

P91. Tracheal Cartilage As A Suitable Graft Source For Reconstructive Pediatric Valve Surgery

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OBJECTIVES: In cardiac surgery especially for pediatric patients materials with growth potential for surgical reconstruction of cardiac structures are highly requested. In the present study, we investigated the integrative capacity of viable and non-viable allo- and xenogeneic tracheal cartilage rings, (allo-/ xeno-vTCR; allo-/ xeno-nTCR), implanted in the mitral valve (MV) position in the sheep model.

METHODS: Viable and non-viable ovine and porcine TCRs were implanted in MV position for 3 and 9 months (n=3) in lambs, respectively. Tissue viability was analyzed by LIVE/DEAD assay. The size of implanted TCRs was exactly adapted to MV size. MV function and TCR position were analyzed by echocardiography. Morphology was evaluated by macroscopy, ring planimetry, H&E-, Movat pentachrome-, von Kossa-stainings, and scanning electron microscopy.

RESULTS: No echocardiographic differences were detected after implantation among groups. Before explantation, no significant MV insufficiency was observed in all groups. In both xeno- and allo-nTCR groups, significant TCR shrinkage with MV stenoses was observed, whereas the size of all allo-vTCRs increased. However, morphological and histological analyses showed superior tissue integration of allo-vTCRs with a significant lower rate of ring dehiscence, inflammation and calcification. Consistently, complete endothelialization and viable cartilage cells were found only in allo-vTCRs.

CONCLUSIONS: Since allo-vTCRs implanted in MV position up to 9 months in sheep show excellent intracardiac tissue integration paralleled with ring size increase according to the somatic growth, native viable tracheal cartilage may represent a well suited living material with growth potential for reconstructive cardiac surgery especially for pediatric patients.