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Letter to Editor

Internal Medicine Section

Prognostic Significance of Transcatheter Aortic Valve Replacement in Aortic Stenosis: The Play of Pressures

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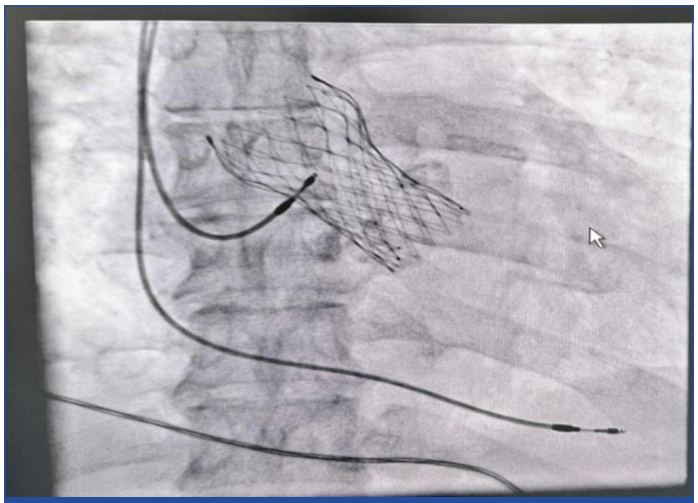
Dear Editor,

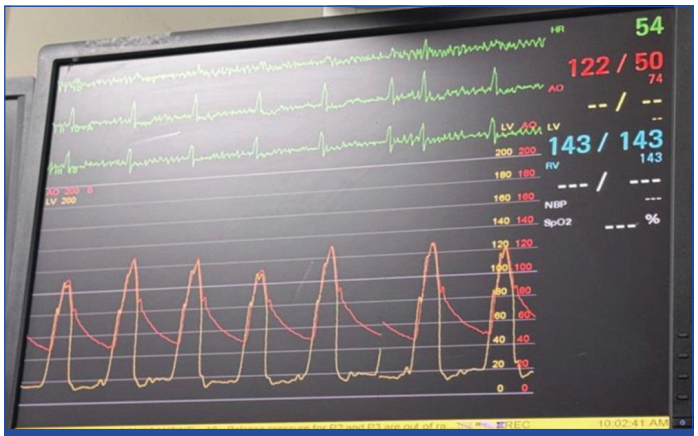
A 45-year-old male with a history of hypertension since eight years on tablet Amlodipine 10 mg once a day presented to Department of Medicine with complaints of exertional breathlessness. He reported experiencing NYHA grade 3 symptoms for the past two months, dizziness for one month, and an episode of syncope five days ago. Upon admission to the medical ward, a transthoracic echocardiogram was conducted, which revealed aortic jet velocity (Vmax) of 4.8 m/s, mean aortic Pressure Gradient (PG) of 45 mmHg, LV mass index (LVMi) 128 gm/m^2, and aortic valve area of 0.7 cm^2 suggesting severe aortic stenosis. Pressure curves prior to Transcatheter Aortic Valve Replacement (TAVR) procedure were measured via two 6-French "pigtail" catheters from Cordis. Catheters were inserted through the stenotic valve to the left ventricle via a vascular access point assigned for the transcatheter heart valve. A second catheter was inserted to the aortic root through a second vascular access point. Both catheters were then connected and measured by a pressure line and transducer. Following careful calibration of the pressure transducer, Left Ventricular (LV) and ascending aortic pressures were recorded concurrently across multiple heartbeats. Left heart catheterisation demonstrated a higher LV pressure compared to aortic pressure [Table/Fig-1]. The patient subsequently underwent TAVR with fluoroscopic procedural imaging [Table/Fig-2]. Post-procedurally, left heart catheterisation showed alignment of LV and aortic pressures [Table/Fig-3]. On follow-up, after 30 days, the patient's dyspnoea had significantly improved and the 2-D echocardiography revealed a decreasing LVMi to 115 gm/m^2.

[Table/Fig-1]: Pressure curves prior to TAVR procedure measured via manometer catheters. The yellow and red line indicates pressures in the left ventricle and aorta, respectively. LV pressures range higher and lower than aortic pressures throughout reading.

Aortic stenosis necessitates increased LV contractile effort to maintain adequate systemic perfusion. With a haemodynamically significant obstruction, this leads to a higher LV pressure than aortic pressure. TAVR effectively bypasses the dysfunctional aortic valve, reducing the LV afterload and allowing for the equalisation of LV and aortic pressures [1]. Aortic valve replacement indications include asymptomatic patients with a cardiac ejection fraction <50% and symptomatic patients with severe aortic stenosis [2]. Aortic valve replacement is done surgically and percutaneously. Since TAVR is done percutaneously, additional indications include patients with low to prohibitive surgical risks. TAVR is also indicated for failed prior bioprosthetic valves in valve-in-valve procedures [3]. Following deployment of the artificial valve, there is relief from the pathological aortic stenotic obstruction, a significant decrease in myocardial oxygen demand, and an increase in cardiac efficiency. Clinically, this results in an improvement in typical aortic stenosis symptoms such as syncope, angina, and dyspnoea. Over time, the resolution of high LV afterload contributes to regression of LVMi, decreased rehospitalisation, and an improved patient prognosis irrespective of gender or age [4,5]. Patients who showed significant regression in



[Table/Fig-2]: Fluoroscopic view of artificial aortic valve deployed post TAVR procedure.



[Table/Fig-3]: Pressure curves after TAVR procedure measured via manometer catheters. The yellow and red line indicates pressures in the left ventricle and aorta, respectively. LV pressures run along aortic pressures throughout reading.

LVMi within the first 30 days did not experience further regression throughout the year. In contrast, patients who did not show regression in the initial 30 days did experience regression over the year, albeit to a lesser extent [5]. This haemodynamic correction post-TAVR is crucial for enhancing patient outcomes and quality of life.

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