Commentary: Is prosthesis oversizing warranted for pulmonary valve replacement in patients with congenital heart disease?

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In this issue of the Journal, Dr Pragt and colleagues\(^1\) report an important experimental analysis looking at the function of the Carpentier Edwards (Irvine, Calif) Perimount Magna Ease heart valve. Because it was originally designed for systemic semilunar valve replacement, a central element of the experimental model was to assess the function of the valve under the physiologic conditions of the pulmonary circulation. Two valve sizes were analyzed: 21 mm and 25 mm. Under pulmonary pressure conditions, the authors found there was incomplete closure of the Magna Ease valve during diastole and an increased regurgitant area. However, this did not translate into a significant regurgitant fraction (5%). They also found the larger 25-mm prosthesis had an increased regurgitant area. Although firm conclusions cannot be reached, the study does provide a potential mechanical basis for structural valve deterioration. In a series of 227 patients with tetralogy of Fallot undergoing pulmonary valve replacement with a bioprosthetic valve, the predominant cause of structural valve deterioration was pulmonary regurgitation.\(^2\) Forty-two percent of the patients in the series had a Carpentier Edwards Magna Ease valve.\(^2\) The mechanism for pulmonary regurgitation was unclear, but the authors found that upsizing the pulmonary valve was a factor in the development of structural valve deterioration. The findings of the study by Pragt and colleagues\(^1\) add another level of evidence that perhaps we should reconsider the concept of placing the largest possible prosthesis when faced with patients who require pulmonary valve replacement. At the very least, hopefully this study will lead to more intensive investigation of bioprosthetic valves in the pulmonary circulation and stimulate more interest in developing a stented bioprosthesis specifically designed for the pulmonary circulation.

References