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Editorial

Optimization of Patients Outcomes: Management Strategies for Polytrauma in the Neuro-ICU

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Patients with traumatic brain injury (TBI) rarely present with only head injuries. In general, the event which resulted in TBI commonly also causes damage to other body parts; this situation can be termed polytrauma, depending on the severity of the accompanying injuries.[1] The most common comorbid injury in patients with neurotrauma is limb fracture, which commonly also accompanies facial and chest fractures.[4] In addition, many medical costs are wasted due to the accompanying damages.[5] Therefore, in cases of polytrauma, additional evaluation is required to assess the accompanying injury due to the injury mechanism, and additional early treatment may be provided, if necessary.[3]

The response to hemodynamic changes is the most important consideration in the treatment of polytrauma patients with TBI. Unlike chest or abdominal trauma, cerebral perfusion should be considered in patients with TBI.[13,17] In particular, if the compensatory mechanism is impaired, the patients may be particularly vulnerable to ischemia caused by hypotension.[6] Therefore, fluid management and the use of inotropes to avoid cerebral ischemia are important.

In general, a large amount of crystalloid solution can be administered for fluid management to prevent cerebral hypoperfusion. However, in some cases it may be more useful to administer plasma instead, to prevent acute respiratory distress syndrome or multiple organ dysfunction syndrome.[15,18] In addition, hemodynamic monitoring (e.g., stroke volume and pulse pressure variations) is recommended to evaluate the reactivity of fluid management.[11]

In cases where red blood cell (RBC) transfusion is required, it is recommended to perform restrictive transfusion (hemoglobin [Hb] <7) rather than liberal transfusion (Hb <10), which is currently being investigated in the TRAIN study and the HEMOTION trial.[10,14] If massive transfusion is required, the plasma/platelets/RBC ratio is recommended as a 1:1:1 protocol.[7]

TBI-induced polytrauma often results in coagulopathy.[8] Therefore, if the risk of bleeding is high, or neurological procedures are required, the transfusion of coagulant or platelets should be considered using on-site care (thromboelastography [TEG®], rotational thromboelastometry [ROTEM®]) monitoring.[2,16] For patients with TBI, it is recommended to maintain platelet levels above $10^5/mm^3$, or prothrombin time and activated partial thromboplastin time levels below 1.5 times if bleeding occurs or procedures are required.[9] Tranexamic acid can sometimes be applied to reduce bleeding risk; however, this strategy is only successful in cases of mild to moderate TBI, if applied within 3 hours, making proper use important.[12]

Overall, in cases of multiple trauma with TBI, complex and careful management is required, and effective treatment should be decided on using various indicators or monitoring strategies.

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