European Journal of Cardiovascular Medicine (EJCM)
Print ISSN : 2042-4884
E-ISSN : 2042-4892
Volume: 15 | Issue 06 | June | 2025
Journal homepage: https://www.healthcare-bulletin.co.uk/

Case Report

Six-Year Follow-Up of TAVI In Rheumatic Severe Aortic Stenosis Using MYVAL THV: A Case Report

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Received: 23/04/2025; Revision: 14/05/2025; Accepted: 18/05/2025; Published: 05/06/2025

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Abstract: This case report details the 6-year follow-up of a 75-year-old woman with chronic rheumatic heart disease (CRHD) with severe aortic stenosis (AS) who underwent trans-catheter aortic valve replacement (TAVR) with a 23 mm Myval™ trans-catheter heart valve (THV). She underwent mitral valve replacement (MVR) few years ago. She has co-morbid conditions like obesity, obstructive sleep apnea (OSA), hypertension, and hypothyroidism. Considering her advanced age and multiple co-morbid conditions with prohibitive surgical risk, TAVI was offered after discussing with the heart team. Significant improvement in her symptoms was observed following TAVR. This case shows the feasibility, durability and effectiveness of TAVI in severe rheumatic aortic stenosis [AS].

Keywords: Rheumatic heart disease, Aortic stenosis, Co-morbid conditions, Transcatheter aortic valve implantation, Mitral valve replacement

INTRODUCTION

Rheumatic heart disease [RHD] is prevalent in people living in developing, low-income countries. RHD patients are relatively young therefore, surgery remains the primary choice. Rheumatic AS has been excluded from major TAVI studies due to predominantly non-calcific nature of rheumatic aortic valve and relatively young age of patients. RHD affects nearly 34.2 million individuals globally, accounting for almost 345,000 deaths yearly mostly in population younger than 30 yrs old. Although it commonly involves the mitral valve, aortic valve disease occurs in almost 30% of RHD cases. However, in RHD associated with severe AS, surgical replacement has been the main stay of therapy given the younger age of these patients, lower degree of calcification and cost. However, there have been case reports and case series showing successful implantation of the valve even in patients with and without significant calcification. We are presenting a case of CRHD with severe AS who was considered high risk for surgery because of co-morbid conditions and previous surgical MVR.

CASE PRESENTATION:

A 75-yr old obese lady presented with c/o progressively increasing exertional shortness of breath [SOB], chest pain and giddiness of 3 months duration. She underwent MVR in 2008 for rheumatic mitral valve disease. She was also suffering from hypertension, OSA and hypothyroidism. Computed Tomography [CT] coronary angiogram revealed insignificant coronary artery disease (CAD) with a calcium score of 100. Trans-thoracic Echocardiogram [TTE][fig.1] demonstrated normally functioning prosthetic mitral valve, severe AS, moderate tricuspid regurgitation [TR], and severe pulmonary hypertension. The patient has morbid obesity with a BMI of 48 kg/m². CT aortogram was done as part of pre-TAVI work-up [Fig.2, 3,4,5]. Subsequently, she underwent TAVI with 23 mm MYVAL in 2018.

PROCEDURE:

After a lengthy discussion with heart team and patient's family, she was taken up for TAVR [2018] and a 23 mm Myval THV was implanted under general anesthesia (fig.6,7,8). The procedure was performed via the right femoral artery. The hardware included a 5F Pig Tail catheter, 8 F Proglide (3), and 5F AR II catheters. Guide wires used were a 0.035 x 150 cm Terumo wire and a 0.035 x 250 cm Safari wire. The procedure achieved good result with no AR by aortic root aortogram and echocardiography.

DISCUSSION:

Degenerative calcific AS is a common cardiovascular condition in industrialized countries, affecting 0.3-0.5% of the population, with incidence rising as people age (4). In contrast, RHD is the leading cause of valvular heart disease worldwide, surpassing degenerative aortic stenosis cases by 4 times. Till recently, TAVI is being considered only for degenerative AS. The reasons for this disparity are complex, involving limited resources, insufficient expertise, and restricted access to valve interventions in developing countries, where RHD is the most common cause (5). Aortic valves affected by rheumatic disease often exhibit significant fibrosis, with calcification developing at a later stage in the degenerative process. These anatomical differences between AS due to rheumatic disease and degenerative AS can impact the deployment and anchoring of THVs (6).

Moscarella E et al. at the 2-year mark, data from the balloon-expandable

(BE) Myval™ group demonstrated superior clinical efficacy compared to the self-expandable (SE) Evolut R group, with an efficacy rate of 86% versus 66% (HR: 2.62, 95% CI 2.2–5.1; p = 0.006). Additionally, the BE Myval™ group experienced fewer cardiac hospitalizations (3.4% vs. 13.9%, p = 0.03). Furthermore, the mean transvalvular gradient was significantly lower in the BE Myval™ group (6.9 ± 2.2 mmHg) compared to the SE Evolut R group (9.5 ± 4.3 mmHg, p < 0.001), although the percentage of patients with a mean gradient ≥20 mmHg was similar between the 2 groups (7). Moreover, there was no significant para-valvular leak or AR or need for new permanent pacemaker (PPM) during 12-month follow-up (8). The clinical data at 2 years highlights the efficacy and safety profile of the BE Myval™ valve compared to the SE Evolut R valve (8).

This case report highlights the long-term outcome of a patient with chronic RHD who underwent MVR in 2008 and received a 23 mm Myval™ THV in 2018 for severe AS. This case highlights the efficacy and durability of Myval™ THV, with the patient reaching a 6-year follow-up milestone, marking the longest reported duration for a 23 mm Myval™ THV implant.

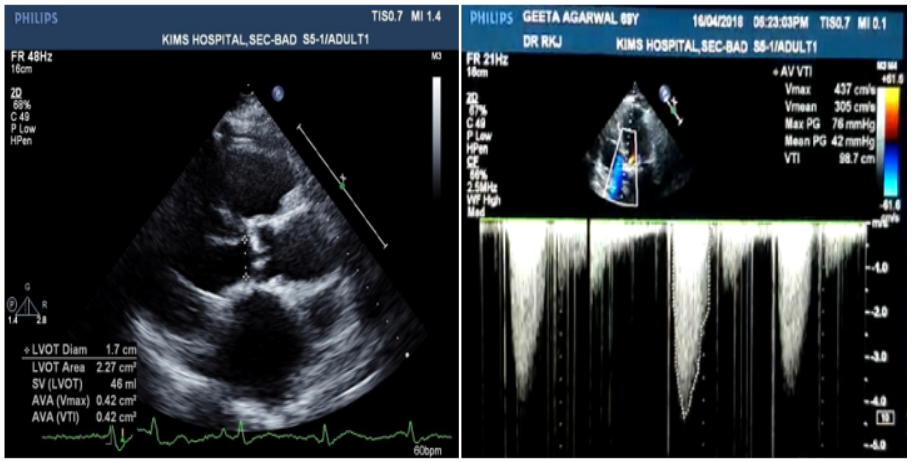

Fig.1. Transthoracic Echocardiogram showing aortic valve gradients

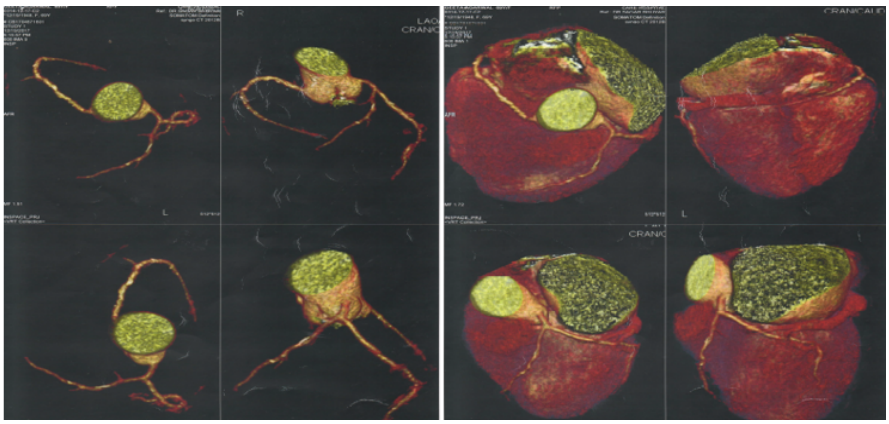

Fig.2. CT coronary angiogram showing mild coronary artery disease

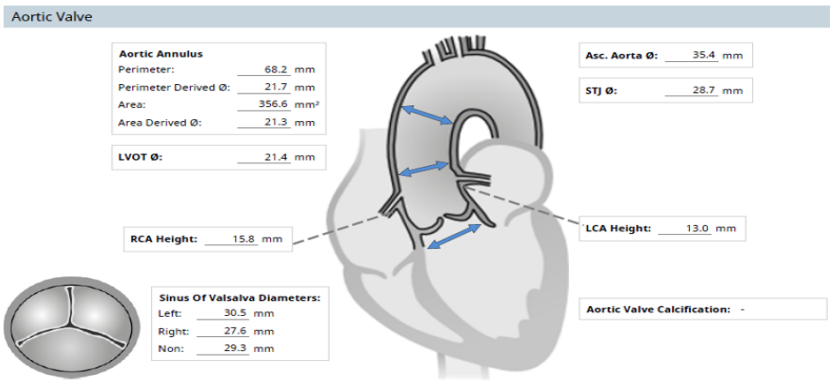

Fig.3. CT aortogram showing various measurements of aortic root relevant to TAVI procedure

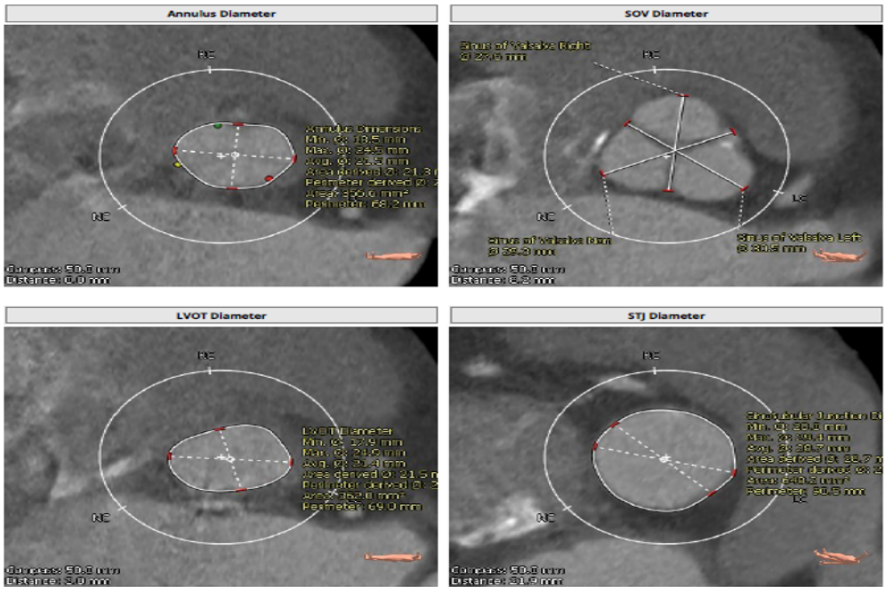

Fig.4.CT aortogram showing measurements of aortic root required for TAVI

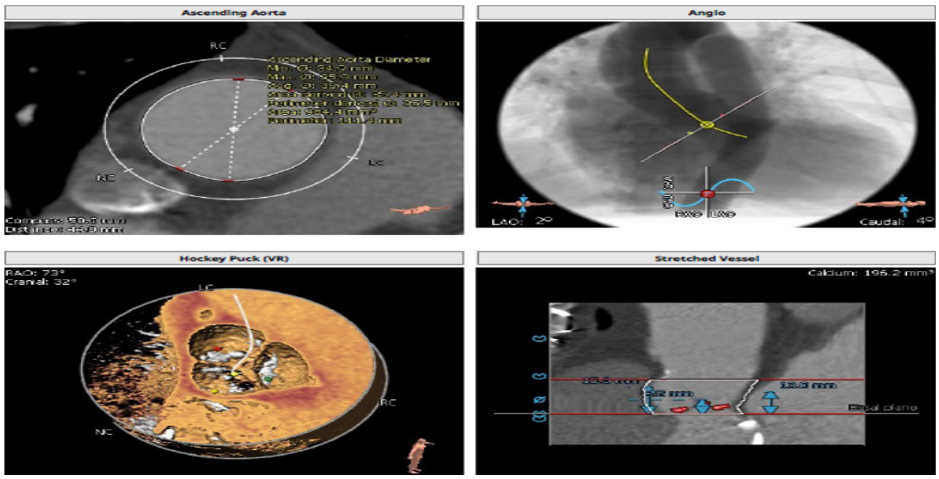

Fig.5.CT aortogram showing measurements mandatory for TAVI

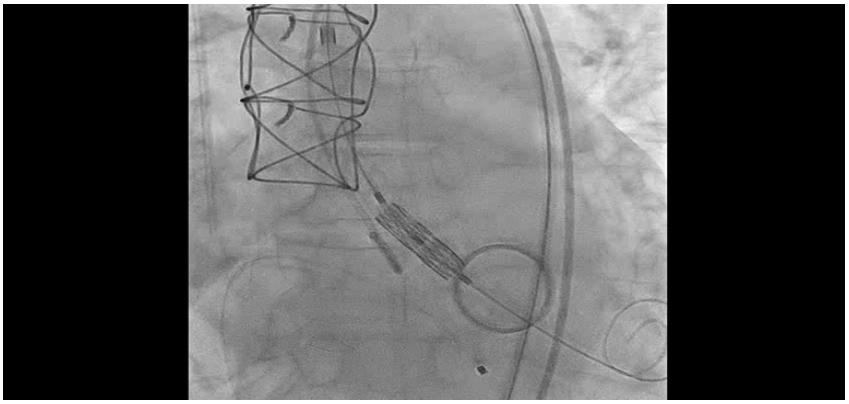

Fig.6. Myval THV position before implantation

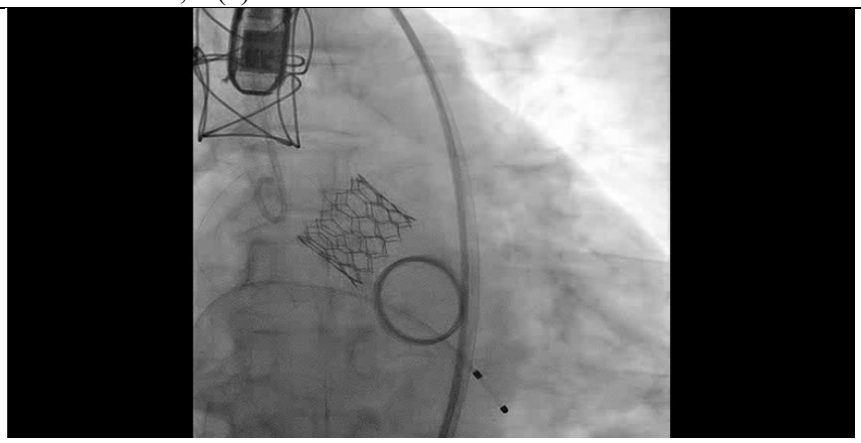

Fig.7. Myval THV after implantation

Fig.8. Pressure gradients across aortic valve after TAVI

CONCLUSION:

Rheumatic aortic valve stenosis is traditionally treated surgically primarily because of lack of substantial calcification that can anchor trans-catheter heart valves as well as a relatively younger population. Historically TAVR has not been performed in this cohort of patients.

The Myval™ THV has consistently demonstrated superior clinical outcomes in patients with degenerative, congenital bicuspid aortic valve stenosis as well as those affected by RHD. This is evidenced by numerous clinical trials and individual case studies. However, based on literature and our experience TAVI may be a good option for the treatment of severe AS due to RHD who are considered high surgical risk. Randomized trials with larger patient populations and long term follow up will be needed to further define the efficacy and safety of TAVI in these patient population.

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