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# Ophthalmoscopic Features in Patients of anaemia

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***Abstract***
***Purpose -*** *To study the ophthalmoscopic features in patients of anaemia*
***Methods-*** *This was prospective observational study that involved 200 eyes of 100 patients with anaemia Complete ophthalmic examination was done in diffuse light followed by direct opthalmoscopic examination and optical coherence tomography.*
***Results-*** *There were 77 females and 23 males .Ophthalmic features of anaemia include reduced visual acuity in some patients.Patient included in study with anaemia due to iron deficiency, megaloblastic anemia, thalassemia and leukemia .Fundus findings include multiple preretinal and intraretinal hemorrhages in 64% patients ,Roth's spots in 58% ,exudates in 52% ,cottonwool spots in 46% , Perivascular sheathing in 34% , neovascularisation in 25% , ischemic optic neuropathy in 18% patients and retinal edema and venous tortuosity in few patients. Out of 100 patients 69 patients were having normal vision and 31 patients had reduced visual acuity.*
***Conclusion -*** *Most of the patients with anaemia had normal visual acuity . Reduced visual acquity seen in some patient. OCT and ophthalmoscopy shows multiple preretinal and intraretinal hemorrhages ,Roth's spots ,exudates ,cottonwool spots ,retinal edema and venous tortuosity.*

***Keywords:*** *Anaemia, Roth spot, Preretinal and intraretinal haemorrhage, Cotton wool spot, Retinal edema*

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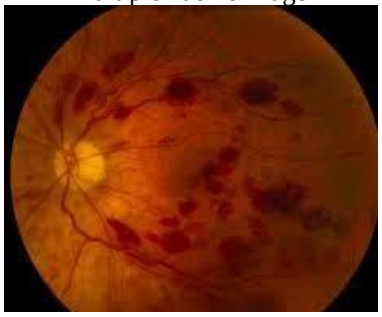
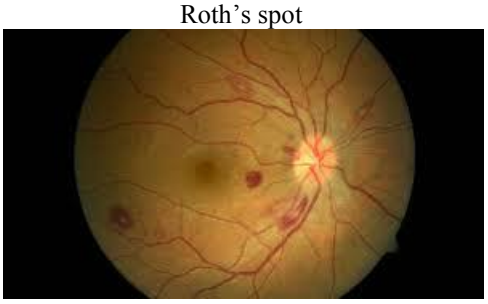
## I. Introduction

Anemias occur when the level of healthy red blood cells (RBCs) or hemoglobin (an iron-binding, oxygen-carrying protein within RBCs) is too low. Depending on the cause, anemias can be classified as follows:
Those occurring due to deficient production of RBCs from the bone marrow (hypoproliferative);
Those due to increased blood loss (bleeding) or damage of red blood cells (hemolysis); or
Those due to abnormalities in the production of the blood cells (ineffective erythropoiesis).
Retinopathy in patients with anemia is well documented. Common findings include hemorrhages that can present at all levels of the retina and choroid, Roth's spots, exudates, cotton wool spots, retinal edema and venous tortuosity . Roth's spots or white centered hemorrhages are typically associated with bacterial endocarditis, however the association is not exclusive, since they occur in diverse conditions including anemia. The white center could represent focal ischemia, inflammatory infiltrates, infectious organisms, fibrin and platelets, or an accumulation of neoplastic cells.2 The exact pathophysiology of anemic retinopathy is not completely understood. However, it seems to be related to retinal hypoxia, venous stasis, angiospasm and increased capillary permeability.3 Anemic retinopathy is most likely to occur in patients with severe anemia or when thrombocytopenia, a disorder of low platelets, is coexistant.4 The ocular changes found in anemic retinopathy are nonspecific and may closely resemble diabetic or hypertensive retinopathy. 5

Multiple haemorrhage



Roth's spot



Anemic retinopathy may also be a secondary manifestation of other systemic diseases such as cancer, infection or autoimmune disorders. Therefore, in addition to ordering a complete blood count (CBC w/differential), other appropriate medical testing may be necessary. In regards to the management, anemic retinopathy is reversible with correction of the anemia.

The ocular complications of leukemia may be due to a direct involvement by leukemic infiltrates or secondary to concomitant anemia or thrombocytopaenia. 6 Leukemic retinopathy is a common manifestation of leukemia and is found in both the acute and chronic forms. Features of leukemic retinopathy include multiple preretinal and intraretinal hemorrhages that are most commonly found in the posterior pole. Other features include Roth's spots, cotton wool spots, exudates, retinal venous tortuosity, perivascular sheathing, and neovascularization. Roth's spot hemorrhages may represent small areas of retinal leukemic infiltration or plateletfibrin deposits. Retinal lesions such as peripheral neovasularization or sea fans neovascularization (reminiscent of sickle cell retinopathy) may develop in patients with chronic leukemia and are thought to occur as a result of peripheral nonperfusion and ischemia from the hyperviscosity. 7 Serous retinal detachments and various other retinal anomalies have been reported, as well as pallor and swelling of the optic nerve, which indicate optic nerve infiltration.

In pathological studies, the choroid is the most commonly affected ocular structure. Choroidal masses lead to a disruption of the retinal pigment epithelium which result from decreased blood flow to the choriocapillaris.8 In some cases a serous or exudative retinal detachment may ensue.

The ocular complications of sickle cell disease are caused by microvascular occlusion secondary to the sickling of red blood cells. Retinal hypoxia, ischemia, infarction, neovascularization, and fibrovascularization may result from the microvascular occlusion.9 The retinopathy can be divided into non-proliferative and prolifertive changes . Although neovascularization may be seen at the optic disc and the macula, proliferative sickle retinopathy is primarily a peripheral retinal disease that can lead to severe vision loss. Proliferative retinopathy is more characteristic of patients with SC and SB thalassemia disease than the more severe systemic form of sickle cell anemia.10

Additional retinal complications of sickle cell disease include sickling maculopathy, central retinal artery occlusion (CRAO), branch retinal artery occlusion (BRAO), epiretinal membrane, ischemic optic neuropathy, development of optociliary shunt vessels, and choioretinal infarctions.11

## II. Method and material

This was a prospective observational study that involved 200eyesof100patientswithanaemia. Patients were recruited from theOPD of MLB MEDICAL college, Jhansi ,Uttar Pradesh and were followed from 1stSeptember 2019 - 1st march 2020 . 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.

**Inclusion criteria**

1.All patients who presented to the OPD of MLB medical College Jhansi who were found to have anaemia were included.

**Exclusion criteria**

1.Patients with ocular systemic diseases(like diabetesand hypertension) that could affect the retina.
2.Patients with other retinal disorders
3.Patients with recent intraocular surgery
4.Patients with the history of trauma
5.Mentally or physically unfit patients

All patients were subjected to a detailed history taking, refraction using Topcon autorefractometer and best corrected visual acuity (VA) measurement. All patients had complete ophthalmic examination , fundus examination with direct ophthalmoscope, 90D lens and fundus photography and optical coherence tomography.

Optical coherence tomography examination was done through dilated pupils, OCT examination was done through a dilated pupil using commercially available Cirrus HD-OCT Model 4000 - Carl Zeiss Meditec, Inc., Dublin,California, USA or Spectralis OCT Heidelberg Engineering.

## III. Results

A total of 200 eyes of 100 patients were studied. We included patients with anemia.There were 23 males and 77 females.

Most of the patients have ophthalmoscopic feature of anemia

**Table1: Gender distribution in anemia patient for ophthalmoscopic feature**

| Gender | no. of patients |
|---|---|
| Male | 23 |
| Female | 77 |

**Table2: Ophthalmoscopic finding in anemia patient**

| Ophthalmoscopic feature | percentage of patient |
|---|---|
| Haemorrhage | 64 |
| Roth spots | 58 |
| Exudates | 52 |
| Cotton wool spots | 46 |
| Perivascular sheathing | 34 |
| Neovascularisation | 25 |
| Ischemic optic neuropathy | 18 |

## IV. Discussion

Transient retinal hemorrhages associated with anemia FROM gastrointestinal hemorrhage were first described by Ulrich(12) in 1883. Subsequently Pagenstecher observed similar examples of retinopathy associated with anemias FROM multiple different etiologies that also resolved upon correction.

The anemias are a GROUP of hematologic disorders manifesting in a decrease in the circulating level of red blood cells and/or a decrease in the level of hemoglobin. Symptoms common to all anemias are weakness and fatigue whereas anemias secondary to specific etiologies may also be associated with particular systemic symptoms.

The manifestations of anemic retinopathy are non-specific and may closely simulate hypertensive or diabetic retinopathy(13). Retinal changes in anemia are common consisting mainly of cotton-wool spots, venous tortuosity, and hemorrhages which may be present at all levels of the retina and choroid. Kanski notes that the duration of the anemia itself does not influence the occurrence of these changes, instead that they seem to be related to the reduction in hematocrit and are more common when the anemia coexists with thrombocytopenia(14).

Factors such as anoxia, venous stasis, angiospasm, increased capillary permeability, and thrombocytopenia have been implicated in the pathogenesis of anemic retinopathy. Other contributing factors include severity of the anemia, increased blood viscosity, as seen in leukemic and other myeloproliferative disorders, and periods of hypotension (especially following severe hemorrhage). The lattermost may also result in shock optic neuropathy which has a presentation and prognosis similar to ischemic optic neuropathy(15). Long-standing anemia FROM Vitamin B12 and/or folate deficiency may also present with optic neuropathy.

## V. Conclusion

Hematological disorders affect millions of population and represent a major public health concern due to the potential for significant morbidity and mortality. The retinal findings associated with the various hematological disorders necessitate an immediate comprehensive medical evaluation. The optometric physician may play a crucial role in the diagnosis and management of these disorders.

## References:


[1]. Lanf GE, Spraul CW, Lang GK. Ocular manifestation of hematological diseases. Klin Monatsbl Augenheik 1998;212: 419-27.
[2]. Kaur B, Taylor D. Fundus hemorrhages in infancy. Surv Ophthalmol 1992;37:1-17.
[3]. Loewenstein JI. Retinopathy associated with blood anomalies. In: Jakobieck F (ed). Clinical Ophthalmology. Revised ed. Philadelphia: J.B. Lippincott Company, 1995;3(85): 995-1000.
[4]. Carraro MC, Rossetti L, Gerli GC. Prevalence of retinopathy in patients with anemia or thrombocytopenia. Eur J Haematol 2001;67:238-44
[5]. Weiss LM. Anemic Retinopathy. Pa Med 1966 Jun;69(6):35-6.
[6]. Schachat AP, Markowitz JA. Ophthalmic manifestation of leukemia. Arch Ophthalmol 1989;107:697-700.
[7]. Miller NR, Walsh FB, Hoyt WF, Newman, NJ. Leukemias/Lymphomas. In: Walsh and Hoyt's Clinical Neuro- Ophthalmology. Philadelphia: Lippincott Williams and Wilkins, 2005:1613-30.
[8]. Reddy, SC, Jackson N, Menon BS. Ocular Involvement in Leukemia study of 288 cases. Ophthalmologica 2003; 217:441-5.
[9]. To KW, Nadel AJ. Ophthalmologic complications in hemoglobinopathies. Hematol Oncol Clin North Am 1991 Jun;5(3):535-48.
[10]. Goldberg MF. Natural history of untreated proliferative sickle retinopathy. Arch Ophth 1971;85(4):428-37.
[11]. Roy MS, Rodgers GP, Noguchi CT, Schechter AN. Retinal signs in sickle cell anemia. Eye 1999;4(6):862-4.
[12]. Pears, MA and Pickering, GW. Changes in the fundus oculi after haemorrhage. Quart. J. Med., 29:153, 1960.
[13]. Weiss, HM. Anemic Retinopathy. Pa Med. 1966. 69(6):35-6.
[14]. Rubenstein, RA, Yanoff, M and Albert DM. Thrombocytopenia, anemia and retinal hemorrhage. AJO 65: 435, 1968
[15]. Beck, RW and Smith, CH. Neuro-Ophthalmology: A Problem-Oriented Approach. First Edition. Boston, 1988. Little, Brown, and Company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