Interrelation of blood coagulation and hemorheology in cancer

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Cancer progression is associated with activation of blood coagulation. Evaluation of blood clotting process by means of low frequency piezothromboelastography in patients with solid tumors (n=21) has demonstrated intensification of contact coagulation phase, the rise of intensity of the proteolytic stage of fibrin forming, the shortening of blood clotting time. Reduced intensity of lysis and retraction of clot was fixed in patients compared to healthy control. Analysis of hemorheological indices in cancer patients revealed the decrease of high shear rate blood viscosity in patients determined by the significant lowering of Hct (by 19%, p<0.01) which exceeded the effects of plasma viscosity growth (by 9.5%, p<0.05) and the decrease of red blood cell deformability promoting elevation of blood viscosity. These changes of macro- and microrheological blood properties in patients with malignancies caused the evident decrease of the efficacy of oxygen delivery to tissue by blood. It was determined by the notable reduction of the number the main oxygen carrier – erythrocytes, as well as by the rise of red blood cell rigidity and aggregability (by 25%, p<0.05). Increased blood fluidity in cancer may to some extent compensate high hemocoagulation activity, preventing thrombotic events; on the other hand impaired blood rheology may induce hypoxia in the microcirculation that favors thrombosis, settlement of tumor cells and thus metastasis.

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