

The effect of hypoglycemia and glucose control on patient outcomes after burn injury

Khalid Al-Bawaliz, Sarah Rehou, Alwiya Ali, Joanne Thai, Marc G. Jeschke

Background and Objectives: Burn injuries are associated with an increase in glucose production and insulin resistance. Hypermetabolism causes further protein catabolism that feeds into gluconeogenesis, thus exacerbating the hyperglycemic state. The purpose of this study is to better understand how hypoglycemia can affect patient outcomes in burn injuries, and what effect glucose control has on these outcomes.

Methodology: This is a retrospective study from patients admitted between 2006 and 2016. Inclusion criteria included adults (≥ 18 years) patients with $\geq 15\%$ total body surface area (TBSA) burn with at least one glucose measurement. Data included demographics, point-of-care-testing (POCT) glucose levels, laboratory glucose measures, insulin administration, and oral anti-diabetic drugs (metformin). These values were collected for the first thirty days post-injury. Patients were grouped based on their lowest glucose measure and stratified into hypoglycemic and normoglycemic.

Results: There were 438 patients included, with 83 patients in the hypoglycemic and 355 patients in the normoglycemic group. Overall mean TBSA was $29\% \pm 15\%$. There was a significant difference in the mean age, injury severity, and TBSA ($p < 0.05$). Median length of stay was significantly increased in the hypoglycemic group: 53 (30-80) vs. 22 (16-37) days ($p < 0.0001$). A significantly greater proportion of patients in the hypoglycemic group did not survive (33% vs. 10%; $p < 0.0001$).

Conclusions and Discussion: Episodes of hypoglycemia in hospital is associated with poor clinical outcomes when adjusted for injury severity. However, maintaining adequate glucose control in the acute care setting is imperative and greater use of strategies to minimize hypoglycemia is necessary.