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Correlation of Hemoglobin A1c Test (HbAlc) with Different Grades of Diabetic Retinopathy

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Diabetic retinopathy is a disorder which generally affects the retina and disturbs the microvasculature of it and is the most dreaded complication of diabetes. This study included 50 patients with diabetic retinopathy, out of which 4% of patients infected with Non-proliferative diabetic retinopathy (NPDR), 48% with mild and 20% with very high NPDR. 8% of cases had very severe NPDR while the rest 20% had PDR. Our results which showed a higher prevalence of CSME in patients with HBA 1c of 8. 7 % and above. From the finding the elevated lipid levels in serum are associated with high risk of CSME and retinal hard exudates.

Keywords: Diabetic retinopathy; serum lipids.

1. INTRODUCTION

Eye, an organ of vision and light perception, converts visible light into electro-chemical impulses to be handled by the brain. It functions like a camera with iris acting like a board up, regulating the amount of light received by the eye and variable focussing & accommodation. The received light is focused by the lens through retina it passes through the optic nerve. The brain after receiving this information it process into an image which is understandable. The retina which is majorly involved in this process is affected in some diseased condition like DM and even causes blindness across the world [1-5]. Case detection, therefore, requires active screening efforts. The prevalence of diabetes mellitus is growing rapidly worldwide and is

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reaching epidemic proportions. But this condition of vision loss is easily preventable if the glycemic level is under control [6-9]. Cases increased with the increased time period of diabetes. One of the main difficulties in establishing whether there is a relationship between the degree of hyperglycemia and the long term complications of diabetes is the lack of a reliable and objective method for assessing diabetic control [10,11]. A measurement of glycated proteins helps to assess the level of glycemia. Currently the most significant and widely used test in DM is monitoring the glycated Haemoglobin(HbA1C). But fewer studies have been done so far between HbA1C and different levels of diabetic retinopathy and this work aims to address this need.

2. METHODOLOGY

Based on ETDRS criteria, patients were graded according to the severity of the diabetic retinopathy. Those with suspected CSME were confirmed by Optical Coherence Tomography (OCT). HbA IC levels were determined in all patients by Immunoturbidimetry method and statistical studies were performed accordingly.

3. RESULTS

(i) Prevalence of Grades of diabetic retinopathy

Based on the observations made, NPDR had highest prevalence amounting to 80 %, whereas PDR accounted to rest of 20% of the study population.

The relationship between diabetic retinopathy and hypertensives was not statistically significant. ($p > 0.05$

(iii) Relationship between grades of diabetic retinopathy and hbal c level.

Among mild NPDR the range of HbA 1C was found > 7%, in moderate NPDR it was u .:- ween 8% - 10%, those with severe and Very severe NPDR had HbA 1C of between 12% - 14% and those with PDR had HbAlC >13%. Higher the HbAlC, greater the severity of retinopathy .

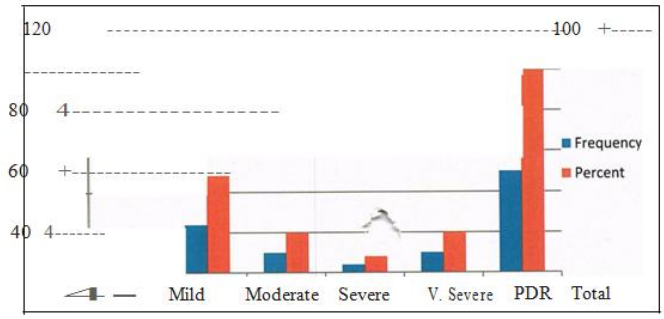

Fig. 1. Prevalence of Grades of diabetic retinopathy

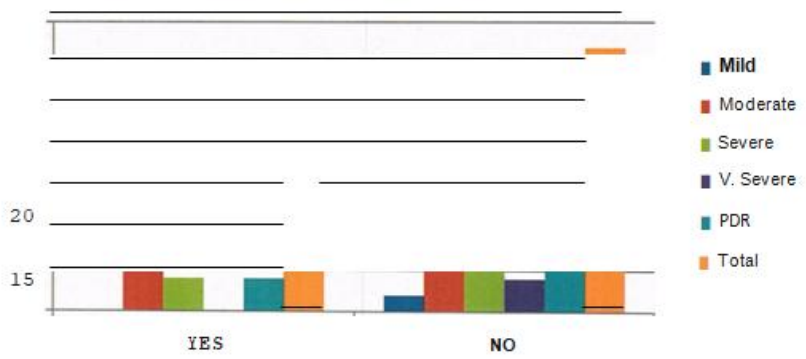

Fig. 2. Relationship between grades of diabetic retinopathy and hypertension

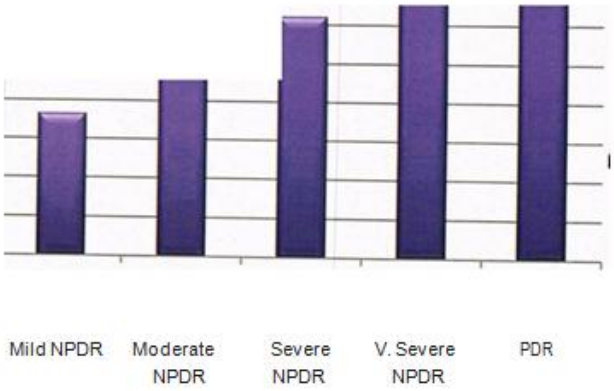

Fig. 3. Relationship between grades of diabetic retinopathy and hypertension

Table 1. Relationship between grades of diabetic retinopathy and hypertension

Grades of Diabetic Retinopathy		Hypertension		Total	P value
		Yes	No		
Mild	Count	0	2	2	
	% within Diabetic Retinopathy	.0%	100.0 %	100.0%	
	% within Hypertension	.0%	6.3%	4.0%	
Moderate	Count	10	14	24	
	% within Diabetic Retinopathy	41.7%	58.3%	100.0%	
	% within Hypertension	55.6%	43.8%	48.0%	
Severe	Count	4	6	10	
	% within Diabetic Retinopathy	40.0%	60.0%	100.0%	
	% within Hypertension	22.2%	18.8%	20.0%	
Very Severe	Count	0	4	4	
	% within Diabetic Retinopa C '\	.0%	100.0 %	100.0%	
	% within Hypertension	.0%	12.5%	8.0%	
PDR	Count	4	6	10	
	% within Diabetic Retinopathy	40.0%	60.0%	100.0%	
	% within Hypertension	22.2%	18.8%	20.0%	0.427
Total	Count	18	32	50	
	% within Diabetic Retinopathy	36.0%	64.0%	100.0%	
	% within Hypertension	100.0 %	100.0 %	100.0%	

4. DISCUSSION

Diabetic retinopathy, is the disorder that majorly affeceting microvasculature of retina, is the most dreaded complication of diabetes. Therefore it IS very essential to identify the cases, who might be at high risk of severe retinopathy. Accurate clinical data is helpful in preventing its complications and are also help in performing studies such as controlled clinical trials of treatment of this disorder. This study involves 50 cases with diabetic retinopathy, out of which 4% of . Patients manifested with mild NPDR, 48% with mild and 20% with severe NPDR. 8% showed very severe NPDR while the remaining 20% had PDR. Chou T . H et al in their study stated that casess with the HBA1c value of 8 had an elevated macular thickening OCT in diabetic eyes and there was a good correlation statistically between younger age ,shorter diabetic duration and thicker macular thickness. Similar statistically significant results were obtained in this paper which showed a higher prevalence of CSME in patients with HBA 1c of

8. 7 % and above. A better correlation was found between severity of Diabetic retinopathy with HbA 1C levels and those manifesting with higher HbA 1C had greater the severity of diabetic retinopathy.

5. CONCLUSION

A statistically significant correlation was found between severity of Diabetic retinopathy with HbA 1C levels and those manifesting with higher HbA 1C had greater the severity of diabetic retinopathy. CSME had a statistically significant correlation with severity of diabetic retinopathy , hyperlipidemia and HbA 1C levels.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline Patient's consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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