

Influence of arachidonic acid metabolites on nuclei and cell migration in proliferative vitreoretinopathy and total retinal ischemic models in rats

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Introduction. Retinal pathology is associated with ischemia and proliferation. In both cases the pathogenesis is manifested by inflammation, accompanied by remodeling of the retina and migration of nuclei and/or cells. The most important in the inflammatory pathway is the metabolism of arachidonic acid. Subsequently arachidonic acid metabolites can play a major role in the process of migration.

Aim. To investigate the influence of arachidonic acid metabolites on nuclei and cell migration in proliferative vitreoretinopathy (PVR) and total retinal ischemic models in rats.

Materials and Methods. PVR rat models was established by the intravitreal injections of 2 μ l Concanavalin A solution (ConA) (0,25 mg/mL) or dispase (D) (0,2 U/ μ L). 20 minutes after the injection, normal saline, 0,016 mg lornoxicam and 0,08 mg triamcinolone were injected intravitreally (2 μ l of each). The rats were further parenterally injected with the same doses on day 1 and 2 after the initial injection. A rat model of total retinal ischemia was induced by occlusion of the inner carotid artery. Same injections as for the PVR model were performed for the ischemic model. The eyes were enucleated on day 1, 3, 7 and 56 (or day 1, 3, 7 and 42 in dispase model). They were embedded in paraffin and cut into sections. Subsequently, the sections were stained with H&E to observe the retinal architecture using light microscopy. All the data analysis of the nuclei and cell migration was performed using the ImageJ program.

Results. In the PVR model the number of migrating nuclei and cells was increased significantly. In the total ischemic model the process of migration was not as defined as in the PVR model. In the PVR model the highest rate of migration was during epiretinal membranes (ERM) formation and this rate fell with ERM maturation. The applied antiinflammatory therapy showed a significant decrease in migration of nuclei and progression of PVR.

Conclusion. The prostaglandins pathway of the arachidonic acid metabolism determines the outcome and intensity of the initial inflammatory response. Prostaglandins may also play a significant role in cell and nuclei migration in proliferative and ischemic retinal pathologies.