ICU
MANAGEMENT & PRACTICE

Calcium Supplementation During Trauma Resuscitation

In major trauma patients, ionised calcium levels (iCa2+) can be disrupted by injury, physiological imbalances, resuscitation strategies, and blood transfusions. Hypocalcaemia often results from the transfusion of citrate-containing blood products, as citrate binds to calcium, and this effect is exacerbated in cases of organ failure and massive transfusion. Other fluid resuscitation strategies can also contribute to low calcium levels through haemodilution or colloid binding. Hypocalcaemia impairs platelet-dependent haemostasis, worsening trauma-induced coagulopathy and leading to increased blood loss, more transfusions, and higher mortality.

Upon arrival at the emergency department (ED), hypocalcaemia is common in 13% to 74% of patients and is associated with increased mortality, coagulopathy, and transfusion needs. There is a suggestion that hypocalcaemia should be added to the lethal triad of trauma-related death, which includes hypothermia, acidosis, and coagulopathy. While a correlation between calcium levels and outcomes has been observed, causation has not been proven. Both hypocalcaemia and hypercalcaemia upon arrival at the ED are linked to higher mortality, with hypercalcaemia associated with the highest mortality rates.

Current European guidelines recommend monitoring iCa2+ and avoiding levels below 0.9 mmol/L, although these recommendations are based on low-quality evidence. The impact of these guidelines on clinical practice is unclear. Despite the limited evidence, recent literature advocates for aggressive correction of iCa2+ levels.

A new study investigated the effects of calcium supplementation during trauma resuscitation on early and overall mortality, hypothesising that calcium supplementation during trauma reception and resuscitation will improve mortality outcomes.

Study researchers conducted a retrospective analysis using data from the TraumaRegister DGU® (2015–2019), employing propensity score matching to balance demographics, injury severity, and management between major trauma patients with and without calcium supplementation. The primary outcome parameters were 6-hour mortality, 24-hour mortality, and in-hospital mortality.

In a cohort of 28,323 directly admitted adult major trauma patients at a European trauma centre, 1593 (5.6%) received calcium supplementation. Using multivariable logistic regression to generate propensity scores, two comparable groups of 1447 patients each were matched.

There was no significant difference in early mortality (6-hour and 24-hour) between the groups. While in-hospital mortality was higher in the calcium supplementation group (28.3% vs. 24.5%), this difference was not significant when adjusted for predicted mortality.

Based on these findings, no evidence was found to support or refute a survival benefit from calcium supplementation during trauma resuscitation. Further research is needed to understand the dynamics and kinetics of ionised calcium levels in major trauma patients and to identify if specific conditions or subgroups could benefit from calcium supplementation.

Source: Critical Care

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Published on : Tue, 9 Jul 2024

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