

Insulin Sensitivity as a Model-Based Marker for Sepsis Diagnosis

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ABSTRACT

Sepsis is highly associated with microcirculatory dysfunction, which normally results in organ failure and increased risk of death. Importantly, early goal-directed therapy observed lower mortality rates in septic shock patients compared to those assigned to standard therapy. Currently, it is almost impossible to diagnose a patient at the onset of sepsis due to the lack of real-time metrics with high sensitivity and specificity. Patient condition is mostly determined by clinician experience and observation of patient reaction to treatment. In this study, a model-based insulin sensitivity profile is used to identify the relation between individual metabolic conditions to their sepsis status. The hour-to-hour variation of insulin sensitivity is highly independent of the treatment received by the patient and may represent a metabolic status for real-time diagnosis of sepsis. The hour-to-hour variation of insulin sensitivity profile is analyzed with sepsis score calculated according to the definition provided by ACCP/SCCM. P-values of various sepsis score group are computed using Mann-Whitney test. Cumulative distribution function of insulin sensitivity shows separation between different sepsis score and more distinguishable at a higher sepsis score compared to the lower sepsis score.

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