Decellularized heterografts versus cryopreserved homografts: experimental study in sheep model


Objectives
The aim of this study is to assess the biological behaviour of porcine decellularized heterografts (Desc group) compared with cryopreserved homografts (Crio group) implanted in juvenile sheep.

Methods
Decellularized porcine pulmonary heterografts were implanted in five animals and cryopreserved pulmonary homografts in another five. The animals were followed-up for a mean of 280±14 days. The valve diameter was measured by echocardiography, which was performed at the 30th postoperative day, and before the explantation. The valves were also assessed macroscopically. Histological evaluation was performed using H.E., Gomori and Weigert staining. Immunohistochemistry specified different cell types (Factor VIII, CD3, Vimentin and CD68). Calcium quantity was analyzed using atomic absorption spectometry.

Results
There was one death in the Desc group due to endoearditis. The valves of Crio group showed decrease in the cellularity whereas the valves of Desc group showed matrix repopulation with endothelial and interstitial cells. Loss of collagen density and disarrangement of the normal fiber architecture was observed in Crio group. Calcium content demonstrated higher levels on the cusps and conduits in Crio group comparatively with Desc group. (P=0.016). The mean valvular diameter at the explantation was significantly increased (P=0.025) in the Desc group.

Conclusions
Decellularized heterografts had a different biological behaviour when compared to cryopreserved homografts and become repopulated by cells with fibroblasts and endothelial cells characteristics. The matrix was preserved and some regenerative potential was present.

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