What is the right blood transfusion trigger?

Blood transfusions are used in medical practice every day all over the world. Their use is largely aimed at restoration of the necessary number of red blood cells (erythrocytes), which main goal is to transport the oxygen to human organism tissues. The decrease in the number of erythrocytes occurs as a result of blood loss during surgical procedures, of severe systematic diseases, and under blood diseases. In the majority of cases allogeneic donor blood is used for blood transfusion. Before the transfusion, donor's blood is compared to the recipient's (the person who acquires the blood) blood for compatibility. If the antigens' groups in donor and recipient blood match the donor blood is used for transfusion. Though it is well proven that donor blood can raise the number of erythrocytes and the level of hemoglobin (a protein in red blood cells that is responsible for the oxygen transport), there is doubt about the safety of donor blood. The problem lies with A) the potential technical failures while preparing, matching, and labeling the donor blood, B) the fact that donor blood is actually the tissue of another person and may lead to some unfavorable reactions in recipient's body, C) the possible transmission of known and unknown germ, and D) with organ failure (e.g. lungs and kidneys) in case of multiple transfusions. Because of these potentially negative properties of donor blood, the majority of modern guidelines highly recommend to use blood transfusion at very low thresholds of erythrocytes and hemoglobin.

We performed a systematic review of all existing clinical trials that compared different thresholds in blood transfusion. We found, for the first time, that the decision (whether to transfuse or not) should be based not only on rough levels of the erythrocytes or hemoglobin but also on the clinical situation of the patient. Patients with the same low levels of erythrocytes and hemoglobin can respond differently to the decrease in the number of the oxygen transporters in the human organism. We have come to the conclusion that patients with surgery as the cause of anemia benefit in receiving donor blood earlier (that is at a higher level of hemoglobin). Conversely, patients in intensive care unit should go on receiving donor blood at a low level of erythrocytes. The reason probably lies within the mechanisms of erythrocytes and hemoglobin level decrease and correspondently, within how different patients adapt to lower level of red blood cells. Hereby, the performed systematic review clearly shows the necessity to consider the clinical context on the whole while taking decision about donor blood transfusion. Our work suggests that in surgical patients more liberal approach in blood transfusion is live saving as compared to more restrictive mode that is instead possibly favorable in critically ill patients.

The conducted review is a major step in our understanding of highly important problem of blood transfusion safety. It underlines the significance of patient-oriented approach in everyday medical management. At bedside we should remember that we deal with individual person whose organism is not the same of another one. The peculiarities of the main disease as well as features of health state of the concrete patient influence the course of illness and should guide transfusion decisions.

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