Prevalance of Diabetic Macular Edema and Its Angiographic Spectrum in Type 2 Diabetes

Dr Anjul Agarwal	Dr Vipin garg

ABSTRACT *PURPOSE- To determine prevalence of diabetic maculopathy and to classify diabetic macular edema angiographically.*

METHODS- Total of 86 patients of type 2 diabetes with retinopathy were studied during Aug12 to Sept 2014. All were evaluated for maculopathy by slit lamp biomicroscopy and fluorescein angiography.

RESULT- Of 172 eyes, 62.8% had NPDR, 37.8% had PDR. CSME was seen in 52.9%.

Angiographically, macular oedema was classified upon no leakage in 33.74%, focal in 18.6%, diffuse in 31.39%, ischemic maculopathy in 16.27% .

CONCLUSION-In our study maximum patients belongs to diffuse leakage followed by focal leakage.

INTRODUCTION

Diabetic retinopathy (DR) is the leading cause of blindness in working-age population. Diabetic macular edema (DME) is the most frequent cause of visual impairment in diabetic patients. DME occurs after breakdown of the blood-retinal barrier because of leakage of dilated hyper permeable capillaries and microaneurysms. It is categorized as focal or diffuse.

- Diffuse - usually presents area of capillary non perfusion with or without cystic changes.
- Focal - characterized by focal leakage from specific capillary lesions

Material and Methods

STUDY DESIGN

It was a hospital based observational study, conducted between August 2012 and September 2014 and included:

1. Patients of type 2 DM attending eye OPD with ocular complaints.
2. Diabetic patients attending diabetic clinic in medicine OPD.
3. Patients of diabetic retinopathy referred to our Retina clinic.

INCLUSION CRITERIA

1. Presence of retinopathy attributable to type 2 diabetes mellitus.
2. Patients able and willing to give informed consent to participate in the study.

EXCLUSION CRITERIA

1. Patients of Type 1diabetes mellitus; gestational diabetes
2. FFA not possible either due to medical reasons or refusals
3. Hazy ocular media precluding a good view of the retina
4. Any prior photocoagulation in the macular region
5. Macular ischemic status doubtful after FFA
6. Concomitant fundus pathology that could potentially affect FAZ (e.g., arterial/venous occlusions)
7. Concomitant ocular pathology that could potentially influence the progression of diabetic retinopathy such as glaucoma, high myopia, retinitis pigmentosa, other causes of optic atrophy
8. Carotid vascular disease detected by clinical examination
9. Patients of on haemodialysis or peritoneal dialysis
10. Patients on insulin treatment

INVESTIGATIONS-

1. Fundus fluorescein angiography (FFA).

Fundus fluorescein angiography – All patients included in the present study underwent FFA. 3ml ampule of 20% sodium fluorescein dye was injected in anticubital vein. Assessment of macular perfusion and FAZ was done using frames centered on the fovea showing the highest quality capillary phase.

2. Fundus photographs were taken using TOPCON 50Dx fundus camera to keep record.

Angiographically Diabetic Maculopathy was further classified as:

1. No leakage
2. Focal macular edema
3. Diffuse macular edema
4. Ischemic maculopathy

Focal macular edema was defined as focal areas of retinal thickening observed through biomicroscopy of posterior pole with flat lens and stereo fundus photograph and characterized by intraretinal angiographic leakage predominantly from foci of microaneurysms in the macular area.

Diffuse macular edema was defined as presence of retinal thickening involving the entire macula, identified by biomicroscopy of the posterior pole and stereo fundus photographs and angiographically characterized by intraretinal leakage from dilated capillary bed throughout the posterior pole, with or without cystoids macular edema. The diffuse form usually presents areas of capillary nonperfusion (Bresnick et al.1976) ischemia, with or without cystic changes.

Ischemic maculopathy- We used the criteria described by Bresnick et al to define macular ischemia. The minimum criterion for diagnosing macular ischemia was moderate FAZ irregularities. Moderate irregularities were defined as abnormally dilated and tortuous capillaries budding into the FAZ, terminal arterioles/venules directly abutting FAZ margins, and enlarged intercapillary spaces around the FAZ. The size was a minor criterion compared to the irregularity of FAZ. Ischemia was diagnosed only when the longest diameter of FAZ was > 1000 µ. . Normal FAZ was defined as an FAZ <1000 µ in the longest diameter, regular and round/horizontally oval in shape. Mild undulations of FAZ were also considered normal

OBSERVATIONS

In our study, a total of 250 cases of type 2 DM were examined. Of these, only 86 patients showed clinical evidence of diabetic retinopathy on ophthalmoscopy. So the prevalence of DR in our study was 34.4%.

TABLE 1- PREVALANCE OF DIABETIC RETINOPATHY

S. No.		PATIENTS	
		NUMBER	PERCENTAGE
1.	Total number of patients of type 2 DM examined	250	100%
2.	Diabetic retinopathy present	86	34.4%

TABLE 2- GRADING OF DIABETIC RETINOPATHY ACCORDING TO ETDRS CLASSIFICATION

	NPDR (n=114; 62.2%) EYES			PDR
	MILD	MODERATE	SEVERE	
No. of Eyes	25	62	27	58
% of Eyes	15.69%	36.04%	14.53%	37.8%

A total of 172 eyes of 86 patients were examined and severity of retinopathy was graded according to the abbreviated ETDRS classification. NPDR was seen in 62.2% cases amongst whom, moderate NPDR was most common (36.04%). PDR was seen in 37.8% of eyes.

TABLE 3- INCIDENCE OF CSME AND NON CSME

S. No.		EYES	
		NUMBER (n)	PERCENTAGE (%)
1.	CSME	91	52.90%
2.	NON CSME	81	47.09%
	TOTAL	172	100%

TABLE 4- ANGIOGRAPHIC CLASSIFICATION OF DIABETIC MACULAR EDEMA

S. No.	TYPE OF LEAKAGE ON ANGIOGRAPHY	NUMBER	PERCENTAGE
1.	NO LEAKAGE	29	33.74%
2.	FOCAL	16	18.6 %
3.	DIFFUSE	27	31.39 %
4.	ISCHEMIC MACULOPATHY	14	16.27%

DISCUSSION

The ability of laser therapy to stabilize or restore the visual acuity in diffuse macular edema is not as good as in focal edema, and may result in central vision loss. Most of the studies fail to distinguish diffuse from focal diabetic macular edema. The importance of classifying the diabetic macular edema into focal and diffuse lies in their different pathological processes..

PREVALANCE OF DIABETIC RETINOPATHY

In our study the prevalence of diabetic retinopathy was 34.4% that is similar to the studies conducted by Romero-Aroca P et al (2006), Eckhard Zander et al (2000) who found 27.48% and 38% prevalence of DR in their studies respectively.

DIABETIC RETINOPATHY GRADING ACCORDING TO ETDRS CLASSIFICATION

In our study Out of total 172 eyes examined, mild NPDR was seen in 15.69% of eyes , moderate NPDR presents in 36.04% of eyes , severe 14.53% NPDR found in of the eyes while PDR was seen in 37.8% of eyes .A study by Rema M et al report prevalence of 30.8 percent with NPDR, 3.4 per cent with PDR and 6.4per cent had DME.

PREVALANCE OF CLINICALLY SIGNIFICANT MACULAR EDEMA IN DR

In our study, 52.90% of patients of diabetic retinopathy had clinically significant macular edema, which is similar to study by Eckhard Zander et al (2000) who found 53% patients with CSME.

ANGIOGRAPHIC CLASSIFICATION OF DIABETIC MACULAR EDEMA

Our study shows that on angiography Focal leakage was seen in 18.6% of patients and diffuses leakage in 31.39% of patients. .Prevalence of ischemic maculopathy in present study was 16.27%. Jacqueline M. et al reports in 94 adult-onset DM patients, the frequency of diffuse macular edema (55.5%) was significantly higher than focal (23.0%) or no macular edema (21.0%) at the time of examination that is similar to our study.

CONCLUSION AND SUMMARY

Diabetic macular edema is an important cause of visual impairment in patients with diabetic retinopathy. DME is best visualized and classified using fluorescein angiography (FA), and is characterized by leakage and enlargement and disruption of the foveal a vascular zone (FAZ), and by retinal capillary loss in other, non-contiguous areas of the macula ("capillary drop-out"). The present study was a hospital based observational study, conducted between August 2012- 2014 .After applying inclusion and exclusion criteria's, out of 250 patients examined ophthalmoscopically, 86 patients with confirmed diagnosis of diabetic retinopathy (any grade), attributable to type 2 diabetes mellitus were included in our study.

All the patients underwent following protocol for examination.-

● Consent, Registration, detailed history, best corrected visual acuity, slit lamp examination, Fundus examination using direct ophthalmoscopy and slit lamp bio microscopy, fundus fluorescein angiography, fundus photography.

At the completion of study, data was analyzed and following conclusions were drawn-
● Incidence of diabetic retinopathy cases was maximum in 51-60 years of age group.
● The mean age of patients with DR was 51 years while that of patients with no DR was 47.5 years

- Majority of the patients (70.93 %) were males, and male: female ratio was 2.4:1
- In our study duration of diabetes ranged from newly diagnosed cases to 20 years.
- Maximum number of patients (47.67%) had duration of diabetes less than 5 years.
- The prevalence of DR in our study was 34.4%.
- Total of 172 eyes of 86 patients were examined and severity of retinopathy was graded according to the abbreviated ETDRS classification.
- NPDR was seen in 62.2% of eyes amongst whom, moderate NPDR was most common (36.04%). PDR was seen in 37.8% of eyes.
- Clinically significant macular edema was seen in 52.90% of eyes in the present study.
- Angiographically diabetic maculopathy was further classified in focal, diffuse, ischemic categories on the basis of macular perfusion.
- Focal leakage was seen in 18.6% of patients, diffuse leakage in 31.39% and ischemic maculopathy in 16.27% of patients.
- 33.74% patients had no leakage on fundus fluorescein angiography.
- In our study prevalence of macular ischemia found to be 16.27%.

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