

Correlations of HOMA2-IR and HbA1c with Algorithms Derived from Bioimpedance and Spectrophotometric Devices

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Abstract

Background

Homeostasis model assessment of insulin resistance (HOMA2-IR) and HbA1c, markers of metabolic syndrome and glycemic control, were compared with Electro Sensor (ES) Complex software algorithms. ES complex software integrates data from Electro Sensor Oxi (ESO; spectrophotometry) and Electro Sensor-Body Composition (ES-BC; bioimpedance).

Methods

One hundred forty-eight Brazilian obese candidates for bariatric surgery underwent complete physical examinations, laboratory tests (fasting plasma glucose, fasting plasma insulin, and HbA1c) and ES complex assessments. HOMA2-IR was calculated from fasting plasma glucose and fasting plasma insulin using free software provided by The University of Oxford Diabetes Trial Unit. ES complex–insulin resistance (ESC-IR) and ES complex–blood glucose control (ESC-BCG) were calculated from ESO and ES-BC data using ES complex software. Correlations between HOMA2-IR and ESC-IR and between ESC-BGC and HbA1c were determined.

Results

ESC-BGC was correlated with HbA1c ($r = 0.85$). ESC-BCG values >3 were predictive of HbA1c $> 6.5\%$ ($\varphi = 0.94$; unweighted $\kappa = 0.9383$). ESC-IR was correlated with HOMA2-IR ($r = 0.84$). Patients with ESC-IR score >2.5 or >3 were more likely to have metabolic syndrome or insulin resistance, respectively, compared with HOMA2-IR value >1.4 and >1.8 , respectively. ESC-IR performance was evaluated by receiver operating characteristic curves. The areas under the curve for metabolic syndrome and insulin resistance were 0.9413 and 0.9022, respectively.

Conclusion

The results of this study in Brazilian subjects with obesity suggest that ES complex algorithms will be useful in large-scale screening studies to predict insulin resistance, metabolic syndrome, and HbA1c $>6.5\%$. Additional studies are needed to confirm these correlations in non-obese subjects and in other ethnic groups.

Keywords

Obesity Insulin resistance Metabolic syndrome
Electro Sensor Complex software HOMA2-IR HbA1c
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Notes

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We thank LD Technology for providing the system used in this study.

Conflict of Interest

This study was not sponsored. The authors have no conflicts of interest to declare.

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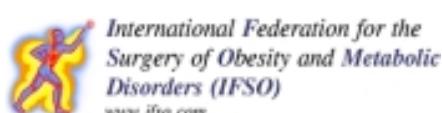
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