Dysglycemia in Critically Ill Patients: Common Problems and Future Direction

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The management of blood glucose (BG) in the critically ill became a topic of great interest following the publication of the landmark single-center surgical ICU study targeting euglycemia (80 to 110 mg/dL) in Leuven, Belgium, in 2001 (1). This study resulted in thousands of protocols and guidelines promoting 'tight' BG control . The failure to show the same results and high incidence of hypoglycemia in following trials have resulted in controversy in blood glucose management in critically ill patients. Analysis of dysglycemia in critically ill patients should include markers of three domains: hyperglycemia, hypoglycemia, and glycemic variability (2,3). Thus, hyperglycemia, hypoglycemia, and blood glucose variability should all be regarded as independent predictors of adverse outcomes in critically ill patients. Agus et al., in their multicenter study (4), showed that critically ill children with hyperglycemia did not benefit from strict glycemic control to a target glucose of 80-110 mg/dL compared to 150-180 mg/dL and patients in lower treatment target showed an insignificant 90-day mortally rate compared to other group. There are so many reasons to describe these controversies: In LEUVEN III study (5), despite a 25% hypoglycemia incidence, tight glycemic control had a significant treatment effect; nevertheless, in Agus et al. study, despite a lower incidence of hypoglycemia, treatment effect was not significant. The reasons can be explained with the fact that first trials were single centered open label studies which were terminated at early stages of the study because of observed benefits which may have exaggerated the treatment effect. Also, the observed difference was found in subgroup analysis which could have been due to chance factor. Findings from RCTs conducted on critically ill adults and children strongly suggest that the largest benefit for blood glucose control can be expected if the difference in blood glucose concentrations between the study groups is large and if the study is done in a single-centre setting where the blood glucose management is tailored to the local treatment habits. Consequently, we could not compare those single centered trials which are not externally validated with high level of adherence to protocols, lower time to target range, higher time in target

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range with multi centered trials with a low level of adherence to protocol higher time to target range, lower time in target range and a totally different method of energy supplementation. Finally, the era of 'one size fits all' in regard to glycemic targets in the critically ill seems to be over. We should also consider the correct and earlier diagnosis of patients, their glycemic status and preadmission glycemic control individually (6). Future trials should consider the discrepancies accounting for controversial points like nutritional status of patients, glucose monitoring methods (7) and insulin titration method.

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