cause the fall in acetoacetate concentration lags behind the resolution of acidosis.

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Is There a Relationship Between Lipoprotein(a) Level and In Vivo Insulin Sensitivity in Childhood?

Interest in lipoprotein(a) [Lp(a)], first described by Berg in 1963 (1), has increased since epidemiological studies have demonstrated an association of elevated serum concentrations with coronary heart (2), cerebrovascular (2,3), and peripheral vascular disease (4).

Several studies have shown that serum Lp(a) levels are elevated in patients with insulin-dependent and non-insulin-dependent diabetes mellitus (IDDM and NIDDM, respectively) (5,6). Moreover, improvement in metabolic control has been associated with lowering of Lp(a) level in some (7–10) but not other studies (11–13). In a group of adolescents with IDDM, we demonstrated that Lp(a) levels were not elevated (14). Furthermore, we made an interesting preliminary observation that daily insulin doses correlated positively with Lp(a) in some patients (15), suggesting a relationship between insulin level/sensitivity and Lp(a) level. However, an epidemiological study in nondiabetic Mexican-Americans and non-Hispanic whites showed no significant relationship between fasting and stimulated insulin and Lp(a) concentration although there was a tendency for an inverse association (16). Yet another study in healthy nonobese men showed an inverse relationship between Lp(a) level and first-phase insulin response to intravenous glucose tolerance test (17). All these relationships point toward a possible interaction between Lp(a) level and insulin sensitivity/resistance as reflected in the level of insulinemia.

To investigate whether any correlation between Lp(a) and insulin sensitivity exists, we analyzed serum Lp(a) data and insulin sensitivity data in 41 healthy subjects who had undergone a hyperinsulinemic-euglycemic clamp experiment to investigate determinants of insulin sensitivity in the pediatric age group. The mean age was 12.5 ± 1.9, with 25 males and 16 females. Seventeen subjects were prepubertal, and 24 subjects were Tanner stages II–IV. Intravenous crystalline insulin (Humulin, Lilly, Indianapolis, IN) was infused at a constant rate of 40 mU · m^{-2} · min^{-1} to study total body insulin stimulated glucose disposal (R_d). Plasma glucose was clamped at 5.6 mmol/l with a variable rate infusion of 20% dextrose. The rate of glucose infusion was adjusted based on arterialized plasma glucose measurements every 5 min. Insulin stimulated glucose R_d was calculated during the last 30 min of a 3-h clamp from the rate of the exogenous glucose infusion. Lp(a) was measured by enzyme-linked immunosorbent assay methodology using monoclonal anti-Lp(a) antibody as described previously (14). Spearman's correlation coefficient was used to assess the relationship between Lp(a) and insulin-stimulated glucose disposal. No significant correlation was found between R_d and plasma Lp(a) either in the total group ($r = 0.003$, $P = 0.493$) or in the subgroups of Tanner I and II–IV ($r = 0.0664$, $P = 0.4$; and $r = 0.0124$, $P = 0.478$, respectively).

In conclusion, even though Lp(a) is a risk factor for macrovascular disease, neither insulin resistance nor hyperinsulinemia appear to have any association with Lp(a), at least in a normal pediatric population. Thus, the atherogenic potential of Lp(a) appears to be independent of

another risk factor exemplified in insulin resistance and/or hyperinsulinemia.

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Hypoglycemia detection by ECG recording?

To investigate whether changes in the electrocardiogram (ECG) could serve as an early marker for hypoglycemia, blood glucose (BG) concentrations were lowered stepwise to subnormal and hypoglycemic levels while standard surface ECG recordings were performed in 14 type I diabetic patients. To evaluate any potential influence of the prevailing quality of metabolic control, six patients (no women/six men) in good metabolic control (GDiab) and eight patients (two women/six men) in moderate metabolic control (MDiab) (HbA_{1c} 6.2 ± 0.5 and 8.6 ± 1.1%; age 27 ± 3 and 29 ± 7 years; duration of diabetes 14 ± 9 and 12 ± 7 years; body mass index 22.9 ± 1.1 and 23.0 ± 3.1 kg/m^2; means ± SD) were studied.

After an overnight fast, during which BG was kept constant by means of a Biostator (Life Sciences Instruments; Elkhart, IN) (at 5.6 mmol/l in GDiab and 11.1 mmol/l in MDiab; in accordance with the patients' previous metabolic control), BG was lowered by intravenous insulin infusion from 11.1 to 5.6 mmol/l in MDiab within 60 min before the experiment. Thereafter it was clamped at 5.0, 3.6, and 2.5 mmol/l for 45 min each in both GDiab and MDiab. BG was allowed to return to basal values after the cessation of insulin infusion. Between clamp levels, BG was lowered gradually over 30 min. The amplitudes of R and T waves were measured using standard ECG recordings (CS 3000, Picker-Schwarzer, Munich) under baseline conditions. R:T ratios were calculated in order to control for amplitude changes caused by alterations of the recording quality during the studies, e.g., induced by sweating during low BG levels. Results are given as ratio changes in percentage against R:T ratios at baseline glucose concentrations of 5.6 mmol/l (GDiab) or 11.1 mmol/l (MDiab). Blood potassium concentrations were measured by an ionsensitive electrode (Ionometer, Fresenius, Bad Homburg, Germany) during the experiments with one GDiab and four MDiab.

Due to a decrease in the amplitude of the T wave with declining BG while R wave amplitudes remained almost constant, R:T ratios increased in