FREQUENCY OF RETINOPATHY IN NEWLY DIAGNOSED PATIENTS OF TYPE 2 DIABETES MELLITUS (DM)

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ABSTRACT

Objective: This study was to determine the frequency of retinopathy in newly diagnosed type-II Diabetics.

Study Design: Cross sectional descriptive study.

Place and Duration of Study: It was conducted at Department of medicine, Military Hospital (MH), Rawalpindi from 1st Jan 2012 to 30 Jun 2012.

Material and Methods: We included 200 patients of type-II DM from both genders diagnosed in last 03 months from both outdoor and indoor departments in the age range of 40 to 70 years by consecutive sampling. All patients having co morbidities affecting retina were excluded. Informed written consent was taken before enrollment. Formal approval of the study was taken from hospital ethical committee. Ocular Fundoscopy was performed with WelchAllyn Ophthalmoscope (REF 11470) as per standard protocols and both eyes were examined. The grade of DR (diabetic retinopathy) awarded as per highest changes in any of the two eyes. All tests were carried by a single person to avoid inter-observer variations. Findings of ocular fundoscopy were confirmed by ophthalmologist. All data was analyzed by using SPSS version 11.

Results: Out of 200 subjects 63.5% were male and 36.5% were female. Age ranged from 40 to 70 years with mean age of 51.05+ 6.910 years. 29 (14.5%) subjects had Diabetic retinopathy. Out of 29 patients, 24 (82.8%) had preproliferative and 5 (17.2%) had proliferative diabetic retinopathy.

Conclusion: A significant proportion of diabetic patients have retinopathy at the time of diagnosis of their disease which is more common in males and with increasing age. It is recommended to thoroughly screen the newly diagnosed diabetics for early detection of diabetic retinopathy and its management involving early referral to eye specialist.

Keywords: Diabetes mellitus, Preproliferative retinopathy, Proliferative retinopathy.

INTRODUCTION

Diabetic retinopathy (DR) is one of the most important causes of visual loss worldwide and it is the principal cause of impaired vision in patients of age between 25 and 74 years[1]. Visual loss secondary to diabetic retinopathy may be a result of macular edema (retinal thickening and edema involving the macula), hemorrhage from new vessels, retinal detachment, or neo-vascularization. The vast majority of patients having diabetic retinopathy are asymptomatic until the very late stages; by that time it may be too late for effective treatment and especially

prevention thus making it important to screen patients with diabetes mellitus on regular basis for the development of retinal changes. More than 10%[2] of the adult Pakistani population suffers from diabetes and in our medical setups screening for DR is underemphasized, thus increasing the risk to visual impairment[3]. In Pakistan the escalation in the rates of diabetes mellitus especially type 2 diabetes is posing threats to the economy and quality of life of people due to poor glycemic control and very high rates of complications[4,5]. DR is the most common cause of blindness in middle-aged subjects, leading to at least 12,000 new cases in the United States each year[1]. The prevalence of DR increases with duration of diabetes. Other risk factors for DR include the level of glycemic control, the type of diabetes (type 1 more than

type 2), and the presence or absence of associated conditions such as hypertension, smoking, dyslipidemia, nephropathy, and pregnancy. Chronic hyperglycemia is thought to be the primary cause of DR[6]. Ophthalmoscopy is an easy and reasonable screening method when performed by well-trained personnel through dilated ocular fundi. The accuracy of Ophthalmoscopy is substantially lower when performed by primary care physicians compared to an ophthalmologist[7]. In many patients, severe visual loss can be avoided with proper screening; good control of glucose and blood pressure, and early intervention with both surgical and pharmacologic therapies[8]. The Diabetes Control and Complication Trial (DCCT) showed that tight glycemic control (HbA1c 7.2 versus 9%) was associated with a 76% reduction in retinopathy[8]. We want to re-emphasize the importance of screening for DR by highlighting the magnitude and seriousness of the issue.

PATIENTS AND METHODS

We included 200 patients from both genders diagnosed exclusively in last 03 months of newly diagnosed type-II DM in age range of 40 to 70 years by consecutive sampling. Selection of patients was done from both outdoor and indoor departments. Patients ≥ 40 years of age with symptoms of diabetes mellitus and random blood glucose concentration 11.1 mmol/L (200 mg/dL) or fasting plasma glucose 7.0 mmol/L (126 mg/dL) on ≥ two occasions were considered diabetic. Retinopathy was defined on the basis of Davis classification as Preproliferative if micro aneurysms, hemorrhages, exudates, and cotton-wool spots were present and Proliferative, or "malignant," retinopathy: consisting of newly formed vessels[9]. Patients having co morbidities including Hypertension, Rheumatoid Arthritis, Vasculitidies, Cataract, Glaucoma, psychiatric illness and unwilling for study were excluded. Informed written consent was taken before enrollment. Formal approval of the study was taken from hospital ethical committee. Subjects to be tested were asked to lie in the couch and 2

drops of eye drops, tropicamide 1% instilled in each eye. 30 minutes later when pupillary dilatation was confirmed, patients were asked to sit in the chair and lights in the examination room were shut down. Detailed fundoscopy of both eyes was performed by the observer using WelchAllyn Ophthalmoscope (REF 11470) and grade of DR (diabetic retinopathy) awarded as per highest changes in any of the two eyes . The results of Fundoscopy were documented on the result proforma. In the end, the subject was counseled to avoid driving for next few hours till the pupillary size normalized. To solve the problem of observer bias all tests were carried by a single person to avoid inter-observer variations of test interpretation. Findings of ocular fundoscopy were confirmed by ophthalmologist AFIO to rule out the possibility of observer bias and to maintain the uniformity of observation. All the data was entered in computer software Statistical Package for Social Sciences (version 11). Descriptive statistics were applied out to summarize the data. Variables included in the study were age, gender and grades of retinopathy. The mean and Standard Deviation (SD) was calculated for numerical data like age while frequency and percentages were calculated for categorical data like gender and grades of DR.

RESULTS

Out of total 200 subjects 63.5% were male and 36.5% were female. Age ranged from 40 to 70 years with mean age of 51.05 ± 6.910 years. Diabetic retinopathy was seen in 29 (14.5%) patients. Out of 29 patients with DR 24 (82.7%) had preproliferative and 5 (17.2%) had proliferative retinopathy as given in table-1.Frequency of DR in males was 14.9% whereas in females it was 13.6% (p=0.807) (Fig-1). In age group 40 to 49 years, out of 85 patients 7 (8.2%) had DR, in age group 50 to 59 years, out of 92 patients 16 (17.4%) had DR whereas in age group above 60 years, out of 23 patients 6 (26.1%) had DR (p=0.055).

DISCUSSION

DR is an important and a common complication of diabetes mellitus quite often

approximately 4.1 million US adults 40 years and older have diabetic retinopathy and 1 of every 12 persons with DM in this age group has advanced,

Table: Frequency of grades of diabetic retinopathy (DR).

DR Grades	Frequency	Percentage of Total Cases	Percentage of DR Cases
Preproliferative DR	24	12	82.8
Proliferative DR	5	2.5	17.2
Total	29	14.5	100.0

detected in some form at the diagnosis of diabetes mellitus. DR is a significant cause of visual loss even in the present time which can be prevented if early interventions are carried out. Our study revealed that the overall frequency of diabetic retinopathy was 14.5% which is quite substantial. There are studies in literature comparable with our study and some studies have been carried out in our population. The Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR) estimated the prevalence of diabetic retinopathy of any grade 8% at 3 years, 25% at 5 years, 60% at 10 years, and 80% at 15 years while the prevalence of advanced grade of diabetic retinopathy which is proliferative diabetic retinopathy (PDR) was 0% at 3 years and increased to 25% at 15 years[10]. This study began in 1979. The examinations were done in a large examining mobile van in southern Wisconsin, an eleven-county area. It involved 996 people with younger-onset type 1 diabetes and 1370 people with type 2 diabetes, who were first examined from 1980 to 1982. The study concludes that up to 21% of patients with type 2 diabetes have retinopathy at the time of first diagnosis of diabetes, and most develop some degree of retinopathy with time. According to data in Archives of Ophthalmology 2004, the estimated prevalence rates in US general population for retinopathy and vision-threatening retinopathy are 3.4% (4.1 million persons) and 0.75% (899,000 persons)[11]. Projections of the data suggest that diabetic retinopathy will increase as a public health problem, both with aging of the US population and increasing age-specific prevalence of DM with time. It further shows that
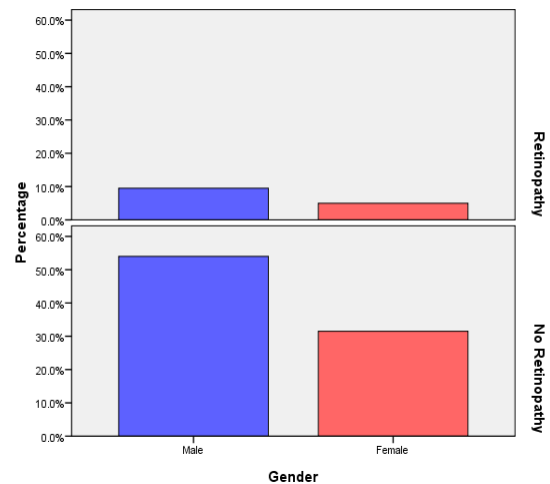

Figure: Percentages of gender distribution of diabetic retinopathy (DR).

vision-threatening DR[11]. According to a study the at Amsterdam, the Netherlands, the prevalence of retinopathy was 13% in newly diagnosed patients of diabetes mellitus and 34% in known patients of diabetes mellitus[12]. According to "The Chennai Urban Rural Epidemiology Study (CURES) from the Madras Diabetes Research Foundation, Chennai, India the overall prevalence of DR in the population was 17.6% (95% confidence interval [CI]: 15.8–19.5), which included 20.8% (95% CI: 18.7–23.1) in known diabetic subjects and 5.1% (95% CI: 3.1–8.0) in subjects with newly detected diabetes[13]. In CURES study, the prevalence of DR was significantly higher in men than in women (21.3% vs. 14.6%; $p < 0.0001$) which also support our observation. Studies have been conducted in Pakistan to detect the prevalence of DR. A study carried out in Karachi aimed to determine DR in

diabetics in which total of 912 subjects were screened for DM and DR. 15.7% of individuals had DR. The prevalence of DR was higher with greater duration of diabetes, and among women. The commonest form of DR was non-proliferative which was 76.5% (mild: 35.3 %, moderate: 29.4 %, and severe: 11.8 %)[14]. Another study carried out at the diabetes clinic of Dow University of Health Sciences (DUHS) found 15% (95% CI 14.7-15.3) of diabetics to have DR within two months of diagnosis of type-II DM[15]. However our study had certain limitations as well. Detection of DR by ophthalmoscope is not very sensitive method. Some studies emphasize that hand-held Ophthalmoscopy alone is insufficient to rule out significant and treatable diabetic retinopathy[2]. Our study lacks the assessment of sensitivity and specifity of ocular fundoscopy in detection of DR in comparison with other techniques especially Digital Retinal Screening, seven-standard field stereoscopic 30° fundus photography and Slit Lamp Retinal Biomicroscopy. Secondly it is emphasized that our data cannot be easily extrapolated to populations with type 1 diabetes mellitus, as we focused our study in a highly selected group of type-II diabetes. Nevertheless, we believe that the study population is a representative sample of the general population of that age and gender in Pakistan. Moreover, the tested population came from all representative parts of Pakistan (urban, semi-urban, and rural) and from all social strata. Our study gives certain implications for clinical practice. In clinical practice in medical OPD and medical wards Ophthalmoscopy in newly diagnosed diabetics is underestimated and that too in female cases but our study reveals that a significant number of cases are having some grade of DR at the diagnosis of diabetes mellitus, so ocular fundoscopy of all newly diagnosed DM cases is recommended.

CONCLUSION

Significant number of newly diagnosed cases of diabetes mellitus have diabetic retinopathy at their presentation. The commonest

form of DR being preproliferative but proliferative DR is also detected in a significant number of cases. It is recommended that every newly diagnosed case of diabetes mellitus must be subjected to detailed ocular fundoscopy for early detection of DR and adoption of preventive and therapeutic measures to save vision. Initiation of treatment and prevention of the DR starts in the physician's office. It is job of the physician to explain upon the subject, the natural course of DR, importance of good Glycemic control and important therapeutic role of ophthalmologist.

Conflict of Interest

This study has no conflict of interest to declare by any author.

REFERENCES

1. Stumvoll M, Goldstein BJ, Haeften TW.Type 2 diabetes: Principles of pathogenesis and therapy. Lancet 2005;365:1333-46.
2. Nishtar S, Shera S, Raffique G, Mohamud KB Ahmed A. Diabetes prevention and control: national Action Plan for NCD Prevention, Control and Health Promotion in Pakistan, J Pak Med Assoc 2004;54:26–30.
3. Surveillance of certain health behaviors and conditions among states and selected local areas - behavioral risk factor surveillance system (BRFSS), United States, 2006. MMWR 2008;57:1-188.
4. Basit A, Hydrie MZ, Hakeem R, Ahmedani MY, Masood Q. Frequency of chronic complications of type II diabetes. J Coll Physicians Surg Pak 2004;14(2):79-83.
5. Ahmed N, Khan J, Siddiqui TS. Frequency of dyslipidaemia in type 2 diabetes mellitus in patients of Hazara division. J Ayub Med Coll 2008;20(2):51-4.
6. Frank RN. Diabetic retinopathy. N Engl J Med 2004;350:48.
7. O'Hare JP, Hopper A, Madhaven C. Adding retinal photography to screening for diabetic retinopathy. A prospective study in primary care. Br Med J 1996;312:679.
8. No authors listed; The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. The Diabetes Control and Complications Trial Research Group. N Engl J Med 1993;329(14):977-86.
9. Tanaka K, Kawai T, Saisho Y, Meguro S, Harada K, Satoh Y. Relationship between Stage of Diabetic Retinopathy and Pulse Wave Velocity in Japanese Patients with Type 2 Diabetes. J Diabetes Res 2013;2013:193514.
10. Klein R, Klein BE, Moss SE, Davis MD, DeMets DL: The Wisconsin Epidemiologic Study of Diabetic Retinopathy. II. Prevalence and risk of diabetic retinopathy when age at diagnosis is less than 30 years. Arch Ophthalmol 1984;102:520–6.
11. Kempen JH, O'Colmain BJ, Leske MC, Haffner SM, Klein R, Moss SE. The prevalence of diabetic retinopathy among adults in the United States. Arch Ophthalmol 2004;122(4):552-63.
12. Van Leiden HA, Dekker JM, Moll AC, Nijpels G, Heine RJ, Bouter LM et al. Blood pressure, lipids, and obesity are associated with retinopathy: the hoorn study. Diabetes Care 2002;25(8):1320-5.
13. Deepa M, Pradeepa R, Rema M, Mohan A, Deepa R, Shanthirani S et al. The Chennai Urban Rural Epidemiology Study (CURES)--study design and methodology (urban component) (CURES-I). J Assoc Physicians India 2003; 51:863-70.

14. Din J, Qureshi MB, Khan AJ, Khan MD, Ahmad K. Prevalence of diabetic retinopathy among individuals screened positive for diabetes in five community based eye camps in northern Karachi, Pakistan. J Ayub Med Coll 2006;18(3):40-3.

15. Wahab S, Mahmood N, Shaikh Z, Kazmi WH. Frequency of retinopathy in newly diagnosed type 2 diabetes patients. J Pak Med Assoc 2008;58:557-61.

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