



## Insulin sensitivity and sepsis score: A correlation between model-based metric and sepsis scoring system in critically ill patients



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### ARTICLE INFO

#### Article history:

Received 19 January 2016

Received in revised form 12 July 2016

Accepted 10 August 2016

Available online 21 August 2016

#### Keywords:

Glucose-insulin model

ICU

Insulin sensitivity

Sepsis

Sepsis score

### ABSTRACT

Sepsis is highly correlated with mortality and morbidity. Sepsis is a clinical condition demarcated as the existence of infection and systemic inflammatory response syndrome, SIRS. Confirmation of infection requires a blood culture test, which requires incubation, and thus results take at least 48 h for a syndrome that requires early direct treatment. Since sepsis has a strong inflammatory component, it is hypothesized that metabolic markers affected by inflammation, such as insulin sensitivity, might provide a metric for more rapid, real-time diagnosis. This study uses clinical data from 30 sepsis patients (7624 h in ICU) of whom 60% are male. Median age and median Apache II score are 63 years and 19, respectively. Model-identified insulin sensitivity ( $S_I$ ) profiles were obtained for each patient, and insulin sensitivity and its hourly changes were correlated with modified hourly sepsis scores ( $SS_{H1}$ ).  $S_I$  profiles and values were similar across the cohort. The sepsis score is highly variable and changes rapidly. The modified hourly sepsis score,  $SS_{H1}$ , shows a better relation with insulin sensitivity due to less fluctuation in the SIRS element. Median  $S_I$  and median  $\Delta S_I$  of the cohort is  $0.4193e-3$  and  $0.004253e-3$  L/mU.min, respectively. Additionally, median  $S_I$  are  $4.392 \times 10^{-4}$  L/mU min ( $SS_{H1} = 0$ ),  $4.153 \times 10^{-4}$  L/mU min ( $SS_{H1} = 1$ ),  $3.752 \times 10^{-4}$  L/mU min ( $SS_{H1} = 2$ ) and  $2.353 \times 10^{-4}$  L/mU min ( $SS_{H1} = 3$ ). Significant relationship between insulin sensitivity across different  $SS_{H1}$  groups was observed ( $p < 0.05$ ) even when corrected for multiple comparisons. CDF of  $S_I$  indicates that insulin sensitivity is more significant when comparing an hourly sepsis score at a very distinguished level.

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