Paulius Lizdenis
Dr. med.

Assessment of the intravascular, transendothelial and extravascular leukocyte locomotion by digital time-lapse intravital microscopy

Geboren am 12.03.1978 in Skuodas, Litauen
Staatsexamen am 13.06.2002 an der Medizinischen Universität Kaunas, Litauen

Promotionsfach: Chirurgie
Doktorvater: Prof. Dr. med. Jan Schmidt

The method of digital time-lapse intravital microscopy represents a modern technology for the investigation of intravascular, transendothelial and extravascular migration of leukocytes, which dramatically improves the study of leukocyte intravascular movement and transmigration. Using this technology, a form of intravascular leukocyte movement was characterised – intraluminal leukocyte crawling. In the present study, the process of transmigration was documented in continuous manner which allowed observing all steps of the transmigration. We found that leukocyte transmigrate occasionally under normal conditions. They cross endothelium in one or in two steps – first, crossing endothelial cell layer, and, in the second step, crossing basement membrane. Neither LPS nor TNF-α had effect on transmigration time. Low concentrations of TNF-α significantly increased number and velocity of intravascular moving leukocytes, e. g. crawlers. Application of high concentrations of LPS and TNF-α decreased leukocyte motility. H1R-antagonist Ketotifen and NSAID Ketoprofen caused dose-dependent inhibition of leukocyte locomotion. Ketoprofen decreased intravascular leukocyte adherence and crawling.

In conclusion, the model of time-lapse digital intravital microscopy represents an excellent tool for investigations of intravascular, transendothelial and extravascular leukocyte locomotion.