ORIGINAL ARTICLE

FREQUENCY OF DIABETIC RETINOPATHY IN HYPERTENSIVE DIABETIC PATIENTS IN A TERTIARY CARE HOSPITAL OF PESHAWAR, PAKISTAN

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Background: Diabetic retinopathy is a common microvascular complication of both type 1 and type 2 diabetes mellitus. If left untreated, it can progress to serious visual disability. Coexistence of hypertension with diabetes has been described as another risk factor adding to the problem. We designed this study to assess the occurrence of diabetic retinopathy in hypertensive diabetic patients of this region and to compare it with normotensive diabetic patients. **Methods:** This cross-sectional study was carried out on 200 previously diagnosed diabetic patients. Apart from routine examination and investigations, retinopathy and blood pressure assessment of each patient was done using standard techniques. Hypertensive diabetic subjects (Group-I, n=107) were compared with non-hypertensive diabetics (Group-II, n=93) for the presence of retinopathy. **Results:** Retinopathy and hypertension were observed in 51% and 53.5% of the total diabetic patients respectively. Hypertensive diabetic patients had significantly higher percentage of retinopathy compared to non-hypertensive diabetic patients (58 vs 43%; $p<0.05$). **Conclusion:** Retinopathy and hypertension are highly prevalent in our diabetic patients. The proportion of retinopathy is significantly more in hypertensive as compared to normotensive diabetics.

Keywords: Diabetes Mellitus, Diabetic Retinopathy, Hypertension, Prevalence, Tertiary care

INTRODUCTION

The world prevalence of diabetes among adults (aged 20–79 years) as estimated to be 6.4%, affecting 285 million adults in 2010, will increase to 7.7% affecting 439 million adults by 2030. Between 2010 and 2030, there will be a 69% increase in numbers of adults with diabetes in developing countries and a 20% increase in developed countries.[1] Our country Pakistan, with its population of 140 million, is estimated to have about 7 million people suffering from diabetes mellitus. Moreover, according to WHO estimation for prevalence of diabetes mellitus, its currently 8th position in the world is expected to rise to the 4th position by the year 2025.[2]

The escalating prevalence, risk factors and chronic complications of Diabetes mellitus (DM) are now established. Chronic complications of DM include cardiovascular disease, nephropathy, retinopathy and peripheral neuropathy. Diabetic Retinopathy (DR) is currently estimated to be the most frequent cause of blindness among adults aged 20–74 years.[3] It has been shown that twenty years after the onset of DM nearly all people with type 1 and more than half with type 2 diabetes develop diabetes related retinal complications.[4] The DR occurrence is related to many factors such as duration of diabetes, chronic hyperglycaemia, presence of nephropathy, pregnancy, hyperlipidemia and hypertension.[4–7] Hypertension is an important risk factor for the onset and progression of DR, and in most studies it is an independent risk factor.[8–10] The UK Prospective Diabetes Study (UKPDS) has demonstrated that effective lowering of blood pressure is associated with a reduction in DR incidence and progression.[9]

Situation in Pakistan regarding the coexistence of hypertension with DM is alarming. In a study by Shera *et al*, the prevalence of hypertension in diabetic population of our country is 64%. Thus a large section of our diabetic population is at visual jeopardy due to DR.[11]

The purpose of this study was to evaluate frequency of retinopathy in diabetic patients at a tertiary care level in Peshawar having additional problem of hypertension.

MATERIAL AND METHODS

This cross-sectional comparative study was carried out in the department of diabetes and endocrinology Hayatabad Medical Complex Peshawar. A total of 200 consecutively admitted diabetic patients of either sex having age from 14–75 years were recruited in the study over a period of six months. Patients having serious disabling illness, unconsciousness, lens opacities and repeat admission during the study period were excluded from the study. Informed consent was taken from each patient before starting the study.

After noting the basic demographic data and relevant clinical information about medical history and examination, the patients were screened for the presence of hypertension and diabetic retinopathy. Blood pressure (BP) was assessed with the help of a mercury sphygmomanometer using standard technique. Patients using antihypertensive agents or a measured systolic

blood pressure (BP) of 130 mm Hg or more and/or diastolic BP of 80 mm Hg or more were considered as hypertensive.[3] Retinopathy was assessed in both eyes through dilated pupils using direct ophthalmoscopy, slit-lamp examination and fundal fluorescein angiography. Retinopathy was assigned if at least one microaneurysm, soft/hard exudate, haemorrhage or new vessel formation in either eye was observed.[12] Fasting and random plasma glucose, blood urea, serum creatinine along with other routine and necessary laboratory investigations were obtained.

A prestructured proforma was used to record the observed data. Included patients were divided into two groups; Group I comprised of 107 diabetic patients with hypertension and Group II had 93 diabetic patients without hypertension. Both groups were compared for the presence or absence of retinopathy. Statistical analysis of the data was done with SPSS-16. Data are presented as percentages and Mean±SD and $p<0.05$ was considered as significant.

RESULTS

Of the total 200 diabetic patients studied, male to female ratio was 1:2 while type 1 to type 2 DM had a ratio of 1:5. Mean age (in years) and body mass index (BMI; defined as weight in kilograms divided by height in meters squared) were 48.3±13 (14–75 years) and 26.4±5.4 (12.3–42.9 Kg/m^2) respectively. Mean random plasma glucose level was 331±111 (84–483 mg/dl). Other characteristics are given in Table-1. Retinopathy and hypertension prevailed by 51% and 53.5% respectively (Table-2). The DR was present in 58% of the hypertensive patients as compared to 43% in normotensive patients showing significant difference ($p<0.05$).

Table-1: Clinical characteristics of study population

Characteristic	Number	Percentage	Range	Mean±SD
Males	69	34.5	-	-
Females	131	65.5	-	-
Type 1 DM	32	16	-	-
Type 2 DM	168	84	-	-
Diabetes duration (Yr)	-	-	1–32	8.5±5.6
Weight (Kg)	-	-	27–100	65.2±13.4
Systolic BP	-	-	90–210	131±25
Diastolic BP	-	-	60–110	79±13
Plasma glucose (mg/dl)	-	-	65–423	331±111

Table-2: Status of hypertension and retinopathy and comparison between groups

Characteristic	Number	Out of	Percentage
Total No. of patients	200	--	--
Total cases of Retinopathy	102	200	51
Total cases of Hypertension	107	200	53.5
Retinopathy in Group I (hypertensive diabetics)	62	107	58*
Retinopathy in Group II (normotensive diabetics)	40	93	43¤

*$p<0.05$ vs ¤

DISCUSSION

Hypertension is a co-morbid condition in diabetic patients affecting them with a prevalence depending upon age, obesity and ethnicity. It substantially increases the risk of both macrovascular and microvascular complications.[3] In fact, in the literature the combination of hypertension with diabetes has been referred to as double jeopardy.[13] However the term was originally used in the sense of developing macrovascular complications such as cardiovascular disease. Although hypertension in itself can lead to retinopathic changes both in non diabetic and diabetic patients, the manifestations are distinct from DR.[14] In addition, many studies have shown hypertension in diabetic patients to be an independent risk factor for microvascular complications including diabetic retinopathy[15–17] and normalisation of blood pressure can decrease the incidence and progression of DR.[3]

In the present study of diabetic patients we observed a frequency of 51% retinopathy and 53.5% hypertension. Comparative analysis between hypertensive and non-hypertensive patients revealed that DR presence was more in hypertensive diabetics (58% vs 43%) with a significant difference ($p<0.05$); the difference did not disappear after adjusting for important variables such as age, BMI and diabetes duration. According to Diabetic Association of Pakistan, 25% of our diabetic population has hypertension as compared to 10% in non-diabetic counterparts.[18] In contrast, the figures of hypertension are very high (53.5%) in the present study. One reason for this difference could possibly be that hospitalised patients expectedly having more comorbidities are examined here. Lower levels of BP (130/80 vs 140/90 mmHg) taken for diagnosis of hypertension could be another important reason for the difference. In an analysis of data from Pakistan National Blindness and Visual Impairment Survey 2003, it has been indicated that 15% of diabetic patients have retinopathy and its risk was higher in hypertensive diabetic patients (OR 2.77 with 95% CI 1.0–4.1).[19] However these data are from newly diagnosed diabetic patients while in our study the mean duration of diabetes was more than 8 years. The results of present study have shown that presence of hypertension has significantly increased the likelihood of diabetic retinopathy. This indication follows the findings of United Kingdom Prospective Diabetic Study Group, who in one of its major studies showed that hypertension is an independent risk factor for the development of microlbuminuria and retinopathy.[9] The same study also showed that long term blood pressure control in hypertensive patients with diabetes results in significant reduction in all diabetes related end points including retinopathy along with other microvascular and cardiovascular complications.[3]

Another study has even demonstrated significant reduction in the progression of retinopathy with aggressive control (Mean BP 128 /75 mmHg**)** vs moderate control (137/81 mmHg) of blood pressure in normotensive in type 2 diabetic patients.[20] These studies testify to the implication of high blood pressure in the development of DR.

Although we have not analysed retinopathy in relation with systolic and diastolic blood pressure separately, it appears from a number of studies that systolic hypertension stands a symbol of greater risk for DR as compared to diastolic hypertension.[15,21] Further studies are therefore recommended to assess respective association of systolic and diastolic hypertension with diabetic retinopathy.

CONCLUSION

Majority of our diabetic patients suffer from retinopathy and incidence of DR is more in patients having additional problem of hypertension. Prompt, adequate, and concurrent management of both diabetes and hypertension is required to prevent visual morbidity in diabetic patients.

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