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## EDITORIAL

# Massive transfusion and survival in a university hospital

In this volume, the study “Proportion of hemocomponents in massive transfusion and its mortality in trauma patients in a university hospital” is included. This study documents customary transfusion practices in patients who are in a serious condition caused by hypovolemic shock admitted to the Shock and Trauma Unit of the “Dr. José E. González” University Hospital.

The study is important and comes at the right time for different reasons. One of them is the fact that while it is infrequent to have detailed researches on transfusion conduct in the country, this is even more accurate regarding a precise documentation of the use of blood products for transfusion support utilized in resuscitation efforts performed during what is known as massive transfusion. Massive transfusion has different definitions, employed in the literature according to the operative criteria valid in different institutions. Among the same it is worth stressing those which reflect the urgency of subsequent blood replacement: replacement of over 50% of estimated blood volume in <3 h and the need to transfuse >4 units of red blood cells per hour, >5 units in 4 h, or >10 units in 24 h, in general in response to a bleeding which may be equal to or larger than 150 mL/min.<sup>1,2</sup>

Severe traumatic lesions leading to massive transfusions are the main cause of mortality in individuals under 60; moreover, traffic accidents constitute the first cause of mortality in individuals under 30 in developed countries.<sup>3</sup> Even though severe cranioencephalic traumatism is the most frequent mechanism of death, acute hemorrhage remains the number one cause of preventable deaths among this population. Amidst the diverse mechanisms which come into play in patients with multiple and/or severe traumatism, coagulation system alteration is one of the most important, complex and difficult to correct, either pharmacologically or with the restitution of the different coagulation factors through blood transfusion. This phenomenon is described as “coagulopathy induced by trauma”, and generally occurs in 1 out of every 4 patients who are admitted to the hospital in these conditions, it contributes substantially to the observed morbidity and mortality in this group.<sup>4,5</sup>

In the study referred to in this number of *MEDICINA UNIVERSITARIA*, the workgroup documented clinical, laboratory and support factors with blood products—packed red blood cells (PRBC) and fresh frozen plasma (FFP)—in a detailed manner in order to analyze the effect that the proportion between these two hemocomponents had in relation to the final measurements of the study, survival at 24 h and 30 days after the analyzed intervention, in a group of patients who received these two products in different proportions. Since the study was conducted in a retrospective manner, an intervention wasn't conducted where they introduced a bias of the arbitrary use of any of the different guidelines or standard replacement scales of intravenous solutions or blood components. This allowed documentation of everyday practice in a hospital with one of the most active shock trauma units in the northeast of the country. Up until a few years ago the recommended practice, derived from the massive transfusion results in patients with hemorrhagic shock as a consequence of severe military trauma, was of a FFP package for every 3 PRBC units.<sup>6</sup> In this context, it is necessary to remember the loss by consumption of coagulation factors, in addition to the effect over functional levels of those who have an intravenous infusion of large amounts of crystalloid solutions, known as “dilutional coagulopathy”.<sup>2,5</sup> Subsequent studies suggested that a larger FFP proportion in relation to PRBC transfused produced better results, increasing survival rates immediately and at 30 days.<sup>7,8</sup> The above is controversial due to, among other things, what is known as “survivor bias”, because there is evidence that patients who survived hemorrhagic shock and massive transfusion suffered from a less severe trauma and were able to receive high PRBC/FFP rates, than those who died and were not able to receive said rate, as a result of their increased severity and lack of time for proper resuscitation.<sup>7,8</sup>

Analyzed data by the authors of the study published in this number allow us to observe the variations in everyday practice of transfusion support in extreme urgency situations in an urban hospital center, while follow-up at 30 days allowed the survival rate of the group to be determined and search for an association of this data with the type and pro-

portion of both blood products received. There are different stands concerning the value of using a certain PRBC/FFP proportion; this depends on the fact that restricted use of plasma has been linked to a higher mortality, apparently caused by a deficient hemostatic resuscitation, while free use of this component may be linked to the development of infections and different degrees of lung injury.<sup>2</sup>

In conclusion, the cited study confirms the tendency of published data in the last few years in acute trauma and hemorrhagic shock literature which ratify transfusion of a larger PRBC/FFP proportion as an early treatment measure of coagulopathy linked to massive transfusion, which results in a substantial improvement in survival rates among this segment of the population treated at the hospital.

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