Document details

Back to results | 1 of 1

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Levels and diagnostic value of model-based insulin sensitivity in sepsis: A preliminary study (Article)

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Abstract

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Background and Aims: Currently, there is a lack of real-time metric with high sensitivity and specificity to diagnose sepsis. Insulin sensitivity (SI) may be determined in real-time using mathematical glucose-insulin models; however, its effectiveness as a diagnostic test of sepsis is unknown. Our aims were to determine the levels and diagnostic value of model-based SI for identification of sepsis in critically ill patients. Materials and Methods: In this retrospective, cohort study, we analyzed SI levels in septic (n = 18) and nonseptic (n = 20) patients at 1 (baseline), 4, 8, 12, 16, 20, and 24 h of their Intensive Care Unit admission. Patients with diabetes mellitus Type I or Type II were excluded from the study. The SI levels were derived by fitting the blood glucose levels, insulin infusion and glucose input rates into the Intensive Control of Insulin-Nutrition-Glucose model. Results: The median SI levels were significantly lower in the sepsis than in the nonsepsis at all follow-up time points. The areas under the receiver operating characteristic curve of the model-based SI at baseline for discriminating sepsis from nonsepsis was 0.814 (95% confidence interval, 0.675-0.953). The optimal cutoff point of the SI test was 1.573×10^{-4} L/mu/min. At this cutoff point, the sensitivity was 77.8%, specificity was 75%, positive predictive value was 73.7%, and negative predictive value was 78.9%. Conclusions: Model-based SI ruled in and ruled out sepsis with fairly high sensitivity and specificity in our critically ill nondiabetic patients. These findings can be used as a foundation for further, prospective investigation in this area. © 2018 Indian Journal of Critical Care Medicine | Published by Wolters Kluwer - Medknow.

Author keywords

Critical care | diagnosis | insulin sensitivity | model-based | sepsis

Indexed keywords

EMTREE drug terms: antibiotic agent | corticosteroid | glucose | hypertensive factor | infusion fluid | inotropic agent | insulin

EMTREE medical terms: adult | Article | artificial ventilation | clinical article | cohort analysis | controlled study | diagnostic value | female | glucose blood level | hospital admission | human | inotropism | insulin dependent diabetes mellitus | insulin infusion | insulin sensitivity | intensive care unit | male | middle aged | non insulin dependent diabetes mellitus | predictive value | receiver operating characteristic | renal replacement therapy | retrospective study | sensitivity and specificity | sepsis

Chemicals and CAS Registry Numbers:

glucose, 50-99-7, 84778-64-3; insulin, 9004-10-8

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