Lipoprotein(a) and Retinopathy in IDDM and NIDDM Patients

Retinopathy is a serious complication of diabetes whose pathophysiological mechanisms remain largely undefined. The frequent occurrence of capillary occlusion would suggest involvement of the fibrinolytic system and has prompted consideration of lipoprotein(a) [Lp(a)] as a risk factor, given its homology with plasminogen (1). Several studies have addressed the question, with contradictory conclusions (2–5). In this study, we examined the relationship between Lp(a) (quantified by enzyme immunoassay [6]) and retinopathy in a large group of IDDM (n = 149; 78 women, 71 men) and NIDDM (n = 358; 181 women, 177 men) patients. Retinopathy was present in 88 (59.1%) IDDM and 138 (38.5%) NIDDM patients (total 226, 44.6%), as defined by ophthalmoscopy and color photography; fluorescein angiography was performed only when clinically necessary. Patients were classified according to the presence or absence of diabetic retinal lesions (macroaneurysms, retinal hemorrhages, soft or hard exudates, new vessels, fibrous proliferation) (7,8). Patients with proteinuria or renal failure were excluded.

Table 1 shows the demographic and clinical characteristics in the combined IDDM and NIDDM population as a function of retinopathy. Significant differences were evident between the two populations with respect to duration of diabetes, triglycerides, HDL cholesterol, and glycemic control. Lp(a) concentrations tended to be higher (nonsignificant) in the population, while there was no significant difference in the percentage of patients with Lp(a) ≥30 mg/dl in the two populations (23.8% vs. 24.3%).

Forward stepwise logistic analysis with retinopathy as the dependent variable revealed that age (odds ratio [OR] 0.965, $P < 0.0001$), hypertension (OR 2.17, $P < 0.0021$), duration of diabetes (OR 1.16, $P < 0.0001$), triglycerides (OR 2.20, $P < 0.0006$), and HDL cholesterol (OR 0.98, $P < 0.0012$) were independently associated with the complication. Other parameters also included in the model but that did not attain significance were sex, BMI, cholesterol, LDL cholesterol, and type of diabetes as well as Lp(a) (dichotomized as ≤29.9 or ≥30 mg/dl).

Table 1— *Demographic and clinical characteristics of IDDM and NIDDM patients with (present) and without (absent) retinopathy*

	Absent	Present	P value
n	281	226	
Age (years)	55.0 ± 16.9	54.2 ± 16.3	NS
Duration of diabetes (years)	9.6 ± 8.2	18.2 ± 8.7	<0.0001
BMI	26.3 ± 4.5	26.2 ± 4.1	NS
HbA_{1c}	8.35 ± 2.38	9.05 ± 1.97	<0.01
Triglycerides (mmol/l)	1.50 ± 0.86	1.85 ± 1.75	<0.01
Cholesterol (mmol/l)	5.51 ± 1.30	5.51 ± 1.27	NS
LDL cholesterol (mmol/l)	3.83 ± 1.13	3.77 ± 0.96	NS
HDL cholesterol (mmol/l)	1.01 ± 0.43	0.91 ± 0.39	<0.01
Lp(a) (median) (mg/dl)	8.0	11.0	NS
Lp(a) (quartiles; 25th, 75th)	4.0, 27.7	4.0, 27.9	

Data are means ± SD unless otherwise indicated. All parameters were compared with the unpaired Student's t test except Lp(a) levels (Mann-Whitney U test). Triglycerides were transformed to log values before comparison.

The present study thus provides no evidence for Lp(a) levels being associated with retinopathy in either IDDM or NIDDM patients (confirmed by analyzing the subgroups separately). This would suggest that Lp(a) is not involved in the mechanism giving rise to retinopathic lesions. Previous studies have proved contradictory, although a common aspect of the studies has been the relatively small number of patients with retinopathy. An important feature of our study in this respect is the number of patients with retinopathy (n = 226), making it the largest study of its kind presently available.

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