P159. Recellularization And Calcification In Decellularized Mitral Heart Valves In A Chronic Porcine Model

Jesper L. Hoenge[1]; Henrik Jensen[1]; Jonas A. Funder[1]; Pascal M. Dohmen[2]; Wolfgang F. Konertz[2]; J M. Hasenkam[1]
[1]Dept. of Cardiothoracic and Vascular Surgery, Aarhus, Denmark; [2]Dept. of Cardiovascular Surgery, University Hospital Charité, Berlin, Germany

OBJECTIVES: Glutaraldehyde bioprosthetic heart valves are non-viable and suffer from limited durability due to calcification and wear. Deoxycholic acid treated decellularized porcine heart valves have exhibited recellularization with limited calcification in the pulmonary position in sheep. The objective of this study was to evaluate recellularization and calcification in deoxycholic acid treated heart valve prostheses in the mitral position in a chronic porcine model.

METHODS: Seventeen pigs were subjected to heart valve prosthesis implantation in the mitral position. After a period of one to six months the valves were explanted and subjected to gross pathology examination, High Resolution x-ray imaging and histological evaluation.

RESULTS: Eight pigs survived the observation period. Three valves suffered from severe fibrin and thrombotic material depositions with disseminated calcification and valve stenosis. Five valves exhibited only slight fibrin deposition and calcification. Myofibroblast-like cell ingrowth was observed in different locations of the valve housing of all explanted heart valves, but very limited ingrowth was seen in the cusp. Fibrous sheath formation on the stent adjacent area was present in all valves. Endothelial-like cells was found in four valve prostheses covering up to 10 % of the cusp surface after six months.

CONCLUSIONS: All eight valves showed deposition of fibrin and platelet material after 1-6 months, three valves to a severe degree. Limited ingrowth of both fibroblast and endothelial-like cells was observed in five valves. In these valves calcification was limited to a few small commissural foci. The non-endothelialized surface makes the valves very vulnerable to thrombotic deposition, however slow revitalization seems possible.