SUMMARY

The aim of the presented experimental work was to study an acute cell and antibody-mediated immune response in recipients of abdominal aortic grafts treated by a new standardized clinical cryopreservation/slow thawing protocol used in the "Vascular graft transplant program in the Czech Republic" in a rat model. Another aim of our study was to compare the influence of two basic types of conservation protocols used in this program (cryopreservation/slow thawing protocol and cold-stored protocol) on the acute immune response after transplantation of such treated abdominal aortic grafts in rats.

Cryopreserved abdominal aortic grafts were transplanted syngeneously between Lewis rats (CRYO-ISO group, cryopreservation period 172.6 days) and allogeneically between Brown-Norway and Lewis rats (CRYO-ALO group, cryopreservation period 179.3 days).

The grafts were explanted on day 30 after transplantation and subsequently examined by histological and immunohistochemical methods, focusing on typical signs of acute rejection in the three basic layers of the aortic wall. We monitored the presence of endothelial cells, signs of intimal hyperplasia, tunica media thickness, the presence of necrosis and deposition of imunoglobulin class G in this layer, the number of CD4+, CD8+ and LEW MHC II+ immunocompetent cells in the adventitial layer of the aortic wall. We monitored the recipient´s antibody immune response by examining the concentration of donor-specific anti-MHC class I and II antibodies in peripheral blood preoperatively and on day 30 after transplantation.

We compared the obtained data statistically with the basic data of our previous experiment studying acute rejection of cold-stored abdominal aortic grafts on the same animal model.

Cryopreserved allografts showed regular aortic wall morphology with well-preserved differentiation of all three basic anatomical layers on day 30 after transplantation. Tunica intima of cryopreserved allografts showed no or only minimal signs of intimal hyperplasia, in contrast to cold-stored allografts. The luminal surface was covered by endothelial cells. Compared to cold-stored, tunica media of cryopreserved allografts did not show signs of necrosis and imunoglobulin class G deposition. Statistically higher concentrations compared to preoperative values in recipients of cryopreserved allografts were recorded only for anti-MHC class I antibodies.

Day 30 recipient sera of both cryopreserved and cold-stored allografts showed significant higher inhibition of fluorescence-labelled MHC class I antibody binding to donor

quiescent splenocytes compared to preoperative values. However, the statistically higher inhibition of fluorescence-labelled MHC class II antibody binding to donor quiescent splenocytes compared to preoperative values was observed only in recipients of cold-stored allografts.

In conlusion, aortal wall histology of rat allografts treated by our new standardized clinical cryopreservation/slow thawing protocol was comparable to that of the cryopreserved isografts on day 30 posttranspant. The immunogenicity of cryopreserved aortal allografts was significantly lower compared to that of cold-stored aortal allografts.

Key words: cryopreservation, acute rejection, isogenic, allogenic vascular graft, myointimal hyperplasia, MHC class I and II antibodies