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THROMBOPLASTIC ACTIVITY OF FROZEN ERYTHROCYTES

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Development of transfusion protocols with taking into account the hemostatic potential of blood of various patients at different diseases has been always remained an actual and unsolved task. In this connection the taking into consideration and modification of thromboplastic properties of erythrocytes prior to transfusion could be effective approach for their directed effect on general hemostasis.

Erythrocytes contain intra-erythrocyte and extra-erythrocyte hemostatic factors related to certain cell structures. It is known that during transfusion of frozen erythrocytes there is inevitable partial hemolysis of erythrocytes and release into a blood flow of erythrocyte factors of blood clotting, such as ADP and thromboplastic factor of erythrocytes, as well as anticoagulants. Hemolysis of erythrocytes leads to exposure of phosphatidylserine molecules on an inner surface of membranes, which activate the clotting factors, causing an additional activation of thrombinase. In patients with different hemorrhagic diseases there was found a rise in the percentage of erythrocyte hemolysis in blood which has a compensatory adaptive character, diminishing the manifestation of hemorrhagic syndrome under conditions of insufficiency of platelet-vascular hemostasis, since the hemolysate possesses higher thromoplastic activity if compared with the intact erythrocytes.

In the work there was studied the time of plasma coagulation under the effect of erythroctes frozen in a liquid nitrogen (-196°C) in combined media with non-penetrating (PEG-1500, dextran) and penetrating (DMSO, 1,2-propane diol) cryoprotectants. It has been established that frozen erythrocytes washed with physiological solution as well as their hemolysates reduce the plasma coagulation time in a greater extent than intact cells.

Thus, during freeze-thawing of erythrocytes in the combined media with penetrating and non-penetrating cryoprotectants and during washing-out likely occurs the activation of cell factors of blood clotting as a result the time of plasma coagulation is reduced under the effect of frozen cells and their hemolysates. In prospects the application of frozen erythrocytes will allow the designing of hemostatic cell drugs to use them in clinic to improve the blood clotting activity.