



Fundus Changes in Patients with Blood Dyscrasias

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Abstract: The present cross sectional study was undertaken to study the spectrum of fundus changes in patients with blood dyscrasias. In this randomized study, patients diagnosed with blood dyscrasias, admitted under Medicine, General surgery, Obstetrics and Gynaecology and Pediatrics, in Krishna Institute of Medical Sciences Hospital, irrespective of age and sex were selected from the period of November, 2013 to December, 2015. It was observed that majority of patients belong to age group 11-20 years. In the study, among 100 patients, 57 were males and 43 were females. The fundus showed numerous significant and non significant changes in the patients with blood dyscrasias. The fundus changes regressed after the improvement of blood picture by appropriate treatment measures. The results shown by them are not uniform and the significance of these changes and their relationship with hematological parameters have been reported differently by various studies.

INTRODUCTION

The retina is a great meeting place between ophthalmology and general medicine. So, in many systemic conditions, fundus examination helps in the diagnosis and/or prognosis of the condition.

The word 'dyscrasia' is a Greek derivation which means bad mixture. A disproportion of the four bodily fluids or humors: phlegm, blood, yellow and black bile. The imbalance is called as dyscrasia.

The retinal findings seen in patients with blood dyscrasias are retinal hemorrhages, microaneurysms, hard exudates, retinal edema, cotton wool spots (soft exudates), retinal vascular changes, pallor of the fundus, optic disc edema, retinal and optic disc neovascularization, vitreous haemorrhage, retinal detachment occur rarely in cases of plasma cell dyscrasias, monoclonal gammopathy and cryoglobulinemia (Sihota and Tando, 2011; Carr and

Henkind, 1963; Duke *et al.*, 1968; Kincaid and Green, 1983; Khouri *et al.*, 1986; Knapp *et al.*, 1987; Hayasaka *et al.*, 1993; Enzenauer *et al.*, 1999; Ashton and Harry, 1963; Rosenthal, 1983; Gass, 1996; Zamir and Chowders, 1999).

Aims and objectives

Aims: To study the various fund us changes in patients with blood dyscrasias.

Objectives: To assess prevalence of fundus changes in patients with blood dyscrasias. To study the spectrum of fundus changes in patients with blood dyscrasias.

Literature review: The retina is a great meeting place between Ophthalmology and general medicine. So, in many systemic conditions, fundus examination helps in the diagnosis and/or prognosis of the condition.

The word 'dyskrasia' is a Greek derivation which means bad mixture. A disproportion of the four bodily fluids or humors: phlegm, blood, yellow and black bile. The imbalance is called as dyscrasia. Retinal hemorrhages may take various configurations based on their location within the retina. Flame-shaped and dot-blot hemorrhages are the most commonly encountered intraretinal hemorrhages in blood dyscrasias.

It is functionally defined as an insufficient Red Blood Cell (RBC) mass to adequately deliver oxygen to peripheral tissues. It may be due to increased RBC clearance, decreased RBC production or both caused by intrinsic or extrinsic causes. According to WHO, haemoglobin (Hb) of $<13.0 \text{ g dL}^{-1}$ in adult male, less than 12 g dL^{-1} in adult non pregnant female and $<11 \text{ g dL}^{-1}$ in pregnant female should be considered as evidence of anemia (Kumar *et al.*, 2009).

Rosenthal (1983) emphasized that optic nerve infiltration occurs predominantly in children with Acute Lymphocytic Leukemia (ALL) and must be differentiated clinically from papilledema.

Brown *et al.* (1992) reported the case of a patient with acute promyelocytic leukemia and optic disc infiltration who showed complete resolution with oral all trans-retinoic acid alone.

McManaway and Neely (1994) reported the case of a patient with acute lymphoblastic leukemia who presented with leukocoria and proptosis resulting from an extensive intraocular and orbital tumor mimicking advanced retinoblastoma.

MATERIALS AND METHODS

In this randomized study, patients diagnosed with blood dyscrasias, admitted under Medicine, General surgery, Obstetrics and Gynaecology and Pediatrics in Krishna Institute of Medical Sciences Hospital, irrespective of age and sex, were selected from the period of November, 2013 to December, 2015. Patient's relevant history like the onset of disease, duration of disease and its progress was noted. The staging of the blood dyscrasia, if available was also noted.

A valid consent was taken for the willingness of the patient to be examined and for their participation in the study. The visual acuity of conscious, co-operative and well oriented patients was checked using the snellen's vision chart for distance and jagger's chart for the near. Anterior segment was examined using the torch light in the ward. If the patients were stable and able to walk, they were examined under the slit lamp. Their anterior segment findings were noted. Their intraocular tension was checked using the Schiottz tonometer and then the pupils of the patients were dilated using tropic plus eye drops (1% Tropicamide and 5% Phenylephrine).

Posterior segment was examined using a direct and an indirect ophthalmoscope. If the patient was stable and able to walk, fundus examination was also done with the help of the volk 90D and the 78D lens under the slit lamp using retro illumination. Fundus photographs were also taken of the patients with relevant retinal findings with the Topcon non mydriatic fundus camera.

Investigations like patient's blood counts, staging of leukemia (if any), bleeding time and prothrombin time were also noted.

Inclusion criteria: All patients who have been diagnosed with abnormal blood counts irrespective of age and sex.

Exclusion criteria: Disorders of the retina which show similar fundus findings which can mimic retinopathy due to blood dyscrasias are hypertensive retinopathy, diabetic retinopathy and retinopathy due to thrombophlebitis and vasculitis. Patients having such disorders along with blood dyscrasias were excluded from the study. Patients which ocular disorders like advanced cataracts, bullous keratopathy, corneal opacities, corneal edema which caused a hindrance for the fundus evaluation were excluded from the study. Patients who refused to give consent for the study were also excluded.

RESULTS AND DISCUSSION

In Table 1, patient's distribution according to age and sex was shown. It was observed that majority of patients belong to age group 11-20 years (35%) followed by the age group of 21-30 years (18%). In the study, among 100 patients, 57 were males and 43 were females.

Table 2 shows the percentage of patients having different blood dyscrasias wherein 51% of the patients had anemia, 43% of the patients had hematological malignancies and 6% of the patients had bleeding disorders.

Table 3 shows the distribution of patients as per hematological malignancies where the maximum incidence was of AML (34.88%) followed by CML (25.58%).

Table 4 shows the distribution of patients as per different types of Anemia. The incidence of Iron deficiency anemia was the maximum (47.06%).

Table 5 shows the distribution of patients as per bleeding disorders. The 83.33% of the patients had ITP and 16.67% of the patients had hemophilia.

The present cross sectional study was undertaken to study the spectrum of fundus changes in patients with blood dyscrasias. All the patients satisfying the inclusion criteria, admitted under medicine, general surgery, obstetrics and gynaecology and pediatrics, in the Krishna Institute of Medical Sciences, Karad were enrolled in the study. The sample size was 100 patients. Patients with

Table 1: Distribution of patients according to age

Age group	Males	Females	Total
0-10	05	06	11
11-20	19	16	35
21-30	10	8	18
31-40	10	04	14
41-50	09	06	15
>50	04	03	07
Total	57	43	100

Table 2: Distribution of patients according blood dyscrasias

Blood dyscrasias	No. of patients	Percentage
Hematological malignancies	43	43.00
Anemia	51	51.00
Bleeding disorders	06	06.00
Total	100	100.00

Table 3: Distribution of patients according to hematological malignancies

Hematological malignancies	Males	Females	No. of patients	Percentage
AML	10	05	15	34.88
ALL	07	03	10	23.26
CML	07	04	11	25.58
CLL	02	02	04	09.30
Lymphoma	02	01	03	06.98
Total	28	15	43	100.00

Table 4: Distribution of patients according to anemia

Anemia	Males	Females	No. of patients	Percentage
Iron deficiency anemia	12	12	24	47.06
Thalassemia	06	05	11	21.57
Aplastic anemia	03	02	05	09.81
Megaloblastic anemia	03	01	04	07.84
Hemolytic anemia	01	03	04	07.84
Anemia of chronic disease	02	01	03	05.88
Total	25	26	51	100.00

Table 5: Distribution of patients according to bleeding disorders

Bleeding disorders	No. of patients	Males	Females	Percentage
ITP	05	03	02	83.33
Hemophilia	01	01	-	16.67
Total	06	04	02	100.00

different blood disorders ranging from different types of anemia to leukemia and bleeding disorders were examined complete ophthalmic examination and note of blood counts were made. Many studies and case reports highlighting the ocular manifestations of different blood dyscrasias are present in the literature. However, the results shown by them are not uniform and the significance of these changes and their relationship with hematological parameters have been reported differently by various studies.

In the current study, 6 out of 100 patients had bleeding disorders, out of which 5 were suffering from Idiopathic thrombocytopenic purpura and 1 had hemophilia. 4 patients out of 6 (66.66%) showed ocular changes. Rubenstein *et al.* (1968) in their study did not

find any retinal hemorrhage in cases that had thrombocytopenia as the sole abnormality in peripheral blood. However, Kataria *et al.* (1983) in their study of fundus, examined two cases of thrombocytopenic purpura and found retinal hemorrhage in one of them. Rubenstein *et al.* (1966) in their study of 123 patients with hemophilia reported ocular findings (orbital or periorbital hemorrhage being most common) in 25 patients. In our study, a total of 43 patients were diagnosed with hematological malignancies, out of which 15 patients had AML, 11 had CML and 10 had ALL, 3 with CLL. The positive fundus findings in them was 53.40% (23 of 43). In the current study, intraretinal hemorrhages were a significant finding in the patients having leukemias (37.21%) as well as patients having bleeding disorders.

CONCLUSION

In the study, out of a total of 100 patients, 57 were males and 43 were females. The maximum number of patients (35 of 100) were in the age group of 11-20 years. A spectrum of retinal findings like hemorrhages, soft exudates, hard exudates, roth spots, dilated tortuous veins and disc pallor were seen in the study which were significant fundus findings associated with blood dyscrasias. Considering the different types of blood dyscrasias, in the hematological malignancies, the most common finding was retinal hemorrhages (37.21%) followed by cotton wool spots (25.58%) which is statistically significant. Cotton wool spots also were a prognostic indicator in the patients with leukemia. Amongst the Anemic patients, cotton wool spots are the most common findings (76.47%) followed by dilated tortuous veins (60.78%) which is NOT statistically significant. Amongst the patients with bleeding disorders, 100% patients have hemorrhages in the retina which is statistically significant. Other minor findings include dilated tortuous veins and hard exudates. As per the study, the fundus showed numerous significant and non significant changes in the patients with blood dyscrasias. The fundus changes regressed after the improvement of blood picture by appropriate treatment measures.

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