7. Anglický souhrn:

Cryopreserved semilunar heart valve allografts: leaflet surface damage in scanning electron microscopy.

Objective:
Allograft heart valves (AHV), biological valves of human origin, offer potential advantages over conventional xenografts in terms of superior hemodynamics and, perhaps, better durability. The most important factors for long-term AHV clinical performance are the processing and cryopreservation methods. The aim of this study was to evaluate the impact of current processing protocol on valve tissue morphology, mainly to address the effect of successive processing steps on the leaflet surface structure. For the detection of fine changes in endothelial covering and underlying layers, our own modification of the scanning electron microscopy (SEM) technique was utilized.

Material and methods:
The study was based on an investigation of 20 AHV (40 specimens). Fourteen valves came from heart-beating donors (multiorgan harvesting) when the heart could not be transplanted for any reason (donor criteria, availability of recipient and/or logistics). Six were obtained at the time of routine postmortems - non heart-beating donors (NHBD). All specimens were initially fixed in Baker's solution. Tissue samples were dissected, dried with hexamethyldisilazane (HMDS), gold-coated, studied and photographed by SEM (Tesla BS 301). In order to define the integrity of the endothelium, subendothelial layers and the quality of the surface under SEM, a special six-level score system was introduced: 1-intact endothelium, 2-confluent endothelium with structural inhomogeneity, 3-disruption of intercellular contacts, 4-separation of endothelial cells, 5-complete loss of endothelium, 6-damage of subendothelial layers). AHV samples were divided into 4 groups for comparison. One aortic AHV "fresh" control sample obtained from a heart-beating donor was evaluated without any processing and was compared with (i) tissue from AHV obtained from NHBD with warm ischemia of 12 and 48 hours, (ii) samples stored at +4 degrees C in saline for 24 h, (iii) antibiotic-treated tissue for 24 h at 37 degrees C and finally with (iv) cryopreserved valves stored in liquid nitrogen (- 196 degrees C) for 6 - 38 months.