Letter to the Editor

The insulin secretion-sensitivity index-2 (ISSI-2) and the measurement of beta-cell function in women with gestational diabetes

Dear Sir;

In their recent report on beta-cell dysfunction in Asian women with gestational diabetes (GDM) [1], Saisho and colleagues assess beta-cell function from the oral glucose tolerance test (OGTT) using a construct defined as the product of (i) insulin secretion, measured by the ratio of the area-under-the-insulin-curve to the area-under-the-glucose curve (AUC_{ins/glu}), and (ii) insulin sensitivity, measured by the IS_{OGTT} index of Matsuda and DeFronzo. They present a graphical representation of the hyperbolic relationship between AUC_{ins/glu} and IS_{OGTT} and describe the product of these two measures as the disposition index.

There are several points that should be recognized with respect to this measure of beta-cell function. Firstly, it should be noted that a graphical presentation alone is not sufficient to establish a hyperbolic relationship between a measure of insulin secretion and a measure of insulin sensitivity. Instead, the confirmation of such a hyperbolic relationship requires its formal mathematical demonstration, as discussed in reference 18 from the report by Saisho et al. Indeed, the formal mathematical confirmation of a rectangular hyperbolic relationship between AUC_{ins/glu} and IS_{OGTT} was previously demonstrated in that reference [2]. Secondly, based on that demonstration, we introduced the product of AUC_{ins/glu} and IS_{OGTT} as a measure of beta-cell compensation that can be obtained from the OGTT and that is analogous to the disposition index derived from the intravenous glucose tolerance test (ivGTT). This product, which is called the Insulin Secretion-Sensitivity Index-2 (ISSI-2), has since been validated against the actual disposition index from the ivGTT [3] and used as an OGTT-based measure of beta-cell function in a series of publications, a few of which are cited here [3-5]. Finally, it should be recognized that ISSI-2 has previously been used to demonstrate beta-cell dysfunction in women with GDM, as compared to their peers, both during pregnancy [4] and in the first year postpartum [5]. These published data are thus supportive of the findings in Asian women reported by Saisho et al [1], albeit under the established name (ISSI-2) for the validated OGTT-based measure of beta-cell function used in the latter report.

References


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Received Sep. 21, 2010; Accepted Oct. 1, 2010 as K10E-279
Released online in J-STAGE as advance publication Oct. 20, 2010
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Conflicts: None to disclose.
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