Vol. 16, No. 3
ORIGINAL PAPER

MEDICINE

MEDICAL CHANNEL
JULY - SEPTEMBER 2010

RISK FACTORS OF DIABETIC RETINOPATHY IN DIABETES MELLITUS.

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ABSTRACT:

PURPOSE OF STUDY*:To determine the risk factors of diabetic retinopathy in diabetes Mellitus.*
DESIGN OF STUDY:*Randomized Hospital based Prospective study*
PLACE AND DURATION OF STUDY:*Medicine Department, Chandka Medical College Hospital Larkana. From January 2007 to June 2007*
PATIENTS AND METHODS:*Total 452 cases were picked up from medical out patient department. 408 (90.26%) cases were known diabetic and 44 (9.73%) were new cases. The relevant investigations such as Blood Sugar Fasting and Random, $HBA_{1c,}$ serum cholesterol, urine for proteins and electrocardiogram were performed. All the patients were referred to ophthalmology department for ophthalmoscopy and retinal photograph.*
RESULTS: *There were 452 cases in this study, 288 (63.71%) were male and 164 (36.28%) female with age range 18 years to 73 years. Among the 452 diabetic patients 128 (28.6%) patients had diabetic retinopathy. In 192 patients with high $HBA_{1c,}$ 76 patients had retinopathy. The 100 patients were hypertensive, 32 patients had retinopathy*
CONCLUSION:*The diabetic retinopathy is strongly associated with the duration of diabetes, hyperglycaemia and hypertension.*

KEY WORDS: Diabetes Mellitus, Retinopathy, Hypertension

INTRODUCTION

The prevalence of diabetes mellitus (DM) in Pakistan is 4.6%, but other put the rate much higher, significant number of these patients would go blind due to retinopathy. The diabetic retinopathy (DR) is one of the leading causes of blindness in the world and it accounts for the majority of new cases of blindness. DM affects various body tissues, the ocular lesions develop after many years of diabetes. It usually appears after 10 years more or less, depending on the age of onset, renal disease and glycaemic control. The ocular lesions are the manifestation of pathological vascular lesions of diabetes. The prevalence of retinopathy increases linearly with an increase of serum glucose and age.[1] The hyperglycaemia increases retinal blood flow and metabolism and has direct effects on retinal endothelial cells and pericyte loss which impairs vascular auto regulation. The uncontrolled blood flow dilates the retinal capillaries and produces the vasoactive substances which cause proliferation of endothelial cells resulting in occlusion of retinal capillaries. It causes retinal hypoxia which stimulates the endothelial growth factors and increase vascular permeability causing new vessel formation.[2] The spectrum of diabetic retinopathy may be background diabetic retinopathy (BGDR), clinical significant macular edema (CSME), preproliferative diabetic retinopathy (PPDR) and proliferative diabetic retinopathy (PDR). The estimated increase in the magnitude of diabetes and potential for a consequent higher prevalence of diabetic retinopathy suggest an immediate need to establish control measures so that the diabetic retinopathy does not become a major cause for vision impairment and blindness. The mortality in diabetes is due to macro vascular complications such as stroke and myocardial infarction.[3] In addition to this, diabetes is also as8sociated with the morbidity of micro vascular diseases including nephropathy, neuropathy and retinopathy.[4]

PATIENTS AND METHODS

This prospective study was conducted in the Medicine Department of Chandka Medical College Hospital Larkana from January 2007 to June 2007. All patients of either sex, having history of DM or newly diagnosed cases of DM, were included after informed consent. A specific proforma containing biodata, detailed history, clinical examination,

investigations, treatment and follow up was filled. There were no specific selection criteria regarding the age, sex, and duration of diabetes. Total 452 cases were picked up from medical out patient department. 408(90.26%) cases were aware of their diabetes mellitus and 44(9.73%) cases were unknown of their diabetes. The relevant investigations such as Blood Sugar fasting and random, HBA_{1C} (to assess glycaemic control), serum cholesterol, urine for proteins and electrocardiogram (ECG) were also performed. All the patients were referred for detecting the diabetic retinopathy to ophthalmology department, where the retinal examination was done with direct and indirect ophthalmoscope, 90 D lens and retinal photography by fundus photograph camera. The diabetic retinopathy was categorized as background diabetic retinopathy (BGDR), clinically significant macular edema (CSME), preproliferative diabetic retinopathy (PPDR), and proliferative diabetic retinopathy (PDR). We have considered BGDR as non-vision threatening retinopathy and CSMO, PPDR, and PDR as vision threatening retinopathy. We considered fundus photography as a gold standard investigation in the absence of optical coherence topography. The patients who had BGDR or no retinopathy at all were advised for review after every three months and patients with CSMO, PPDR, and PDR were treated by laser photocoagulation and were reviewed after every month.

TABLE NO: 1

AGE DISTRIBUTION OF THE PATIENTS (N=452)

S.NO	Years	No: of Patients
01.	10-19	26
02.	20-29	46
03	30-39	54
04.	40-49	106
05	50-59	132
06.	60-69	70
07.	>70	18

RESULTS

Our study included 452 cases of DM. 288(63.71%) were male, and 164 (36.28%) female with age range 18 years to 73 years. 408 (90.26%) patients were known diabetics in which 320(78.43%) patients were on oral hypoglycaemic drugs and 88(21.56%) patients were on the insulin therapy, while remaining 44(9.73%) patients were unaware of DM and were diagnosed on screening of fasting blood sugar level >126mg/dl. More than half of the patients were between 40-60 yrs of age. (Please see age distribution in Table-1). The obesity was present in 208 (46.01%) cases, while remaining patients were with average built. The relation between duration of diabetes and frequency of retinopathy is shown in table number 2. Among the 408 known diabetic patients, 280 patients had no retinopathy while 56 patients had non-sight threatening retinopathy and 72 patients had sight threatening retinopathy. In the newly diagnosed 44 patients none of them had retinopathy. Therefore out of 452 patients, only 128 (28.6%) patients had diabetic retinopathy. 104 patients had hyperlipidemia, 198 patients showed proteinurea. In 192 patients the HbA_{1c} was high which shows the poor glycaemic control and of these 76 (39.58%) patients had retinopathy. 100 patients were hypertensive of which 32 (32%) patients had retinopathy.

DISCUSSION

Diabetes mellitus is common disorder affecting multiple systems of the body. The morbidity and mortality of the diabetes is due to its impact on blood vessels. The vascular complications are directly related with duration of diabetes and glycaemic status. Reduction in progression and severity of retinopathy is seen when HbA_{1c} is < 7%.[5] In our study among the 452 cases of DM, 128 (28.31%) patients had diabetic retinopathy. Shella k. West et al: [6] have shown the prevalence of diabetic retinopathy up to 23%, which is close to our study. We have noticed that, the frequency of retinopathy increases with the duration of diabetes. The

TABLE NO:2

DURATION OF DIABETES AND FREQUENCY OF RETINOPATHY

S.No	Duration of Diabetes	None	BGDR	PPDR	CSME	PDR	Total
01.	Newly Diagnosed Patients	44	-	-	-	-	44
02.	1—5 years	172	20	12	08	08	220
03.	6–10 years	60	16	08	06	02	92
04.	11—15 years	28	12	08	02	02	52
05.	16—20 years	14	04	02	04	04	28
06.	>20 years	06	04	_____	04	02	16
	Total	324	56	30	24	18	452

patients who had history of DM less than 5 years, the frequency of retinopathy was 21.81 %, while those who had history of DM for more than 20 years the frequency was 62.5% (please see table 2).Besides the duration of diabetes another important risk factor was glycaemic control. In 192 patients who had HbA_{1c} > 7%, the frequency of retinopathy was 39.58% as compared to 260 patients who had HbA_{1c} < 7%, the frequency of retinopathy was 20%. The other important risk factor was hypertension. In 100 hypertensive patients the frequency of retinopathy was 32% as compared to 27% in 352 normotensive patients. Robyn.J.Tap et: al:[7] have showed the prevalence of diabetic retinopathy up to 15.3%, which increases with the duration of diabetes. The prevalence was 9.2% in patients with duration of diabetes < 5 years where as 57% in those with duration of diabetes > 20 years. The prevalence of retinopathy is increased with increasing HbA_{1c}. It is 8.5% in those who had HbA_{1c} < 5.6% as compared 29.1% in those having HbA_{1c} >7%. Perumalsamy et: al; [8] in their study showed the prevalence of diabetic retinopathy 20.4%. The prevalence increases with the age and duration of diabetes. It was 12.6% in those with history of diabetes < 5 years and 52.1% in those with diabetes > 20 years. All above studies and our study have shown the similar risk factors for retinopathy, such as duration of diabetes, glycaemic status and hypertension. The duration of diabetes was the major risk factor and it cannot be modified while two other risk factors, such as glycaemic control and hypertension are modifiable. Mathew et al [9] in their trials showed lesser progression of diabetic retinopathy in patients with type 2 diabetes underwent tight blood pressure control independent of the use of angiotensin converting enzyme (ACE) inhibitors. Lloyd Panl Aiello [10] in his study indicated that, treatment with enlapril and Losartan were both associated with a reduction in the progression of diabetic retinopathy approximately 65% and 70 % respectively. Diabetic retinopathy is both treatable and often preventable condition. More aggressive management of hyperglycaemia and hypertension reduces the risk of vision threatening retinopathy. Regular screening and earlier referral to ophthalmologist for treatment of vision threatening diabetic retinopathy by laser photocoagulation is very important to prevent irreversible blindness. Without treatment proliferative retinopathy will eventually develop profound visual loss.

CONCLUSION

The diabetic retinopathy is strongly associated with the duration of DM, hyperglycaemia and hypertension. Therefore proper management of hyperglycaemia, hypertension and earlier referral to the ophthalmologist for screening and laser photocoagulation can prevent visual loss.

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