Electrical and rheological properties of blood in patients with type 2 diabetes mellitus

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Aim: The study investigated the kinetics of blood conductivity under transient viscometric flow in parallel with the rheological properties of blood in patients with type 2 diabetes mellitus.

Materials and methods: The measurements were performed by the rotational viscometer Contraves LS30 with the standard and a concurrent measuring system MS 1/1, a device, developed by the conductometric method with a software for measurement of conductivity of biological fluids. The measurements of whole blood conductivity and whole blood viscosity (WBV) in a group of 13 patients with type 2 diabetes mellitus and 9 healthy matched controls were carried out at a temperature of 37\textdegree C. WBV at $\gamma$ from 0, 0237 s\textsuperscript{-1} to 128, 5 s\textsuperscript{-1} and the time variation of whole human blood conductivity were investigated at rectangular and trapezium-shaped Couette viscometric flow under electric field of 2 kHz. The kinetics of conductivity signals were recorded both under transient flow and after the complete stoppage of shearing at $\gamma$ from 0 to 94.5 s\textsuperscript{-1}. A non-linear curve approximation of the growth and relaxation whole blood conductivity experimental dependences was done.

Results and discussion: It was found that the mean WBV and hematocrit values in the group of patients with type 2 diabetes were higher in comparison to the controls in the entire shear rate range. The results obtained for the blood conductivity in time depends on the shear rate and on the hematocrit of the samples under transient flow.\textsuperscript{.}