Bovine Jugular Vein Conduits vs. Homografts for Pediatric Pulmonary Valve Replacement

Nadia Hussein¹, Supreet P. Marathe¹,², Kim Betts³, Fraser O. Wallace⁴, Douglas Bell⁵, Matthew Yong⁴, Cameron Ward¹,², Prem Venugopal¹,², Igor E. Konstantinov⁴,⁶, Nelson Alphonso¹,²

¹ University of Queensland, Brisbane, Australia, ² Queensland Children’s Hospital, Brisbane, Australia, ³ Curtin University, Perth, Australia, ⁴ Royal Children’s Hospital, Melbourne, Australia, ⁵ The Prince Charles Hospital, Brisbane, Australia, ⁶ Murdoch Children’s Research Institute, Melbourne, Australia

Introduction

- Repair of congenital heart defects often requires relief of right ventricular outflow tract obstruction
- Several options exist for pulmonary valve replacement, including prosthetic valves and right ventricle to pulmonary artery conduits, but the optimum choice has been unclear
- This study compared long-term performance of bovine jugular vein (BJV) conduits and cryopreserved homografts

Results

- Pulmonary homografts significantly outperformed both BJV conduits and aortic homografts in freedom from structural valve degeneration (SVD) and reintervention; these differences persisted with propensity-matching
- No difference was found between the performance of BJV conduits and aortic homografts
- Small conduits showed significantly higher risk of SVD and reintervention, as did oversized conduits
- Infective endocarditis occurred in 10% of BJV conduits, compared to 1% and 1.5% in pulmonary and aortic homografts

Methods

Inclusion Criteria

Patients undergoing pulmonary valve replacement:
- With a cryopreserved pulmonary homograft, aortic homograft, or bovine jugular vein conduit;
- Under 20 years of age at time of operation;
- Operation between 1 Jan 2000 and 31 Dec 2018;
- At Queensland Children’s Hospital (Brisbane), Royal Children’s Hospital (Melbourne), and the Prince Charles Hospital (Brisbane).

Exclusion Criteria

- Acquired (non-congenital) heart disease;
- All other valve/conduit types.

Performance Measures

- Freedom from structural valve degeneration (SVD; peak trans-pulmonary gradient ≥50 mmHg or moderate or greater pulmonary regurgitation);
- Freedom from re-intervention (surgical or catheter);
- Incidence of infective endocarditis

Selected characteristics of the three study groups by conduit type (above).

Limitations

- Differences between study group characteristics resulted in propensity-matched samples of only about half the original sample, though the results remained similar
- Median follow-up time was much shorter for the BJV group
- IE prophylaxis could not be accounted for

Conclusion

- Pulmonary homografts result in better outcomes than BJV conduits or aortic homografts when implanted in the pulmonary position

References