

The risk of recoarctation of aortic arch reconstruction varies among different type of patch material

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Background: Recoarctation after aortic arch reconstruction is a known complication in neonates and infants. Homograft is the most commonly used patch material for aortic arch reconstructions in our centre. Since 2014, tissue engineered bovine pericardium (CardioCel®, Admedus Regen Pty Ltd, Perth, WA, Australia), was used as an alternative. The aim of our study was to determine if the material used for arch reconstruction had an influence on the development of recoarctation.

Methods: Data of all neonates and infants who underwent aortic arch reconstruction with use of any patch material between 2005 and 2016, in either univentricular or biventricular repair, was reviewed. Recoarctation was defined by the need of reintervention, either percutaneous or surgical. 41 patients were included. The aortic arch was reconstructed with a homograft (n =30) or CardioCel® (n = 11), at a median age of 2 (1 - 49) weeks and 2 (2-30) weeks, respectively. The median weight at the procedure was 3.5 (2.4 – 9.7) kg and 3.4 (2.8-7.6) kg for the homograft and CardioCel® group, respectively.

Results: Recoarctation was documented in 15 patients; 7 patients (23%) in the homograft group and 8 patients (73%) in the CardioCel® group. Freedom from reintervention estimated 77% and 17% at 1 year, for homograft and CardioCel® group, respectively. The difference was highly significant (p = 0.000). The median time at the first intervention for recoarction was 23 (14-461) weeks and 14 (7-10) weeks for the homograft group and CardioCel®, respectively. The time difference did not reach the level of significance (P=0.07). Among patients with recoarctations, the number of subsequent reinterventions needed to treat the recoarctations was higher among the CardioCel® (mean 1.9 reinterventions per patient) compared to the homograft group (mean 1.3/patient) (P=0.057). Treatment for recoarctation was percutaneous balloon angioplasty in 11 patients, stent implantation in 2, and operative enlargement in 2.

Conclusion: The patch material used for aortic arch reconstruction in neonates influences the rate of recoarctation and the number of reinterventions needed to treat them. Based on our results CardioCel®, a bovine pericardial patch, cannot be recommended for reconstruction of the aortic arch in neonates.