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Original Research Article

Assessing Prevalence and Severity of Diabetic Retinopathy (DR) and in Recently Diagnosed Type 2 DM Patients: A Clinical Study

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Conflict of interest: Nil

Abstract:

Aim: The aim of the present study was to estimate prevalence and severity of DR and in recently diagnosed type 2 DM patients.

Material & Methods: A study was conducted in the Department of Opthalmology during the duration of 1 year. This observational, prospective study was conducted in patients who visited the diabetic clinic and recently diagnosed (less than 3 months from first diagnosis) for type 2 DM. In present study total 200 patients were evaluated for diabetic retinopathy.

Results: In present study total 200 patients were evaluated for diabetic retinopathy. Most of patients were from 61-70 years (24%), followed by 51-60 years (22%) and 41-50 years (19%) age group. Male patients (55%) were more than female patients (45%). We noted 10% prevalence of diabetic retinopathy in study patients. Prevalence was more in males (60%) as compared to females (40%). In present study diabetic retinopathy was noted in 20 patients, divided as mild nonproliferative diabetic retinopathy (60%), Moderate nonproliferative diabetic retinopathy (15%), Severe nonproliferative diabetic retinopathy (5%) and proliferative diabetic retinopathy (PDR) (15%). Macular edema was noted in 4 patients. 60% of them had mild macular edema while 20% each had moderate and severe macular edema.

Conclusion: Screening for diabetic retinopathy is important for newly diagnosed diabetic patients. A systematic screening program in the community is needed for early detection and to reduce blindness in diabetic patients.

Keywords: Diabetic Retinopathy, Type 2 Diabetes Mellitus, Non-proliferative, Macular Edema.

Introduction

Diabetes mellitus, a chronic metabolic noncommunicable disease (NCD), has attained epidemic proportions worldwide. Diabetes causes significant morbidity, disability, and early mortality. As of 2015, >415 million adults have diabetes mellitus, and this number is estimated to increase to 642 million by 2040. [1] Diabetic retinopathy (DR) is the most frequent complication of diabetes and remains the leading cause of preventable blindness in the working-age population in developed countries. [1,2]

It is estimated that DR develops in more than 75% of diabetic patients within 15 to 20 years of diagnosis of diabetes. [3,4] DR is of two types, non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). Severity of NPDR depends on micro aneurysms, hemorrhages, cotton wool spots, and beading of veins and can progress to PDR. Inherit characteristic of PDR is neovascularization. Its either PDR or diabetic maculopathy that is responsible for vision loss. Chronic hyperglycemia inflicts profoundly in development and progression of DR by stimulating multiple mechanisms such as polyol pathway, enzymatic glycation, protein kinase C activation, hemodynamic changes, and renin angiotensin aldosterone pathway [5] and Type 2 DM accounts for more than 90% of the diabetic population worldwide. [6]

Approximately one in five adults are now estimated to have diabetes in India. [7,8,9,10] Most are diagnosed with type 2 diabetes during their working age, with some diagnosed only after developing complications. If screening and treatment pathways for diabetic retinopathy are not prioritised urgently, the rate of blindness due to VTDR is projected to increase in parallel with the exponential rise in the prevalence of diabetes in the country. [11] The National Diabetic Retinopathy RAAB (Rapid Assessment of Avoidable Blindness)

survey 2015-2019, conducted by RP Center for Ophthalmic Sciences under the aegis of the Ministry of Health and Family Welfare Govt India clearly and significantly showed the Prevalence of Diabetic Retinopathy among diabetics to be 16.9%, a reasonably high figure in a RAAB survey. [12]

Diabetic retinopathy (DR) is the leading cause of visual impairment among working-age adults; however, increasing awareness and the early identification of DM has ameliorated the problem somewhat. [13] Most standard protocols for the screening of DR recommend annual or biannual dilated retinal examinations for all patients with diabetes. [14]

Therefore, in present study we aimed to estimate prevalence and severity of DR and in recently diagnosed type 2 DM patients

Material & Methods

A study was conducted in the Department of Ophthalmology, Sunaina Netralaya, Biharsharif, Nalanda, Bihar, India.during the duration of 1 year. This observational, prospective study was conducted in patients who visited the diabetic clinic and recently diagnosed (less than 3 months from first diagnosis) for type 2 DM. In present study total 200 patients were evaluated for diabetic retinopathy.

Inclusion Criteria:

- Patients who were recently diagnosed (less than 3 months from first diagnosis) for type 2 DM, willing to participate

Exclusion Criteria:

- Patients with mature cataracts and hazy media, whose fundi could not be examined.
- Patients with a history of exposure to radiation, hypertensive retinopathy without DM, sickle cell disease and pheochromocytoma.
- Patients who were not willing to participate.

Methodology

Study was explained and a written informed consent was taken. Patients underwent history taking (age, sex, medical history, smoking), general physical examination and routine ophthalmological examination was done. The pupils of both eyes were dilated by using a mydriatic agent (1% Tropicamide eye drops). Distant direct ophthalmoscopy, direct ophthalmoscopy and binocular indirect ophthalmoscopy were done. Binocular indirect ophthalmoscopy was done with a 20 D lens with the patient in supine position. Findings were noted and patients were categorized according to findings; whether diabetic retinopathy was present or absent. If present, retinopathy was classified according to early treatment of diabetic retinopathy study (ETDRS) classification. [15] Presence of diabetic macular oedema was noted. If present, it was further classified into clinically significant (CSME) or non-significant. [15]

Statistical Analysis

Data was collected, entered in Microsoft excel sheet and analysed by descriptive statistics

Results

Table 1: Age and gender distribution

Age in years	Total N=200	Diabetic Retinopathy N=20
≤ 40	22 (11%)	2 (10%)
41-50	38 (19%)	3 (15%)
51-60	44 (22%)	4 (20%)
61-70	48 (24%)	4 (20%)
71-80	36 (18%)	4 (20%)
>80	12 (6%)	3 (15%)
Total	200	20
Gender		
Male	110 (55%)	12 (60%)
Female	90 (45%)	8 (40%)

In present study total 200 patients were evaluated for diabetic retinopathy. Most of patients were from 61-70 years (24%), followed by 51-60 years (22%) and 41-50 years (19%) age group. Male patients (55%) were more than female patients (45%). We noted 10% prevalence of diabetic retinopathy in study patients. Prevalence was more in males (60%) as compared to females (40%).

In present study diabetic retinopathy was noted in 20 patients, divided as mild nonproliferative diabetic retinopathy (60%), Moderate nonproliferative diabetic retinopathy (15%), Severe nonproliferative diabetic retinopathy (5%) and proliferative diabetic retinopathy (PDR) (15%). Macular edema was noted in 4 patients. 60% of them had mild macular edema while 20% each had moderate and severe macular edema.

Table 2: Diabetic retinopathy and macular edema

	N	%
Diabetic retinopathy (N=20)		
Mild NPDR	12	60
Moderate NPDR	4	20
Severe NPDR	1	5
PDR	3	15
Total	20	100
Macular edema (N=5)		
Mild	3	60
Moderate	1	20
Severe	1	20

Discussion

Diabetes mellitus (DM) has exemplified its presence globally. In India, 69.1 million are diabetics as of 2015 compared to 18 million in 1995. [16,17] At this rate, crossing one billion as estimated by the International Diabetes Federation Association and World health organization seems obvious. Pan India studies on the prevalence of Diabetic retinopathy (DR) are limited, few initial studies, such as The Chennai Urban Rural Epidemiology Study and Arvind comprehensive eye study in rural population, concluded the prevalence of DR as 17.8% and 10.8% in diabetics, respectively. [18,19] DR is a common microvascular complication, an important complication among adults and elderly. DR is of two types, nonproliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). Severity of NPDR depends on microaneurysms, hemorrhages, cotton wool spots, and beading of veins and can progress to PDR. Inherit characteristic of PDR is neovascularization. Its either PDR or diabetic maculopathy that is responsible for vision loss. Chronic hyperglycemia inflicts profoundly in development and progression of DR by stimulating multiple mechanisms such as polyol pathway, enzymatic glycation, protein kinase C activation, hemodynamic changes, and renin angiotensin aldosterone pathway [20] and Type 2 DM accounts for more than 90% of the diabetic population worldwide. [21]

Proliferative diabetic retinopathy (PDR) is a treatable cause of severe visual loss in people with diabetes. If left untreated, most eyes with low-risk PDR characterized by mild to moderate retinal or optic disc neovascularization progress to high-risk PDR with increasing retinal or disc neovascularization. Risk factors for the development of retinopathy and visual loss include type of diabetes, duration of diabetes, poor glycemic control, poor blood pressure control, deranged lipid profile, obesity, obstructive sleep apnea (OSA), pregnancy and anaemia. The duration of diabetes is probably the strongest predictor for development and progression of retinopathy. [4] In present study total 200 patients were evaluated for diabetic retinopathy. Most of patients were from 61-70 years (24%), followed by 51-60 years (22%) and 41-50 years (19%) age group. So sale A et al [22] studied 4600 (males 67%, females 33%) newly diagnosed patients with T2D, majority were from the age group 41-50 years (40%). Male patients (55%) were more than female patients (45%). We noted 10% prevalence of diabetic retinopathy in study patients. Prevalence was more in males (60%) as compared to females (40%).

In present study diabetic retinopathy was noted in 20 patients, divided as mild nonproliferative diabetic retinopathy (60%), Moderate nonproliferative diabetic retinopathy (15%), Severe nonproliferative diabetic retinopathy (5%) and proliferative diabetic retinopathy (PDR) (15%). Macular edema was noted in 4 patients. 60% of them had mild macular edema while 20% each had moderate and severe macular edema. Hao Z et al [23] enrolled 947 patients in their study and were divided into two groups according to whether they were diagnosed with DR. There was no statistically significant difference between the two groups in sex, age, hypertension, DM diagnosed age, family history of diabetes, drinking history and HbA1c. BMI was significantly higher in DR patients. newly diagnosed T2DM subjects, DR is associated with reduced beta-cell responsiveness, resulting from beta-cell failure rather than insulin resistance, leading to fasting and postprandial hyperglycemia and hypoinsulinemia.14 The most effective way of preventing the risk of vision loss from diabetes mellitus is patient education about the need for screening for retinopathy even in the absence of any visual complaints. Therefore, early screening is strongly recommended for all newly diagnosed T2DM patients [24,25]

Conclusion

Screening for diabetic retinopathy is important for newly diagnosed diabetic patients. A systematic screening program in the community is needed for early detection and to reduce blindness in diabetic patients.

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