CORRELATION BETWEEN HOMA2-IR AND HbA1c WITH ALGORITHMS BASED ON DISTINCT PHYSIOLOGIC MEASUREMENTS (ES COMPLEX SYSTEM)

ABSTRACT

Background: HOMA is a method for assessing β-cell function and insulin resistance (IR) from basal (fasting) glucose and insulin or C-peptide concentrations. These blood determinations are sometimes inconvenient for screening purposes, since they are time consuming. Other physiologic tests like: electrochemical acid-base assessment, arterial stiffness, autonomic nervous system level activity and body composition can be rapidly assessed with the use of electronic devices (Electro Sensor Model Complex System- ES Complex).
Correlation between HOMA2, HbA1c, and ES Complex System obtained from obese patients was evaluated in this study.

Methods: A group of 148 obese candidates to bariatric surgery was selected for the study.
Besides a complete physical examination, fasting glucose, Insulin, and HbA1c was determined. ESC-IR (ES Complex–Insulin Resistance) algorithm was calculated and compared to HOMA2-IR (HOMA-2-Insulin Resistance). Correlation between ESC-BGC (ES Complex -Blood Glucose Control) and HbA1c determination was also performed.

Results: A good correlation was obtained between both HbA1c/ESC-BCG (r=0.85)., and HOMA2- IR/ ESC-IR (r=0.84) **.** ESC diagnostic performance was also evaluated by using Receiver Operating Characteristics (ROC curves). For Metabolic Syndrome diagnosis the area under the curve obtained was 0.9413, and for Insulin Resistance 0.9022.
A result higher than 3 obtained from ESC-BCG can predict treatment failures in diabetic patients. Also, patients with scores higher than 2.5 and 3, obtained from ESC-IR have a high probability of having metabolic syndrome and insulin resistance, respectively, as compared to HOMA2-IR.

Conclusion: The ES Complex System can be used as a screening method to predict Insulin Resistance, Metabolic Syndrome and Diabetes treatment failures, when performed in populations sharing the same characteristics. Additional studies have to be done to document this correlation in other groups of patients not investigated in this work, as healthy individuals, and non-obese diabetics**.**

New Approach for beta cell function screening from with physiological data Algorithms in obese patient's population.

Authors: Dr. Chaim Elinton Adami and Renata Cristina Gobato
Universidade Estadual de Campinas, Faculty of medical sciences, Department of surgery. Cidade Universitária Zeferino Vaz Barão Geraldo
13083970-Campinas, SP-Brazil-postcard Box: 6111

Abstract

Background: The pathogenesis of type 2 diabetes is hypothesized to be related to two principal factors: insulin resistance and β cell function. Only the blood tests and related algorithms are used to assess these factors. Physiologic data affected by these factors have never been used to screen β cell function.
The aim of this research was to assess the correlation between algorithms from physiologic data and HOMA2% β algorithms.

Methods: 115 obese patients (93 women and 22 men) mean age 39 (range 17– 62) , candidates to bariatric surgery were included in the study and were undergoing for laboratory tests including fasting blood glucose, fasting insulin plasma, for blood pressure measurement and for an examination with the E.S Complex system.
About 40% of patients were undergoing antihypertensive agents or metformin, but no one was undergoing insulin or secretagogues treatment.
The ES Complex (Electro Sensor Complex) system is a combination of devices and the data obtained from the system are conductance measurements, hemodynamic indicators, arterial stiffness, SpO2%, Blood pressure, autonomic nervous system level activity and body composition.
The HOMA2 % β (Homeostasis model assessment 2, percent β cell function) algorithms had been calculated from the fasting blood glucose and the fasting insulin plasma.
The ESC % β (Electro sensor complex, percent β cell function) algorithms had been calculated from the E.S Complex system data.
Statistical analysis was performed to correlate of ESC-%β and HOMA2-% β using the coefficient of correlation and the Spearman's coefficient of rank correlation.

Results:
The coefficient of correlation ESC- %β and HOMA2-%β is r=0.72 (using Log values) and the Spearman's coefficient of rank correlation (rho) was 0.799 and significance level for both P= 0.0001.

Conclusion: The ESC- %β, algorithms have a good correlation with the HOMA2- %β. The ES Complex can be used as a rapid, cost-effective, and noninvasive tool in screening and follow up of the β cell function on a larger scale.