To Evaluate The Incidence Of Diabetic Retinopathy In Newly Diagnosed Diabetic Patients Presented At Tertiary Care Hospital

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Abstract: Background: Diabetes mellitus is defined as metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, protein and fat metabolism resulting from defects in insulin secretion, insulin action, or both. It occurs in two forms: Insulin dependent diabetes mellitus and Non – insulin dependent diabetes mellitus[1]. This disease results in generalized macrovascular and microvascular complication directly affects kidneys, eyes, peripheral nerves and heart. The incidence of diabetes retinopathy in Indian population was 21.7%. Material And Methods: In this cross sectional study all the patients attending eye OPD and indoor patients at tertiary eye care were screen for eligibility. Total of 150 patients were included in the study for duration of 28 months. Detail history including hypertension and other systemic illness was asked. Best corrected visual acuity was taken after refraction. Anterior segment examination was done with slit lamp, specially looking for rubeosis iridis, pupillary reaction and type of lens opacity. Statistical analysis was done using Z test, unpaired T test and chi- square test with the help of software and methods. Result: Patients with type 2, diabetes have more incidence of developing diabetic retinopathy than patients with type 1. Hypertension was more commonly associated disease than other systemic illness. Diabetic retinopathy is more prevalent in patients with higher FBS and HB1Ac. Conclusion: The frequency of retinopathy is more common in patients with high blood sugar profile. Hypertension is more commonly associated with diabetes than other systemic illness.
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Key Words: Newly Diagnosed Diabetic Patients, Diabetic Retinopathy, Hypertension, HB1Ac, FBS

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Introduction: Diabetes mellitus is as metabolic disorder of multiple etiologies characterized by chronic hyperglycaemia. In type 1 Diabetes mellitus patients have either HLAR4 or DR3susceptibility than an environment factor.

There is infiltration of pancreatic islets with activated T lymphocytes. This results in an immune attack on Beta-cells with resultant destruction of Beta-cells. When more than 90% of Beta-cells are destroyed, diabetes appears. In type 2 Diabetes pancreatic Beta-cell is intact but there are resistance to the action of insulin, impaired insulin secretion and increased hepatic production of glucose. As insulin resistance and hyperinsulinaemia progresses the Beta-cells become unable to sustain this hyper-secretion.

This results in impaired glucose tolerance, results in type 2 Diabetes mellitus. Diabetic Retinopathy refers to retinal changes seen in patients with diabetes mellitus. In Diabetic retinopathy saturation of sorbitol-aldolase reductase pathway occur so fructose and sorbitol accumulate in the cell and cause osmotic damage to cells[3]. It is microangiopathy affecting retinal precapillary arterioles, capillaries and venules. In non-proliferative phase of diabetic retinopathy there is a loss of intramural pericytes, thickening of basement membrane and closure of retinal capillaries. The initial loss of pericyte leads to dilatation of blood vessels seen as micro-aneurysm and a breakdown of blood vessels allowing leakage of vascular content into surrounding tissues resulting in oedema, hard exudates[4].

In proliferative phase there is growth of fibrous, glial and neovascular tissue in response to underlying retinal ischemia. Proliferation starts with the formation of new vessels that originate from the retinal vessels (NVE) and optic nerve head (NVD). Alteration of vitreous occurs which consist of vitreous contraction, thickening of the posterior hyaloid membrane and detachment of the posterior hyaloid surface.

Occurrence of Diabetic retinopathy in type 1 diabetes mellitus after 5-10 years was 25 to 30% and after 10 to 15 years it was 75 to 95%[5]. For

type 2 diabetes mellitus occurrence of diabetic retinopathy (Non proliferative diabetic retinopathy) was 23% after 11-13 year and after 16 years it was 60%[6]. In our study we will evaluate the occurrence of diabetic retinopathy in newly diagnosed diabetics.

Aim: To evaluate the incidence of diabetic retinopathy in newly diagnosed diabetic patients presented at tertiary care hospital.

Objectives: To find out the association of diabetic retinopathy with glycemic control. To find out the association of diabetic retinopathy with hypertension.

Material & Methods: This cross sectional study includes 150 newly diagnosed type 1 and type 2 diabetic patients who satisfied the inclusion criteria and this study was carried out in Department of Ophthalmology, AMC MET Medical College, Ahmedabad from August 2018 to December 2020. Informed written consent was obtained from every patient and the study was approved by the institutional ethics review committee. The confirmed cases will be finally analysed and assessed clinically and by appropriate laboratory investigations including FBS and HB1Ac.

After enrolling the patients thorough examination was carried out by measuring visual acuity, intraocular pressure, slit lamp examination and patients were dilated with 0.8 % tropicamide and 5 % phenylephrine and binocular indirect ophthalmoscopy was carried out. Detail examination was done with slit lamp using 78 D or 90 D, indirect ophthalmoscope and fundus camera. For this study we have graded diabetic retinopathy according to ETDRS classification. Patients giving consent and diagnosed first time were included in the study.

Patients already diagnosed with diabetes who are on treatment, patients suffering from mental/debilitating illness and patients having any past retinal or any other retinal disease were excluded.

Table 1: ETDRS Classification[7]

Category/ Description
Non-Proliferative Diabetic Retinopathy (NPDR)
Very Mild NPDR: Microaneurysms Only.
Mild NPDR: Any of all of: Microaneurysms, retinal haemorrhages, exudates, cotton-wool spots, up to the level of moderate NPDR. No intraretinal microvascular anomalies (IRMA) or significant beading.
Moderate NPDR: Severe retinal haemorrhages (more than ETDRS standard photograph 2A: about 20 medium-large per quadrant)in 1-3 quadrants or mild IRMA. Significant Venous beading can be present in no more than 1 quadrant. Cotton wool spots commonly present.
Severe NPDR: The 4-2-1 Rule, One Or More Of: Severe haemorrhages in all 4 quadrants. Significant venous beading in 2 or more quadrants. Moderate IRMA in 1 or more quadrants.
Very Severe NPDR: 2 or more of the criteria for severe NPDR.

PDR
Mild-Moderate PDR: New vessels on the disc (NVD) or new vessels elsewhere (NVE), but extent insufficient to meet the high-risk criteria.
High-Risk PDR: NVD greater than ETDRS standard photograph 10A (about 1/3 disc area). Any NVD with vitreous haemorrhage. NVE greater than 1/3 disc area with vitreous haemorrhage.
Advanced Diabetic Eye Disease: Haemorrhages: Pre-retinal, Intra-gel or both. Tractional Retinal Detachment. Rubeosis Iridis (NVI)

Statistical Analysis: Data entry was done in MS Excel 2010 and analysis of data was done using SPSS. Continuous variables were reported as mean and standard deviation. Categorical variables were reported as number and percentages. Z test, Unpaired T-test and chi-square test were used by appropriate software and methods. P value <0.01is highly significant, <0.05 is significant and >0.05 is not significant.

Results: This cross sectional study includes 150 newly diagnosed types 1 and types 2 diabetic patients who satisfied the inclusion criteria and this study was carried out in Department of

Ophthalmology, AMC MET Medical College, Ahmedabad from August 2018 to December 2020. In the present study due to age wise distribution 32 patients were below the age of 40 years. 37 patients (24.67%) were between age group 41-50 years. 40 (26.67%) patients between age group 51-60 years. 41 patients were above 60 years. The mean age of study was 51.19±14.43. According to gender wise distribution, male patients were 80 (53.34%) predominantly higher than female patients 70 (46.67%) and occurrence of DR was higher in female patients 13 than in male patients 11. In our study out of 150 patients 126 having no DR, 19 patients (12.67%) were having mild NPDR and 5 patients having moderate NPDR. Severe NPDR and PDR were not found in any patients. According to systemic illness distribution out of 150 patients, 55 patients (36.67%) having hypertension, 7 patients (4.67%) having tuberculosis, 5 patients (3.34%) having asthma and 1 patient (0.67%) having hypothyroidism.

Table 1: Co- Relation Of FBS And HBA1c With Diabetic Retinopathy

	With Retinopathy N=24	Without Retinopathy N=126	P Value
FBS	203.80±17.3	115±21.3	<0.001
HBA1C	9.27±0.7	6.90±0.603	<0.001

Table 2: Relation Of Hypertension And Diabetic Retinopathy

	Newly Diagnosed DM + Patients Developing Retinopathy (N= 24)	Newly Diagnosed DM + Patients Developing No Retinopathy (N=126)	P Value
Number Of Patients With Hypertension	17 (70.84%)	38 (30.16%)	<0.05

Table 3: Percentage Of Diabetic Retinopathy In Newly Diagnosed Retinopathy

	No Diabetic Retinopathy	Diabetic Retinopathy
Number of Newly Diagnosed Diabetic Retinopathy	126 (84%)	24 (16%)

Discussion: Diabetic retinopathy is the second major cause of blindness in the world. Recently it got greater attention because it is potentially treatable with laser photocoagulation when retinopathy is detected early and blindness can be prevented. Multiple risk factors have influence on development of Diabetic retinopathy such as hypertension, pregnancy, glycemic control, genetic factors.

Table 4: Association Of Hypertension With Diabetic Retinopathy

	Hypertension With Diabetic Retinopathy
Shahid Wahab et al[9]	60%
G paudyal et al[11]	37%
Present Study	70%

In study of Shahid Wahab et al 60% hypertensive patients develop diabetic retinopathy. In study of G paudyal et al 37% hypertensive patients develop diabetic retinopathy. In our study 70% hypertensive patients develop diabetic retinopathy. In our study incidence of diabetic retinopathy was higher in hypertensive patient because prevalence of hypertension was higher in diabetic patients in our study.

Table 5: Relation Of FBS With Diabetic Retinopathy

	Diabetic Retinopathy Present	Diabetic Retinopathy Absent
Shahid Wahab et al[9]	182±51.1	129±57.9
Atif sitwat Hayat et al[8]	189±54.5	130.5±59.9
Present study	203.80±17.3	115±21.3

The relation of FBS and Diabetic retinopathy co-relates with above mentioned studies.

Table 6: Relation Of HBA1C With Diabetic Retinopathy

	Diabetic Retinopathy Present	Diabetic Retinopathy Absent
Shahid Wahab et al[8]	9.1±1.3	7.1±1.3
Atif Sitwat hayat et al[9]	8.8±1.4	7.1±1.5
H E NKUMBE et al[10]	7.2±1.5	8.9±2.2
Present study	9.27±0.7	6.90±0.603

The relation of HBA1c and Diabetic retinopathy co-relates with above mentioned studies.

Table 7: Incidence Of Diabetic Retinopathy In Newly Diagnosed Diabetic Patients

	Percentage Of Newly Diagnosed Diabetic With Diabetic Retinopathy
Nathan et al[12]	12.6%
Adolhali et al[13]	13.5%
Agarwal et al[14]	11.7%
Rema et al[15]	5.1%
Klein et al[16]	10.2%
Shahid Waheb et al[10]	15%
Chawdhaury et al[17]	17.5%
Atif Sitwat Hayat et al[8]	17%
Present Study	16%

Conclusion: Hypertension is more commonly associated with diabetes than other systemic illness. The frequency of retinopathy in newly diagnosed diabetic patients was relatively higher in our study than previous reports and background lesions were predominant. Detail fundoscopic examination and slit lamp examination of all diabetic patients at the time of diagnosis is of paramount importance.

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