THE WISCONSIN EPIDEMIOLOGIC STUDY OF DIABETIC RETINOPATHY

A COMPARISON OF RETINOPATHY IN YOUNGER AND OLDER ONSET DIABETIC PERSONS

Ronald Klein, Matthew D. Davis, Scot E. Moss, Barbara E.K. Klein, and David L. DeMets

From the Departments of Ophthalmology and Statistics University of Wisconsin Medical School Madison, Wisconsin U.S.A.

ABSTRACT

In a population-based survey of diabetic persons, retinopathy was detected by stereoscopic color fundus photography in 70% of persons under 30 years of age at diagnosis and taking insulin (Group YO), in 62% of persons 30 years of age or older at diagnosis and taking insulin (Group OO-I) and in 36% of persons 30 years of age or older at diagnosis not taking insulin (Group OO-N). The mean duration of known diabetes was 14.6 years in Group YO, 11.0 years in Group OO-I and 6.9 years in Group OO-N. After 20 years of diabetes, proliferative retinopathy was present in about 50% of Group YO, about 25% of Group OO-I and about 5% of Group OO-N. After 15 years of diabetes, macular edema was present in about 18% of Group YO, about 20% of Group OO-I and about 12% of Group OO-N.

When present, macular edema tended to be associated with more hard exudate in Group OO-N.

INTRODUCTION

Suprisingly little information is available to document similarities and differences in retinopathy characteristics of Type I and Type II diabetes. Such comparisons are limited by the difficulty of classifying patients objectively and accurately by diabetes type, by the lack of population-based studies and by the paucity of reports in which patients with both types of diabetes have been assessed concurrently with standardized methods such as masked grading of stereoscopic fundus photographs.
Nevertheless, certain concepts have become generally accepted. In Type I diabetes, retinopathy is rarely present sooner than two years after diagnosis\(^3,11,14\) and is rarely a threat to vision until after ten years of known diabetes,\(^10\) whereas in Type II diabetes, retinopathy may be present, even severe, at the time of diagnosis.\(^3\) Proliferative diabetic retinopathy (PDR) is the most important ocular problem faced by individuals with Type I diabetes, while diabetic maculopathy has been considered the more important problem in Type II diabetes.\(^3,10,11,13,14\)

The Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR), in which a population-based sample of diabetic individuals was evaluated using stereoscopic fundus photography, provides a unique opportunity to evaluate these generally accepted concepts and look for other similarities and differences. Because it was not feasible to measure C-peptide or serum insulin levels in this study, patients are classified by age at diagnosis of diabetes and insulin use.

**PATIENTS AND METHODS**

**The Population**

The methods of identification and description of the population have appeared in detail in previous reports.\(^11,12\) In brief, 452 of the 457 physicians who provided primary care to diabetic patients in an 11-county area in Southern Wisconsin (Health Service Area 1 [HSA-1]) participated in the study. Participation involved keeping lists of all diabetic patients for whom primary care was provided from July 1, 1979 to June 30, 1980. During this one-year period, 10,135 diabetic patients were identified by the physicians. Charts of 9,841 of these patients were reviewed. Three hundred thirty-eight patients were confined to nursing homes; 157 had died before July 1, 1979, forty-five did not have diabetes (incorrect computer coding), and 18 had moved before July 1, 1979 or had gestational diabetes. The charts of these 558 patients were reviewed for sociodemographic data only. Among the remaining 9,283 patients, the diagnosis of diabetes had been made in 1,396 before 30 years of age, and in 7,887 at 30 years of age or older.

Of the 1,396 younger-onset group, 1,210 were taking insulin and, of them 1,092 lived within HSA-1. All of these individuals were invited to participate in the examination phase of the study; 902 (82.6%) were examined, 122 (11.2%) had moved out of the area, could not be located or had died, and 68 (6.2%) refused.

For the older-onset group, eligibility criteria for inclusion in the examination phase of the study included a diagnosis of diabetes by the primary care physician, confirmed by random or post-