An important aspect of the epidemiological study of diabetic retinopathy consists in tracing factors linked with its evolution. Numerous studies have been carried out on chronological factors: age at the clinical onset of diabetes, present age, known duration of diabetes.

Because of the high risk of atherosclerotic cardiovascular disease in diabetics, the measurement of blood pressure, body weight and serum lipids all form part of the routine check for diabetes. However, their relation to the development of diabetic retinopathy has been studied relatively little and apparently never comprehensively.

The present work analyses, in a group of insulin-dependent diabetics, the relationship between the degree of evolution of diabetic retinopathy and weight, blood pressure and serum lipid levels, as well as the relationship between all these factors and the chronological variables. The subjects chosen form a reliable group for the study of these relationships, as, contrary to maturity onset diabetes, the existence of the disease is independent of the weight factor and is a certainty.

MATERIAL AND METHODS

The study was carried out on 145 adult, insulin-dependent diabetics, aged less than 60, out-patients or in-patients of the Department of Diabetology of the Hôtel-Dieu, Paris, between January 1970 and January 1971. Their weight, height, supine blood pressure and serum cholesterol and lipid levels were noted.

Fifty-three of them (group G1) form part of a longitudinal study of diabetic retinopathy*. For these, fluorescein angiography of the eye fundus was taken. This fluorography


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is centred systematically on the macula. It explores a circular surface totalling about 5 papillary diameters including the papilla. The fluorographic aspects are described quantitatively giving the numbers of microaneurysms per quadrant, the retinal haemorrhages and new vessel formation. Only the number of microaneurysms, considered the most specific lesions of the disease, is used in this study. The inclusion of haemorrhages, exudates and new vessels, which are neither numerous nor normally distributed, does not contribute further information or alter the results in any way. In this group, the evolution of the retinal lesions ranged from stage I to stage III of Alberts and Slosse's classification. Stages 0, IV and V are by definition not included in the longitudinal study.

The other 92 patients (group G2) were in-patients. Their data were obtained by retrospective examination of the records of all insulin-dependent diabetics hospitalised during the period when group G1 subjects were recruited. The only records excluded from the study were those of patients hospitalised for severe diabetic ketosis or ketoadosis, because these have marked disturbing effect on humoral parameters, blood pressure and weight. All the parameters used in this work form part of the routine check upon admission. In particular, the data for the eye fundus of the in-patients are those of the clinical routine examination and not of fluorescein angiography which explains the qualitative classification of the results. The patients fell into 4 classes:

Class A : normal eye fundus
Class B : isolated abnormalities of the perimacular small blood vessels
Class C : microaneurysms and/or haemorrhages and/or exudates
Class D : presence of new vessels.

A few patients of class C exhibit non-specific lesions, haemorrhages or exudates without microaneurysms. It was considered that in such a group of insulin-dependent subjects, who on average are young and not suffering from high blood pressure, these lesions are very likely to be of diabetic origin.

In group G1 as in group G2, the lesions described are those of the more severely involved eye. All the data were set down on questionnaires and worked out by computer at the Centre de Calcul de l'INSEERM.

RESULTS

Description of the groups studied (tabs 1-3)

The study is based on diabetic subjects who became insulin-dependent at the onset or soon after, and who were young at the onset of diabetes. The duration of clinical diabetes is shorter in group G2 than in group G1. This corresponds to the presence, within group G2, of an important subgroup of patients with a normal eye fundus. This subgroup does not exist in group G1 by reason of the selection criteria operating for the subjects included in this group. Generally, subjects in both groups showed little overweight: 3 subjects only were more than 20% overweight, their blood pressure was not high and their serum lipid levels were within the limits considered normal.

Relationship between diabetic retinopathy, age at the onset of diabetes, present age and duration of diabetes (tab. 4)

In both groups, the degree of evolution of diabetic retinopathy was closely correlated to the duration of diabetes. On the other hand, it was not related to age at onset of diabetes nor, in group G1, to present age. Statistical analysis shows that the significant link in group G2 between severity of retinopathy and present age reflects solely the fact that older subjects have diabetes of longer standing.

2