Estimating glycemic index of rice-based mixed meals by using predicted and adjusted formulae

ABSTRACT

The estimation of glycemic index (GI) of rice-based mixed meal either by using predicted GI (GI_{pred}) or adjusted GI (GI_{adj}) formula is unclear. This study aimed to determine the glycemic response of rice in rice alone or mixed meals and to identify the appropriate formula for estimating the GI of rice-based mixed meals. The glycemic responses produced by the rice alone (red rice, fragrant white rice or parboiled rice) and the rice-based mixed meals (fried red rice, fried fragrant white rice or fried parboiled rice) which provided 25 g available carbohydrate were assessed in 11 healthy individuals. To determine the measured GI ($GI_{measured}$) of rice alone and rice-based mixed meals, participants underwent three repeated tests of a reference food (Glucolin®). Tests were performed in random order on nine separate visits after an overnight fasting for at least 8 h. Capillary glucose at baseline (0 min), 15, 30, 45, 60, 90 and 120 min from starting the meals was assessed and used to determine the incremental area under the curve ($iAUC_{120}$). The agreement between $GI_{measured}$ and the estimation formulae (GI_{pred} or GI_{adj}) were determined using Bland-Altman analysis. The $iAUC_{120}$ after consuming rice alone was significantly higher than the rice-based mixed meals except for fried fragrant rice, which was comparable to the rice alone ($P > 0.05$). The $GI_{measured}$ values of rice were categorized as medium (61 for parboiled rice, 67 for fragrant white rice, and 68 for red rice). GI_{pred} ($r = 0.40$, $P < 0.01$) and GI_{adj} ($r = 0.41$, $P < 0.01$) were significantly correlated with $iAUC_{120}$. The agreement between $GI_{measured}$ and GI_{adj} is apparent suggesting the usefulness of GI_{adj} in estimating meal GI of rice-based mixed meals.

Keyword: Glycemic index; Mixed meal; Glycemic response; Rice