

# RESEARCH ARTICLE

### FUNDUS FINDINGS IN PATIENTS OF MILD, MODERATE AND SEVERE DEGREE OF ANAEMIA PRESENTING TO THE TERTIARY HEALTH CARE CENTRE

# Dr. Jitendra Kumar<sup>1</sup>, Dr. Apurva Jain<sup>2</sup> and Dr. Rashmi Kumari<sup>2</sup>

- Professor & Head, Dept. of ophthalmology, MLB Medical College Jhansi, India. 1.
- 2. Junior Resident, Dept. of ophthalmology, MLB Medical College Jhansi, India.

..... Manuscript Info

Manuscript History Received: 24 May 2022 Final Accepted: 28 June 2022 Published: July 2022

Keywords:-Retinopathy, Roth Spots, Hemorrhages, Macular Edema

#### Abstract

..... Purpose: To study fundus findings in patients of mild, moderate, and severe degree of anaemia presenting to the tertiary health care centre. Methods: This was a prospective observational study that involved25 patients of anemiacomplaining of blurring of vision, conjunctival pallor, pain, subconjunctival hemorrhage and evelid swelling.

Results: There were 20 females and 5 males and the age group taken was 20 to 50 years. Out of 25 patients of nutritional anemia, 12 patients belonged to the age group of 20 to 30 years, out of which 10 were females and 2 weremales. 8 patients belonged to age group of 30 to 40 years, out of which 6 were females and 2 were males. 5 patients belonged to the age group of 40 to 50 years, out of which 4 were females and 1 was male. In our study, it was found that 5 patients belonged to the category of severe anemia with hemoglobin [<6 gm/dl], 8 patients belonged to the category of moderate anemia with hemoglobin ranging between 6-10 gm/dl, 12 patients belonged to the category of mild anemia with hemoglobin ranging between 10-12 gm/dl.On looking for various fundus manifestations in different grades of anemia viz.mild, moderate and severe anemia, we found out that the incidence of retinal vascular changes in the form of venous dilation and tortuosity, pale disc, roth spots, macular edema.subhyaloid hemorrhages, dot - blot and flame shaped hemorrhages showed an increasing trend with increase in severity of anemia.

Conclusion: There is a high prevalence of anemia in India which affects female gender more than male gender. Anemic retinopathy is not an uncommon condition but it is generally asymptomatic and gets noted incidentally during general workup of the patients. It has variable presentation in different patients with different grades of anemia.

> Copy Right, IJAR, 2022,. All rights reserved.

Introduction:-

Anaemias are a group of disorders characterized by a decrease in the number of circulating red blood cells or in the amount of hemoglobin in each cell, or both. It is a common hematological disorder presenting with variable ocular manifestations. A variety of pathologic changes occurring due to and associated with anaemia are implicated in the clinical features of anaemic retinopathy. Anaemia causes retinal hypoxia, which leads to infarction of the nerve fibre 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 edemaand

### Corresponding Author:-Dr. Jitendra Kumar

Address:-Professor & Head, Dept. of ophthalmology, MLB Medical College Jhansi, India.

hemorrhages. In many clinical situations, thrombocytopenia is associated with anaemia, and that leads to defective coagulation and hemorrhages.

Other factors implicated in the pathology are venous stasis, angiospasm, increased blood viscosity (myeloproliferative disorders), hypotension (following hemorrhage), etc. Hypotension may lead to optic neuropathy.<sup>[1,2]</sup>

Rarely, loss of vision can be a presenting complaint, because most cases are asymptomatic. At the macula, hemorrhages, edema, or hard exudates can cause impairment of vision. Alternatively, vision loss may occur due to disc edema or optic neuropathy.

Arteries are attenuated and pale, and veins are dilated and tortuous. These findings are seen more as the severity of anaemia increases. Superficial, flame-shaped hemorrhages located in the nerve fiber layer are the most common finding in anaemic retinopathy. In a few cases, dot and blot hemorrhages in deeper retinal layers may be noted. Rarely, blood may be present in the subhyaloid plane or in the vitreous. The white centers in Roth spots can be due to inflammatory infiltrates, fibrin and platelets, neoplastic cells, or focal areas of ischemia.<sup>[3]</sup>

Retinal nerve fibre layer infarction due to retinal hypoxia in anaemia causes superficial fluffy white lesions called as cotton wool spots. Hard exudates may be seen and when these are present at the macula they form a macular star

Retinal edema occurs due to microtrauma of the vessel wall secondary to raised transmural pressure leading to leakage. **Optic nerve changes include** edema or, in later stages of optic neuropathy, optic disc pallor is seen.<sup>[4]</sup>

# Method And Material:-

This was a prospective observational study that involve 25 patients between 20-50 years with anemia complaining of blurring of vision, conjunctival pallor, pain, subconjunctival hemorrhage and eyelid swelling. Patients were recruited from the OPD of MLB MEDICAL college, Jhansi,Uttar Pradesh and were followed from 15<sup>th</sup>January 2022- 15<sup>th</sup>July 2022. It was performed under the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

All included patients were subjected to detailed ocular history and examination including visual acuity with or without pinhole by Snellen's chart, fundus examination by direct and indirect ophthalmoscopy after full mydriasis. Fundus photography was done with fundus camera. Complete blood count hematological investigation was done. Severity of anemia was graded according to hemoglobin level with 10-12 mg % as mild anemia, 6-10 mg% as moderate anemia and less than 6 mg % as severe anemia.

All patients with history of any ocular surgery or trauma, ocular or systemic disorders, which could affect the fundus of the patient or eyes with ocular media haziness were excluded from the study.

Fundus Showing The Dilatation And Tortuosity Of Retinal Veins And Scattered Intraretinal Hemorrhages





Fundus Showing Flame Shaped Hemorrhages, Dot Blot Hemorrhages, Roth Spots, Subhyaloid Hemorrhage

Fundus showing venous vessels dilatation and tortuosity, pale disc, multiple intraretinal hemorrhages and subhyaloid hemorrhage.



### **Result:-**

In our study, out of total 25 patients of nutritional anemia, 20 are females and 5 patients are males.12 patients belonged to the category of mild anemia with hemoglobin ranging between 10-12 mg %, out of which 10 were females (83.33%) and 2 weremales (16.66%). 8 patients belonged to the category of moderate anemia, out of which 6 were females (75%) and 2 were males(25%). 5 patients belonged to the category of severe anemia, out of which 4 were females (80%) and 1 was male (20%).

We found out that among 12 mildly anemic patients, 7 (58.3%) people showed fundus changes in the form of retinal vascular changes like venous dilation and tortuosity shown by 2 patients, dot blot hemorrhages exhibited by 3 patients and pale disc shown by 2 patients respectively.

In 8 cases of moderate anemia, only 6 patients showed changes in fundus namely retinal vascular changes shown by 3 patients, roth spots shown by 2 patients, pale disc shown by 4 patients, dot blot and flame shaped hemorrhages shown by 3 and 4 patients respectively.

In 5 patients of severe anemia, only 4 patients showed fundus changes like retinal vascular changes and roth spots shown by 3 patients , pale disc shown by 3 patients. Dot blot seen in 4 patients, flame shaped seen in 4 patients and subhyaloid hemorrhages seen in fundus of 1 patient. In 2 patients of severe anemia, macular edema was also seen.

#### Grading Of Anaemia According To Hemoglobin Levels

HEMOGLOBIN (g/dl)	GRADE OF ANAEMIA
10-12	MILD ANAEMIA
6-10	MODERATE ANAEMIA
<6	SEVERE ANAEMIA

#### Gender Distribution In Cases Of Anaemia

	TOTAL	FEMA	MALES	%AGE	%AGE
	CASES	LES		FEMALES	MALES
MILD	12	10	2	83.33	16.66
ANAEMIA					
MODERATE	8	6	2	75	25
ANAEMIA					
SEVERE	5	4	1	80	20
ANAEMIA					

### Distribution Of Presence Of Fundus Changes In Different Grades Of Anaemia

ANAEMIA	TOTAL	FUNDUS CHANGES				
GRADE	CASES	PRESENT	ABSENT	%AGE	OF	PATIENTS
				SHOWING		FUNDUS
				CHANGES		
MILD	12	7	5	58.3		
ANAEMIA						
MODERATE	8	6	2	75		
ANAEMIA						
SEVERE	5	4	1	80		
ANAEMIA						

### Distribution Of Various Fundus Abnormalities In Different Grades Of Anaemia

GRADE	VENOUS	ROT	DOT BLOT	FLAME	SUBHYALOI	PAL	MACUL
	DILATION	Н	HEMORRHAG	SHAPED	D	Е	AR
	AND	SPOT	ES	HEMORRHAG	HEMORRHAG	DIS	EDEMA
	TORTUOSI	S		ES	ES	С	
	TY						
MILD	2	-	3	-	-	2	-
MODERA	3	2	3	4	-	4	-
TE							
SEVERE	3	3	4	4	1	3	2

# **Discussion:-**

In a study, Satish S. et al<sup>[5]</sup>, conjunctival pallor was the most common finding and was seen in all patients followed by flame shaped hemorrhages as the second most common finding and was seen in 37.50% of patients. Fundal pallor was the third most common finding seen in 31.25%. Incidence and severity of retinal manifestations was more with more severe grades of anaemia.<sup>[6]</sup> In a study by Shaheen N. et al<sup>[7]</sup>, conjunctival pallor was reported in 74% cases and retinal abnormalities being the second most common ocular manifestation was observed in 16 % cases . In a study, Merin S et al<sup>[8]</sup>, they examined a 89 patients, out of which 20 (22.47%) had retinal changes, which were attributed to the anaemia. These consisted of hemorrhages of various forms – round, splinter, flame shaped, punctate, hemorrhages with pale centers, cotton wool or hard exudates. In another study by Holt J.M. and Gordensmith<sup>[9]</sup> who studied 63 patients with anaemia and noted that flame shaped hemorrhages were the commonest hemorrhages.

Merin S. and Freund have also found that in severe anaemia, the retinal abnormalities were found in 31.8%, while in moderate anaemia, these were seen in only 13.3%.<sup>[8,10]</sup> Kalpana Suresh studied 34 patients with anaemia and found that flame shaped hemorrhages were common followed by deep hemorrhages.<sup>[11]</sup> Authors also commented that propensity of retinal hemorrhages is more if anaemia is associated with thrombocytopenia.<sup>[7,12,13,14]</sup>Posterior pole pallor was seen in 25 patients out of 150 patients(16.67%). All were with severe anaemia which can be as a result of generalised reduced haemoglobin content. Trevor-Hoper found it in 14% cases.<sup>[15]</sup>

Normally, the ocular complications are usually reversible with the correction of anaemia. Anemic patients should be monitored frequently with 3 to 6 months follow up evaluation. Small preretinal hemorrhage respond to blood transfusions, while large hemorrhage require posterior hyaloidectomy or vitrectomy to prevent macular damage.

The occurrence of ocular abnormalities is always directly proportional with the severity of anaemia. We should always keep in mind that ocular changes in anaemia are non specific and may closely resemble other conditions, so it is important to rule out other ocular and systemic diseases.

# **Conclusion:-**

Commonest fundus finding seen in all grades of anaemia is retinal hemorrhage followed by venous dilatation with tortuosity and pale disc. Anaemia can cause various ocular manifestations.

The ocular abnormalities increases with the increasing severity of anaemia, so all the patients with moderate to severe anaemia should always undergo complete eye checkup, so that early diagnosis and timely treatment can be done.Regular fundus examination can help in judging the severity and gravity of anaemia, thus helps in resolution of retinal hemorrhages.

# **References:-**

1. Rubenstein RA, Yanoff M, Albert DM. Thrombocytopenia, anemia, and retinal hemorrhage. Am J Ophthalmol. 1968;65(3):435-439.

2. Foulds WS. The ocular manifestations of blood diseases. Trans Ophthalmol Soc UK. 1963;83:345-360.

3. Kaur B, Taylor D. Fundus hemorrhages in infancy. SurvOphthalmol. 1992;37(1):1-17.

4. Beck RW, Smith CH. Neuro-ophthalmology: A Problem-oriented Approach. Boston: Little, Brown, and Co.; 1988.

5. Satish SC, Tapan JP. Ocular manifestations in patients with nutritional anaemia. Indian J of basic and applied Med Research2014;3(4):89-94.

6. Venkataraman A, Panda BP, Dey A. Nutritional anemia as a cause of vision loss in developing countries: a case report. Kerala J of Ophthalmol 2013;25(4):383-384.

7. Nusrat S, Junaid S, Nasti AR, et al. Ocular manifestations in anaemia- A clinical study. JK Practitioner 2005;12(3):128-130.

8. Merin S, Freund M. Retinopathy in severe anemia. Am J Ophthalmol 1968;66(6):1102-1106.

9. Holt JM, Smith G, et al. Retinal abnormalities in diseases of the blood. Brit J Ophthalmol1969;53(3):145-160.

10. Duke-Elder S, Dobree JH. Diseases of the retina. System of ophthalmology. St. Louis: C. V. Mosby 1967;10:358-399.

11. Suresh K, Sampath R, et al. Ocular manifestations in haematological disorders. Shri Ramchandra J of Med 2011;4(1):1-4.

12. Marwaha RK, Singh S ,Garewal G, et al. Bleeding manifestations in megaloblastic anaemia. Indian J Pediatr 1989;56(2):243-247.

13. Lam S, Lam BL. Bilateral retinal hemorrhages from megaloblastic anemia: Case report and review of literature. Ann Ophthalmol 1992;24(3):86-90.

14. Rubenstein RA ,Yanoff M, Albert DM. Thrombocytopenia, Anaemia and retinal hemorrhage. Am J Ophthalmol 1968;65(3):435-439.

15. Trevor – Roper P.D. "Blood dyscrasias and the reticuloendothelial system". Modern Ophthalmology by Arnold Sorsby. Philedelphia, J. B. Lipinctt Co.1963:2,545-549.