



ANEMIA IN PATIENTS WITH DIABETIC RETINOPATHY IN RURAL TERTIARY CARE CENTER OF WESTERN MAHARASHTRA, INDIA.

Ophthalmology

**Dr. Surekha
Bangal**

Professor, Dept of Ophthalmology, Rural Medical College, Loni

**Dr. Vaishali
Phalke***

Professor, Dept of Community Medicine, Rural Medical College, Loni *Corresponding Author

ABSTRACT

INTRODUCTION: Present study was aimed to identify association between presence of anemia and severity of Diabetic Retinopathy (DR) among diabetic patients.

MATERIAL AND METHODS: The present study was observational with cross-sectional study design. It was conducted on patients with history of type 2 DM attending outpatient department of Ophthalmology of Pravara Rural Hospital were included in the study. All patients were subjected to Direct and Indirect Ophthalmoscopy for detection and classification of DR. Hemoglobin levels of patients were recorded and classified as non-anemic and anemic.

RESULTS: Out of 1377 patients screened, 318 patients (23.09 %) had Diabetic Retinopathy. Of 318 patients 179 (56.3%) were males while 139 (43.7%) were females. Most patients belonged to stage I DR (158, 49.6%) followed by stage II DR (94, 29.5%). Anemia was present in 257 (80.8%) patients. Comparing the number of patients with respect to presence or absence of anemia with staging of DR, no statistically significant difference was observed.

CONCLUSION: The occurrence of DR in the study was 23.09%. Most patients belonged to stage I DR (158, 49.6%) followed by stage II DR (94, 29.5%). Anemia was present in 257 (80.8%) patients. There was no association between presence anemia and staging of DR.

KEYWORDS

Diabetic Retinopathy, Diabetes Mellitus, anemia, Hemoglobin

INTRODUCTION:

With increasing trend of number of patients with Diabetes mellitus, the complications of Diabetes are on rise [1]. One of the micro-vascular complications which leads to gradual loss of vision and blindness is Diabetic retinopathy (DR). Prevalence of DR ranges from 9.6%–21.7% in India [2-6]. Although, progression of diabetes depends on the control of blood glucose levels and blood pressure, the progression of complications of the disease are not entirely ruled out. [7] Additional factors are to be searched for development of complications of diabetic retinopathy. Anemia is commonly associated with patients of diabetes [8]. It has been implicated in development of end organ damage among patients with diabetes [9]. In a study by Chung et al [10], a positive relationship between severity of anemia and stages of diabetic retinopathy has been proven. The present study was conducted to evaluate relationship between anemia and severity of diabetic retinopathy among patients of type 2 diabetes mellitus in the Pravara rural hospital, a tertiary care center of western Maharashtra, India.

MATERIAL AND METHODS

Present study was observational with cross-sectional design. It was conducted in the outpatient Department of Ophthalmology, Pravara Rural Hospital, Loni, Maharashtra. The study was initiated after obtaining Institutional Ethics Committee approval. Patients with history of type 2 DM and attending the outpatient department were included in the study. Patients who had no signs of DR, those with retinopathy in the absence of Diabetes Mellitus or due to other causes like radiation sickle cell disease were excluded from the study. Patients who satisfied inclusion criteria and gave written informed consent were included in the study.

All patients were subjected to complete eye examination. Direct and indirect Ophthalmoscopy was performed post dilatation of pupils with 1% Tropicamide eye drops. The retina was screened for retinopathy and classified according to the diabetic retinopathy study classification (ETDRS) [11,12]. The Hemoglobin levels of the patients were recorded and classification of anemia was done using the guideline by WHO [13]. Patients with hemoglobin level of less than 13 g/dL in men and <12.0 g/dL in women was considered anemic. The findings were recorded and analyzed using Graphpad Instat software.

RESULTS:

Out of 1377 patients having diabetes, 318 (23.09 %) showed presence of Diabetic Retinopathy. Among 318 patients 179 (56.3%) were males while 139 (43.7%) were females.

Table no. 1 shows distribution of patients according stages of Diabetic retinopathy. Most of the patients belonged to stage I DR (158, 49.6%) followed by stage II DR (94, 29.5%). When classified as NPDR and PDR, their occurrence is respectively 21.85% and 0.79%.

Anemia was present in 257 (80.8%) patients. Table no. 2 shows distribution of patients as per stages of DR and anemia. On comparing the number of patients with respect to presence or absence of anemia with the stages of DR, no statistically significant difference was observed ($P=0.608$, Fisher's Exact test).

DISCUSSION:

Diabetic retinopathy is the major blinding complication of diabetes. The present study was designed to identify association between the presence of anemia and severity of Diabetic retinopathy.

Among 318 patients, 179 (56.3%) were males while 139 (43.7%) were females. This finding was similar to studies done by Krishnaiah S et al [14], Rema et al [5] and Gadkari et al [6].

Most of the patients belonged to stage I DR (158, 49.6%) followed by stage II DR (94, 29.5%). The occurrence of NPDR and PDR was 21.85% and 0.79% respectively. The occurrence of PDR was similar to a study done by Rema M et al [5], while it was lower as compared to other authors [15-17].

In our study, anemia was present in 257 (80.8%) patients. The prevalence of anemia among patients with DR was very high in the present study as compared to those done by Rani et al (12.3%) [17], Lee et al (16.2%) [18] and Bahar et al (45.9%) [19]. The difference in the occurrence of DR and anemia as well, may be due to differences in the type of population studied and geographical differences in the population. This can be explored and confirmed by doing nationwide large scale study in different regions.

In our study, there was no statistically significant difference as to the distribution of anemia in patients with various stages of diabetic retinopathy (Table no. 2). In a study by Rani et al [17], longer duration of diabetes and presence of diabetic retinopathy were independent predictors for anemia. In a cross sectional study by Lee, DR risk decreased with increase in hemoglobin levels [18]. Conway, in a prospective study, reported that Hemoglobin levels were predictive of PDR irrespective of gender [20]. J. Idiculla found that anemia was an independent risk factor for development of DR [21]. Study by Bahar et al also suggested that diabetic patients with DR and normal renal function have lower Hb levels [19].

Anemia is common among patients with type 2 DM[22]. Hemoglobin levels progressively decrease despite of the status of renal system in these patients [23]. Anemia is a proven risk factor for development of coronary artery disease, heart failure and mortality due to cardiovascular diseases.[24]. Study by Ito et al[9] found anemia as a risk factor for development of diabetic retinopathy. Chung et al reported a positive association between anemia and retinopathy of diabetes after adjustment of conventional risk factors like duration of diabetes, hypertension and HcA1C[7]. Hypoxia of retinal tissues has been implicated in development of retinal damage. Hypoxia causes synthesis of vascular endothelial growth factor (VEGF), which induces growth of vascular tissues. [25]. Moreover, anemia may cause oxidative stress in absence of adequate erythrocytes and antioxidant mechanisms [25].

In our study, analysis was done without taking into consideration other known associated risk factors for diabetic retinopathy.

Conclusion:

The occurrence of DR in the present study was 23.09%. Most of the patients belonged to stage I DR (158, 49.6%) followed by stage II DR (94, 29.5%). Anemia was present in 257 (80.8%) patients. No association was between the presence anemia and staging of DR. Further studies are required to ascertain the association between anemia and DR.

Table no. 1. Distribution of patients according to stages of DR.

Stages of DR	Number of patients	
	Number	Percent
I NPDR (Mild)	158	49.7
II NPDR (Moderate)	94	29.6
III NPDR (Severe)	24	7.5
IV NPDR (Very severe)	31	9.7
PDR	11	3.5

NPDR- Non proliferative DR, PDR- Proliferative DR

Table no. 2. Distribution of patients with respect to stages of DR and presence of anemia

Stage of Diabetic Retinopathy	Anemia		Total	Fisher's Exact
	Absent	Present		
1 NPDR	27	131	158	p=0.608
2 NPDR	21	73	94	
3 NPDR	6	18	24	
4 NPDR and PDR	7	35	42	
Total	61	257	318	

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