HEMORHEOLOGICAL EFFECTS OF VALSARTAN IN L-NAME HYPERTENSION IN RATS

Ana S. Silva-Herdade, Carlota Saldanha

Nitric oxide is an important regulator of vascular function and blood pressure and the chronic administration of nitric oxide synthase (NOS) inhibitors provides an experimental model of hypertension. This study aims to investigate the hemorheological effects of oral administration of N^{ω}-nitro-L-arginine methyl ester (L-NAME) for 3 weeks in Wistar rats and the same effects for Valsartan intravenous treatment. Three experimental groups were performed: a Control group, a HTA group that drank L-NAME 600mg/L and a HTA-VLT group that received Valsartan after 3 weeks of L-NAME treatment. After the experimental period systolic blood pressure was determined and blood samples were collected for determination of the following parameters: erythrocyte deformability, nitric oxide (NO) and intracellular calcium concentrations, membrane fluidity and acetylcholinesterase (AChE) activity.

In this rat model of chronic nitric oxide deprivation and comparing with the control group the systolic blood pressure significantly increases after 21 days demonstrating the development of systemic hypertension. Relatively to the hemorheological parameters the erythrocyte deformability is decreased in the L-NAME group, increasing the erythrocyte membrane fluidity. The NO concentrations, as expected, decrease after NOS inhibition and the intracellular calcium concentrations remain invariable. AChE activity is decreased in the HTA group. Valsartan administration decreases the systolic blood pressure augmented in L-NAME treated rats. The decreased erythrocyte deformability obtained in the L-NAME group was reverted with Valsartan for higher levels of shear stress and the membrane fluidity is similar to one obtained in the control group. The NO concentrations remain lower than the control group in the HTA-VLT group but there is a significant increase in the intracellular concentrations of calcium, moreover AChE activity is also reverted after Valsartan administration.

In conclusion, Valsartan revert the systemic hypertension achieved with the NOS inhibition restoring the significant hemorheological modifications obtained.

Instituto de Bioquímica, Unidade de Biologia Microvascular e Inflamação, Instituto de Medicina Molecular, Faculdade de Medicina de Lisboa, Portugal