Glycemic Control in the Medical Intensive Care Unit

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Abstract

Hyperglycemia in the critically ill is a well-known phenomenon, even in those without known diabetes. The stress response is due to a complex interplay between counter-regulatory hormones, cytokines, and changes in insulin sensitivity. Illness/infection, overfeeding, medications (e.g., corticosteroids), insufficient insulin, and/or volume depletion can be additional contributors. Acute hyperglycemia can adversely affect fluid balance (through glycosuria and dehydration), immune and endothelial function, inflammation, and outcome. While there are several insulin infusion protocols that are able to safely and effectively treat hyperglycemia, the bulk of accumulated evidence does not support a causal relationship between acute hyperglycemia and adverse outcomes in the medical intensive care unit. Meta-analysis of randomized controlled trials suggests there is no benefit to tightening glucose control to normal levels compared to a reasonable and achievable goal of 140 to 180 mg/dl. There is a significantly increased risk of hypoglycemia. Although there is some evidence that patients without known diabetes have worse outcomes than those with known diabetes, more recent evidence is conflicting. Glycemic control in critically ill patients should not be neglected, as studies have not tested tight versus no/poor control, but tight versus good control. A moderate approach to managing critical illness hyperglycemia seems most prudent at this juncture. Future research should ascertain whether there are certain subgroups of patients that would benefit from tighter glycemic goals. It also remains to be seen if tight glucose control is beneficial once hypoglycemia is minimized with technological advances such as continuous glucose monitoring systems.

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Abbreviations: (ADA) American Diabetes Association, (CI) confidence interval, (GLUT) glucose transporter (ICU) intensive care unit, (IIT) intensive insulin therapy, (LOS) length of stay, (NICE-SUGAR) Normoglycaemia in Intensive Care Evaluation Survival Using Glucose Algorithm Regulation, (NNH) number needed to harm, (OR) odds ratio, (RCT) randomized controlled trial

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