A Case of Concomitant Severe Aortic Stenosis and Severe Regurgitation Treated Successfully by Transcatheter Aortic Valve Intervention

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Abstract

Aortic regurgitation (AR) and aortic stenosis (AS) are valvular heart diseases which can have a significant negative impact on patients' morbidity and mortality. Traditionally, surgical aortic valve replacement is the main choice of treatment for such patients. In recent years, transcatheter aortic valve implantation (TAVI) has become a good alternative for AS patients with high surgical risk. TAVI for AR patients reportedly has benefits but there is limited evidence. Here, we present the case of a 75 year-old female with severe AS accompanied by AR treated successfully by TAVI.

Keywords: transcatheter aortic valve implantation, aortic stenosis, aortic regurgitation

Introduction

Aortic regurgitation (AR) and aortic stenosis (AS) are valvular heart diseases which can have a significant negative impact on patients' morbidity and mortality. Traditionally, surgical aortic valve replacement is the main choice of treatment for such patients.

According to current guidelines published by the European Society of Cardiology,[1] In recent years, transcatheter aortic valve implantation (TAVI) has become a good alternative for AS patients with intermediate to high surgical risk and those who are not suitable for surgical intervention.

In patients with severe AR, however, surgical valve replacement is still the mainstay therapy. TAVI for AR reportedly has benefits but there is limited evidence, and it carries a greater risk of device embolization. Also, concomitant AS and AR is a rare situation, and hence there are no recommendations for TAVI. Here, we present a case with severe AS accompanied by AR treated successfully by TAVI.

Case presentation

A 75 year old Taiwanese female had severe mitral regurgitation after mitral valve replacement with mechanical valve in 1998. She was receiving regular follow up in the Mennonite Christian Hospital's outpatient department.

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She presented to our hospital due to bilateral lower extremities edema and shortness of breath since February 2019. Electrocardiography showed atrial fibrillation. Echocardiography (both transthoracic and transesophageal were performed) revealed about 61 mm left ventricle dilation with ejection fraction of 38% (Figure 1-A), severe AS with area about 0.65 cm^2 and mean pressure gradient of 36 mmHg accompanied by severe AR (Figure 1-B). Three-dimensional computer tomography reconstruction was also performed for aortic annulus measurement (Figure 1-C).

Cardiac catheterization revealed patent coronary arteries. After securing thorough informed consent, TAVI was performed under general anesthesia. A 5-French AL1 catheter was placed into the left ventricle via 0.035 inch wire for left ventricle pressure measurement and also changing Confida Wire (Figure 2-A). Transcatheter heart valve (CoreValve EvolutR 34mm by Medtronic) was implanted under controlled pacing at a rate of 120 beats per minute. The first attempt failed and had to be retrieved due to complete heart block during deployment (Figure 2-B). In the second attempt, we placed

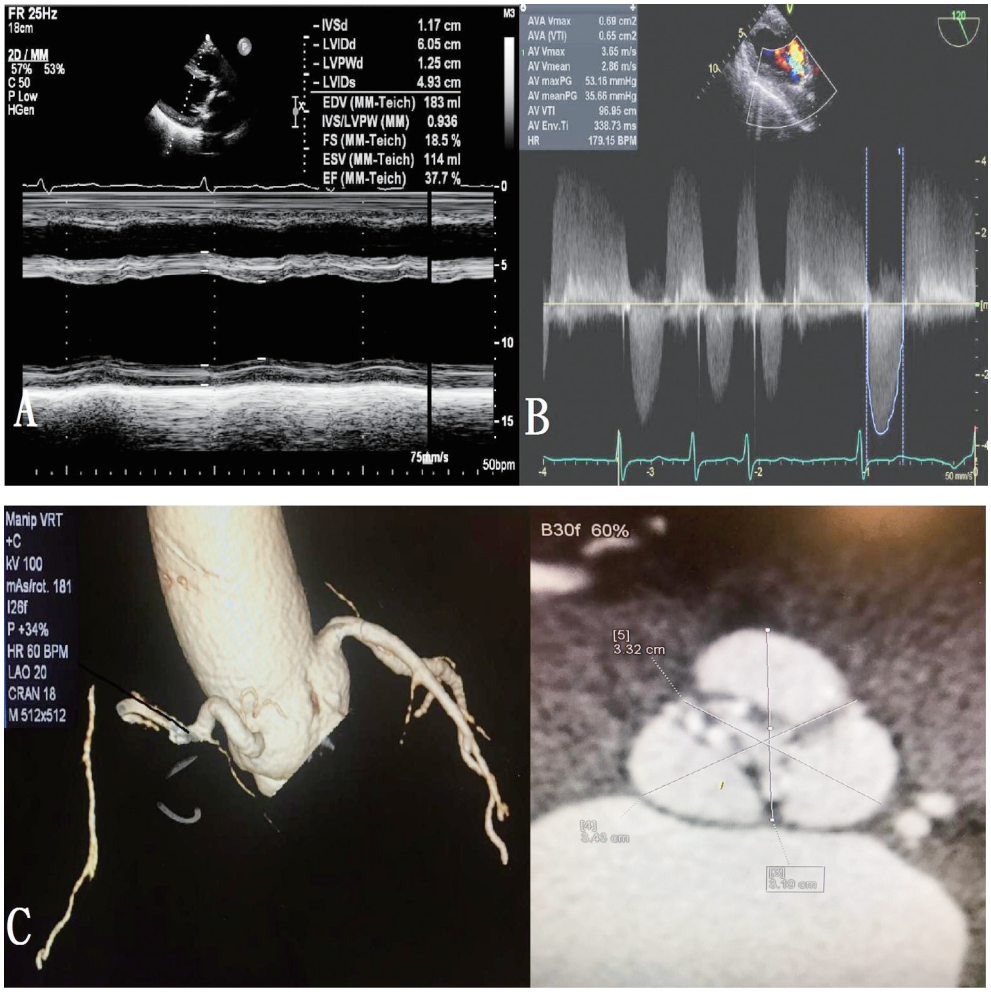

Figure 1. (A) Transthoracic echocardiographic evaluation of left heart ejection fraction. (B) Transesophageal echocardiographic evaluation of AS and AR. (C) Three-dimensional computer tomography reconstruction was performed for aortic annulus measurement.

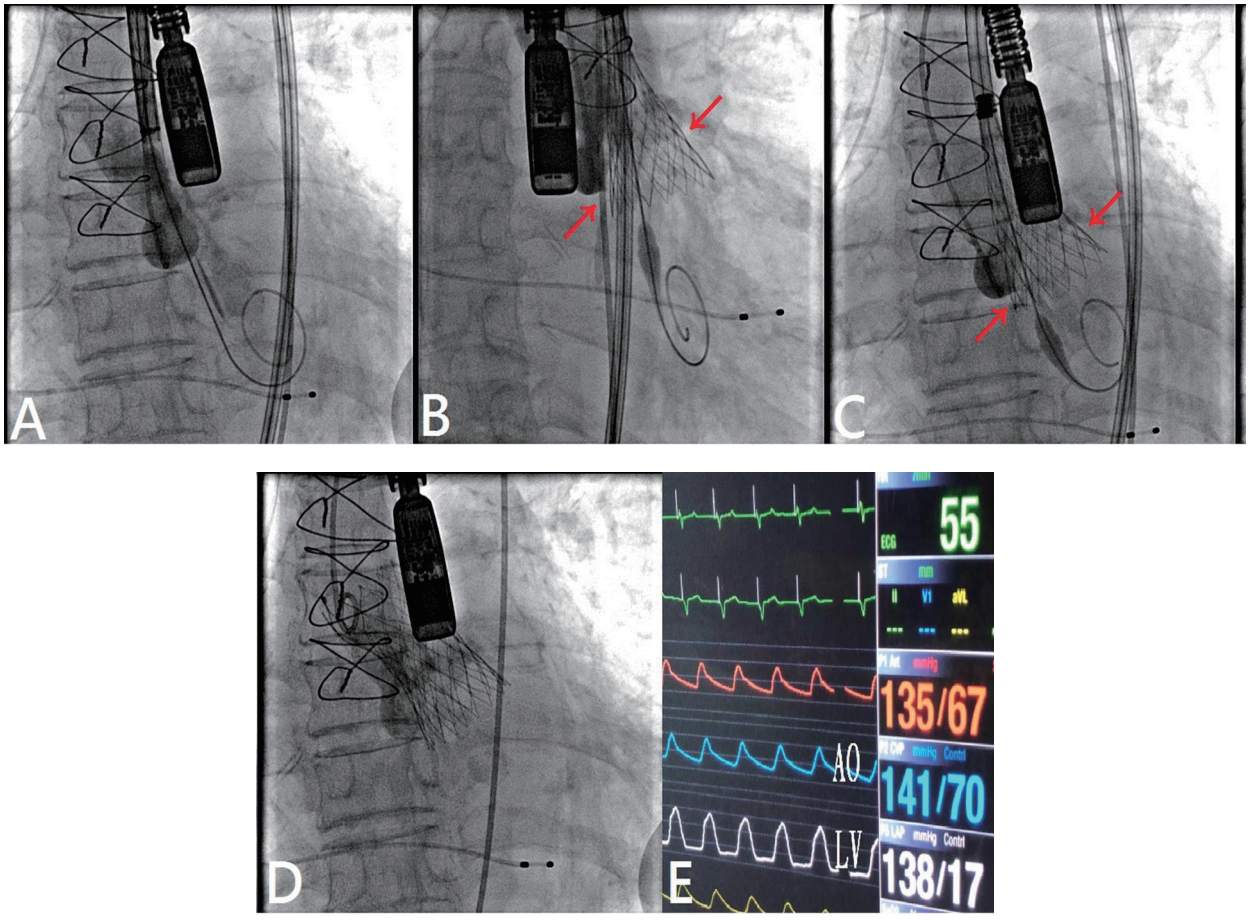

Figure 2. (A) Confida wire placed into the left ventricle. Contrast was injected to obtain the exact location of the aorta. AR was also observed. (B) The first attempt at transcatheter heart valve deployment, which had to be retrieved due to complete heart block. (C) The second attempt at transcatheter heart valve deployment. (D) The fluorography after TAVI, which showed no visible AR, as confirmed by TEE. (E)Pressure gradient resolved significantly after TAVI.

the heart valve 3 millimeters less in depth than on the previous attempt (Figure 2-C). After the procedure, no heart block, no significant aortic valve pressure gradient (Figure 2-D) and no residual AR were observed (Figure 2-E). Five days after the procedure, the patient was discharged in stable condition and with no dyspnea.

Discussion

In severe AR, the coexistence of aortic root dilation makes successful TAVI more difficult and prone to migration, malpositioning or significant paravalvular leakage. Therefore, surgical valve replacement is currently preferred.

Some research is available for TAVI in pure AR. In one systemic review,[2] thirteen reports with a total of 237 patients were included. TAVI was feasible in these patients with a relatively low rate of early adverse events, but the statistical power was limited because of the small population size.

Newer-generation devices were studied in an international registry study,[3] in which 78 patients with pure native AR had these devices implanted. Device success and clinical efficacy were significantly better with newer-generation

devices compared to previous devices with less significant paravalvular regurgitation. Newer-generation devices may become available for AR in the future, however there is currently no evidence regarding patients with concomitant AS and AR.

In our case, concomitant AS and AR are successfully managed by TAVI. Despite the lack of evidence regarding the efficacy of TAVI in such patients, TAVI may come to be seen as a viable option. Further investigation is needed to evaluate its safety and efficacy in patients with concomitant severe AS and AR.

References

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