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Impact of Glucose Variability on Hospital Mortality in Non-Diabetic Septic Patients: A Novel Insight from Original Research

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Abstract:

Background

Severe sepsis is a potentially fatal illness that necessitates critical care due to organ failure. It has been determined that glucose variability (GV) may play a role in hospital mortality, especially in non-diabetic septic patients. In non-diabetic septic patients, our study examines the relationship between hospital mortality rates and glucose fluctuation.

Materials & Methods

In the Department of General Medicine at Sree Balaji Medical College and Hospital in Kancheepuram, Tamil Nadu, India, a prospective observational study was carried out , over an 18-month period beginning in November 2022. We enrolled 100 randomized patients, with 50 patients presenting with sepsis and 50 non-septic patients as controls. Glucose variability was assessed using blood glucose measurements, and its association with mortality was analysed using logistic regression, adjusting for potential confounders including organ failure, glucose testing, and medication.

Results

According to our research, non-diabetic septic patients with high glucose fluctuation had higher hospital mortality rates. Compared to patients with more stable glucose levels, individuals with greater variations in their levels of glucose also had higher mortality rates. The relationship between glucose variability and mortality was unaffected by hypoglycaemia, organ failure, frequency of glucose testing, or medication use.

Keywords: medication, fluctuation, unaffected, hypoglycaemia

INTRODUCTION

In intensive care units (ICUs), sepsis is a major cause of mortality. It is crucial to identify modifiable risk factors as soon as possible. It is well known that blood glucose control is essential to intensive care unit (ICU) care; yet, there is growing recognition of the role glucose fluctuation plays as an independent predictor of death. Patients with sepsis who do not have diabetes are especially susceptible to changes in blood sugar levels, which could worsen their already serious condition. Our research attempts to investigate the connection between hospital mortality in non-diabetic septic patients and glucose fluctuation.

MATERIALS AND METHODS

Study Design

This was a comparative analytical study that was observational and prospective.

Study Area

The study was carried out in the Sree Balaji Medical College and Hospital's department of general medicine in Kancheepuram, Tamil Nadu, India.

Study PopulationA total of 100 patients were randomised, 50 of whom had sepsis at the time of admission and the other 50 serving as controls.

Study Period

The study was carried out over an 18-month period, starting in November 2022.

Data Collection

Periodic measurements of blood glucose levels were made, and the standard deviation and coefficient of variation techniques were used to compute the glucose variability. After controlling for relevant confounders, mortality outcomes were recorded and the relationship between glucose variability and death was determined using logistic regression.

RESULTS

Compared to patients with stable glucose levels, those with higher variability in their glucose levels had significantly higher mortality rates ($p < 0.05$). Among patients who were not diabetic and were septic, glucose variability continued to be an independent predictor of death even when other variables like medication use, organ failure, and diabetes status were taken into account.

In our research, the mortality rate of 10 patients out of 30 cases was 33%, with a significant p-value of less than 0.001, and the control group saw higher mortality.

	Cases	Control	TOTAL	P-Value
Yes	10 (33%)	0	10	0.001
No	20 (67%)	30 (100%)	50	
TOTAL	30	30	60	

Figure 1 Mortality in both the case and control groups

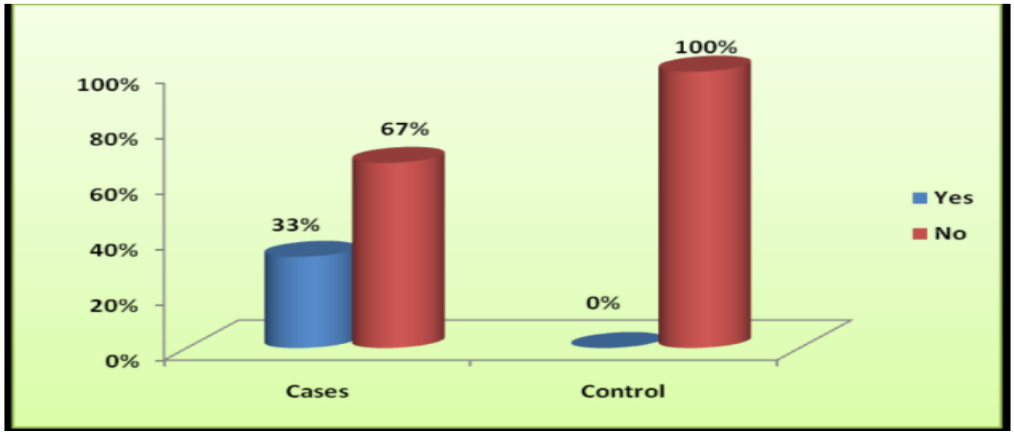

Figure 2 A graph showing the death rates in the case and control groups

DISCUSSION

Our findings underscore the importance of glucose fluctuation as an independent risk factor for hospital mortality in critically sick non-diabetic septic patients. The deleterious effects of glucose variations on the immune system, organ function, and inflammatory pathways could be the mechanism underlying this connection. Improving blood glucose variability in sepsis patients may be achieved by closely monitoring blood glucose levels and administering customised insulin therapy.

CONCLUSION

Among non-diabetic septic patients, glucose fluctuation is a strong independent predictor of hospital death. By cautiously managing and monitoring blood glucose levels, it may be possible to lower mortality in this susceptible group.

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