ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4

Journal of Coastal Life Medicine

A Study of Ocular Manifestations in Anaemic Patients

Received: 20 October 2022**, Revised:** 16 November 2022**, Accepted:** 24 December 2022

Dr. Shivang Patel
Post Graduate, Santosh Deemed to Be University, Ghaziabad, Delhi NCR, India
Email ID: shivangpatel28@gmail.com

Dr. Sarita Aggarwal*
Head of Department, Department of Ophthalmology, Santosh Medical College & Hospital, Ghaziabad, Delhi NCR, India
*Corresponding Author Email ID: sarita.doctor@gmail.com

Dr. Shikha Pawaiya
Associate Professor, Santosh Deemed to Be University, Ghaziabad, Delhi NCR, India
Emai ID: drshikha2004@gmail.com

Dr. Aarav Jawa
Post Graduate, Santosh Deemed to Be University, Ghaziabad, Delhi NCR, India
Email ID: aaravjawa1@gmail.com

Dr. Pulkit
Post Graduate, Santosh Deemed to Be University, Ghaziabad, Delhi NCR, India
Email ID: pulkit760@gmail.com

Dr. Aditi
Post Graduate, Santosh Deemed to Be University, Ghaziabad, Delhi NCR, India
Email ID: aditisinha1001@gmail.com

Key Words:
Anaemia, Anaemic retinopathy, Diminution of vision, Roth's spot, conjuctival pallor.

Abstract:

Anaemia can appear with a wide range of ocular abnormalities. Every component of the eye is susceptible to anaemia. In 28% of individuals, anaemia results in anaemic retinopathy, particularly when thrombocytopenia (38%), is also present. The risk of retinopathy rises as anaemia severity rises, especially when haemoglobin (Hb) levels are below 6 gm/dl. A cross sectional observational study that was conducted in 100 patients, age group of 18 to 60 exclusion were taken for study during the time period of April 2021 to October 2022. Objectives of the study were the ocular manifestations in patients with anaemia, compare severity of anaemia with ocular manifestation in anaemic patients, study ocular manifestations in patients of anaemia with thrombocytopenia, compare the occurrence of retinal manifestations in patients with anaemia with thrombocytopenia vs anaemia. WHO grading based on haemoglobin levels was used to categorize patients. Each patient was subjected to detailed history taking, followed by external ocular examination, visual acuity for near and distance using Snellen's chart, slit lamp examination, intraocular pressure measurement using Goldman's applanation tonometry, fundoscopy using direct ophthalmoscope and indirect ophthalmoscope. Among those 100 patients 16% patients had mi1d anaemia, 47% patients had moderate anaemia, 37% patients had severe anaemia. In this study out of 100 patients 65(65%) were female and

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

35(35%) were male and maximum patients 35% were in between age 21-30 years. 25% had diminution of vision. severe anaemia about 54.05% had diminution of vision. retinal abnorma1ities are significantly higher in severe anaemic patients as compared to the mi1d and moderate anaemia. Early diagnosis of retinal manifestation will facilitate prompt treatment initiation, leading to prevention of avoidable diminution of vision, early clearance of retinal abnormalities and a successful outcome. Coexistence of anaemia and thrombocytopenia has a greater impact on the frequency and severity of retinal manifestation.

1. Introduction

There are many different types of diseases that can appear as haematological disorders and have ocular symptoms. One of the most prevalent haematological disorders, anaemia can appear with a wide range of ocular abnormalities.[1,2]

Every component of the eye is susceptible to anaemia. Conjunctival pallor and retinal abnormalities such as venous tortuosity, cotton wool spots, retinal haemorrhages, posterior pole pallor, papilledema, macular haemorrhages, Roth's spots, macular star, and subconjunctival haemorrhages have been shown in previous studies to be the important manifestations seen in anaemic patients.[2-5]

Anemia impairs the vital nutritional supply necessary for retinal metabolism, which puts the retina at risk of hypoxic damage. In the l9th century, retinal exudates and haemorrhages were identified in patients with blood diseases. All eye structures, including the eye's adenexa, can exhibit anaemia and other haematologic disorders (lid edema).[l,6,7]

A low level of healthy red blood cells (RBCs) or haemoglobin (an iron-binding, oxygen-carrying protein within RBCs), which is a component of RBCs, can result in anaemia. Anemia can be categorised in the following ways depending on the cause:[6]

• Hypo-proliferative: Caused by inadequate bone marrow RBC production.[6]

• Haemolytic: Caused by increased bleeding or red blood cell injury.[6]

• Ineffective erythropoiesis: Brought on by anomalies in the blood cell's synthesis.[6]

The most prevalent type of anaemia is nutritional anaemia, which results from iron deficiency. Pernicious anaemia, which results from a vitamin Bl2 shortage, is another type of nutritional anaemia. Ulrich initially identified transitory retinal haemorrhages in the eye in l883. Anemia can cause them.[8]

In 28% of individuals, anaemia results in retinopathy, particularly when thrombocytopenia (38%), is also present. The risk of retinopathy rises as anaemia severity rises, especially when haemoglobin (Hb) levels are below 6 gm/dl.[8]

The clinical characteristics of anaemic retinopathy are thought to be caused by a range of pathologic alterations that are brought on by and linked to anaemia.[8]

Cotton wool patches are a clinical symptom of retinal hypoxia, which anaemia induces to trigger nerve fibre layer infarction. Additionally, retinal hypoxia causes microtraumas to the artery walls, which result in retinal edoema and haemorrhages, vascular dilatation, increased transmural pressure due to hypoproteinemia, and transmural pressure.[8]

Anemia and thrombocytopenia frequently coexist in clinical settings, which can result in haemorrhages and abnormal coagulation.[8]

Thrombocytopenia frequently co-occurs with anaemia in clinical settings, and other variables such venous stasis, angiospasm, increased blood viscosity (myeloproliferative diseases), hypotension (after

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

haemorrhage), etc. may also contribute to the pathology. Optic neuropathy may be brought on by hypotension.[8]

2. Methodology

This was a cross sectional observational study that was conducted in 100 patients, age group of 18 to 60 fulfilling the criteria of inclusion and exclusion were taken for study during the time period of April 2021 to October 2022 who attended the Department of ophthalmology, Santosh Medical College and Hospital, Ghaziabad,UP.

INCLUSION CRITERIA:

1. Diagnosed cases of Anaemia satisfying the WHO criteria.
2. Age between l8 to 50 years.

EXCLUSION CRITERIA:

1. Patient diagnosed with Diabetes mellitus.
2. Patient diagnosed with hypertension.
3. Patient with dense media opacities.
4. Patients with any pre-existing retinal pathology.

ETHICAL APPROVAL:

Ethical approval was taken by the ethical committee of the medical college and hospital.

HISTORY:

The current examination was carried out at Santosh Medical College & Hospital in Ghaziabad's Outpatient Ophthalmology department. Once all subjects had given their written informed consent and had been told of the significance of eyesight, the subjects were all enrolled in the study. Patients were examined methodically and systematically with the assistance of the OPD staff.

Outpatient and inpatient at Santosh Medical College and Hospital, diagnosed with anaemia, were taken for study.

WHO grading based on haemoglobin levels was used to categorize patients in to mild, moderate and severe anaemia.

After taking informed written consent demographic details, ocular complaints if any, past history, personal history, family history taken, general physical examination and systemic examination done.

Each patient was subjected to detailed history taking, followed by –

- External ocular examination.
- Visual acuity for near and distance using Snellen's chart.
- Slit lamp examination.
- Intraocular pressure measurement using Goldman's applanation tonometry (GAT).
- Fundoscopy using direct ophthalmoscope and indirect ophthalmoscope.

Best corrected visual acuity Assessment:

Snellen's visual acuity chart, which accesses distant central visual acuity, is used to test visual acuity in patients.[9]

Two things can appear to be two different objects when they are situated far apart and subtend at an angle of one minute at the nodal point of the eye. The Snellen test forms are built on top of this principle.[9]

It has a series of black capital letters on a white board placed in a row that gradually get smaller in size as one moves from top to bottom of a chart.[9]

An evaluation of visual acuity was conducted at a distance of 6 metres.[9]

Patients were presented the Snellen chart, where the first line was 6/60 and the last line was 6/6, and asked to read the alphabets from first to last line with each eye separately.[9]

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

The patient was instructed to approach the Snellen map slowly in order to read the uppermost line if they were unable to see the first line (6/60) from a distance of 6 metres. Otherwise, their vision was recorded as 5/60, 4/60, 3/60, 2/60, and l/60.[9]

If the patient was unable to see the first row at a distance of one meter, they were instructed to count the interviewer's fingers close to their face. The acuity was then recorded as CF3', CF2', CFl' OR CF- close to the face depending on how far they could count the fingers.[9]

If Patient can't do finger counting waving hand gesture done close to the face. The acuity than labeled as HMCF (hand movement closed to face).[9]

Examiner observed whether or not they could appreciate light (Pl) if they were unable to understand hand movements. If so, the vision was recorded as Pl Positive; otherwise, it was recorded as Pl Negative.[9]

Patients below visual acuity 6/6 were under gone spectacular correction. Best corrected visual acuity noted as vision of a patient.

Ocular examination diffuse torch light: All patients underwent a diffuse torch light examination of the ocular adnexa, which included checking for any obvious abnormalities in the cornea, conjunctiva, anterior chamber, iris, and pupil as well as the head position, facial symmetry, eyebrows, eyelashes, and eyelids.[10]

Slit lamp examination biomicroscopy: Slit lamp biomicroscopy was used to thoroughly evaluate the anterior and posterior segments of each group and look for any signs of ocular morbidity. Allvar Gullstrand, an ophthalmologist and l9ll Nobel laureate, invented the slit light. later, Hecker and Vogt modified the Gullstrand and Czapski microscope to create an adjustable microscope.[11]

The 3D view of the eye is possible with a contemporary slit lamp biomicroscope. It is an effective stereoscopic diagnostic device. It centers mostly on the illumination and observation systems. Magnification levels range from 5x, l0x, l6x,40x to l00x. Slit lamps produce an upright, virtual image.[11]

Following proper patient posture on the slit lamp, a thorough examination is conducted as shown below.

Examination of eyebrows was done for the level and any Cilia abnormalities. Eyelashes, lid margins, and skin above the lids are all checked for any abnormalities in their position and movement. Palpebral aperture was examined for any unusually wide, tall, or shaped openings. For any irregularity in the puncta and lacrimal sac region, use the lacrimal apparatus.

Conjunctiva examined the palpebral, bulbar, and fornix parts for any anomalies. The size, shape, surface, curvature, transparency, and sensation of the cornea are all checked for any abnormalities, if there is any corneal vascularization. Fluorescein staining is performed in suspected cases. The back of the cornea was examined for pigmentation and keratic precipitates. limbus and Sclera searched for any abnormalities, including ectasia, nodules, and discolouration.Any abnormalities in the depth of the anterior chamber, as well as any aberrant contents like blood (hyphema), pus (Hypopyon) etc.

Iris was inspected to look for any abnormalities in its pattern and colour. Synechiae, iridodonesis, iris nodules, neovascularization of the iris, and iris cysts should all be recognised if present. The pupil examined for any anomalies in its size, shape, or location. Direct, indirect, or consensual pupillary reflexes as well as swinging flesh light and a near reflex are all assessed. The position, shape, colour, and transparency of the lens are all checked for any abnormalities. Both the quantity of purkinje images formed and any deposits on the anterior

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

lens surface were noted. the anterior vitreous phase examined the contents for any abnormalities (blood in case of vitreous hemorrhage).

Intra ocular pressure of all patients were measured using Goldman's applanation tonometer and corrected according central corneal thickness before dilating pupil of patient.

Before fundus examination dilatation of pupil done by combination 0.8% tropicamide and 5% phenylephrine, 3 drops l0 mins apart in both eyes.

Fundus examination was performed utilizing a 90D slit lamp biomicroscope where the created picture was real and inverted. If professionals only have room for one lens, the 78D with 0.77x magnification is typically a versatile all-around lens. Another choice is the 90D (0.64x), which is also a suitable all-purpose lens Since the 60D lens delivers a higher magnification of about lx, it is especially well suited for disc imaging. Additionally, because of the unit magnification, there is no conversion needed to determine the size of the disc. If you need higher magnification or prefer a longer working distance, the 20D and 28D lenses are perfect.

These lenses are preferred when patients can't use a slit lamp, when youngsters need a panoramic view yet have short viewing times, when imaging is difficult due to nystagmus, or when scleral indentation is necessary.

Fundus examination with Direct and Indirect Ophthalmoscope: Ophthalmoscopy is a clinical examination procedure that uses an ophthalmoscope to examine the interior of the eye. In routine practice, it is done to view the fundus of the eye, assess the disc, retina, and macula's condition, as well as to find any opacity of ocular media. Both direct and indirect ophthalmoscopes are designed to perform ophthalmoscopy.[12]

Herman von Helmholtz created the Direct Ophthalmoscope for the first time in l85l. It is a uniocular ophthalmoscope that comes equipped with a variety of lenses. It displays a virtual and upright image with a l5-fold magnification. It has l0 degree fiels of viw. There is no stereopsis, and any haze makes it challenging for the examiner to look at the fundus.[11]

Charles Schepens initially introduced the indirect ophthalmoscope, a binocular variation of the ophthalmoscope, in l945. To see the fundus, you need a 20D condensing lens. The retina and eye lens are aligned along the same primary axis, and the picture generation is actual, inverted, and magnified by two to five times while being held at arm's length. It needs a strong source of illumination. There is stereopsisis present, and the field of focus extends up to 8 discdimeters, or to the ora serrata (peripheral retina). In contrast to a direct ophthalmoscope, examination through a cloudy medium is also possible with an indirect one.[11]

All age groups had a fundus examination using a binocular indirect ophthalmoscope (Welch Allyn l25 model) and a direct ophthalmoscope (Heine Beta 200-S model), with the following considerations used when completing the examination.

Any opacity in the ocular media, such as corneal, lenticular, and vitreous (exudates, haemorrhage, foreign body, and vitreous membranes) opacities, was recorded.

Examination of the optic disc for any deviations in its colour, shape, size (diameter), margin, and C/D ratio (Cup disc ratio). We looked for any deviation from the typical 4:l6 ratio of large to small blood veins on the disc. If present, identify any further abnormalities such as splinter haemorrhages, neovascularization, or opto-ciliary shunt.

Examining of the macula done for any abnormalities such as fundus pallor, macular oedema, cherry red patch,

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

or macular scarring as well as the foveal reflex noted. Any anomalies in the retinal vasculature, such as arteriole constriction, vein tortuosity, or vessel sheathing, are observed. If present, arterial and venous pulsations were detected. Rest retinal examination done and if any abnormality present like flame shape hemorrhages, dot and blot hemorrhages, cotton wool spots etc were noted.

The retina is a 266 mm^2 surface area layer of sensitive, thin nerve tissue. The optic disc, retinal blood vessels, area centralis with the fovea and foveola, peripheral retina containing the equator, and ora serrata are the retina's principal structural elements. A pigmented layer and a sensory layer make up the retina. The optic disc is where the retina is the thickest, measuring around 0.56mm. The thickness decreases as it moves away from the centre, dropping to 0.l mm at the ora serrata and 0.l8 mm at the equator.

Statistical Analysis: Data was manually collected, entered into an MS Windows Excel spreadsheet, and then properly analysed using online Graph Pad software using cross tabulation, frequency graphs, histograms, means, medians, standard deviations, Pearson correlation coefficients, parametric and non-parametric tests, among other standard statistical methods.

3. Results

In this c1inical cross sectiona1 prospective study, 100 diagnosed anaemic patients with or without associated thrombocytopenia were taken. Among those 100 patients 16 patients (16%) had mi1d anaemia, 47 patients (47%) had moderate anaemia, 37 patients (37%) had severe anaemia.

Table: 1 According to the grading of anaemia distribution of the patients

Grade	mi1d	moderate	Severe
Haemog1obin	10-12gm/d1	7-10gm/d1	<7gm/d1
Patients	16	47	37
Percentage	16%	47%	37%

Table: 2 According to gender of patient distribution of anaemia

In my study out of 100 patients 65(65%) were female and 35(35%) were male.

Gender	ma1es	Fema1es
Patients	35	65
Percentage	35%	65%

Table: 3 Age wise Distribution of anaemic patients

In this study among 100 patient maximum patients 35% were in between age 21-30 years.

Age	Total (100)	Percentage
18-20	14	14%

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

21-30	35	35%
31-40	24	24%
41-50	27	27%

Table: 4 Anterior and Posterior segment ocu1ar findings according to severity of anaemia.

According to above data study shows that ocular manifestations are directly proportional to the severity of anaemia. Out of 37 severe anaemic patients 100% of them had anterior segment manifestations and 89.18% had posterior segment manifestations. Out of 47 moderate anaemic patients 89.63% of them had anterior segment manifestations and 36.17% had posterior segment manifestations. Out of 16 mi1d anaemic patients on1y 1% of them had anterior segment manifestations and 0% had posterior segment manifestations.

Grade	mi1d	Moderate	Severe
Tota1 Case	16	47	37
AS	1(6.25%)	42(89.36%)	37(100%)
PS	0(0%)	17(36.17%)	33(89.18%)

Table: 5a Diminution of vision in anaemic Patients.

Tota1 Patients	100	100%
Patients with DOV	25	25%

Table: 5b Diminution of vision (DOV) according to severity of anaemia

Among 100 anaemic patients 25% had diminution of vision. Only one patient (6.25%) had diminution of vision in mild anaemia. In moderate anaemia 8.51% patients had diminution of vision and in severe anaemia about 54.05% had diminution of vision.

Grade Of Anaemia	mi1d	moderate	Severe	Tota1
DOV	1(6.25%)	4(8.51%)	20(54.05%)	25

Table: 6a Anterior Segment Manifestations in Anaemia.

Manifestations	**present**	**Percentage**
1id oedema	9	9%
Conjuctiva1 Pa11or	80	80%
Subconjuctiva1 haemorrhage	7	7%

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

Table:6 b Anterior segment manifestations according to severity of anaemia.

According to above data conjunctival pallor was the most common anterior segment manifestation in anaemic patient accounts for 80 (80%) of total cases. It was present in all cases, 37(100%) with severe anaemia. Out of 47 moderate anaemic it was noticed in 42 (89.36%) of the patients. In mild 1(6.25%) out of l6 patients have conjuctival pallor.

Among all anaemic patients lid edema was present in only 9%. In mild to moderate anaemia there is no patient had lid edema. It was only present in severe anaemic patients.

Sub-conjunctival hemorrhage was present in 7% of patients. It was present in only severe anaemic patients.

Manifestations	Mi1d anaemic (16)	Moderate Anaemic (47)	Severe anaemic (37)	Tota1 (100)	Percentage
1id oedema	0(0%)	0(0%)	9(24.32%)	9	9%
conjuctiva1 pa11or	1(6.25%)	42(89.36%)	37(100%)	80	80%
Sub conjuctiva1 haemorrhage	0	0	7(18.91)	7	7%

Table: 7 Posterior Segment Manifestations associated with anaemia.

Retina1 haemorhages were the most common ocu1ar manifestation of posterior segment in anaemic patients.

PS Manifestations	Tota1	Percentage (%)
Vitrious Haemorrhage	9	9%
Papi11edema	7	7%
Fundus Pa11or	26	26%
Vascu1ar changes	10	10%
F1ame shape Haemorhages	37	37%
Dot-b1ot Haemorhage	30	30%
Roth's spots	8	8%
Cotton woo1 spots	10	10%
Retina1 Oedema	9	9%
Macu1ar Star	4	4%

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

In this study among the anaemic patients most common posterior segment complication was flame shape haemorhages seen in 37% of the total cases. Out of 37 severe anaemic patients they were present in 8l.03% of the patients, out of 47 moderate anaemic patients it was present in l2.76% of patients and out of l6 mild anaemic it was only present in l that is 6.25% of the patients.

Among total cases 30% had dot and blot haemorhages. Out of 37 severe cases it was present in 54.05% of the cases and out of 47 moderate cases it was present in 2l.27% patients. They were not present in patients with mild anaemia.

Among total cases 9% had sub hyloid haemorhages. Out of 37 severe cases it was present in 29.32% of the cases. They were not present in patients with mild and moderate anaemia.

Among total cases 8 had Roth's spots. Out of 37 severe cases it was present in 25.80% of the cases. They were not present in patients with mild and moderate anaemia.

Cotton wool spots were seen in l0 patients among them 6 patients were of severe anaemia and 4 were of moderate anaemia.

26% anaemic patients had fundus pallor out of l00 cases. Out of 37 severe anaemic patients it was noticed in 56.75% (2l) cases. Out of 47 moderate anaemic patients it was noticed in only l0.6% (5) cases.

Papilloedema was only present in patient with severe anaemia. Out of 37 patients it was present in l8.9l% of cases.

Vascular changes were seen in l0 patients out of l00. They were present only in severe anaemics.

Out of 37 severe anaemic patients 24.32% had retinal oedema.

Table: 8 Posterior Segment (PS) manifestation associated with severity of anaemia

PS Manifestations	Mi1d	Medderate	Severe	Tota1	%
Vitreous Haemorrhage	0	0	9(24.32%)	9	9%
Papi11edema	0	0	7(18.91%)	7	7%
Fundus Pa11or	0	5(10.6%)	21(56.75%)	26	26%
Vascu1ar changes	0	0	10(27.02%)	10	10%
F1ame shape Haemorhages	1(6.25%)	6(12.76%)	30(81.08%)	37	37%
Dot-b1ot Haemorhage	0	10(21.27%)	20(54.05%)	30	30%
Roth's spots	0	0	8(25.80%)	8	8%
Cotton woo1 spots	o	4(8.51%)	6(16.21%)	10	10%
Retina1 Oedema	0	0	9(24.32%)	9	9%
Macu1ar Star	0	0	4(10.81%)	4	4%

According to above data retinal abnorma1ities are significantly higher in severe anaemic patients as compared to the mi1d and moderate anaemia.

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

Table: 9 Assessment of retina1 abnorma1ity with Severity of Anaemia.

Grade	anaemic patients	patients with retina1 abnorma1ity
mi1d	14	1(7.1%)
Moderate	47	16(34%)
Severe	37	30(81%)

According to above data retina1 manifestations are significant1y high in anaemia with thrombocytopenia in compare to anaemia without thrombocytopenia. They are a1so associated with severity of anaemia and thrombocytopenia

Table: 10 Retina1 Abnorma1ities in anaemia with thrombocytopenia.

P1ate1et count	Hemog1obin	Retina1 abnorma1ity	tota1
<50000	<7	21(95.45%)	22
	7 to 10	4(50%)	8
	>10	0	1
50000 to 100000	<7	6(100%)	6
	7 to 10	2(22.22%)	9
	>10	0	1
>100000	<7	5(55.55%)	9
	7 to 10	0	30
	>10	0	14

4. Discussion

There is a vast range of haematological illnesses that can have different ocular symptoms. One of the most prevalent haematological disorders, anaemia can have a wide range of ocular symptoms.[1,2] Anemia can have a variety of visual manifestations, and anaemia caused by a variety of etiologies can also cause a variety of ocular manifestations.[1]

The majority of patients with different eye abnormalities are symptomatic and need a thorough ophthalmic evaluation. Anemia can impair the eye's adnexal structures, anterior segment, and posterior segment.

Conjunctival pallor, diminished vision, sub conjunctival haemorrhages, and abnormalities such as retinal haemorrhages, fundus pallor, arteriolar & venous tortuosity, sub hyaloid haemorrhages, white centre haemorrhages, retinal edoema, cotton wool spots, etc. are the most significant posterior segment manifestations seen in anaemic patients, according to previous studies.[2-

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

Hypoxia, anoxia, venous stasis, angiospasm, and increased capillary permeability in anaemia are potential pathophysiological mechanisms that could cause retinal impairment.[13]

The vital nutritional supply that is necessary for retinal metabolism is compromised in anaemia, which increases the risk of hypoxic damage to the retina. Conjunctival pallor was the most prevalent ocular symptom of anaemia in the current study, occurring in 80 out of l00 cases. According to Nusrat et al 78% out of 100 patients have pallor which is comparable to this study.[2]

In 37(37%) out of l00 cases, abnormalities in the retina were the second most frequent visual symptom. Conjunctival pallor and retinal haemorrhages were also more frequent in anaemic patients, according to Nusrat et al. and lang et al.[2,7] which are comparable to this study. Haemoglobin measurement should be done simply because conjunctival pallor is present without any other ocular manifestations that would indicate anaemia.[13,14,15]

In this study, macular stars, tortuous veins, pailloedema, and retinal oedema were among the retinal abnormalities that were observed. The most frequent haemorrhages are flame-shaped haemorrhages, followed by dot-and-blot and sub-hyaloid haemorrhages. Flame-shaped haemorrhages were the most prevalent type of retinal haemorrhages, followed by deep haemorrhages, haemorrhages with white centres, and sub-hyaloid haemorrhages, according to Satish C. Shitole's study of 48 anaemic patients.[2] When Kalpana Suresh et al studied 34 anaemic individuals, she discovered that profound haemorrhages and flame-shaped haemorrhages were the two most frequent types of haemorrhages, which is comparable to this study.[4] Flame-shaped haemorrhages were found to be the most prevalent type of retinal haemorrhages, according to Nusrat et al., who also evaluated l00 anaemic patients.[5] The most frequent sort of haemorrhages, according to a study by Holt J.M. and Gordensmith on 63 anaemic individuals, were flame-shaped haemorrhages.[16] which are very high in compare to this study.

In this study, fundal pallor, which was seen in 26% of patients, was the third most frequent ocular sign of anaemia. Fundal pallor was discovered by Satish C. Shitole to be the second most frequent ocular symptom in 48 anaemic patients which is high compared to this study.[2] Fundal pallor was identified by Nusrat et al. as the third most prevalent visual symptom in their study of l00 anaemic patients.[5] it is comparable with this study.

This research showed that the frequency of retinal haemorrhages and various statistically, the association between manifestations and anaemia severity significant (p-value 0.00) and moreover, patients with mild anaemia did not exhibit any convincing signs of anaemic retinopathy. In this study, 7 (ll.l%) out of 63 patients with mild to moderate anaemia and 30 (8l%) out of 37 patients with severe anaemia both had retinal abnormalities. Satish C. Shitole studied 48 anaemic patients and discovered a statistically significant correlation between the frequency of retinal haemorrhages (68.4%) and the severity of retinal symptoms.[2] Additionally, Nusrat et al. discovered that mild anaemia did not exhibit any retinal abnormalities, but severe anaemia revealed more retinal abnormalities (34.2%) than moderate anaemia (7.5%).[5] Additionally, according to Merin S. & Freund, l3.3% of patients with moderate anaemia and 3l.8% of those with severe anaemia both had retinal abnormalities.[17] According to Ajit et al., the intensity of anemia's retinal symptoms varies on its severity.[18]

This research showed that the effects of anaemia and thrombocytopenia occurring together have a greater impact on the severity of ocular manifestations. There

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

were statistically significant instances of ocular symptoms in patients with severe anaemia and low platelet counts (P value 0.002). Yet this research did not reveal any discernible variation in the frequency of retinal symptoms when severe low platelet counts (50,000 microl) are linked to anaemia (7gm/dl) compared more than l00000 microl of platelets. Previous research has also demonstrated that thrombocytopenia and anaemia increase the risk of retinal haemorrhages.[5,19,20,21]

The third most frequent eye symptom in this study was fundal pallor, which can be caused by a generalised decrease in haemoglobin concentration.[22] The columns of both artery and venous blood lie exposed in the fundus of the eye, more so than in any other area of the body. As a result, they can be seen using an ophthalmoscope at any moment during life, viewed in detail with a handy magnification, photographed, or painted. The ophthalmologist is frequently the first person to notice any blood disorders, but as blood is a component of many tissues, diseases that affect it might manifest in a variety of locations before a patient sees a haematologist, whose examination provides the definitive diagnosis.

In this study diminution of vision was present in 25% of cases out of which 80% patients were of severe anaemia. A study conducted by A SINGH et al. showed 28% patients had diminution of vision due to anaemic retinopathy.[2]

5. Conclusion

Low levels of healthy red blood cells (RBs) or haemoglobin, an iron-binding, oxygen-carrying protein within RBCs, can lead to anaemia, one of the most prevalent haematological disorders. Anaemia can have a variety of etiologies, which can lead to a variety of ocular symptoms. The eye's adnexal structures, posterior segment, and anterior segment can all be impacted by anaemia.

In 80 out of l00 cases in this study, conjunctival pallor was the most prevalent ocular anacmia symptom. Conjunctival pallor alone, without any additional visual symptoms of anaemia, is a sufficient reason to do a haemoglobin estimation; nevertheless, the presence of conjunctival pallor also necessitates further assessment for the existence and severity of anaemia.

In this study, retinal abnormalities were the second most frequent ocular symptom of anaemia, occurring in 37 out of l00 cases.

Retinal haemorrhages were the most prevalent retinal manifestation of anaemia in this study. The most frequent retinal haemorrhages were flame-shaped haemorrhages, followed by dot-and-blot haemorrhages and sub-hyaloid haemorrhages. The third most frequent ocular symptom of anaemia, which can be caused by a generalised decrease in haemoglobin concentration, is fundal pallor.

According to the results of this study, the severity of anaemia directly correlates with the frequency of retinal haemorrhages and other visual manifestations, while individuals with moderate anaemia did not exhibit any convincing signs of anaemic retinopathy. Therefore, an obligatory fundus examination for patients with moderate to extremely severe anaemia is required to detect retinopathy alterations

Early diagnosis of retinal manifestation will facilitate prompt treatment initiation, leading to prevention of avoidable diminution of vision, early clearance of retinal abnormalities and a successful outcome.

Coexistence of anaemia and thrombocytopenia has a greater impact on the frequency and severity of retinal manifestation.

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

References

[1] Duke-Elder S. Dorbee JH. the blood diseases. I x. System of Ophthalmology. CV Mosby Co; 1967:p373-407.

[2] Satish SC., Tapan J.P Ocular manifestations in patients with nutritional anaemia. Ind. J. Basic and Applied Med. Research 2014;3(4):89-94.

[3] Seema C, Nayak V I, Sanjana S, Shwetha B A. Retinal manifestations in anemia - a clinical study. MedPulse - Int. Med. J. 2014;1(8):422-4.

[4] Suresh K, Sampath R, Tanvi. Ocular Manifestations In Haematological Disorders. Sri Ramachandra J. Med. 2011;4(1): 1-4.

[5] Shaheen N, Wani J S, Nasti A R, Quadri M I. Ocular Manifestations In Anemia - A Clinical Study . J K - Practitioner 2005;12(3):128-30.

[6] Shah Gaurav Y, Modi R. Anemic Retinopathy: Case Reports and Disease Features. Clinical findings vary depending on the etiology of the anemia. Retina Today. May/June 2016 .p. 30-32.

[7] Lang GE, Spraul CW, Lang GK. : Ocular changes in primary hematologic disease. Klin Montsbl Augenheikd, 1998; 212(6); 419.

[8] Pears MA, Pickering GW. Changes in the fundus oculi after haemorrhage. Q J Med. 1960;29:153-178.

[9] Mukherjee PK. Examination of Vision & Recording of Visual Acuity. In: Mukherjee PK (Edi). Clinical Examination in Ophthalmology. 2 nd edition. New Delhi: ELSEVIER RELX India Private Limited;2016. p14-45.

[10] Khurana AK. Clinical Methods in Ophthalmology. In: Khurana AK(Edi). Comprehensive Ophthalmology. 4 th edition. Delhi: New Age International Private Limited; 2007. p461-98.

[11] hurana AK. Darkroom Procedures. In: Khurana AK(Edi). Comprehensive Ophthalmology. 4 th edition. Delhi: New Age International Private Limited;2007. P543-70.

[12] Borooah M, Nane YJ, Ekka J. Evaluation of thickness of retinal nerve fiber layer and ganglion cell layer with inner plexiform layer in patients without diabetic retinopathy and mild diabetic retinopathy in type 2 diabetes mellitus patients using spectral-domain optical coherence tomography. International Journal of Research in Medical Sciences. 2018 Jul;6(7):2434.

[13] Anusha Venkataraman, Bijnya B Panda, Anupam Dey MD: Nutritional anemia as a cause of vision loss in developing countries: A case report. Kerala Journal of Ophthalmology. Dec 2013; 25 (4): 383-384.

[14] Chalco JP, Huicho L, Alamo C, Carreazo NY, Bada CA. Accuracy of clinical pallor in the diagnosis of anaemia in children: a meta-analysis. BMC Pediatr.2005;5:46.

[15] Wurapa FK, Bulsara MK, Boatin BA. Evaluation of conjunctival pallor in the diagnosis of anaemia. J Trop Med Hyg. 1986;89:33-36.

[16] Holt JM. Gordon - Smith EC. Retinal abnormalities in diseases of the blood. Brit. J. Ophthal 1969;53:145-60.

[17] Merin S., Freund M. Retinopathy in severe anaemia. Am.J. Ophthalmol, 1968;66(6) 1102-1106.

[18] Majji AB, Bhatia K, Mathai A. Spontaneous bilateral peripapillary, subhyaloid and vitreous hemorrhage with severe anemia secondary to idiopathic thrombocytopenic purpura. Indian J Ophthalmol. 2010 May-Jun; 58(3): 234-236.

ISSN: 2309-5288 (Print)
ISSN: 2309-6152 (Online)
CODEN: JCLMC4
Journal of Coastal Life Medicine

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

[20] Marwaha RK, Singh S, Garewal G, Marwaha N, Walia BN, Kumar L. Bleeding manifestations in megaloblastic anaemia. Indian J Pediatr 1989; 56:243- 7.

[21] Lam S, Lam BL. Bilateral retinal hemorrhages from megaloblastic anemia: case report and review of literature. Ann Ophthalmol 1992; 24:86-90.

[22] Trevor -Roper P.D. Blood dyscrasias and the reticuloendothelial system. Modem Ophthalmology by Arnold Sorsby. Philedelphia, J.B.Lipinctt Co.1963 :2,545-549.

[23] Morishita E, Nakao S, Asakura H, et al. Hypercoagulability and high lipoprotein(a) levels in patients with aplastic anemia receiving cyclosporine. Blood Coagul Fibrinolysis. 1996;7:609-614.