

Correlates of incident hypocalcemia amongst trauma patients in the Western Cape of South Africa: a secondary analysis of the Epidemiology and Outcomes of Prolonged Trauma Care (EpiC) study

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Abstract

Background Derangements in ionized calcium are common following trauma, with prior research describing an association between hypocalcemia and adverse outcomes such as mortality, coagulopathy severity, and transfusion requirement. The present study evaluates clinical characteristics of patients presenting to emergency care with ionized calcium derangements following severe trauma in a low-resource practice setting.

Methods Patients presenting to emergency care throughout the Western Cape of South Africa following severe traumatic injury (excluding patients with severe traumatic brain injury) for whom an ionized calcium level was measured are included. Patients were stratified according to initial ionized calcium, and characteristics of the different strata (demographics, injury characteristics, and initial serum biomarkers) were compared. Linear and quadratic regression was used to evaluate the relationship between initial ionized calcium and selected laboratory markers such as hemoglobin, lactate, venous pH, and platelets.

Results 1989 subjects were included. The median initial ionized calcium was 1.14 mmol/L (IQR: 1.09–1.19 mmol/L). 51% of patients were hypocalcemic (< 1.15 mmol/L), and 1.0% hypercalcemic (> 1.29 mmol/L) on presentation. Differences were observed between ionized calcium strata with respect to age ($p < 0.01$), injury body region ($p = 0.02$), maximum abbreviated injury scale (AIS) score ($p = 0.03$), and shock index ($p = 0.05$). There was a statistically significant relationship between initial ionized calcium and both platelets ($p < 0.01$) and hemoglobin ($p = 0.03$) when treating ionized calcium as a quadratic (U-shaped) variable.

Conclusions Derangements in ionized calcium following acute trauma are associated with injury severity (as defined by maximum AIS score) and injury body region, as well as a subset of other laboratory values, including platelet count and hemoglobin. It is notable that the relationship between these variables was parabolic, suggesting that both extremes of ionized calcium derangements are associated with derangements in other serum markers.

Trial registration Not applicable to this study.

Keywords Hypocalcemia, Trauma, Epidemiology, Global health, Hypercalcemia