



PREVALENCE OF RETINOPATHY IN PATIENTS OF ANAEMIA AND ITS CORRELATION WITH SEVERITY OF ANEMIA

Ophthalmology

Dr. Divjot Kaur Assistant Professor

Dr. Anubha Bhatti* Associate Professor, Deptt Of Ophthalmology *Corresponding Author

Dr. Manveen Kaur Assistant Professor, Deptt Of Ophthalmology

ABSTRACT

Purpose: To detect the prevalence of retinopathy in patients of anemia and to correlate anemic retinopathy with severity of anemia. **Materials And Methods:** This was prospective study which analyzed 106 patients with anemia referred to our department. The study group underwent complete ocular examination including best corrected visual acuity, intraocular pressure, anterior segment examination and fundus examination on slit lamp biomicroscope. The patients were classified as having mild, moderate and severe anemia based on the concentration of hemoglobin as per WHO classification. Patients with other co-existent systemic diseases like diabetes mellitus, hypertension and other blood dyscrasias such as leukemia and lymphomas were excluded from the study. Demographic features and retinopathy changes on fundus examination were noted. **Statistical Methods:** Descriptive analyses were used to study the parameters. **Results:** Anemic retinopathy was found in 31 (29.24%) patients out of 106 patients included in study group. In patients with moderate anemia, fundus lesions were found in 2 out of the total of 57 patients. In patients with severe anemia, fundus lesions were found in 29 out of the total of 49 patients. **Conclusion:** Retinopathy is frequent finding in patients with moderate and severe anemia. 2 out of 57 patients of moderate anemia and 29 out of 49 patients of severe anemia had retinopathy. Hence, the prevalence of anemic retinopathy is higher in cases of severe anemia as compared to moderate anemia.

KEYWORDS

Anemia, Retinopathy.

INTRODUCTION

Anemia is a condition characterised by decrease in concentration of hemoglobin in blood. Hemoglobin is necessary for transporting oxygen to tissues and organs in the body. The reduction in oxygen available to organs and tissues when hemoglobin levels are low is responsible for many of the symptoms experienced by anemic people. In the eye, anemia can lead to transient retinal hemorrhages. These were first described by Ulrich in 1883 in association with gastrointestinal hemorrhage.¹ Anemia causes retinopathy in 28% of patients, especially when there is coexisting thrombocytopenia (38%). As the severity of anemia increases, the risk of retinopathy increases, particularly when the hemoglobin (Hb) level is below 6 gm/dL.² Anemia causes retinal hypoxia, which leads to infarction of the nerve fiber layer and clinically manifests as cotton wool spots. Retinal hypoxia also leads to vascular dilatation; increased transmural pressure owing to hypoproteinemia; and microtraumas to the vessel walls, which cause retinal edema and hemorrhages.^{3,4} To the best of our knowledge, there is a lack of data describing the prevalence of Anemic Retinopathy and its association with varying severity of anemia. The aim of our study was to calculate the prevalence of fundus lesions in anemic patients and its correlation with severity of anemia.

MATERIAL AND METHODS

A hospital-based prospective study was conducted on 106 anemic patients referred from the Department of Gynaecology and Medicine. The patients were documented as anemic after investigations like complete hemogram, peripheral blood film and reticulocyte count. After informed consent, the study group underwent complete ocular examination including best corrected visual acuity, intraocular pressure, anterior segment examination and fundus examination on slit lamp biomicroscope. The patients were classified as having mild, moderate and severe anemia based on the concentration of hemoglobin as per WHO classification.⁵ (Table 1)

Table 1: Showing Severity Of Anemia On Basis Of Hemoglobin Concentration As Per WHO Classification

Severity	Hb conc.
Mild	10-11.9 g/dl
Moderate	7- 9.9 g/dl
Severe	<7 g/dl

The criteria for diagnosing Anemic Retinopathy (AR) included the presence of any of the following features on retinal examination: hemorrhages that can present at all levels of the retina and choroid, Roth's spots, exudates, cotton wool spots, retinal edema, venous tortuosity, optic disc edema or pallor.⁶ Roth's spots are described as white-centered hemorrhages. The white centers in Roth spots can be due to inflammatory infiltrates, fibrin and platelets, neoplastic cells, or focal areas of ischemia.⁷ All patients with moderate and severe anemia

were included in the study. Patients with other co-existent systemic diseases like diabetes mellitus, hypertension, and other blood dyscrasias such as leukemia and lymphomas were excluded from the study. Demographic features and retinopathy changes on fundus examination were noted.

OBSERVATIONS AND RESULTS

A total of 106 patients of moderate (57) and severe (49) anemia were referred to our department. Forty four patients were male (41.5%) and sixty two patients were female (58.4%) (Table 2).

Iron deficiency anemia (66%) was the most common type of anemia seen in the study group. (Table 3)

Table 2: Demographic Characters Of The Study Group

Total number of patients	106
Males	44
Females	62
Age group	18-75 yr

Table 3: Types Of Anemia In Study Group

Type of anemia	Number
Iron deficiency anemia	70
Folic acid/ B 12 deficiency anemia	30
Haemorrhagic anemia	4
Aplastic anemia	2

Anemic retinopathy was found in 31 (29.24%) patients out of 106 patients included in study group. In patients with moderate anemia, fundus lesions were found in 2 out of the total of 57 patients.

In patients with severe anemia, fundus lesions were found in 29 out of the total of 49 patients.

Out of 31 patients with anemic retinopathy, only venous tortuosity and engorgement was found in 17 patients (Figure 1). Retinal Hemorrhages (flame shaped and dot blot) were found in 13 patients.

Cotton wool spots and Roth spots with above fundus lesions was found in 1 patient (Figure 2). (Table 4)

Table 4: Showing Retinopathy changes on fundus examination in patients

Retinopathy changes on fundus examination	Number (%)
Venous engorgement and tortuosity	17 (54.8)
Retinal hemorrhages	13 (41.9)
Roth's spots+ cotton wool spots with retinal hemorrhages and venous engorgement and tortuosity	1 (3.2)

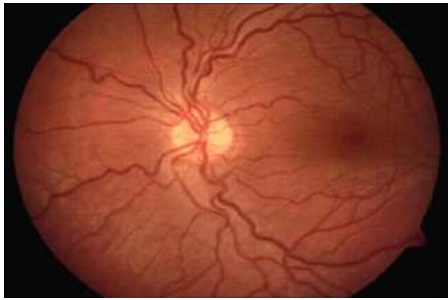


Figure 1 Fundus photograph showing venous engorgement and tortuosity

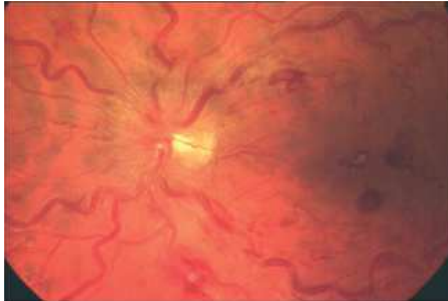


Figure 2 Fundus photograph showing venous engorgement and tortuosity along with hemorrhages and Roth spots

DISCUSSION

The World Health Organization describes anemia as a condition in which the number of red blood cells or the hemoglobin (Hb) concentration within them is lower than normal. According to the World Health Organization, anemia is defined as an Hb level <13 g/dL in men and <12 g/dL in women.⁵ The common ocular features noted with anemia are conjunctival pallor, retinal abnormalities, and posterior pole pallor.⁸⁻¹⁰ The retinal changes found in AR are nonspecific and may closely resemble diabetic or hypertensive retinopathy. We excluded anaemic patients having other comorbidities like diabetes or hypertension from the study.

The prevalence of AR in our study was 29.24%. This is in concordance with other study by Venkatesh et al where prevalence of AR was 29.6%.¹¹ A study by Punjabi et al noted the prevalence of AR in pediatric age group to be about 30%. A higher prevalence of AR was noted in children with Hb levels below 10 gm/dl.¹²

2 (3.5%) out of 57 patients of moderate anemia and 29 (59.1%) out of 49 patients of severe anemia had retinopathy. Hence, the prevalence of anemic retinopathy is higher in cases of severe anemia as compared to moderate anemia. Ajit et al also observed that severity of retinal manifestations of anemia was related to the severity of anemia.¹³

Overall, most common retinal changes were Venous engorgement and tortuosity seen in 54.9% followed by retinal hemorrhages in 41.9% and Roth spots & cotton wool spots along with retinal hemorrhages and venous engorgement in 3.2%. This is in contrast to many studies where retinal hemorrhages were the most common retinal changes. Dr. Ajay Kumar studied prevalence of retinopathy in 120 patients, he concluded that retinal hemorrhages mainly deep retinal hemorrhages were most common finding.¹⁴ Nusrat et al concluded in their study that conjunctival pallor and retinal hemorrhages were commonest in ocular features in anemic patients.¹⁵ Holt et al studied 63 patients with anemia and noted that flame shaped hemorrhages were the commonest type of hemorrhage.¹⁶ Suresh et al studied 34 patients with anemia and found that flame shaped hemorrhages were common followed by deep haemorrhage.¹⁷ Since anemic retinopathy is almost always reversible with correction of the anemia, regular and repeated fundus examination should be carried out.

CONCLUSION

Retinopathy is frequent finding in patients with moderate and severe anemia. 2 out of 57 patients of moderate anemia and 29 out of 49 patients of severe anemia had retinopathy. Hence, the prevalence of anemic retinopathy is higher in cases of severe anemia as compared to moderate anemia. Although, anemic retinopathy is often not

significant clinically, incidental findings of such lesions in asymptomatic patients should arouse suspicion of underlying undiagnosed hematological disorder.

REFERENCES

1. Pears MA, Pickering GW. Changes in the fundus oculi after haemorrhage. *Q J Med.* 1960;29:153-178.
2. Carraro MC, Rossetti L, Gerli GC. Prevalence of retinopathy in patients with anemia or thrombocytopenia. *Eur J Haematol.* 2001;67(4):238-244.
3. Rubenstein RA, Yanoff M, Albert DM. Thrombocytopenia, anemia, and retinal hemorrhage. *Am J Ophthalmol.* 1968;65(3):435-439.
4. Foulds WS. The ocular manifestations of blood diseases. *Trans Ophthalmol Soc UK.* 1963;83:345-360.
5. World Health Organization, Centers for Disease Control and Prevention. *Anaemia.* Geneva: World Health Organization; 2020.
6. Aisen ML, Bacon BR, Goodman AM, Chester EM. Retinal abnormalities associated with anemia. *Arch Ophthalmol* 1983;101:1049-52.
7. Ling R, James B. White-centred retinal haemorrhages (Roth spots). *Postgrad Med J* 1998;74:581-2.
8. To KW, Nadel AJ. Ophthalmologic complications in hemoglobinopathies. *Hematol Oncol Clin North Am* 1991;5:535-48.
9. Lang GE, Spraul CW, Lang GK. Ocular changes in primary hematologic diseases. *Klin Monatsbl Augenheilkd* 1998;212:419-27.
10. Coskun M, Sevensan NO. The evaluation of ophthalmic findings in women patients with iron and vitamin B12 deficiency anemia. *Transl Vis Sci Technol* 2018;7:16.
11. Venkatesh R, Reddy NG. Determinants for Anemic Retinopathy. *Beyoglu Eye J* 2023; 8(2): 97-103.
12. Punjabi S, Devasthali G, Gulati A. Retinal abnormalities in children suffering from low hemoglobin levels. *Int J Res Med Sci* 2021;9:401-5.
13. Majji AB, Bhatia K, Mathai A. Spontaneous bilateral peripapillary, subhyaloid and vitreous haemorrhage with severe anaemia secondary to idiopathic thrombocytopenic purpura. *Indian J Ophthalmol.* 2010;58(3):234-6.
14. Kumar A. A Prospective Cross-Sectional Study of Ocular Manifestations in Patients with Anemia. *J Dental Med Sci.* 2019;18(11):10-15.
15. Shaheen N, Wani JS, Nasti AR, Quadri MI. Ocular manifestations in anaemia-A clinical study. *J K Practioner.* 2005;12(3):128-30.
16. Holt JM, Gordon-Smith EC. Retinal abnormalities in diseases of the blood. *Bri J ophthalmol.* 1969;53(3):145.
17. Suresh K, Sampath R, Tanvi. Ocular manifestations in haematological disorders. *Shri Ramchandra J Med.* 2011;4(1):1-4.