Role of hemorheological factors in the control of microcirculation in anemic patients with solid cancer

Kislov Nikolay¹, Muravyov Alexei¹, Tikhomirova Irina¹, Peganova Ekaterina¹, Petrochenko Elena¹
¹State Pedagogical University

The blood rheology has a regulating effect on the microcirculation. Blood viscosity (BV) determines the magnitude of the shear stress on the arteriole wall for NO release, and under some conditions red blood cells (RBCs) excrete ATP for vascular tone control. The investigation of the role of hemorheology in the regulation of microcirculation was the study aim. In patients with solid malignancies recorded hemorheological profile, microvascular perfusion and oxygenation of tissues and determined the RBC ATP content before and after three cycles of chemotherapy based on platinum (cisplatin). After 3rd cycle of chemotherapy a decrease in microvascular perfusion (MP) by 18% and tissue oxygenation (TO) by 12% were found. Decrease of Hct in these conditions has two negative effects: 1) a decrease in blood oxygen capacity; 2) decrease in BV. There were also two positive responses: 1) some increase in plasma viscosity (PV) and 2) RBC deformability rise by 9%. PV positive correlation with the MP (r = 0.520) and TO (r = 0.850) confirms this. The RBC content of ATP was 28% less than the control. It was found that RBC ATP negatively correlated with MP (r = -0.620). Therefore, an increase in PV could offset the decline in blood oxygen capacity due to stimulation arteriole vasodilatation and an increase of microvascular perfusion and tissue oxygenation.

This work was supported by RSCF research project No. 14-04-01703.