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MODERN METHODS OF DIAGNOSIS OF ANEMIAS IN NEWBORN

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Abstract
EV transfusion is one of the most frequent medical interventions in the neonatal period. The main purpose of transfusion is to maintain adequate oxygen delivery to tissues. It is an effective and rapid way to increase tissue oxygenation in newborns with blood loss [1,2,3].

Keywords: Anemia, newborns, blood transfusion, red blood cells, donor.

Introduction

EV transfusion reduces the compensatory increase in cardiac output in physiologically significant anemia. However, transfusion of donor red blood cells also leads to a number of complications, and there are certain risks associated with it. With all the ambiguities in the methodology, there are randomized studies that suggest an increased risk of death with EV transfusions [5,7]. In addition, frequent transfusions lead to tissue iron overload, and iron is known to be a strong oxidizing agent [5,7,8,9].

These iron-induced processes are associated with an increased risk of retinopathy of prematurity, ALD and necrotizing enterocolitis [4,5,6]. In addition, risks of infection are associated with EV transfusions [7]. Despite the reduction of leukocytes from EB, infection with cytomegalovirus in transfusions has been reported in 1-3% of cases [10,11]. Speaking about the risk of CMV infection in EV transfusions it should also be noted that the virus is often present in asymptomatic adults and about 70% of the population is seropositive. [12].

It is desirable to transfuse seronegative EB to preterm infants, but this complicates the blood collection process and limits the number of donors. Another alternative, given that viruses are thought to reside in neutrophils, is to reduce the number of leukocytes in the EB, or to use storage methods that reduce virus survival, such as freezing in glycerol. Blood irradiation primarily affects lymphocytes and is therefore not a proven way to prevent CMV infection. EB transfusion has an

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inhibitory effect on erythropoiesis and is also associated with acute lung injury, circulatory volume overload, toxic effects of anticoagulants and preservatives, and HCC [1,6,7,8,9].

Transfusion of EB may also lead to the development of a graft versus host reaction, although the question of the possibility of such a reaction in children with low and extremely low body weight is not completely clear [10,11]. The issue of indications for EV transfusion in the neonatal period is one of the most difficult. In a survey of 1018 neonatologists from the United States, Germany, Japan, the United Kingdom, Spain, Italy, Canada, Belgium, and the Netherlands, 11 questions were asked regarding the criteria for EV transfusion in newborns. The main finding of this study was that there was a large variation in hemoglobin levels as a criterion for transfusion.

The greatest variation in hemoglobin values was in the first week of life in preterm infants who did not require ventilation [2,3]. Currently, there is no clinical marker that can determine when EV transfusion is necessary. In order to optimize oxygenation in children with low and extremely low body weight, critically ill newborns, they try to maintain hemoglobin and hematocrit at a given level. However, hematocrit level itself is a poor indicator of tissue oxygenation. Studies evaluating the level of lactate in capillary blood as a criterion for transfusion were also inconclusive, as its changes probably reflect tissue perfusion rather than hemoglobin level [3,4,5,6]. Echocardiographic studies demonstrating changes in cardiac output are also insufficient to clarify the need for EV transfusion [56]. A study was conducted by Wardle S.P., 2002, in which infrared spectroscopy was used to indirectly assess peripheral tissue oxygenation in 7 preterm infants with birth weight less than 24,1500 g to decide on the need for EV transfusion. No significant differences were found when compared with a group of newborns in which the decision about the need for EV transfusion was based on standard guidelines [8].

However, the impact of this drop in cerebral oxygen saturation on long-term neurologic outcome is unknown [8,9,10,11,12,13]. Our analysis of recommendations for transfusion of EB for neonatal anemia in different countries over the last few years has shown a general, consistent trend toward the use of lower hemoglobin thresholds for transfusion. This is due to a number of retrospective studies showing that it does not lead to increased mortality, incidence of serious illness, length of hospitalization, and decreased frequency of EV transfusions. [4,5,6].

A study of long-term neurologic development found no significant differences in children depending on whether lower or higher hemoglobin thresholds were used in indications for EV transfusion in the newborn period [9,13]. Thus, it is currently impossible to provide clear evidence-based criteria for transfusion of erythrocyte suspension in newborns, but the establishment of local protocols for transfusion, lower hemoglobin thresholds for EV transfusion, and adherence to them by physicians has led to a reduction in the frequency and volume of transfusions.

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