

Glycemic Variability, hypoglycemia and organ failure in the Glucontrol study



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Introduction

Organ failure is a common complication associated with increased mortality in Intensive Care Unit (ICU) patients. Increased mortality is also related to glycemic variability (GV) and hypoglycemia [1]. This research evaluates the influence of GV and severe hypoglycemia on organ failure rate.

Methods

Patients:

N=704 (Glucontrol study)

Randomized

- Intensive Insulin Therapy (IIT), blood glucose (BG) target: 4.4-6.1 mmol/L (N=350)
- Conventional Insulin Therapy (CIT), BG target: 7.8-10.0 mmol/L (N=354)

Matched for age, sex, diagnosis and severity of illness (APACHE II score)

Daily assessment:

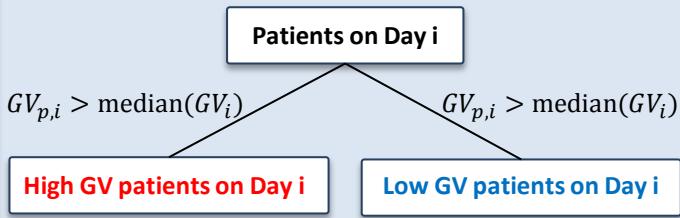
Organ failure: SOFA score

Glycemic variability (GV): liability index

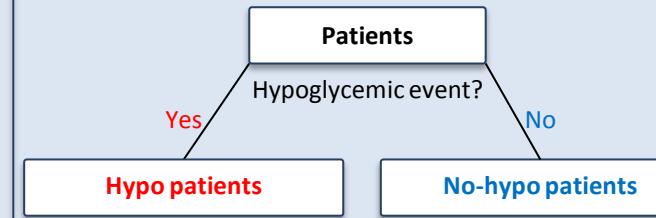
$$\sum_N \frac{(BG_{N+1} - BG_N)^2}{h_{N+1} - h_N}$$

Hypoglycemic event: BG < 2.2 mmol/L

GV and SOFA score:



Hypoglycemia and SOFA score:



Comparison of daily SOFA scores (median, IQR, mean) for each group, on each day.

Note: glycemic outcome are considered independently of glycemic target.

Results

Patients with high GV: higher

SOFA score

($p < 0,05$ on Days 2-4)

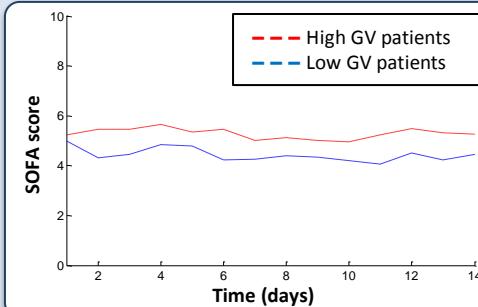


Fig. 1 : Evolution of mean SOFA score for patients with high GV (red) and patients with low GV (blue)

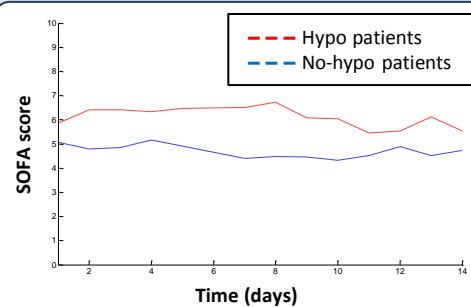


Fig. 2 : Evolution of mean SOFA score for patients with (red) and without (blue) hypoglycemic event

Conclusions

High glycemic variability and hypoglycemia are both associated with increase in SOFA score, and thus increase in organ failure rate.

Reference

[1] Bagshaw, S. et al. The impact of early hypoglycemia and blood glucose variability on outcome in critical illness. *Critical Care*, 13(3), R91, 2009.

Acknowledgements

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