

The investigation of ischemia-reperfusion changes on small intestinal segments and small intestinal transplantation experimental models with the appliance of surgical and microsurgical techniques

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Mesenterial ischemia-reperfusion injury is still a serious clinical problem which can be the determining factor of survival in gastrointestinal tract surgery, different mesenterial diseases and small bowel transplantation. In order to perceive the pathomechanism of mesenterial ischemia-reperfusion and to improve the technical problems of the experimental transplantation models we performed our research on three different laboratory animal species.

In case of the first experimental model due to creating isolated double jejunum-segments on mongrel dogs we found out that the greatest apoptotic activity was detected at the 4th and 6th hour of reperfusion after 30 minutes ischemia in the mucosa of the small intestine.

It was also stated that application of the 3x3 and 3x5 minutes ischemic preconditioning, Vitamin E (25 mg/bw/kg), Allopurinol (50 mg/bw/kg) resulted in increased apoptosis caused by ischemia-reperfusion in the mucosa in contrast to our hypothesis.

In the second experimental model on mongrel dogs during the reperfusion after 30 minutes ischemia of the superior mesenteric artery we verified the worsening of the red blood cell deformability by filtrometric measuring on the 3rd postoperative days.

In the third experimental model on outbred rats, 30 minutes of mesenterial ischemia followed by reperfusion resulted in significant decreasing of red blood cell deformability measured by ektacytometer; the red blood cell aggregation, the hematocrit, the mean corpuscular volume and the white blood cell count values were significantly increased in local venous blood (portal vein) compared to the systemic venous blood (caudal caval vein).

In the fourth experimental „avascular” small bowel transplantation model on inbred mice we proved the viability of the small intestine chips implanted into the greater omentum. The design of this operation technique is a simplified and quick model without any vascular anastomosis. In connection with this model we also developed an advanced microsurgical educational protocol to help the small bowel transplantation experiments.

mesenterialis ischaemia-reperfusio, praeconditionalás, apoptosis, mikrosebészet

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