

## Editorial



# Moderate Aortic Valve Stenosis with Left Ventricular Systolic Dysfunction: Potential Role of Early Aortic Valve Replacement

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### Conflict of Interest

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► See the article “Early Surgery versus Watchful Waiting in Patients with Moderate Aortic Stenosis and Left Ventricular Systolic Dysfunction” in volume 50 on page 791.

Degenerative aortic stenosis (AS) is the most common valvular heart disease in developed countries, and the prevalence is increasing as the societies become older. While there is a clear-cut recommendation for aortic valve replacement (AVR) in severe AS with left ventricular systolic dysfunction (LVSD) regardless of symptom, there has been no established recommendation for the treatment of moderate AS with LVSD in current guideline.<sup>1,2)</sup> A retrospective study published in this issue of *Korean Circulation Journal* might provide an important evidence for those patients. At this point the two important issues should be addressed: 1) the natural prognosis of moderate AS with LVSD; 2) the clinical benefit of early AVR in those patients.

Moderate AS had been considered as a relatively benign disease in an earlier study based on invasive catheterization data, however, actually a considerable number of patients with moderate AS experience cardiovascular events or AVR. In patients with moderate AS and concomitant LVSD, 61% of the patients experienced death, AVR or heart failure (HF) hospitalization during 4 years of follow up and the event rate is highest in the first year after diagnosis (24%).<sup>3)</sup> Moon et al.<sup>4)</sup> reported that among the 255 patients with moderate AS and concomitant LVSD, 121 patients (47.5%) died and 48 patients (18.8%) received AVR during a median 1.8 years of follow up. Ito et al.<sup>5)</sup> report that decreased LV contractility and/or high LV wall stress were present in the majority of patients with LV ejection fraction (EF) less than 60% even before AS became severe and the survival was poor in those patients being linked with these abnormalities. Although the pure effect of moderate AS in patients with LVSD remains unknown, the high event rates in those studies suggest that the presence of moderate AS in patients with LVSD might accelerates LV systolic/diastolic dysfunction by increasing overall ventricular afterload and negatively affects prognosis. These patients might be more vulnerable to the increased hemodynamic loads (e.g. infection, bleeding, and myocardial ischemia) and prone to clinical deterioration. Therefore, in theory, performing AVR at moderate stage in patients with LVSD might improve clinical outcome by earlier relieving of LV afterload.

Bastos et al.<sup>6)</sup> reported a favorable hemodynamic change after transcatheter AVR in patients with moderate AS and LVSD: left shifted pressure-volume curve, increase in end-systolic

elastance, lower myocardial oxygen consumption, and increase in EF. In a retrospective study from Duke Echocardiographic Laboratory Database,<sup>7)</sup> 26% of the patients with moderate AS and LVSD underwent AVR. AVR with or without coronary artery bypass surgery associated with lower mortality (hazard ratio [HR], 0.68; 95% confidence interval [95% CI], 0.52–0.90,  $p=0.0072$ ) compared with medical therapy in those patients. AVR within 90 days from index echocardiography was also associated with significantly lower mortality (HR, 0.59; 95% CI, 0.44–0.78;  $p=0.002$ ). Moon et al.<sup>4)</sup> also reported that the incidence rate of all-cause death was significantly lower in the early AVR group who received AVR within two years of the index echocardiography compared with the medical treatment group (5.03PY vs. 18.80PY; HR, 0.31; 95% CI, 0.16–0.61;  $p<0.001$ ). It remained statistically significant even after multivariate adjustment (HR, 0.43; 95% CI, 0.20–0.91;  $p=0.028$ ). Surprisingly, the LV EF was recovered over 50% in 59.5% of the early AVR group versus 19.3% of the medical treatment group in the follow-up echocardiography.

Current guidelines recommend surgical AVR only in patients with moderate AS undergoing coronary artery bypass graft or surgery for the ascending aorta, or of another valve (class of recommendation IIa, level of evidence C).<sup>1,2)</sup> However, there is lack of recommendation for AVR in patients with moderate AS and LVSD despite the substantial morbidity and mortality because there is insufficient evidence that supports early AVR in those patients. The result from a new study published in this issue<sup>4)</sup> of the Journal provide a clue to answer this complex unsolved question.

Some challenges exist for promoting early AVR in patients with moderate AS and LVSD: 1) identifying the patients with true moderate AS and LVSD; 2) strong evidence from randomized clinical trials supporting early AVR in those patients; 3) periprocedural and long-term complication risk and exclusion of other cause of LVSD. A low-dose dobutamine stress echocardiography can be used to clarify low-flow AS or to identify pseudo-stenosis from true AS, and to check a left ventricular contractile reserve in patients with LVSD. Computed tomography aortic valve calcium score would also be helpful to determine whether the patient have severe AS. Given the high rates of periprocedural death or stroke with surgical AVR especially in the patients with LVSD, the use of transcatheter AVR can be justified as a less invasive alternative approach in those patients with high surgical risk.<sup>8,9)</sup> The upcoming TAVR UNLOAD (Transcatheter Aortic Valve Replacement to Unload the Left ventricle in Patients with Advanced Heart Failure) trial (NCT02661451)<sup>10)</sup> will provides more clear evidence whether early AVR improves clinical outcome in patients with moderate AS and LVSD.

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