ABSTRACT (ENGLISH)

Background: The investigation of the immunosuppression usage in cardiovascular surgery and interventional cardiology is, at present, concentrated on three main topics: 1) influence on intimal hyperplasia of coronary and peripheral vascular reconstructions 2) influence on rejection of allogeneic vascular grafts and 3) influence on intimal hyperplasia of coronary arteries after endovascular interventions. Modern immunosuppressive drug FK506 (Tacrolimus) could have a positive effect for these indications. In experimental study, FK506 inhibited rejection of arterial allografts and also inhibited intimal hyperplasia in percutaneous coronary interventions.

Aims: The purpose of this study was to evaluate the effect of systemic tacrolimus treatment on the process of arterialisation of allogeneic and syngeneic venous grafts in a rat vein-to-artery implantation model.

Material and Methods: Lewis (LEW) rats were used as recipients of syngeneic (Lewis) or allogeneic (Brown-Norway; BN) iliolumbar veins which were implanted into abdominal aorta. Recipients were divided into six groups. In groups A, E and F were animals after syngeneic (LEW to LEW) and in groups B, C and D were animals after allogeneic (BN to LEW) transplantations. Animals in the groups C and F had daily intramuscular injections of tacrolimus of 0.2 mg/kg and animals in groups D and F 0.1 mg/kg, respectively. The groups A and B had no treatment. Light microscope evaluations of arterialised vein grafts were performed 30 days after operation.

Results: The blood level of FK506 30 days after transplantation was statistically different between the allogeneic groups C and D and between syngeneic groups E and F ($p < 0.001$). In syngeneic groups (A, E, F) we observed venous graft arterialisation in all animals. The use of FK506 led to inhibition of intimal hyperplasia in these animals. Moreover, this inhibition was dose dependent (thickness of intimal layer: group A 12.7 ± 7.0 μm, group E 7.0 ± 3.0 μm and group F 5.0 ± 1.0 μm). The process of venous graft arterialisation was also present in the allogeneic group D with a minimal dose as well as in group C with low dose of FK506. But we observed no difference in thickness of the intimal layer between these groups (group C 15.0 ± 8.4 μm, group D 15.1 ± 6.1 μm). In contrast, the allogeneic group B without immunosuppression showed no histological signs of arterialisation with destruction of intimal layer without signs of proliferation.

Conclusion: Treatment with FK506 showed a dose dependent inhibition of neointimal hyperplasia in arterialised syngeneic vein grafts in rats.
In allogeneic vein grafts, FK506 was sufficient even at a minimal dose (half-dose compared to that use in arterial transplantation model) to inhibit acute rejection and facilitated their arterialisation 30 days after transplantation.