

Response to Letters Regarding Article, “Comparison Between Transcatheter and Surgical Prosthetic Valve Implantation in Patients With Severe Aortic Stenosis and Reduced Left Ventricular Ejection Fraction”

We thank Subramanian et al and Ranucci et al for their insightful comments with regard to our study.¹ In response to the comments of Ranucci et al, we provide the following statements.

1. The important variability in the 30-day mortality rates (8% to 33%) reported in previous studies is essentially related to the differences in the cutoff values used for the left ventricular ejection fraction (LVEF), but also, and more importantly, it is related to the differences in the baseline risk profile of the study populations. The fact that the mortality (12%) observed in our surgical aortic valve replacement (SAVR) series is higher than that (8% to 10%) of some previous series is essentially related to the worse-risk profile of the patients included in this series.
2. The assessment of SAVR operative risk was based on a comprehensive analysis of the factors included in the risk scores, and those (eg, frailty) not included in these scores, as well. All patients included in the transcatheter aortic valve implantation (TAVI) series had been refused for SAVR by at least 2 cardiac surgeons.
3. We agree that the presence of reduced LVEF should not be used as the sole argument to recommend TAVI rather than SAVR in patients with severe aortic stenosis. SAVR remains the standard of care in the vast majority of patients with reduced LVEF and high gradient, and in those with low gradient and myocardial contractile reserve, as well. However, TAVI may provide a good alternative to SAVR in those patients having both reduced LVEF and markers of high or prohibitive operative risk, including the lack of contractile reserve, small aortic root, and other major comorbidities.

In response to the comments of Subramanian et al, we provide the following statements.

1. The issue of correction of subvalvular obstruction would merit further studies. Myectomy was used in 3% of the patients in the SAVR group. It remains uncertain whether TAVI can efficiently correct subvalvular obstruction in all patients. When adequately positioned, the stent of the SAPIEN valve does not extend down to the interventricular septal bulge, which generally causes the obstruction.
2. Stentless bioprostheses are associated with better hemodynamic performance and a lower incidence of prosthesis-patient mismatch,² which may translate into significant benefits with regard to short- and long-term outcomes, especially in the patients with depressed left ventricular (LV) function. On the other hand, the use of stentless bioprostheses is associated with longer procedural times, which could increase the operative risk, especially in patients with vulnerable LV function.²
3. The superior hemodynamic performance of TAVI, which has been recently confirmed by the results of the Placement of AoRTic TraNscathetER Valve (PARTNER-A) trial, is multifactorial and may include the possibility of implanting a larger valve within a small annulus. However, our results, and those of previous studies, as well,³ do not support the concept that balloon valvuloplasty could contribute to the expansion of aortic annulus.

4. Because of the multicenter nature of this study, there was an important diversity in the types of prostheses used for SAVR. However, this series is probably more representative of current surgical practice. The risk–benefit ratio of aortic root enlargement in the context of high-risk patients is questionable, especially in those patients with depressed LVEF.
5. Optimized myocardial protection strategies, including antegrade and/or retrograde cardioplegia with normohemic blood through aorta or coronary ostia, have been used in patients undergoing SAVR.
6. It is difficult to compare the operative mortality rates of studies that have markedly different baseline characteristics and design. It is noteworthy that the baseline risk profile of our SAVR group was substantially worse than that reported by Chikwee et al (eg, logistic EuroScore: 18% versus 11%).⁴
7. The absence of contractile reserve on dobutamine stress echocardiography was not a predictor of 30-day mortality in our study.
8. We agree that the extent of myocardial viability as assessed by MRI may be useful to guide decision making with regard to a preemptive or concomitant revascularization procedure and to predict the magnitude of LV function recovery after procedure. These data, however, were not systematically collected in the context of this study.
9. The finding of superior recovery of LV function in TAVI versus SAVR should be interpreted with caution, because this was a nonrandomized study, and the baseline characteristics of the 2 groups were different. Nonetheless, the most important and compelling finding of this study is the rapid and marked improvement in LVEF following TAVI despite the high-risk profile of this population. This finding, combined with the less invasive nature of the procedure and the lower incidence of prosthesis-patient mismatch, provides arguments in favor of the utilization of TAVI in high-risk patients with severe aortic stenosis and depressed LV function. Our preferred approach in these high-risk patients is to attempt to optimize valve hemodynamics while minimizing the invasiveness and duration of the procedure. TAVI may achieve both goals, whereas SAVR, combined with aortic root enlargement, septal myectomy, and/or stentless bioprosthesis implantation, may not.

Disclosures

Drs Rodes-Cabau, Webb, Dumont, Doyle, and Pibarot hold consultancies, are in the speaker's bureau of Edwards Life Sciences, and/or have received research grants from this company.

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References

1. Clavel MA, Webb JG, Rodés-Cabau J, Masson JB, Dumont E, De Larochelliere R, Doyle D, Bergeron S, Baumgartner H, Burwash I, Dumesnil JG, Mundigler G, Moss R, Kempny A, Bagur R, Bergler-Klein J, Gurvitch R, Mathieu P, Pibarot P. Comparison between transcatheter and surgical prosthetic valve implantation in patients with severe aortic stenosis and reduced left ventricular ejection fraction. *Circulation*. 2010; 122:1928–1936.
2. Kunadian B, Vijayalakshmi K, Thornley AR, de Belder MA, Hunter S, Kendall S, Graham R, Stewart M, Thambyrajah J, Dunning J. Meta-analysis of valve hemodynamics and left ventricular mass regression for stentless versus stented aortic valves. *Ann Thorac Surg*. 2007;84:73–78.
3. Ng AC, Delgado V, van der Kley F, Shanks M, van de Veire NR, Bertini M, Nucifora G, van Bommel RJ, Tops LF, de Weger A, Tavilla G, de Roos A, Kroft LJ, Leung DY, Schuijff J, Schalij MJ, Bax JJ. Comparison of aortic root dimensions and geometries before and after transcatheter aortic valve implantation by 2- and 3-dimensional transesophageal echocardiography and multislice computed tomography. *Circ Cardiovasc Imaging*. 2010;3:94–102.
4. Chikwe J, Croft LB, Goldstone AB, Castillo JG, Rahmanian PB, Adams DH, Filsoufi F. Comparison of the results of aortic valve replacement with or without concomitant coronary artery bypass grafting in patients with left ventricular ejection fraction < or =30% versus patients with ejection fraction >30%. *Am J Cardiol*. 2009;104:1717–1721.

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