

**Examination of acute limb ischemia-reperfusion in experimental models.
Preservation possibilities of the viability of limb amputates from traumatic origin.**

Ph.D. dissertation - Summary

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Limb amputation and ischemia-reperfusion (I/R) of trauma origin means serious challenge in the clinical practice, furthermore limited number of laboratory parameters are known and used, which may help to follow-up the changes and value the prognosis. It is mostly true when the ambiguous effects of preventive cooling influence the clinical outcome.

In order to answer the raised questions, even partially, two animal experimental model have been worked out: (I) On rats hemodynamic and acid-base alterations have been investigated after 2-hour ischemia in the first hour of the reperfusion, in the respect of arterio-venous differences, too. (II) In a canine model after prolonged cooled and non-cooled 3-hour ischemia and the following reperfusion local and systemic hematological, hemorheological and hemostaseological alterations have been investigated, furthermore, intraoperative microrcirculatory tests and tissue pressure monitoring, and later histological examinations have been performed.

In the rat model, besides the general effects of the pentobarbital anesthesia, hind limb ischemia-reperfusion resulted in systemic hemodynamical and acid-base changes in the first hour of the reperfusion, showing significant arterio-venous differences in pH values. For the restitution of changed parameters the first hour of the reperfusion was not enough.

In the canine model the 3-hour ischemia and the following reperfusion resulted in significant and indicative changes in several hemorheological and hemostaseological parameters. Rheological properties of the blood -excluded in the ischemic limb- were significantly worse than of the blood in systemic circulation. At the beginning of the reperfusion the pathologic changes have been also observed in the systemic circulation. Impairing of red blood cell deformability and activated partial thromboplastin time on the 1st – 3rd postoperative days showed changes with indicative force for ischemia-reperfusion injury, as well as the intraoperatively measured tissue pressure in the anterior shin compartment. These parameters showed more prominent changes in the case of cooling, and these alterations seem to be applicable for determining and following-up the changes caused by ischemia-reperfusion, being with or without cooling.

According to the results it is suggested that the uncontrolled and only empirically used in situ cooling requires more vigilance, though, it may enlarge the indicative alterations of hemorheological and hemostaseological parameters caused by ischemia-reperfusion. In the light of the complex pathophysiological alterations and the actual clinical state, all of these may strongly influence the outcome – in respect of replantations, the viability of the tissues.