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Model - Based Insulin Sensitivity as a New Biomarker of Sepsis Diagnosis in the Intensive Care Unit

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INTRODUCTION: Currently, there is a lack of real-time biomarker to diagnose sepsis. Insulin sensitivity (SI) may be determined in real-time using mathematical glucose-insulin models, but its effectiveness as a diagnostic test of sepsis remains unexplored. We aimed to explore the diagnostic value of model-based SI as a new biomarker of sepsis in a mixed cohort of diabetic and non-diabetic patients newly admitted to the intensive care unit (ICU). **MATERIALS AND METHODS:** In this cross-sectional study, we analysed SI levels derived from the Intensive - Control-of- Insulin -Nutrition-Glucose model in septic (n=45) and non-septic (n = 41) patients upon their ICU admission. The diagnostic value of model-based SI for sepsis was determined through analysis of the area under the curve (AUC) of the receiver operating characteristic curve. **RESULTS:** Baseline SI levels were significantly lower in patients with sepsis than those without sepsis (0.560 (SD=0.676) vs. 1.097 (SD=1.473) x 10⁻⁴ L/mU/min, P = 0.037). However, the AUC of 0.588 revealed that model-based SI was a poor diagnostic test of sepsis in the mixed cohort of diabetics and non-diabetics. In a separate analysis among the non-diabetics (n=19), model-based SI predicted sepsis with clinically valid performance (AUC 0.911). **CONCLUSION:** Presence of sepsis significantly reduced SI in the critically ill patients but a low SI could predict sepsis only in the non-diabetic cohort. © 2021, International Medical Journal Malaysia. All rights reserved.

Author keywords

insulin resistance; insulin sensitivity; intensive care units; sepsis

**Topic name**

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Kernel density estimates for sepsis classification

Parente, J.D. , Chase, J.G. , Möller, K. (2009) *Computer Methods and Programs in Biomedicine*

Development of a model-based clinical sepsis biomarker for critically ill patients

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-
- 1 Bergman, RN, Ider, YZ, Bowden, CR, Cobelli, C.
Quantitative estimation of insulin sensitivity
(1979) *AJP - Endocrinol Metab*, 236 (6), pp. E667-E677. Cited 41 times.
1. [Internet]
<http://ajpendo.physiology.org/cgi/content/abstract/236/6/E667>
-
- 2 Agwunobi, A.O., Reid, C., Maycock, P., Little, R.A., Carlson, G.L.
Insulin resistance mid substrate utilization in human
endotoxemia ([Open Access](#))

(2000) *Journal of Clinical Endocrinology and Metabolism*, 85 (10), pp. 3770-3778. Cited 167 times.
<http://jcem.endojournals.org>
doi: 10.1210/jcem.85.10.6914

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-
- 3 Chambrier, C., Laville, M., Rhzioual Berrada, K., Odeon, M., Bouletreau, P., Beylot, M.
Insulin sensitivity of glucose and fat metabolism in severe
sepsis

(2000) *Clinical Science*, 99 (4), pp. 321-328. Cited 75 times.
<http://www.clinsci.org/>
doi: 10.1042/cs0990321

View at Publisher
-
- 4 Kajbaf, F., Mojtahedzadeh, M., Abdollahi, M.
Mechanisms underlying stress-induced hyperglycemia in
critically ill patients ([Open Access](#))

(2007) *Therapy*, 4 (1), pp. 97-106. Cited 48 times.
<http://www.futuremedicine.com/doi/full/10.2217/14750708.4.1.97>
doi: 10.2217/14750708.4.1.97

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-
- 5 Mannucci, E., Bardini, G., Rotella, F., Rotella, C.M.
Comparison among different insulin sensitivity indices in
obese patients

(2003) *Diabetic Medicine*, 20 (6), pp. 462-466. Cited 10 times.
doi: 10.1046/j.1464-5491.2003.00935.x

View at Publisher
-
- 6 DeFronzo, R.A., Tobin, J.D., Andres, R.
Glucose clamp technique: A method for quantifying insulin
secretion and resistance ([Open Access](#))

(1979) *American Journal of Physiology Endocrinology Metabolism and
Gastrointestinal Physiology*, 6 (3), pp. E214-E223. Cited 6268 times.
doi: 10.1152/ajpendo.1979.237.3.e214

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-

- 7 Lin, J., Razak, N.N., Pretty, C.G., Le Compte, A., Docherty, P., Parente, J.D., Shaw, G.M., (...), Geoffrey Chase, J.
A physiological Intensive Control Insulin-Nutrition-Glucose (ICING) model validated in critically ill patients ([Open Access](#))

(2011) *Computer Methods and Programs in Biomedicine*, 102 (2), pp. 192-205. Cited 138 times.
doi: 10.1016/j.cmpb.2010.12.008

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-
- 8 Singer, M., Deutschman, C.S., Seymour, C., Shankar-Hari, M., Annane, D., Bauer, M., Bellomo, R., (...), Angus, D.C.
The third international consensus definitions for sepsis and septic shock (sepsis-3) ([Open Access](#))

(2016) *JAMA - Journal of the American Medical Association*, 315 (8), pp. 801-810. Cited 7501 times.
<http://jama.jamanetwork.com/article.aspx?articleid=2492881>
doi: 10.1001/jama.2016.0287

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-
- 9 Health M of. Clinical Practice Guidelines; Management of Type 2 Diabetes (2009) *Clin Pract Guidel Manag Type 2 Diabetes*, 73.
9
-
- 10 Bewick, V., Cheek, L., Ball, J.
Statistics review 13: Receiver operating characteristics curves ([Open Access](#))

(2004) *Critical Care*, 8 (6), pp. 508-512. Cited 545 times.
doi: 10.1186/cc3000

[View at Publisher](#)
-
- 11 Shukeri, W.F.W.M., Mat-Nor, M.B., Jamaludin, U.K., Suhaimi, F., Razak, N.N.A., Ralib, A.M.
Levels and diagnostic value of model-based insulin sensitivity in sepsis: A preliminary study ([Open Access](#))

(2018) *Indian Journal of Critical Care Medicine*, 22 (6), pp. 402-407. Cited 5 times.
<http://www.ijccm.org/>
doi: 10.4103/ijccm.IJCCM_92_18

[View at Publisher](#)
-
- 12 Mat-Nor, M.B., MD Ralib, A., Abdulah, N.Z., Pickering, J.W.
The diagnostic ability of procalcitonin and interleukin-6 to differentiate infectious from noninfectious systemic inflammatory response syndrome and to predict mortality

(2016) *Journal of Critical Care*, 33, pp. 245-251. Cited 34 times.
<http://www.elsevier.com/ezlib.iium.edu.my/inca/publications/store/6/2/3/1/4/3/index.htm>
doi: 10.1016/j.jcrc.2016.01.002

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-

- 13 Blakemore, A., Wang, S.-H., Compte, A.L., Shaw, G.M., Wong, X.-W., Lin, J., Lotz, T., (...), Chase, J.G.

Model-based insulin sensitivity as a sepsis diagnostic in critical care (Open Access)

(2008) *Journal of Diabetes Science and Technology*, 2 (3), pp. 468-477. Cited 28 times.

<http://dst.sagepub.com/content/by/year>

doi: 10.1177/193229680800200317

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