

## Stress Hyperglycemia in Pediatric Critical Illness: The Intensive Care Unit Adds to the Stress!

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### Abstract

Stress hyperglycemia (SH) commonly occurs during critical illness in children. The historical view that SH is beneficial has been questioned in light of evidence that demonstrates the association of SH with worse outcomes. In addition to intrinsic changes in glucose metabolism and development of insulin resistance, specific intensive care unit (ICU) practices may influence the development of SH during critical illness. Mechanical ventilation, vasoactive infusions, renal replacement therapies, cardiopulmonary bypass and extracorporeal life support, therapeutic hypothermia, prolonged immobility, nutrition support practices, and the use of medications are all known to mediate development of SH in critical illness. Tight glucose control (TGC) to manage SH has emerged as a promising therapy to improve outcomes in critically ill adults, but results have been inconclusive. Large variations in ICU practices across studies likely resulted in inconsistent results. Future studies of TGC need to take into account the impact of commonly used ICU practices and, ideally, standardize protocols in an attempt to improve the accuracy of conclusions from such studies.

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**Abbreviations:** (BG), blood glucose, (CBP) cardiopulmonary bypass, (EN) enteral nutrition, (ECLS) extracorporeal life support, (FFA) free fatty acids, (GIR) glucose infusion rate, (GLUT) glucose transporter protein, (GH) growth hormone, (IGF-1) insulin-like growth factor-1, (ICU) intensive care unit, (IL-1) interleukin-1, (IL-6) interleukin-6, (PN) parenteral nutrition, (ROS) reactive oxygen species, (RRT) renal replacement therapy, (SH) stress hyperglycemia, (TGC) tight glucose control, (TNF- $\alpha$ ) tumor necrosis factor- $\alpha$

**Keywords:** blood glucose, children, critical illness, stress hyperglycemia, tight glucose control

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