Lp(a) and Insulin Dose in IDDM

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IDDM, insulin-dependent diabetes mellitus; Lp(a), lipoprotein(a); RIA, radioimmunoassay; NIDDM, non-insulin-dependent diabetes mellitus.

We read with interest the article of Austin et al. (1). They describe two subpopulations in 59 adolescents with IDDM in regard to the relationship between Lp(a) and daily insulin dose. Only those patients with Lp(a) above the 70th percentile showed a relationship between Lp(a) and daily insulin dose ($r = 0.72$; $P = 0.002$).

Table 1—*Lp(a) and insulin dose*

	Total	0–70th Percentile	70–100th Percentile
n	206	144	62
Age (yr)*	12.4 ± 3.52	12.2 ± 3.6	12.9 ± 3.62
Lp(a) (mg/L)†	211 (116–427)	146 (89–221)	560 (461–790)
Insulin dose (U/kg)*	1.01 ± 0.42	1.02 ± 0.39	0.98 ± 0.35

*Data are means ± SD.
†Data are medians (25–75th percentile).

We have found no relationship between Lp(a) and daily insulin dose in 206 children and adolescents with IDDM ($r = 0.06$; $P = 0.42$). This remained when data were analyzed specifically for those above the 70th percentile for Lp(a) ($r = -0.1$; $P = 0.2$) and for pubertal (Tanner 2–5) patients only ($n = 132$; $r = -0.09$; $P = 0.2$) (Table 1).

Lp(a) was measured on serum stored at 2–8° using end-point nephelometry (Hyland laser nephelometer PDQ) and addition of specific monoclonal antibodies (INCSTAR, Stillwater, OK). This method has been correlated with RIA (Pharmacia, Uppsala, Sweden) ($n = 57$, Lp(a) range 30–1500 mg/L, $r = 0.97$) in our laboratory.

Consistent with our findings that show no relationship between Lp(a) and insulin dose in IDDM, patients with hyperinsulinemia of NIDDM do not show higher Lp(a) (2).

References

1. Austin A, Warty V, Janosky J, Arslanian S: The relationship of physical fitness in lipid and lipoprotein(a) levels in adolescents with IDDM. *Diabetes Care* 16:421–26, 1993
2. Haffner SM, Morales PA, Stern MP, Gruber MK: Lp(a) concentration in NIDDM. *Diabetes* 41:1267–73, 1992

Is There or Is There Not a Relationship Between Lp(a) and Insulin Dose in IDDM?

The observation of a relationship between Lp(a) levels and reported daily doses of insulin in IDDM patients in our study (1) was a post hoc

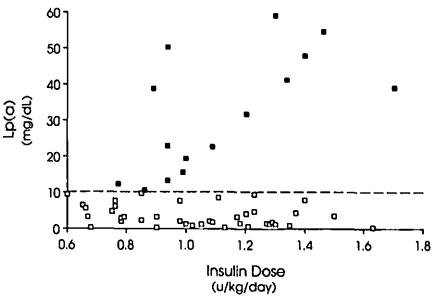

Fig. 1—*Correlation of Lp(a) and daily insulin dose.*

finding. As Fig. 1 shows, the regression analysis of Lp(a) and daily insulin dose clearly divides the patient population into 2 groups (as designated by – – – –). In the group with Lp(a) <10 mg/dl, no relationship was found between Lp(a) and insulin dose. However, in the group with Lp(a) >10 mg/dl, a significant correlation was observed ($r=0.72$, $P=0.002$). Though no differences were noted between these 2 groups with regard to duration of diabetes, BMI, daily insulin dose, and plasma lipids, HbA_1 level was lower in the first group compared with the second group (10.0±0.3 vs. 11.9±0.6%, $P=0.005$). Poor glycemic control has shown association with elevated Lp(a) levels (2). It is possible that in our efforts to improve glycemic control in the group with elevated HbA_1 and higher Lp(a), daily insulin doses were increased. Thus, the relationship between Lp(a) and insulin dose could be an epi phenomenon secondary to the relationship of Lp(a) and HbA_1. However, HbA_1 and Lp(a) levels did not correlate ($r=0.28$, $P=0.3$) in the group with Lp(a) >10 mg/dl.

Contrary to our findings, and in a much larger population of children and adolescents with IDDM, Couper et al. (3) found no relationship between Lp(a) and insulin dose. In both cases, however, it is cautioned that the insulin dose is reported by the patients, and, as most diabetes health-care professionals are aware, in a significant proportion of diabetic adolescents, this may not be a reliable index of the true insulin doses ad-

ministered daily. Our observation would have been more important if the relationship of Lp(a) was with circulating free insulin levels. Notwithstanding these drawbacks, we believe this observation is important and should be pursued further with prospective studies in both diabetic and nondiabetic subjects. We appreciate the input of Couper et al.

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Lp(a), lipoprotein(a); IDDM, insulin-dependent diabetes mellitus, BMI; body mass index.

References

1. Austin A, Warty V, Janosky J, Arslanian S: The relationship of physical fitness to lipid and lipoprotein (a) levels in adolescents with IDDM. *Diabetes Care* 16:421–26, 1993
2. Haffner MS, Tuttle KR, Rainwater DL: Decrease of lipoprotein (a) with improved glycemic control in IDDM subjects. *Diabetes Care* 14:302–307, 1991
3. Couper JJ, Cocciolone R, Nairn J, Ryall RG: Lp(a) and insulin dose in IDDM (Letter). *Diabetes Care*. 16:1402, 1993

Fitness Levels in IDDM Adolescents

Austin et al. (1) speculate that higher physical fitness levels in adolescents with IDDM may decrease the risk of cardiovascular disease through modulating lipid levels. This hypothesis is supported by recent reports of a greater role for lipids in endurance exercise than was originally thought (2) and by adaptive hyperlipogenesis associated with a certain genetic vigor underlying coronary artery disease and obesity (3).

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IDDM, insulin-dependent diabetes mellitus.

References

1. Austin A, Warty V, Janosky J, Arslanian S: The relationship of physical fitness to lipid and lipoprotein(a) levels in adolescents with IDDM. *Diabetes Care* 16:421–25, 1993
2. Hagerman FC: Energy metabolism and fuel utilization. *Med Sci Sports* 24:8309–14, 1992
3. Sugden PH, Friedman EH, Miller N: Serum cholesterol, triglycerides, and aggression (Letter). *Lancet* 340:1350, 1992

Assessing Risk Factors When Screening for Diabetes Mellitus

Even though an estimated 6 million cases of diabetes mellitus in the U.S. are undiagnosed, the advantages and disadvantages of screening programs to identify these individuals are controversial (1–5). In its position statement, the American Diabetes Association has proposed that risk factors for diabetes should be assessed and only those individuals with ≥1 risk factors be screened for diabetes (6). These risk factors include *1*) a family history of diabetes mellitus; *2*) obesity; *3*) an at-risk race (American Indian, Hispanic, or black); *4*) previously identified impaired glucose tolerance; *5*) hypertension or significant hyperlipidemia; and *6*) in nonpregnant women, a history of gestational diabetes mellitus or delivery of babies >9 lbs.

To determine the usefulness of these recommendations, we measured both the risk factors for diabetes by a verbal questionnaire and the blood glucose concentrations by a reflectance meter of 575 self-selected participants in a diabetes screening program. Blood glucose was tested regardless of the answers to the questionnaire.

Of the participants, 34% (193) had no risk factors for diabetes mellitus, and 8.9% (51) had abnormal screening glucose concentrations. Of the participants with abnormal screening glucose concentrations, 31% (16) had no risk factors for diabetes mellitus. Overall, 8.3% of the self-selected participants without risk factors for diabetes mellitus had abnormal screening tests, compared with 9.2% of those with ≥1 risk factors (NS). No differences were observed in the abnormal screening glucose concentrations of participants without risk factors for diabetes compared with those with ≥1 risk factors. A history of prior, borderline diabetes was the only risk factor predictive of an abnormal screening test (OR 5.6, 95% CI 2.1–14.6) as was the presence of ≥3 risk factors for diabetes (OR 4.5, 95% CI 1.7–11.4). A follow-up of all participants with abnormal screening tests an average of 1.8 yr after screening (range: 1.1–2.6 yr) revealed that 41% had diabetes mellitus: 6 from the group with no risk factors and 15 from those with ≥1 risk factor (NS).

Assessing diabetes risk factors to identify individuals appropriate for blood glucose screening imposes an administrative burden on those conducting the screening program. This burden is cost-effective only if it aids in selecting