



## NEW APPROACHES TO RED CELL TRANSFUSION

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### ABSTRACT

*Donated blood and blood products play a critical role in helping: women with bleeding associated with pregnancy and childbirth; children with severe forms of anemia caused by malaria and malnutrition; patients with blood and bone marrow diseases, congenital disorders of hemoglobin synthesis and immunodeficiency conditions; people those who received traumatic injuries as a result of emergencies, disasters and accidents; patients undergoing complex medical and surgical procedures.*

**Introduction.** It should be kept in mind that information on the accuracy of viscoelastic hemostatic studies is not widely published, although subjective operator characteristics appear to have a significant influence on the outcome of the study [1,2,3]. In one study with 7 operators, coefficients of variation of individual indicators were 2.6–11.2% for ROTEM and 7.4–19% for TEG [18]. Interlaboratory comparison with external quality control samples shows much worse accuracy: 7–49% for TEG and 7–83% for ROTEM [8,7,9,24]. Russian scientists also note differences in thromboelastometry reference intervals from those recommended by the manufacturer and confirm the need to develop reference intervals within each specific laboratory [1,10,16]. There is a need to ensure there is enough safe blood donated for everyone in need around the world. Every minute, someone in the world needs donor blood [3,5,6,10,18]. Donated blood and blood products help save millions of lives every year. The right to health is a human right; Every person in the world should have the opportunity to receive a transfusion of safe donor blood at the time and place where the need arises. Ensuring that people and communities have access to safe and quality donated blood and blood products requires the organization of regular blood donations throughout the world [13,16,27]. Donated blood and blood products play a critical role in helping: women with bleeding associated with pregnancy and childbirth; children with severe forms of anemia caused by malaria and malnutrition; patients with blood and bone marrow diseases, congenital disorders of hemoglobin synthesis and immunodeficiency conditions; people who have suffered traumatic injuries as a result of emergencies, disasters and accidents; patients undergoing complex medical and surgical procedures [26].

We studied specialized publications from 1950 to 2011 using major databases. The systematic review included randomized controlled trials in which groups of blood recipients were clearly separated based on a clear indication (trigger) or target level (threshold),

described as the level of hemoglobin or hematocrit, which should be determined before red blood cell transfusion [27].,28] The comparison group was required to receive allogeneic or autologous red blood cell transfusions at higher hemoglobin and hematocrit levels than the intervention group [9,16] In addition, in the control group, transfusions could be administered according to current practice at which the target level was used. may not have been precisely defined, but liberal and restrictive transfusion strategies were included in trials of surgical and medical patients in adults and children [9,16]. Descriptive studies assessing the effects of blood transfusion were also not considered. For each trial, the relative risk (RR) for allogeneic transfusion in the intervention group compared with the control group and corresponding 95% confidence intervals were calculated using a random effects model. The rules for the procurement, storage, transportation and clinical use of donor blood contain a description of 11 types of red blood cells containing transfusion media [8,12] . We identified 19 studies (n=264 patients) that met the inclusion criteria. In the restrictive tactics group, 39% fewer patients received red blood cell transfusions than in the liberal tactics group. In the restrictive group, the average number of red blood cells transfused was 1.19 units less, and the average hemoglobin concentration before transfusion was 14.8 g/L less. There were no significant differences in 30-day mortality, ability to walk independently, duration of hospital treatment and other outcomes in the two compared groups [7,14]. The recommendation of 70 g/L in adult or pediatric intensive care unit patients is based on the TRICC studies ( Transfusion Requirements In Critical Care ) and TRIPICU ( Transfusion Strategies for Patients in Pediatric Intensive Care Units ), in which 70 g/L was the target hemoglobin level in the restrictive group. The recommendation of 80 g/L or symptoms is based on the results of the FOCUS study ( Transfusion Trigger Trial for Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair ), a restrictive strategy in which transfusion was allowed for hemoglobin below 80 g/l or the above-mentioned symptoms [13,26]. The panel is confident that this recommendation is likely to be appropriate for all surgical and medical patients, with the exception of those with acute coronary syndrome [6,15]. Restrictive transfusion strategies are also recommended for patients receiving stored autologous red blood cells. The recommendation for a sufficient hemoglobin level of 70 g/l does not apply to patients outside intensive care, as this situation has not been studied. Also, this recommendation does not apply to preoperative transfusions, since this decision must also take into account the expected blood loss during surgery [19,27].

In fact, 4 types of donor red blood cells are recommended for use:

- leukodepleted erythrocyte suspension ;
- erythrocyte suspension , leukodepleted , irradiated;
- washed red blood cells;
- cryopreserved red blood cells.

It is important that leukoreduction ( leukodepletion ) is recommended as a mandatory procedure for processing cellular components of blood.

Recipients of red blood cells do not need donor: 1) leukocytes, which are removed during leukodepletion and 2) plasma, which is replaced by an additional solution. None of the 10 clinical sections recommend packed red blood cells.

This obsolete component must be eliminated from our practice .

In various sections of the recommendations, it is advised to select donors whose blood does not contain antibodies to cytomegalovirus (CMV). Please note important recommendation 7, according to which, when using leukoreduced erythrocytes, special selection of CMV-negative donors is not necessary. Cytomegaloviruses are contained within white blood cells and are removed by leukodepletion .

Irradiation is a way to prevent graft-versus-host disease. Important for blood transfusions: 1) to immunocompromised patients and 2) to relative donors.

- Laundering is used for severe allergies to allogeneic plasma proteins .

- Cryopreservation is a way to preserve red blood cells of rare blood groups.

- It seems promising to take into account the world's reviving interest in whole blood transfusions.

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