LETTER TO THE EDITOR

IS QUANTITATIVE INSULIN SENSITIVITY CHECK INDEX, A FAIR INSULIN SENSITIVITY INDEX IN HUMANS?

J.P. BASTARD (1, 2), J.J. ROBERT (3), C. JARDEL (4), E. BRUCKERT (5), A. GRIMALDI (6), B. HAINQUE (4)

Recently, Katz et al. [1] have proposed a new accurate method for assessing insulin sensitivity in humans. This new method has been called QUICKI for quantitative insulin sensitivity check index and is defined from fasting plasma glucose and insulin as \(\frac{1}{\log(\text{insulin}) + \log(\text{glucose})}\). QUICKI was found highly correlated with insulin sensitivity measured by the hyperinsulinemic euglycemic clamp, this correlation being higher with QUICKI than with minimal model analysis of a frequently sampled iv glucose tolerance test. Thus, the authors suggested that QUICKI might be useful for clinical research.

This prompted us to test this new index of insulin sensitivity. We then measured QUICKI in a population of 26 subjects with a wide range of insulin sensitivity including 9 healthy lean controls, 8 obese non-diabetics and 9 type 2 diabetics, who participated in a clamp study [2]. The characteristics of the subjects are listed in Table I. We compared QUICKI with the results obtained from the hyperinsulinemic euglycemic clamp and the so-called homeostasis model assessment (HOMA) defined as \((\text{fasting insulin} [\text{mU/l}] \times \text{fasting glucose} [\text{mmol/l}])/22.5\). Insulin mediated glucose disposal was measured using the hyperinsulinemic euglycemic clamp method at two insulin infusion rates (40 and 400 mU/m² × min). The continuous insulin infusion was maintained for 100 min at each rate. In the diabetic subjects, glucose infusion was started when plasma glucose concentration had decreased from hyperglycemic to normoglycemic levels, which required less than 60 minutes. The mean glucose infusion rates (GIR) of the last 30-min of insulin infusion were used to assess insulin responsiveness. Plasma glucose levels were determined with a glucose oxidase method (Beckman Glucose Analyzer II). Plasma insulin was assayed using the polyethylene glycol separation method and ERIA radioimmunoassay kit (Bis-Ins Diagnostics Pasteur, France). Results are mean ± se and differences between groups were determined using one-way analysis of variance followed by a Fisher protected least significant test for pair wise differences. To analyze relationship between pairs of indexes of insulin sensitivity, linear regression analysis was performed. The threshold for significance was set at \(p = 0.05\).

As shown in Table I, obese diabetic and obese non-diabetic subjects were more insulin resistant than lean control subjects, the most insulin resistant being the obese diabetics whatever the insulin sensitive assessment test used. Values for QUICKI in the three groups of subjects were comparable to those reported by Katz et al. [1]. We found significant correlations between GIR and both QUICKI and HOMA \((r = 0.815, p < 0.001\) and \(r = -0.639, p < 0.001\), respectively). When HOMA was log-transformed, the correlation between GIR and log (HOMA) was almost as good as the one between GIR and QUICKI \((r = -0.801, p < 0.001)\). As a matter of fact, we found a high correlation between QUICKI and log (HOMA)

(1) Service de Biochimie et Hormonologie, Hôpital Tenon AP-HP, Paris.
(2) INSERM U-402, Faculté de Médecine Saint-Antoine, Université Paris VI, Paris.
(4) Service de Biochimie, Hôpital de la Salpêtrière, AP-HP, Paris.
(r = −0.992, p < 0.001) as also shown by Katz et al. [1], and these authors may concede that HOMA when log-transformed is quite similar to QUICKI. Thus, QUICKI may be a reasonable surrogate measure of insulin sensitivity in humans. The determination of frequent values to determine insulin resistant subjects may be of interest in epidemiological studies and probably for individual subjects in the future.

**REFERENCES**
