ORIGINAL RESEARCH PAPER

Pathology

DYSPLASTIC EOSINOPHILIA ASSOCIATED WITH STEROIDS

KEY WORDS: drug induced eosinophilia, myeloid dysplasia of eosinophilic lineage.

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ABSTRACT

The bone marrow normally is influenced by certain drugs which may cause temporary suppression of the activity and with withdrawal of drugs can get reactivated. Generally, the bone marrow response to drugs and chemicals like chloramphenicol, pesticides and methotrexate are bit predictable and can be detected easily. However, drugs like steroids which are also immunomodulators, the response may not be obvious initially and during the course of time can be detected in an odd way.

Two patients who were on steroids had peripheral eosinophilia with evidence of certain degree of dysplasia involving eosinophilic lineage of myeloid series are noted.

INTRODUCTION

Bone marrow is a dynamic organ which constantly produces hematopoietic elements as per the need and are influenced by nutritional status of the individual as well as other environmental factors like infections, associated drug intake, personal and professional life style.

Two patients in the Post Covid era developed eosinophilia following intake of steroids prescribed by family physician for certain reasons. The patients developed skin lesions during when haematological work up was done which showed peripheral eosinophilia. The patients were 50 years male and 74 years female respectively.

CASE NO 1:

50 years male presented with bullous disorder where clinical diagnosis was Bullous Pemphigoid.

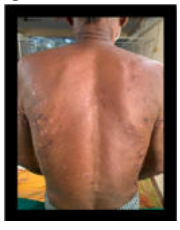

Fig. 1a

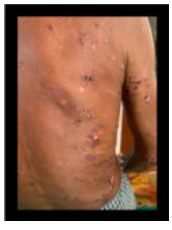

Fig. 1b

FIG 1a & 1b: Picture after treatment.

Hemogram of case no 1:

Hb: 13.3g%
RBC – 3.96 million/cu.mm
WBC – 13700 cells/cu.mm
DC: N - 45%; L – 17%; M – 4%; E – 34%
Platelets: 3.61 lakhs/cumm.

The Peripheral Smear exhibited the following features:

Most of the RBCs are normocytic and normochromic in nature. The WBCs are normal in count except for peripheral eosinophilia. The morphology of the same is described later.

The Platelets are adequate in number and normal in morphology.

The skin biopsy was taken 3 times in the course of 4 months at the site of lesion. Essentially the histological features revealed subepidermal bulla. However, the last biopsy showed intraepidermal bullae with scattered eosinophils. In all the biopsies the dermal vessels are surrounded by inflammatory infiltrates composed of lymphocytes and eosinophils along with occasional neutrophils.

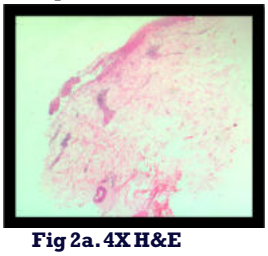

Fig 2a. 4X H&E

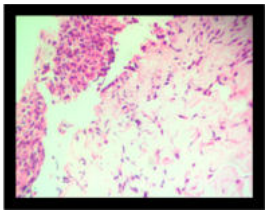

Fig 2b. 40X H&E

FIG. 2a & 2b: Subepidermal bulla which contains proteinaceous material with occasional eosinophils.

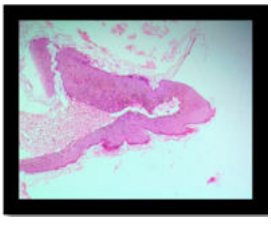

Fig 3a. 10X H&E

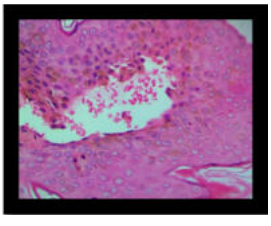

Fig 3b. 40X H&E

FIG 3a & 3b: Denuded squamous epithelium, deeper to the basement membrane, proteinaceous material with scattered eosinophils are present.

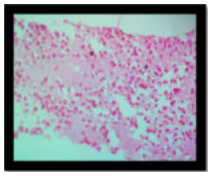

FIG 4: 40X H&E. Contents of the subepidermal bulla – proteinaceous material harbouring degenerated RBCs and scattered eosinophils.

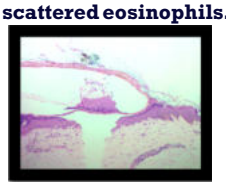

FIG 5a. 10X H&E

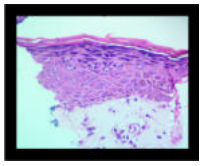

FIG 5b. 40X H&E

FIG 5a & 5b: Sub Epidermal Bulla Which Appears Like A Intraepidermal Bulla Due To Orientation; A Portion Of Squamous Epithelium Appears Broken Off.

CASE NO 2:
74 years female had skin lesion which was biopsied following clinical diagnosis of Psoriasis Vulgaris.

Patient did not give permission for taking pictures.

Hemogram of case no 2:
Hb: 3.3g%
RBC – 1.72 million/cu.mm
WBC – 14100 cells/cu.mm
DC: N - 47%; L – 25%; M – 7%; E – 21 %
Platelets: 1.1 lakhs/cumm.

The Peripheral Smear shows the following features:
RBCs show hypochromasia and anisopoikilocytosis. Microcytic hypochromic cells and macrocytic cells are also present.

WBCs show hypersegmented neutrophils and peripheral eosinophilia.

Platelets are adequate in number and normal in morphology.

The histological picture revealed biopsy up to deep dermal level with hyperkeratosis, irregular acanthosis. The upper dermal vessels are surrounded by lymphocytes, eosinophils and occasional neutrophils. Also seen are inflammatory infiltrates in subepidermal zone composed of similar cells in dermis. However, no definite histological picture of Psoriasis was present.

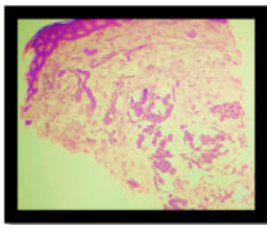

FIG 6. 4X H&E Skin biopsy showing mild hyperkeratosis and irregular acanthosis.

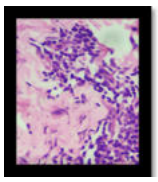

FIG 7a

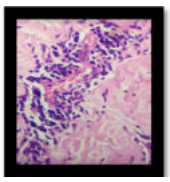

FIG 7b

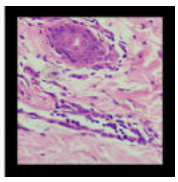

FIG 7c

FIG 7a, 7b & 7c: 40x H&E Blood vessels surrounded by mixed inflammatory infiltrates where eosinophils are also present.

The Peripheral Smear of both the patients exhibited Eosinophilia. Hyper segmented neutrophils were present. The eosinophils showed following features namely

1. Hyper segmented Eosinophils.
2. Hypo segmented Eosinophils.
3. Eosinophils with round nuclei.

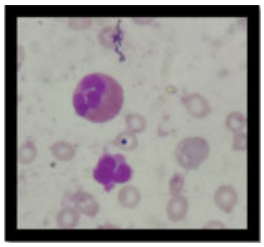

FIG 8: Hyper segmented Eosinophil

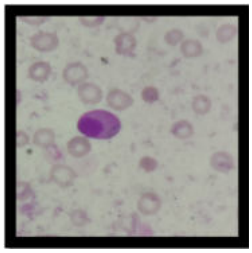

Fig. 9. Hyposegmented Eosinophil

Platelets were adequate however megakaryo nucleus was present.

DISCUSSION:
Both the patients were on oral steroids- Prednisolone, right from the day prescribed (6 months back) and were taking the drugs on and off over the counter whenever they felt. On the day of clinical presentation, effect of steroids was observed on their facies, which were then tapered. The haemoglobin value of the second patient, which was less then 4g% could be attributed to the advancing age combining with nutritional deficiency and she had no other haematological discrepancy.

The present study showed that the steroidal administration in patients sometimes causes increase in granulopoietic activity such as their release and proliferation.

Pluripotent Stem Cells differentiate into eosinophil lineage committed progenitors. After stimulation by cytokines namely IL 3, IL 5, and GM – CSF, the progenitor cells differentiate into eosinophils, leave the bone marrow compartment and enter the peripheral circulation (1).

The cytokine stimulation is enhanced by steroid. The eosinophils remain in circulation for 8 – 12 hours and then enter the targetoid tissues where the disintegrated in 10 – 12days time (2). The steroidal activity is similar to exposure to allergen. The allergen induces expression of eosinophils and Transforming Growth Factor Beta (TGF-ß) and causes rise in blood eosinophils (1).

In Bullous Pemphigoid, there will be eosinophilic infiltration within and below blisters and along the basement membrane. In this condition, the patients usually exhibit eotaxin and IL - 5(same effect as discussed above) which causes increase in eosinophilic infiltration in skin (1). The complements present causes eosinophils to release enzymes and reactive oxygen into the basement membrane which in turn causes blister formation.

In peripheral blood the eosinophil count will be considerably elevated and show the following morphological features namely hypo segmented, hyper segmented eosinophils (3).

CONCLUSION:

The drug steroid was prescribed and was taken unmonitored because of comfort. The patient returned to OPD in an unscheduled manner with Cushingoid features. Complete hemogram and peripheral smear study was done which showed the above features. The changes in the eosinophilic lineage of myeloid series are uncommon and is being documented.

REFERENCES:

1. Lee JJ, Rosenberg HF, editors. Eosinophils in health and disease. Academic Press; 2012 Nov 16., chapter 7: 190, chapter 12: 400, chapter 13: 445, chapter 15: 577.
2. Wintrobe MM. Wintrobe's clinical hematology. Lippincott Williams & Wilkins; 2008., 617
3. Bain BJ, Clark DM, Wilkins BS. Bone marrow pathology. John Wiley & Sons; 2019 Apr 15., chapter 8: 569, 570
4. Firkin F, Chesterman C, Rush B, Pennington D. De Gruchy's Clinical haematology in medical Practice. John Wiley & Sons; 2008 Jan 19., chapter 9: 222.