

Category 1 :**Endocrine disorders**

Category 2 :**Cardiovascular - other**

A307 - Enhanced insulin sensitivity variability in the first 3 days of ICU stay: Implications for TGC

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Introduction:

Effective tight glycemic control (TGC) can improve outcomes, particularly in cardiovascular surgery, but is difficult to achieve. Variability in insulin sensitivity/resistance resulting from the level and evolution of stress response, particularly early in a patient's stay, can lead to hyperglycemia and variability, which are associated with mortality. This study quantifies the daily evolution of the variability of insulin sensitivity for cardiovascular surgical and all other ICU patients.

Methods:

Retrospective analysis of SPRINT TGC study data. Model-based insulin sensitivity (SI) was identified hourly from data. Hour-to-hour percent changes in SI were assessed for cardiovascular surgical (CVS) patients (N=76) and all other, non-cardiovascular surgery (Non-CVS) patients (N=317). Results are compared for Days 1, 2, 3 and Days 4 Onward. Cumulative distribution functions (CDFs), median values, and inter-quartile points (25th and 75th percentiles) are used to assess differences between groups and their evolution over time.

Results:

CVS patients are more variable than Non-CVS patients on Days 1-2 ($p < 0.005$) and similar on Days 3 and 4 Onward ($p \geq 0.13$). Variability declines by day. CVS and Non-CVS patients are both more variable on each of Days 1-3 than the overall Day 4 Onward values ($p < 0.005$). At the inter-quartile percentiles, CVS patients are 1.4-2.0 times more variable than Non-CVS patients on Day 1, 1.40-1.44 times on Day 2, and 1.1-1.2 times on Day 3, but identical ($< 1.1x$ difference) for Day 4 Onward. Absolute SI increases daily for both groups, and the difference between groups shrinks from 33% to 12% over Days 1-3 and is 4% on Day 4 onward ($p < 0.005$ for all). Glycemic control was equivalent for both groups ($p > 0.05$) and thus these results were not due to differences in TGC achieved, but patient-specific factors instead.

Conclusions:

All ICU patients exhibit greater insulin sensitivity variability over Days 1-3, and cardiovascular surgery patients are more variable than others. Clinically, the results imply that TGC patients, especially cardiovascular surgery patients, will require greater measurement frequency, reduced reliance on insulin, and more explicit specification of carbohydrate nutrition in Days 1-3 to safely minimise glycemic variability and maximise control for best outcome.