

Original article:

Ocular manifestations in patients with nutritional anaemia

Dr.Shitole Satish C. , Dr.Jakkal Tapan P.

Name of the Institute: ESIC-Post graduate Institute of Medical sciences and Research Institute, Parel, Mumbai 12

Corresponding author: Dr.Shitole Satish C.

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Abstract:

Background: Occurrence of anaemic retinopathy and conjunctival pallor is common in nutritional anaemia. Magnitude of retinal manifestations depends upon severity of anaemia. Retinal damage in anaemia occurs due to anoxia, venous stasis, angiospasm and increased capillary permeability.

Methodology: Non interventional study was conducted in 48 adult patients diagnosed with nutritional anaemia in gynaecology, medicine and surgery department. Patients with diabetes, hypertension, anaemia other than nutritional causes and media opacities were excluded. After obtaining informed consent ocular examination was carried out with direct torch light illumination and direct ophthalmoscope. Fundus examination was done after dilatation of pupils with tropicamide (mydriatic) eye drops. Patients were examined in more detail in the Ophthalmology O.P.D (whenever possible).

Results: Conjunctival pallor was the most common finding and was seen in all patients. Flame shaped retinal haemorrhages was the second most common finding and was seen in 37.50% of patients. Fundal pallor was the third common finding seen in 31.25%. Other ocular manifestations like lid edema, subconjunctival haemorrhage, papilledema, macular star, cotton wool spot etc were less common. Incidence and severity of retinal manifestations was more with more severe grades of anaemia.

Conclusion: Anaemia can result in wide variety of ocular manifestations. Patients with conjunctival pallor should be evaluated for anaemia. Patients with moderate to very severe anaemia should undergo mandatory fundus examination for identification of anaemic retinopathy. Incidence and severity of retinal haemorrhages depends on severity of anaemia. Early recognition of retinal manifestation may help in early institution of treatment and thus early resolution of retinal changes.

Keywords: Nutritional anaemia, anaemic retinopathy, Severity of anaemia, fundus examination

Introduction

Anaemia is a commonest haematological disorder presenting with variety of ocular manifestations ¹. It can affect every part of the eye and adnexa but predominant features are conjunctival pallor and retinal haemorrhages ². Other retinal manifestation includes venous and arteriolar tortuosity, cotton wool spots, macular star and papilledema. Their high incidence is correlated with severity of anaemia. Substrate for retinal metabolism is reduced in anaemia and makes it prone for hypoxic damage ³. This study highlights the occurrence of ocular manifestations in anaemia, relation between incidence of retinal haemorrhages with severity of

anaemia and need for fundus examination in anaemic patients.

Methodology

This non-interventional study was undertaken in the ophthalmology department of our institute. 48 patients with nutritional anaemia from age group between 18 to 45 years from department of gynaecology, medicine and surgery were included in the study after obtaining written informed consent. Complete haematological work up was done to exclude patients with anaemia other than nutritional cause. Patients with diabetes, hypertension, anaemia other than nutritional causes and media opacities were excluded. All the patients were examined for ocular manifestations in their

respective wards. Patients were examined in more detail in the Ophthalmology O.P.D (whenever possible). Visual acuity in both eyes were recorded with a standard Snellen's chart. Evaluation of anterior segment of eye was done to detect presence of ocular manifestations (like lid edema, subconjunctival haemorrhage, conjunctival pallor) due to anaemia by direct torch light or slit lamp bio microscope. Evaluation of posterior segment of eye was done to detect presence retinal manifestations of anaemia (like venous dilatation and tortuosity, retinal haemorrhages, cotton wool spots, macular star and even papilledema) with the help of direct

or indirect ophthalmoscope after full dilatation of pupil with Tropicamide (mydriatic) eye drops.

The details of the patients, type and severity of anaemia along with ocular manifestations consistent with anaemia were recorded.

Data were analysed by using Chi-square test. The p-value of < 0.05 was taken as statistically significant.

Results

Out of total 48 patients with nutritional anaemia iron deficiency was seen in 26(54.16%) patients, megaloblastic anaemia was seen in 8(16.66%) patients and dimorphic anaemia was seen in 14(29.16%) patients.

Table 1: Distribution of cases according to type of anaemia.

Type of anaemia	No. of cases	Percentage of cases
Iron deficiency anaemia	26	54.16 %
Megaloblastic anaemia	8	16.66%
Dimorphic anaemia	14	29.16 %

In our study we found that conjunctival pallor was the commonest ocular manifestation in anaemia and was present in all cases. Diminution of vision was noticed in 4 out of 8 patients (50%) of megaloblastic anaemia and 9 out of 15 (64.28%) patients of dimorphic anaemia. Patients with iron deficiency anaemia did not show visual impairment. Lid edema was observed in 4 out of 26

(15.38%) patients with iron deficiency anaemia. It was not seen in patients with megaloblastic and dimorphic anaemia. Subconjunctival haemorrhage was seen in 1 out of 8 (12.5%) patients of megaloblastic anaemia and 2 out of 14 (14.28%) patients of dimorphic anaemia. It was not seen in patients with iron deficiency anaemia.

Table 2: Distribution of ocular manifestations in anterior segment

Ocular Manifestations	Iron deficiency anaemia (26 cases)	Megaloblastic anaemia (8 cases)	Dimorphic anaemia (14 cases)	Total (48 cases)	Percentage
Diminution of Vision	--	4	9	13	27.08%
Lid oedema	4	--	--	4	8.33%
Conjunctival pallor	26	8	14	48	100%
Subconjunctival haemorrhage	--	1	2	3	6.25%

In our study we found that retinal haemorrhage was the most common ocular manifestation in posterior segment due to anaemia. Flame shaped haemorrhage were seen in 18 cases out of 48 (37.50%), white centered haemorrhage were seen in 9 patients (18.75%), deep haemorrhages were seen in 15 patients (31.25%) and sub hyloid haemorrhages were seen in 4 patients (8.33%).

Fundal pallor was the second most common retinal manifestation seen in 15 out of 48 patients

(31.25%) with anaemia. Other retinal manifestation like papilledema (4.16% of patients), venous dilatation and tortuosity (4.16% of patients), retinal oedema (6.25% of patients), cotton wool spots (8.33% of patients) and macular star (2.06% of patients) were less commonly noticed on fundus examination.

Table 3: Distribution of ocular manifestations in posterior segment

Retinal manifestations	Iron deficiency anaemia (26 cases)	Megaloblastic anaemia (8 cases)	Dimorphic anaemia (14 cases)	Total (48 cases)	Percentage
Fundal pallor	4	5	6	15	31.25%
Papilledema	--	--	2	2	4.16%
Venous dilatation & tortuosity	--	1	1	2	4.16%
Retinal oedema	--	1	2	3	6.25%
Flame shaped Haemorrhage	3	5	10	18	37.50%

White centred haemorrhage	--	3	6	9	18.75%
Deep haemorrhages	2	5	8	15	31.25%
Vitreous / Subhyloid haemorrhage	--	2	2	4	8.33%
Cotton wool spots	-	1	3	4	8.33%
Macular star	--	--	1	1	2.08%

In our study we also studied correlation between retinal haemorrhages and haemoglobin level in anaemic patients. Patients with mild-moderate anaemia showed retinal haemorrhages in 18.5% of patients. Patients with severe anaemia showed retinal haemorrhages in 68.4% of patients. In our

study incidence and severity of retinopathy was more with higher grades of anaemia. The association between anaemia and retinal haemorrhage was statistically significant. Chi-square is used to test the association

Table 4: Relationship of retinal haemorrhages with grades of anaemia

Grades of anaemia (Haemoglobin in gm %)	No. of cases of anaemia studied	No. of cases with retinal haemorrhages	Odd's ratio	P value`
Severe (less than 7)	19	13 (68.4%)	3.69	0.02*
Moderate to mild (7-11)	27	05 (18.5%)	1	

P statistically significant < 0.05

Discussion

Ocular manifestations of anaemia have been increasingly recognized and anaemia of varied reasons can result in different ocular manifestations¹. Nutritional anaemia remains the common haematological abnormality in India. It can occur due to deficiency of iron, folic acid or vitamin B₁₂. Iron deficiency anaemia is the common type of nutritional anaemia. Most patients with ocular manifestation are symptomatic requiring an ophthalmic consultation.

Amongst 48 patients, maximum number of cases were of iron deficiency anaemia in our study.

In our study vision impairment was noted in patients with megaloblastic anaemia and dimorphic anaemia. Anusha V et al also reported a sudden nonprogressive loss of vision due to anaemic retinopathy secondary to iron deficiency and megaloblastic anaemia and ocular manifestations were bilateral flame shaped haemorrhage, Roth's spot with cotton wool spot and subhyloid haemorrhages. Possible factors resulting in retinal

damage could be anoxia, venous stasis, angiospasm and increased capillary permeability in anaemia⁴.

Lang GE et al reported that anaemic manifestations are uncommon in eye adnexa structure (like subconjunctival haemorrhage, lid edema etc). Our results are also comparable⁵.

Conjunctival pallor and retinal haemorrhages were the most common finding in our anaemic patients. Lange et al and Nusrat et al also found that conjunctival pallor and retinal haemorrhages were more common in patients with anaemia^{2 5}. Presence of conjunctival pallor without other information suggesting anaemia is a reason enough to perform haemoglobin estimation⁶. Bilateral retinal haemorrhage are well documented in patients with megaloblastic anaemia^{7,8}.

Flame shaped haemorrhage were common in our study followed by deep haemorrhage, white centered haemorrhages and sub hyloid haemorrhage. Holt JM et al studied 63 patients with anaemia and noted that flame shaped haemorrhages were commonest type of haemorrhage⁹. Kalpana Suresh studied 34 patients with anaemia and found that flame shaped haemorrhages were common followed by deep haemorrhage³. Authors also commented that propensity of retinal haemorrhages is more if anaemia associated with thrombocytopenia^{2, 7, 8, 10}. Anoxia, venous stasis, angiospasm and increased vascular permeability results in retinal damage due to hypoxia leading to anaemic retinopathy⁴. Fundal pallor was the second most common retinal manifestations in our study.

Other retinal manifestations like venous and arteriolar dilatation, retinal edema, macular star etc were less common.

Our study revealed incidence of retinal hemorrhages and magnitude of retinal manifestations has

direct relationship with severity of anaemia which is statistically significant and patients with mild anaemia did not show any evidence of anaemic retinopathy. Nusrat et al also found that the retinal abnormalities were more in severe anaemia (34.2%) than in moderate anaemia (7.5%).mild anaemia did not reveal any retinal abnormality². Merin S & Freund have also found the in severe anaemia the retinal abnormalities were found in 31.8% while in moderate anaemia these were seen in on 13.3 % of patients¹¹. Ajitet al also commented that severity of retinal manifestations of anaemia depends upon severity of anaemia¹².

Conclusion

Conjunctival pallor and flame shaped haemorrhages are most common ocular manifestations in patients with nutritional anaemia.Presence of conjunctival pallor further needs evaluation for presence and severity of anaemia. Patients with moderate to very severe anaemia should undergo fundus examination to diagnose these conditions. Incidence and severity of retinal manifestations depends upon severity of anaemia. Early recognition of retinal manifestation may help in early institution of treatment and thus early resolution of retinal changes.



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