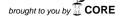
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## **Biomedical Signal Processing and Control**

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## 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  $(S_l)$  profiles were obtained for each patient, and insulin sensitivity and its hourly changes were correlated with modified hourly sepsis scores (SS<sub>H1</sub>). SI profiles and values were similar across the cohort. The sepsis score is highly variable and changes rapidly. The modified hourly sepsis score, SS<sub>H1</sub>, shows a better relation with insulin sensitivity due to less fluctuation in the SIRS element. Median  $S_1$  and median  $\Delta S_1$  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/mUmin (SS<sub>H1</sub> = 0),  $4.153 \times 10^{-4}$  L/mUmin (SS<sub>H1</sub> = 1),  $3.752 \times 10^{-4}$  L/mU min (SS<sub>H1</sub> = 2) and  $2.353 \times 10^{-4}$  L/mU min (SS<sub>H1</sub> = 3). Significant relationship between insulin sensitivity across different SS<sub>H1</sub> groups was observed (p < 0.05) even when corrected for multiple comparisons. CDF of S<sub>1</sub> indicates that insulin sensitivity is more significant when comparing an hourly sepsis score at a very distinguished level.

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http://dx.doi.org/10.1016/j.bspc.2016.08.005 1746-8094/© 2016 Elsevier Ltd. All rights reserved.