medical history of mitral valve replacement had severe dyspnea and was symptomatic even at rest for 3 mo. His echocardiography showed severe native pure aortic regurgitation. His euroscore was 15. A TAVR procedure with an evolut R was planned. A 34 mm evolut R was placed by transesophageal echocardiography. The mitral prosthesis was functioning normally, and mild-moderate paravalvular leakage was evident by transesophageal echocardiography. The patient recovered without any complication. At 1 mo follow up, the patient was well, and no paravalvular leakage was noted.

CONCLUSION

TAVR for pure aortic regurgitation in the presence of prosthetic mitral valve can be a safe procedure.

Key words: Transcatheter aortic valve replacement; Prosthetic; Mitral stenosis; Aortic regurgitation; Case report

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Core tip: Transcatheter aortic valve replacement (TAVR) is recommended in the

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treatment of severe aortic stenosis in patients who are at high or prohibitive surgical risk. Several patients with previous mitral valve surgery were reported to have been treated with TAVR. However, TAVR has been performed off-label to treat patients with pure aortic regurgitation due to the absence of calcium for device anchoring. There are few data showing that transfemoral TAVR is feasible and safe for the treatment aortic regurgitation in selected patients. Here, we report one case of transfemoral TAVR for native aortic regurgitation in the setting of a pre-existing mitral prosthesis.

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INTRODUCTION

Transcatheter aortic valve replacement (TAVR) is recommended in the treatment of severe aortic stenosis in patients who are at high or prohibitive surgical risk^[1]. Several patients with previous mitral valve surgery have been reported to be treated with TAVR^[2-6]. However, TAVR has been performed off-label to treat patients with pure aortic regurgitation due to the absence of annular or leaflet calcification for device anchoring. There are few data showing that transfemoral TAVR is feasible and safe for the treatment aortic regurgitation in selected patients^[7]. Here, we report one case of transfemoral TAVR for native aortic regurgitation in the setting of a pre-existing mitral prosthesis.

CASE PRESENTATION

Chief complaints

A 64-year-old man with a history of mitral valve replacement with a 27 St. Jude Medical™ mechanical valve prosthesis for rheumatic mitral stenosis 3 years ago presented severe dyspnea for 3 mo.

History of past illness

The patient had severe aortic regurgitation and was symptomatic at mild exercise and rest (NYHA III-IV). His past history was unremarkable.

Personal and family history

The family history was unremarkable.

Laboratory examinations

Baseline echographic data included regurgitant jet width left ventricular outflow tract (LVOT) diameter of 70%, aortic valve pressure half time of 240, and left ventricular ejection fraction of 50. Euroscore was calculated to be 15.

Imaging examinations

The minimum aortic annulus to mitral valve distance was measured to be 5 mm by multislice computed tomography (Figure 1). Computed tomography showed an aortic annulus perimeter of 83.3 and a cross sectional area of 515.1 mm², and the right and left coronary ostia height were 12.9 mm and 8.9 mm, respectively (Figure 2, Figure 3).

FINAL DIAGNOSIS

Severe aortic stenosis.

TREATMENT

Heart team at our hospital decided to recommend TAVR. A TAVR procedure with an

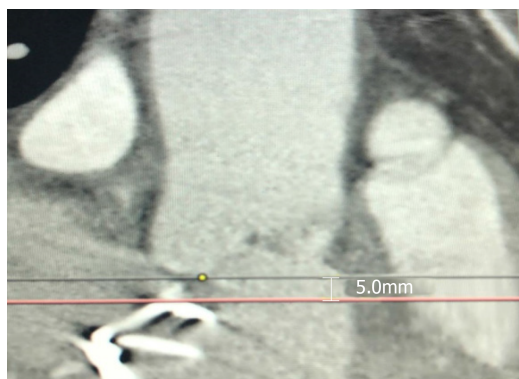


Figure 1 The distance of aortic annulus to prosthetic mitral valve.

evolut R (Medtronic, Brampton, ON, Canada) through femoral access was planned. The patient was administered general anesthesia. Intraoperative transesophageal echocardiography during TAVR was used. A 34 mm evolut R valve was deployed during rapid ventricular pacing. Aortic root angiography was performed immediately after valve deployment. We confirmed that the coronary arteries were patent. By arteriography, mild aortic regurgitation was demonstrated. The mitral prosthesis was functioning normally by transesophageal echocardiography (TEE). Mild to moderate paravalvular leakage was evident on TEE.

OUTCOME AND FOLLOW-UP

The patient was discharged at 4 d. He recovered without any complication. At 1 mo follow up, the patient was well and his New York Heart Association Class was 1 and 2. Doppler transthoracic echocardiography revealed maximal/mean gradients of 16/8 mmHg. No paravalvular leakage was noted. The left ventricular ejection fraction was 55.

DISCUSSION

Transcatheter aortic valve replacement in the presence of mechanical mitral valve prosthesis and pure native aortic regurgitation is an off-label indication. This is because the absence of annular or leaflet calcification in pure aortic regurgitation is an associated risk for valve dislocation^[1-7]. The stiff mitral cage can affect the TAVR device's stability. Balloon expansion and device instability can increase the risk of malposition and embolization. The LVOT distance below the aortic annulus has to be more than 2 mm for safe positioning^[5]. In our patient, the distance between aortic annulus and mitral valve prosthesis was 5 mm.

Despite good positioning of the aortic valve prosthesis, it can interfere with the mitral valve prosthesis^[4]. This is especially true for first generation devices that are larger prosthesis that may interfere with the stiff mitral valve. Our device evolut R is a second generation device^[8]. Coronary height is important for coronary obstruction during the procedure, and it is predicted to be less than 12 mm^[6]. In our patient, left coronary ostia height was lower than 12 mm. Therefore, we implanted the prosthesis slightly lower into the LVOT by TEE guidance.

CONCLUSION

According to our experience, transcatheter aortic valve implantation in the presence of mitral valve prosthesis and pure aortic regurgitation can be a safe procedure. However, preprocedural screening of the patient by multi slides tomography and interprocedural TEE are essential for the safe procedure.

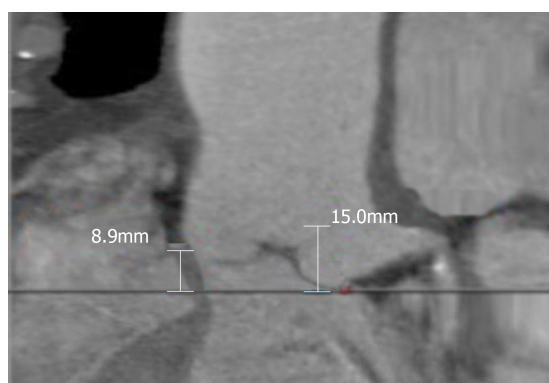


Figure 2 The left coronary ostia height.



Figure 3 The right coronary ostia height.

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