

Critical Care

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THE EFFECTS OF EPISODIC GLYCEMIC VARIATIONS ON THE CLINIC OUTCOMES OF PATIENTS WITH SEVERE SEPSIS AND SEPTIC SHOCK IN A COMMUNITY HOSPITAL SETTING

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PURPOSE: The issue of glycemic control in critically ill patients has yet to be settled. Large studies exploring strict protocols were equivocal, as better outcomes were seen in surgical patients, while potential harm loomed over medical patients. Subsets within these groups and degrees of glycemic control, yielded conflicting findings, further complicating the overall picture. The effects of episodic glycemic variation remain unclear in those most critically ill of patients - those with severe sepsis and septic shock.

METHODS: This is a multi-center retrospective chart review study of patients admitted for severe sepsis and septic shock to the critical care unit of Raritan Bay Medical Center, Perth Amboy and Raritan Bay Medical Center, Old Bridge from January 2016 to August 2017. We extracted data on hypoglycemia, (single blood sugar reading below 70), and hyperglycemia, (two consecutive blood sugar readings greater than 200). Primary outcomes were mortality and length of ICU and hospital stay. Possible confounders, such as diabetes, steroids, and sepsis category (severe sepsis or septic shock), were also measured.

RESULTS: A total of 611 cases were included in the study, and approximately 25% of patients expired. Compared to euglycemic patients, higher odds of death were observed in hyperglycemic (OR 1.98 $p=0.02$) and hyperglycemic/hypoglycemic patients (OR 2.02, $p=0.04$). Hypoglycemic patients did not have an increase odds of death (OR 1.4 $p=0.15$). Mean ICU length of stay was longer in hypoglycemic (4.97 vs 6.56, $p<0.01$) and hyperglycemic patients (5.24 vs 6.29, $p=0.049$). Mean hospital length of stay was longer in hypoglycemic (9.32 vs 13.64, $p<0.01$) and hyperglycemic patients (9.86 vs 13.80, $p<0.01$). Diabetic patients had decreased odds of hypoglycemia (OR 0.59, $p<0.01$), but not hyperglycemia (1.20, $p=0.40$). Steroids and sepsis category did not influence the odds of experiencing a non-euglycemic state and did not impact outcomes.

CONCLUSIONS: In patients with sepsis in the critical care units, episodic hyperglycemia is associated with mortality, while both hyperglycemia and hypoglycemia increased ICU and hospital length of stay. Diabetic patients had decreased odds of hypoglycemia but not hyperglycemia, mortality or ICU, and hospital length of stay. Steroid administration and sepsis category did not affect the odds of non-euglycemic state or associated outcome measures.

CLINICAL IMPLICATIONS: In septic patients, episodic glycemic extremes are associated with worsened mortality and length of stay in the ICU. Considering the substantial benefits of outcomes in patients maintaining euglycemia through the entire hospital encounter, it provides further evidence for preserving euglycemic state in septic patients. However, randomized control trials examining strict glycemic protocols in septic patients, not all critically ill patients, is required to draw more definitive conclusions.

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