

## Editorial



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# We Always Have a Choice: Pericardial Versus Porcine Valves for Surgical Aortic Valve Replacement

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► See the article “Pericardial Versus Porcine Valves for Surgical Aortic Valve Replacement” in volume 52 on page 136.

In Korea, the rapid changes to an aging society (as of 2019, the average life expectancy of Korean was 83.3 years, the second highest in the OECD after Japan, whose was 84.4 years), and the changes in medical policy with insurance coverage for transcatheter aortic valve replacement (TAVR), aortic valve disease is increasing and many patients are referred to a heart team for valve replacement.<sup>1)2)</sup> At this point, reconsideration of the very old controversy in field of surgical aortic valve replacement (SAVR)- pericardial versus porcine valve- is timely.

In western countries, bioprosthetic valves are used with increased frequency because of the aging of the population and the tendency to avoid anticoagulation and its related problems. Currently, there are lots of bioprosthetic valves made of numerous materials, but all the existing bioprosthetic valves have the issue of structural valve deterioration (SVD).<sup>3)</sup> The 2017 European Society of Cardiology/European Association for Cardio-Thoracic Surgery guidelines for the management of valvular heart disease shows us, the consensus of expert for preferences of mechanical prosthesis and bioprosthesis in accordance with the patients' condition. However, there are no such guidelines on the type of bioprosthesis to be preferred.<sup>4)</sup> In real world practices of SAVR, we as cardiac surgeons make a choice between mechanical valve and bioprosthetic valve. Once we decide to implant a bioprosthetic valve, then another problem of choosing between bovine pericardial valve and porcine valve awaits us. Recently even patients in their early 50s who have traditionally subject to mechanical SVAR, are receiving bioprosthetic SAVR more frequently with valve-in-valve (ViV) TAVR procedures in mind.<sup>5-7)</sup>

Historically, there were 2 types of animal tissue-derived artificial valves, which are bovine pericardium and porcine (aortic) valves. According to the earlier studies and recent meta-analysis, bovine pericardial valves showed superior postoperative hemodynamic results compared with porcine valves, but both types of the valve showed comparable postoperative functional status and valve durability.<sup>7)8)</sup> Since the subjects of these studies were mostly elderly patients, it was thought that due to a combination of various factors, such as the patient's frailty other than the hemodynamic factor, the results of these studies were complex to determine whether porcine or bovine pericardium was superior over the other.

Shin et al.<sup>9)</sup> conducted an observational retrospective study and shows that, for patients undergoing bioprosthetic SAVR (636 patients between January 2000 and May 2016, single

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center), the use of bovine pericardial valves was associated with superior prosthetic aortic valve hemodynamic profiles and improved late survival rates compared with porcine valves. The landmark survival analysis showed comparable survival rates between the groups who underwent SAVR with bovine pericardial valves (“Pericardial group”) and those with porcine valves (“Porcine” group) within 8 years following surgery (hazard ratio [HR], 1.27; 95% confidence interval [CI], 0.88–1.84;  $p=0.19$ ). However, the Pericardial group showed a significantly superior survival trend beyond 8 years after surgery compared with the Porcine group (HR, 0.61; 95% CI, 0.41–0.90;  $p=0.010$ ). Even though freedom from adverse valve-related complication rates (SVD and valve-reoperation) was not significantly different between the 2 groups, in this paper.

The exact mechanism behind the survival difference in the later periods after surgery (>8 years) is not clear, as they mentioned. It may be attributable either to superior hemodynamic profiles or to better durability of bovine pericardial valves over porcine valves, or to the mode of SVD (acute cusp tears versus gradual valve stenosis).<sup>9)</sup>

As mentioned earlier, we are experiencing a rapid aging of the society. In 1999, the average life expectancy of Koreans was 75.5, but this increased to 83.3 in 2019.<sup>1)</sup> Keeping this change in minds, firstly, we first need to know the durability of bioprosthetic materials and fates of those bioprosthetic valves in the very long-term. In this aspect, the mean follow-up period of the aforementioned study, which was 5.01 years, is a bit short and could be extended several more years. Secondly there are too many types of valves were included in this analysis. Some of them are not used in clinically because of early SVD problem and some of the recently developed valves are reported suitable for ViV TAVR.<sup>8)10)</sup> If they focus on analyzing the valves that are currently in use and do a little longer-term follow-up, hopefully we can understand the reasons for the difference in landmark survival analysis between bovine pericardial valves and porcine valves.

This study, which refined a lot of data and derived a meaningful result with regards to landmark survival difference beyond 8 years after surgery, is expected to provide valuable clues for patients and doctors to determine the type of valve to use in the future SAVR.

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