

## Prevalence of Diabetic Retinopathy in Known Diabetics with Macro Vascular Complications

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### Abstract

Patients with macrovascular complications were included for the study. 44 individuals were positive for diabetic retinopathy and 56 individuals had no evident retinopathy. Of 16 diabetic patients 2 had diabetic retinopathy and 66 had duration of diabetes of 10.1 – 20 years, among whom 27 individuals had retinopathy. 18 individuals had duration of diabetes of 20.1- 30 years, among whom 15 individuals had diabetic retinopathy. The values suggest a rise in incidence of retinopathy with increased duration of diabetes. Also a positive association is observed in the prevalence of macrovascular complications and diabetic retinopathy in the study group. No positive association was obtained between duration of diabetes and macrovascular complications in patients without retinopathy, suggestive of other factors involved in pathogenesis which would include hypertension, hyperlipidemia. A positive association was obtained between duration of diabetes and macrovascular complications in patients.

**Keywords:** diabetic retinopathy, macrovascular complications

### Introduction

Several causes of blindness have been established. Most of these major causes of blindness are preventable if identified and intervened with at the earliest. Major cause

of blindness are cataract, age related macular degeneration, diabetic retinopathy, childhood blindness, trachoma, refractive errors, corneal opacities, onchocerciasis. Visual loss due to all the causes is preventable except for age related macular degeneration. National society to prevent blindness states, diabetes mellitus is one of the major causes of avoidable blindness in both developing and developed countries. Patients with diabetic retinopathy (DR) are 25 times more likely to become blind than non-diabetics (1). Appropriate diabetic control arrests or retards the progress of diabetic retinopathy, thus the chances of visual impairment and visual loss.

Diabetic retinopathy is a micro-vascular abnormality associated with diabetes. It may be the most common micro-vascular complication of diabetes. It is responsible for nearly 10,000 new cases of blindness every year in the United States alone (2). Other micro-vascular complications are diabetic nephropathy and diabetic neuropathy.

On clinical detection of any one of the above complications of diabetes, a thorough investigation of the patients is done to evaluate the presence of other micro-vascular complications. This study is intended to assess the association between macrovascular complications with occurrence of diabetic retinopathy.

**Materials and methods**

Cross-sectional study with 100 patients was carried out in Sree Balaji Medical College & Hospital, Chennai-44. Inclusion criteria include patients with history of diabetes (Type 1 and Type 2) with coronary artery disease, cerebro-vascular disease and peripheral arterial disease. Detailed history of the patients was collected over the duration of diabetes and treatment taken for the same and associated complications. Complete visual acuity check up with Snellen's chart for distant vision and Jaeger's chart for near vision. Amsler grid test was carried out to

evaluate macular function, complete anterior eye drops for complete dilation of pupils to assess the retina. Direct ophthalmoscope, indirect ophthalmoscope with sclera indenter to assess the central and peripheral retina. 90 Dioptre lens to assess the Macula, blood investigations like FBS, PPBS to assess the glycemic status.

**Results**

Total sample were 100 patients and in which 55 were male and 45 were female. The microvascular complications and duration of the diabetes were presented in Table 1.

Parameters	Total patients		Diabetic retinopathy present (44)		Diabetic retinopathy absent (56)	
	No	%	No	%	No	%
Sex						
Male	55	55	23	52.3	32	57.1
Female	45	45	21	47.7	24	42.9
Macro-vascular complications						
CVA	12	12	8	18.2	4	7.1
CVA (Stroke)	3	3	2	4.5	1	1.8
Diabetic Gangrene	38	38	10	22.7	28	50
Diabetic Gangrene +	1	1	0	0	1	1.8
Diabetic Gangrene + Cellulitis	35	35	14	31.8	21	37.5
IHD	10	10	10	22.7	0	0
IHD+ CVA	1	1	0	0	1	1.8
Old CVA						
Duration of Diabetes						
0-10 yrs	16	16	2	4.5	14	25
10.1-20 yrs	66	66	27	61.4	39	69.6
20.1-30 yrs	18	18	15	34.1	3	5.4

95.5% patients with diabetic retinopathy had duration of diabetes for 10.1-30 years. 94.6% of non-retinopathy

patients, with diabetes, had duration of diabetes from 0-20 years. The association between duration of diabetes and

diabetic retinopathy is found to be statistically significant with chi square value of 18.001 and p=0.000.

The correlation between the macrovascular complications and diabetic retinopathy were presented in table 2:

Macro-vascular complications	Diabetic retinopathy present	Diabetic retinopathy absent	Chi square value	P value
CVA	8	4	22.477	0.001
CVA (Stroke)	2	1		
Diabetic Gangrene	10	28		
Diabetic + Gangrene	0	1		
Cellulitis IHD	14	21		
IHD+ CVA	10	0		
Old CVA	0	1		

Among the entire sample of 100 patients with macrovascular complications 44% patients are diagnosed positive for diabetic retinopathy and 56% patients are diagnosed negative. The association of macrovascular complications and prevalence of diabetic retinopathy is

found to be statistically significant with a chi square value of 22.477 and P= 0.001.

The correlation between the macro-vascular complications and duration of diabetes is presented in table 3;

Macro-vascular complications	Duration of Diabetes (yrs)			Chi square value	P value
	0-10	10.1-20	20.1-30		
CVA	0	9	3	0.001	
CVA (Stroke)	1	1	1		
Diabetic Gangrene	11	25	2		
Diabetic + Gangrene	0	1	0		

Cellulitis	4	26	5	31.946	
IHD					
IHD+ CVA	0	3	7		
Old CVA	0	1	0		

82% had established macro-vascular complications within 0-20 yrs of diabetic status and 84% had established macro-vascular complications within 10.1-30 years of diabetic status. The association of macro-vascular complication and duration of diabetes is found to be statistically significant with chi Square value of 31.946 and P=0.001

Among the patients with evidence of diabetic retinopathy clinically 4.5% patients had duration of diabetes of 0-10 yrs, 61.4% patients had duration of diabetes of 10.1-20 years and 34.1% had duration of diabetes of 20.1-30 years. The association of macro-vascular complications and duration of diabetes is found to be statistically significant with chi Square value of 15.563 and P=0.049.

Among patients with no evidence of diabetic retinopathy clinically, 25% patients had duration of diabetes of 0-10 years, 69.6% had duration of diabetes of 10.1-20 years and 5.4% had duration of diabetes of 20.1-30 years. The association of macro-vascular complications is statistically found to be non-significant in patients without diabetic retinopathy with chi square value of 7.457 and p=0.682. The correlation between duration of diabetes and diabetic retinopathy, in individual macro-vascular complications, no statistical significant correlation is observed in the two parameters except in the group of patients with both IHD and CVA where all patients were clinically diagnosed to have diabetic retinopathy.

**Discussion**

In the current study, a significant association was observed in the duration of diabetes and prevalence of

diabetic retinopathy (P-value = 0.001), as well as macrovascular complications of diabetes (P value =0.001). this implies that with increasing duration of diabetes, the chances of prevalence of its complications increases. This has been proven and stated by MacKinnon JR and Forrester JV in oxford text book of endocrinology and diabetes (3) and several other findings (4-6).

A significant association was also found between the occurrence of diabetic retinopathy and macrovascular complications of diabetes (P value = 0.001). Also there was a significant association observed in duration of diabetes and macrovascular complications of diabetes in the group of 44 patients with diabetic retinopathy (P-value= 0.049). These are studies suggesting diabetic retinopathy as a predictor of cardiovascular mortality in individuals both type 1 and type 2 DM (7). A positive association was not observed between the duration of diabetes and macrovascular complications of diabetes in the remaining 56 patients with no diabetic retinopathy. This suggests that presence of diabetic retinopathy can be predictor of macrovascular complications due to diabetes.

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