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The glucogram: A new quantitative tool for glycemic analysis in the surgical intensive care unit

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Abstract

Background:

Glycemic control is an important aspect of patient care in the surgical intensive care unit (SICU). This is a pilot study of a novel glycemic analysis tool – the glucogram. We hypothesize that the glucogram may be helpful in quantifying the clinical significance of acute hyperglycemic states (AHS) and in describing glycemic variability (GV) in critically ill patients.

Materials and Methods:

Serial glucose measurements were analyzed in SICU patients with lengths of stay (LOS) >30 days. Glucose data were formatted into 12-hour epochs and graphically analyzed using stochastic and momentum indicators. Recorded clinical events were classified as major or minor (control). Examples of major events include cardiogenic shock, acute respiratory failure, major hemorrhage, infection/sepsis, etc. Examples of minor (control) events include non-emergent bedside procedures, blood transfusion given to a hemodynamically stable patient, etc. Positive/negative indicator status was then correlated with AHS and associated clinical events. The conjunction of positive indicator/major clinical event or negative indicator/minor clinical event was defined as clinical “match”. GV was determined by averaging glucose fluctuations (maximal – minimal value within each 12-hour epoch) over time. In addition, event-specific glucose excursion (ESGE) associated with each positive indicator/AHS match (final minus initial value for each occurrence) was calculated. Descriptive statistics, sensitivity/specificity determination, and student's *t*-test were used in data analysis.

Results:

Glycemic and clinical data were reviewed for 11 patients (mean SICU LOS 74.5 days; 7 men/4 women; mean age 54.9 years; APACHE II of 17.7 ± 6.44 ; mortality 36%). A total of 4354 glucose data points (1254 epochs) were analyzed. There were 354 major clinical events and 93

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