comparisons between two stentless valves, which showed no difference in postoperative aortic valve area, maximum velocity across the valve and mortality.

Pelletier et al. [8] performed a cohort study comparing 878 CE porcine and 715 Ionescu-Shiley, CE and Mitroflow bovine valves in AVR, MVR or MR from 1976–88. It showed similar late survival rates and clinical improvement. However, the freedom from all valve-related complications was significantly better in porcine valves.

Eichinger et al. [9] conducted an RCT comparing 68 MM porcine valve and 70 CE Perimount bovine valves in AVR in the years 2000 to 2002. There was no difference in patient–prosthesis mismatch. The bovine valve had lower mean pressure gradient at rest and during exercise 10 months after operation.

Walther et al. [10] carried out an RCT on 100 patients from 2000–2003 comparing MM porcine and Perimount bovine valves. Transvalvular blood flow velocity and mean pressure were assessed. Both valves showed acceptable haemodynamic function with significant LV mass regression with overall better haemodynamic profile in bovine valves.

Czer et al. [11] conducted a cohort study on 656 patients comparing Hancock standard and CE porcine valves with St Jude Medical bileaflet bovine valves in AVR, MVR or MR positions from 1976–84. Both porcine and bovine valves had a similar mortality rate. Porcine valves had higher structural failure rates with higher reoperation rates. Bovine valves showed better functional status postoperatively.

Dalmau et al. [12] performed an RCT in Spain comparing 43 MM porcine valves with 43 Edward Perimount Magna bovine valves in AVR position. Mean pressure gradient, EOA and LV mass regression were examined. Bovine valves showed better haemodynamic function with lower patient–prosthesis mismatch prevalence at 1-year follow-up.

Borger et al. [13] performed a cohort study comparing 57 Medtronic Hancock II porcine valves with 57 CE Perimount Magna bovine valves in AVR and/or concomitant procedures in 2004 to 2005. Bovine valves showed better peak and mean transvalvular gradients with lower patient–prosthesis mismatch.

Wagner et al. [14] compared 50 CE Perimount bovine valves, 70 Perimount Magna bovine valves, 44 MM porcine valves and 28 Soprano bovine valves through a cohort study in Germany. They demonstrated that generally bovine valves had better haemodynamic performance compared with porcine valves.

Suri et al. [15] conducted an RCT from 2004 to 2006 examining 76 Edwards Perimount bovine and 76 MM Porcine valves. Despite small differences in haemodynamic performance, both valves had similar LV regression after 1 year follow-up.

An RCT performed by Dalmau et al. [16] from 2004 to 2006 comparing 54 Edwards Perimount Magna bovine and 54 MM showed superior haemodynamic function in bovine valves leading to LV regression. Patients with bovine valves also had better overall survival rate at 5 years.

**Conflict of interest:** none declared.

**REFERENCES**


eComment. The current bioprosthesis of choice for aortic valve replacements

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I read with great interest the paper by Yap et al. regarding the best valve substitute for aortic valve replacement [1]. In their results, they included six randomized
controlled trials and nine cohort studies yielding a total of 9880 patients from 1974 to 2006. However, we found two additional relevant articles investigating the long-term durability of pericardial and porcine valves.

Brown et al. from the Mayo clinic recently published an interesting article assessing the incidence of early thrombosis in patients with biological valves [2]. The paper was in favor of bovine valves because all patients with early valve thrombosis requiring reoperation were implanted with porcine valves. The calculated incidence of valve thrombosis was 1.26% for the Biocor valve, 0.84% for the Hancock valve and 0.37% for the Mosaic valve. There were no patients with valve thrombosis in the pericardial valve cohort. One possible explanation of this discrepancy is related to the design of the porcine valve stent, which promotes blood stasis between the ring of the stent and the suture of the leaflet. Based on their findings, they recommended the implantation of a mechanical or a pericardial valve, in case of early thrombosis of a porcine valve.

Grunkeimer et al. reviewed the long-term durability of the Carpentier-Edwards pericardial and bovine aortic valves in 2955 patients [3]. The likelihood of explantation by 15 years was similar for both valves (7% for the porcine valve and 8% for the pericardial valve). However, the modes of failure were different: structural valve deterioration was seen mainly in the form of a leaflet tear for porcine valves and calcification and fibrosis for pericardial valves. According to the available literature, we concur with the conclusion of Yap et al. that the bovine valve is superior in its haemodynamic profiles and has a lower rate of complications. Another advantage of the pericardial valve is the very low rate of valve thrombosis with only one case report of early bioprosthesis thrombosis in the aortic position [4].

Conflict of interest: none declared

References


eComment. Choice of bioprosthesis for aortic valve replacement

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We read with great interest the best evidence topic by Yap et al. regarding the best bioprosthesis for aortic valve replacement [1]. We would like to present the results of our relative prospective multicentre randomized study. The aim of the study was to compare the haemodynamic performance and the sizing characteristics of the Medtronic Mosaic Ultra porcine and Carpentier-Edwards Perimount Magna bovine pericardial bioprosthetic stented aortic valve in relation to the patient’s true aortic annulus size [2]. After the aortic valve excision, the annulus was measured by blinded sizes prior to the randomization of 141 patients (Ultra, n = 72; Magna, n = 69) [2]. The median patient age was 75 years, and 89% of the patients had aortic valve stenosis. A good left ventricular function was present in 75% of patients, and the EuroSCORE-predicted mortality was equal to 9%. Concomitant procedures (coronary artery bypass grafting, mitral/tricuspid valve repair, septal myectomy, modified maze procedure with radiofrequency) were performed in 61% of patients. The in-hospital mortality was 3%, and at six months postoperatively, 96% of the patients were in NYHA class I/II, with no inter-group differences. The mean ‘true aortic annulus’ size was 23.0 ± 1.4 mm for the Ultra valve, and 22.6 ± 1.8 mm for the Magna valve (P = not significant). The implanted labeled valve size was or = 23 mm for 83% of Ultra valves, and for 52% of Magna valves (P <0.01), and smaller than the measured true aortic diameter (44% Magna vs 33% Ultra). The mean echo gradients were lower with Magna valves (11 ± 6 mmHg) than with Ultra (17 ± 6 mmHg; P <0.01), while the effective orifice area (EOA) was higher with Magna than with Ultra (1.6 ± 0.4 versus 1.4 ± 0.4; P <0.01). Both groups showed a similar left ventricular mass regression (Ultra -48 ± 83 g; Magna -42 ± 70 g). Trivial to moderate regurgitation was noted in 24% of Ultra valves compared to 48% of Magna valves (P <0.01) [2]. According to the results of our study, the selection of the Ultra bioprosthetic valve allowed the implantation of larger valve sizes. However, when compared to the ‘true aortic annulus’, the Magna was associated with lower transprosthetic gradients and larger EOAs. However, the long-term significance of these observations remains inconclusive in terms of bioprosthesis selection [2].

In conclusion, the choice of bioprosthetic heart valve should not be influenced solely by the early systolic gradients, but also by the expected long-term durability [2]. Rahimtoola has suggested that bovine valves have a lower incidence of structural valve degeneration based on a 2001 meta-analysis of both Hancock and Carpentier-Edwards valves [2, 3]. A recent report on the Hancock II bioprosthesis reported a freedom from structural valve degeneration at 20 years of 85% in patients aged 60-70 years, and of 99.8% in patients aged >70 years [2,4]. The results of in vitro studies have also suggested that the Perimount Magna ThermoFix anti-calciﬁcation treatment may be inferior to the Mosaic Ultra anti-calciﬁcation, and would result in an earlier reversal of the initially favorable Magna gradients [5].

Conflict of interest: none declared

References