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PII: S0022-5223(21)01741-4
Reference: YMTC 18328

To appear in: The Journal of Thoracic and Cardiovascular Surgery

Received Date: 6 December 2021
Revised Date: 6 December 2021
Accepted Date: 7 December 2021


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Commentary: Pulmonary Conduits: A Note of Optimism in the Natural History of Dead Tissue?

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Word Count: 488

Disclosures: Ronald K. Woods - co-founder of OperVu, Inc (no relationship to content of this work).

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Central Message: For larger pulmonary conduits, pulmonary homografts may offer greater freedom than bovine jugular conduits from reintervention and/or structural valve deterioration.

Central Picture Legend: Ronald K. Woods, MD, PhD

Based on an incredibly large cohort of patients Marathe et al. report that pulmonary homografts, compared to bovine jugular vein conduits, offer clinically relevant superior freedom from reintervention and structural valve deterioration when the conduit diameter at implantation is greater than 15mm.\(^1\) This is a new, interesting finding which we should not ignore, and at the same time, place in appropriate context. In a 2015 report (also large cohort), Sandica et al. concluded just the opposite for patients less than 25 years of age.\(^2\) Patel et al., in a cohort of 231 bovine jugular implants in the size 16-22mm range, reported 5 and 10 year freedom from replacement that appear to be superior to those of Marathe et al. (199 implants) based on freedom from replacement.\(^3\) Marathe et al. report reintervention (which will be higher); however, I doubt that the low numbers of catheter-based reinterventions in Patel et al.’s series account for these findings. Oh, and by the way, all the aforementioned reports support what we already know about endocarditis – very low for pulmonary homografts and 7-10% for bovine jugular conduits.

This report met the standards and scrutiny of expert statistical review of the Journal, so I tread lightly. But I am a bit intrigued by the numbers. To reduce the impact of various biases inherent to such a study, the authors included several covariates, including size of the conduit. But in the propensity matched analysis (Supplementary Table 1), the only variable related to size was
whether the diameter was greater than or less than 15 mm. The median diameter and interquartile range for bovine conduits were 18mm (14mm – 20mm, 22 mm is largest commercially available); whereas, for pulmonary homografts the median diameter was 23mm (20mm – 25mm). From my admittedly non-expert data analytic capabilities, lumping all these conduits into a single > 15mm group could be a potential source of bias in favor of pulmonary homografts. Even were this the case, their findings remain interesting and noteworthy.

I do think there may be some validity to their results, but must disclose my current practice and opinion are already in line with what the authors either recommend or imply. More specifically, I typically implant the bovine jugular conduit only in neonates or infants or in patients for whom I expect a need to return for additional surgery in the next 3-5 years; and usually only when a suitably sized pulmonary homograft is not available or when additional conduit length is needed for the reconstruction. For older children, the concern with endocarditis alone is sufficient to dissuade me. We must acknowledge, though, the ongoing utility of the bovine conduit in specific circumstances. Similar to others, I advocate for a better conduit, but we should remain grateful that we have both types of conduits available. As they are all dead biologic tissue and subject to the natural history of dead tissue, I am amazed they work as well as they do.
References


