

PREVALENCE OF DIABETIC RETINOPATHY IN PAKISTANI SUBJECTS A PILOT STUDY

Pages with reference to book, From 49 To 50

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ABSTRACT

Of 3000 diabetic patients screened, 780 were diagnosed to have retinopathy. The incidence of the complication was higher in the age group of 51 years and above, and of diabetes (76.7%) (JPMA 41: 49, 1991).

INTRODUCTION

The average life of diabetic patients has been prolonged with the advent of antidiabetic drugs. Unfortunately, the incidence of diabetic retinopathy has increased many folds. In a nonselective randomized population based study in 1959 at Liaquat Medical College, Hyderabad, the incidence of diabetes was 1.7% in patients below 40 and 3% in above 40 years age group¹. In another survey at Karachi in 1986, it increased to 7.66%¹. The present study was conducted to determine the incidence of retinopathy both proliferative and background type, and see the effect of the duration of diabetes on the patients.

PATIENTS AND METHODS

An IBM personal computer was used to compile the data of 3,000 diabetic patients examined. All patients underwent a preliminary examination, including external ocular tests, recording of visual acuity and the best corrected visual acuity. Intraocular pressure was recorded by applanation tonometry. Fundus examinations by indirect ophthalmoscope as well as with slit lamp and fundus lens were done routinely. For permanent record, coloured photographs by Topcon Fundus Camera were taken in all cases where changes due to diabetes were noted either in the anterior or posterior segment. Fluorescein angiography was carried out only for macular oedema. Diabetic retinopathy was further classified into background type of diabetic retinopathy (BDR) and proliferative diabetic retinopathy (PDR).

RESULTS

Three thousand diabetics were included in the study of which 780 (26%) had retinopathy. Four hundred and nine (52%) were males and 371 (48%) females. Six hundred and seventeen (79%) cases had background, and 163 (21%) proliferative retinopathy. Of the 409 male diabetics the incidence of it increased alarmingly with the prolongation of the duration retinopathy rose from 0.7% in the 21-30 year age group to 66.1% in the age group 51 years and above while the incidence in the female population was 1.1% in the age group 21-30 years and 54.2% in the age group of 51 years onward (Table I).

Table I. Diabetic Retinopathy According to Age.

AGE OF GROUP	MALE				FEMALE			
	BDR	PDR	TOTAL	(%)	BDR	PDR	TOTAL	(%)
1 - 20 Years	-	-	-	-	-	-	-	-
21 - 30 Years	2	1	3	(0.7)	2	2	4	(1.1)
31 - 40 Years	14	7	21	(5.1)	21	5	26	(7.0)
41 - 50 Years	86	29	115	(28.1)	117	23	140	(37.7)
51 - Onward	214	56	270	(66.1)	161	40	201	(54.2)
	316	93	409	(100.0)	301	70	371	(100.0)

BDR: Background Diabetic Retinopathy

PDR: Proliferative Diabetic Retinopathy

A remarkable correlation was observed between the duration of diabetes and retinopathy. Of 780 patients with retinopathy 182 (23.3%) had diabetes for 1-5 years and 598 (76.7%) for 6-16 years. The effect of duration of diabetes on the development of retinopathy is similar in both sexes (Table II).

Table II. Diabetic Retinopathy According to Duration of Diabetes.

DURATION OF DIABETES	MALE				FEMALE			
	BDR	PDR	TOTAL	(%)	BDR	PDR	TOTAL	(%)
1- 5 Yrs	74	21	95	(23.2)	69	18	87	(23.5)
6- 10 Yrs	94	30	124	(30.3)	88	13	101	(27.2)
11- 15 Yrs	62	16	78	(19.0)	63	23	86	(23.2)
16- Onward	86	26	112	(27.5)	81	16	97	(26.1)
1-16 & Onward	316	93	409	(100.0)	301	70	371	(100.0)

BDR: Background Diabetic Retinopathy

PDR: Proliferative Diabetic Retinopathy

DISCUSSION

The two common hypotheses for pathogenesis of diabetic retinopathy are (i) high blood pressure and low intraocular pressure (I.O.P)³ and (ii) hypoxia leading to production of vasoproliferative substances^{4,5}. Stefansson et al³ observed that high blood pressure and low I.O. P. were present in a majority of their patients with diabetic retinopathy. In contrast those diabetics, who had low blood pressure and high intraocular pressure, did not develop diabetic retinopathy. The author also observed that if the diabetic patients who had low blood pressure with diabetic retinopathy, developed glaucoma, the progress of diabetic retinopathy was retarded or stopped. Therefore, they opined that high blood pressure and low intraocular pressure were the main causes of diabetic retinopathy, rather than hypoxic retina, as suggested by others⁴⁻⁷. The initial changes in the capillary cell population, which include endothelial proliferation on the venous side and generalized pericyte damage, are possibly related to the capillary venous dilation linked with the initial increase in blood flow⁸. The first sign of diabetic retinopathy is therefore an increased permeability to fluorescein dye as measured by fluorophotometer⁹⁻¹². In diabetics there is an increase in hemoglobin A1c and decrease in 2-3

diphosphoglycerate (2-3 DPG) which increases the affinity of Hb for oxygen. Thus oxygen release is affected. The total oxygen consumption of the diabetic retina increases by 10-12% above the normal^{13,14}, so it is believed that these two factors, i.e. increased consumption and decreased availability of oxygen, lead to tissue hypoxia state. Constant high blood pressure, prolonged hyperglycaemia, increased Hb A1c and decreased 2-3 DPG cause hindrance in dissociation of oxygen, from Hb molecule and on the other hand increased consumption of oxygen by diabetic retina causes an imbalance between supply and demand. This probably leads to venous capillary dilation surrounded by capillary closure. Another factor which plays an important role in the pathogenesis of loss of retinal pericytes and thickening of basement membrane is aldose reductase¹⁵. Hohman¹⁶ grew human retinal capillary pericytes in tissue culture and demonstrated presence of aldose reductase in these pericytes. In various population based studies conducted in different parts of the world, including Australia^{17,18}, Denmark¹⁹, Iceland²⁰ and United States²¹ it was established that the prevalence of diabetic retinopathy varies between 24 and 70%. However the reason for large variations in the prevalence of total (24% to 70%) and proliferative (4.5% to 22%) retinopathy, may be due to the fact that these studies were not performed under the same conditions²² (Table III). According to a study conducted in Sweden²⁴, the prevalence of retinopathy in insulin-treated diabetics of 40 years of age or younger was 66% and in orally treated diabetic patients of all ages it was 17%. There was an increasing prevalence of retinopathy in all age groups with longer duration of diabetes. Background retinopathy was present in 31% subjects and proliferative in 13%.²² The results of our study are comparable to the figures quoted by other investigators. A higher age group and a long duration of diabetes influence the development of the retinal changes. The pathogenesis is yet to be determined.

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