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Possible adverse effects of the blood donation from brain-dead patients☆

Posibles efectos adversos de la donación de sangre de pacientes en muerte encefálica

Dear Editor:

We have found the article published by Nanwani Nanwani et al.[1] on blood donation from brain-dead (BD) patients to be very interesting. It has opened a valuable debate on the clinical circumstances and ethical principles which should be revised in order to view this option as feasible. In our opinion, we must not obviate the close relationship between the progression of severe brain damage and the generation of hypermetabolic reactions and immune-mediated processes throughout the body. Brain death is the greatest stress factor to which organs, tissue and cells are exposed before possible donation, due to the generation of hemodynamic, ventilatory, endocrine and inflammatory modifications, mediated by an important neuromodulated inflammatory response.[2]

If in addition BD is reached secondary to severe traumatic brain injury, for example, we know that the elevated secretion of cytokines produces an increase in the concentration of brain tissue factor. This in turn activates the complement system, which in combination with important catecholamine release, contributes to perpetuating the coagulopathic state. Such rapid release of large amounts of tissue factor following severe traumatic brain injury also induces thrombin formation. Likewise, the systemic proinflammatory state is responsible for the activation of fibrinogen and IL-6, which together with complement activation would explain the hypercoagulability state that predominates in the first 24 h after trauma. On the other hand, platelet inhibition and consumption, together with the excessive activation of fibrinolysis, would account for the increased risk of bleeding in later stages after trauma.[3]

Taking into account that several studies have shown high plasma IL-6 concentrations in donors to be significantly associated with reduced recipient survival at 6 months after hospital discharge,[4] to what extent are we able to affirm that blood from BD patients will not be affected by this metabolic and immune cascade that is activated in patients with severe brain injury? From our perspective, current scientific knowledge does not allow us to be sure of the absence of immune-modulating effects in the recipients.

In turn, once BD has been established, it is common practice to administer amines, antibiotics and several different drugs to maintain donor clinical stability - and this undoubtedly could affect the theoretical quality of the blood components.[2]

We also must remember that during the organ harvesting and preservation process, vascular infusions are performed involving specially prepared fluids which seek to maintain homeostasis. These solutions contain additives (osmotic agents, electrolytes, colloids, metabolic inhibitors, metabolites, antioxidants and even drugs), and can have an impact on the presence of coagulation factors.[5] In this way, if blood extraction as suggested by the authors is performed during or after harvesting of the rest of body organs, we likewise would not be able to discard potential clinically significant alterations of the extracted blood components.

Coinciding with the authors on the importance of finding new resources and seeking solutions to the more than likely shortage of blood products which we may face, we believe that if this practice is finally implanted, it must be done so with extreme caution. Although the ethical debate is important, we feel that attention should focus on demonstrating the viability of using such blood products and clarifying the doubts regarding possible adverse effects.

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Reflections and aspects to consider about blood donation in brain-dead patients☆

Reflexiones y aspectos a considerar de la donación de sangre de pacientes en muerte encefálica

Dear Editor:

We wish to thank the team of Dr. Egea for its scientific contribution to the debate on blood donation in brain death (BD).[1] In effect, the inflammatory and coagulopathic processes, together with the preservation fluids in the case of organ and tissue donations, could affect the quality of the donated blood, and as a result, the latter could only be used under very limited circumstances.

However, thanks to the processing or ''washing'' of whole blood or of packed red cells with saline solution or other means for removing proteins, cytokines and other mediators, with or without filtration, it is currently possible to obtain standardized components in all transfusion centers and services for patients with a history of post-transfusion allergic reactions, severe respiratory distress or IgA deficiencies. New devices are being developed that allow safe removal of the entire aforementioned inflammatory and immune-modulating cascade, as has been so well described by Jiménez-Guerra et al.[2] Many of these techniques are already being successfully used to standardize and improve the quality of the ''recovered'' blood.[3]

For the time being, the procedure could be considered for the obtainment and subsequent cryopreservation of red cells corresponding to ''rare'' or ''low prevalence'' blood groups (<1 in 1000 subjects), for although the Bombay blood group is the best known, there are also others. In a global context, the International Society of Blood Transfusion (ISBT) endorses collaboration in searching for these rare donors. Most developed countries have collaboration networks, with localized donors and hundreds of cryopreserved and phenotypes blood units available for use when needed. The management of post-transfusion allosensitized patients constitutes a genuine logistic challenge, and a recent example of this is the case of a critical and bleeding patient sensitized with an anti-Tja in a national hospital (personal communication, Dr. Esther Chica). Hence we propose that this debate should also be carried out contemplating the non-heart beating donation scenario.

Lastly, we totally agree with the authors that the excuse cannot be a decrease in blood donation and an increased dependency on external plasma and blood products due to probable inadequate use of many of them, and that it is not acceptable to favor or promote qualitative laxity or place the safety of donation or transfusion at risk. In addition, while we are still in wait for the data corresponding to 2020, the recorded decrease in blood donation during the COVID-19 pandemic has further worsened in Spain.[4]

Nevertheless, all the measures must be publicly debated and should be based on evidence and not on the scarcity of blood components. Accordingly, it is now more important than ever to implement Patient Blood Management (PBM) programs, working on their three basic elements: a) the study, prevention and treatment of anemia; b) the improvement of hemostasis, the prevention and early management of coagulopathy, bleeding recovery and the avoidance of ''vampirism''; and c) the improvement of tolerance of anemia, ameliorating the hemodynamic and cardiorespiratory response, and applying restrictive transfusion criteria.[5] In sum, we need a Spanish national PBM plan, as well as a plasmapheresis protocol for the provision of blood and plasma products, and should also establish a common donor and patient database.[6,7]

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Conflicts of interest

The authors declare that they have no conflicts of interest.

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