

Original article:

Dysplastic neutrophils on peripheral blood smear –hematological finding in HIV infection”

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Abstract:

Introduction: Our aim was to identify the haematological manifestations (Peripheral smear) of altered haematopoiesis resulting from HIV infection .Review the pathogenesis of the haematological manifestations of human immunodeficiency virus (HIV).

Method: Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol and by universal precaution as per the guideline of National aids control organization (NACO, India). A complete blood counting including HB%, PCV, Red cell indices ,platelet count and total white cell count and differential was done by Automated blood cell counter analyzer of all the patient on antiretroviral therapy. The all cell count indices including WBC count with differential and platelet count, was further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B Stain and Leishman stain.

Result: In our 300 study cases, 291 case (97.00% n=300) show presence of detached nuclear fragment, in case of females 109 case (97.32% n=112) while in males182 cases (96.80% n=188) show detached nuclear fragment. Least common significant finding of our study is neutropenia. In our study 14 cases (4.6%) n=300 shows Neutropenia in which 10 cases are males (5.31%,n=188) and 4 cases are females (3.57% n=112)

Conclusion: In our study detached nuclear fragment is most common finding of dysplastic neutrophils and least common finding is Neutropenia. (Presence of Detached Nuclear Fragment>CytoplasmicVacuolation,> ToxicGranulation/Dohlebody, >Hypo granularity and occasional Pelger huet form>Left Shift>Neutropenia)

Keywords: Neutropenia, HIV infection

INTRODUCTION

Peripheral blood neutrophils are showed striking dysplastic features,whichincluded detached nuclear fragments, acquired Pelger-Huet anomaly chromatin clumping, neutrophils with strangely shaped nuclei, and a high nucleocytoplasmic ratio and macropolycytes.Dysplastic changes in neutrophils are common in patients with AIDS and can be the feature that suggests the possibility of HIV

infection.The presence of detached nuclear fragments in neutrophils is particularly suggestive. The range of changes seen differ from those that are usual in myelodysplastic syndromes. Hypogranularity is less common whereas bizarrely shaped nuclei and a high nucleocytoplasmic ratio in mature cells are more common. but they are quite uncommon whereas they are characteristic of HIV infection. Typically left-shifted and may exhibit a

number of morphologic abnormalities, including enlarged size, hyposegmentation, and Pelger-Huet anomalies. Atypical plasmacytoid lymphocytes are occasionally seen in asymptomatic individuals but are particularly common in lymphopenic patients with AIDS and during acute HIV infection. Large atypical monocytes have also been described with prominent vacuolization and fine nuclear chromatin.

MATERIAL & METHODS

The present study was conducted at the Department of Pathology MGM Medical College associated with M.Y. Hospital Indore, M.P. The study was designed as an observational hospital-based study over a period of time from 2010 to 2012 years. Detailed general, systemic examination along with complete details of patient and informed consent was obtained from all study participants from the ART Center of M.Y. Hospital Indore during the time of registration at center.

Patients selection criteria- The study targeted medically diagnosed HIV positive cases with the help of ELISA technique and confirmed by western blot under the guideline of National AIDS Control Organization (NACO, India) over a period of time from 2010 to 2012.

All studied 300 cases registered at ART Center and on HAART between the age of 5 to 69 years who are scheduled to visit the hospital at regular intervals of time for routine medical review were studied.

Laboratory investigations- Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol and by universal precaution as per the guideline of National AIDS Control Organization (NACO, India).

A complete blood counting including HB%, PCV, Red cell indices, platelet count and total white cell count and differential was done by Automated blood cell counter analyzer of all the patients on antiretroviral therapy. The all cell count indices including WBC count with differential and platelet count, was further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B stain and leishman stain.

Hematological examination-

Hematological examination including HB%, PCV, Red cell indices, platelet count and total white cell count with differential count should be done on peripheral smears stained with field A and B stain and leishman stain.

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RESULTS

Distribution of dysplastic neutrophils parameters

Total No. of case	300		% , n=300
A	Neutropenia	14	4.60%
B	Toxic Granulation/Dohle body	262	87.33%
C	Cytoplasmic Vacuolation	276	92.00%
D	Left Shift	22	7.33%
E	Presence of Detached Nuclear Fragment	291	97.00%
F	Hypogranularity and Occasional Pelger huet form	256	85.33%

- Out of 300 study cases detached nuclear fragment(97.00%)in neutrophils is most common and Neutropenia (4.6%) is least common finding on peripheral smear.
- Presence of Detached Nuclear Fragment in neutrophils is highly suggestive of HIV infection.

Distribution of dysplastic neutrophils parameters in female

Total No. of	112		%
Female case			
A	Neutropenia	4	3.57%
B	Toxic Granulation/Dohle body	96	87.71%
C	Cytoplasmic Vacuolation	99	88.39%
D	Left Shift	7	6.25%
E	Presence of Detached Nuclear Fragment	109	97.32%
F	Hypogranularity and Occasional Pelger huet form	96	85.71%

Data analysis in following hematological parameters with the difference of sex distribution under the Extended Mantel-Haenszel test for trend of chi –Squares test.

- Chi-sq. test X2 Value = 1.388 [DF = 1] 2-sided P = 0.239 , For trend in a given direction: P = 0.119

Distribution of dysplastic neutrophils parameters in male

Total No. of Male case	188		No.	% n=188
A	Neutropenia	10	0.0531	
B	Toxic Granulation/Dohle body	166	0.8829	
C	Cytoplasmic Vacuolation	177	0.9414	
D	Left Shift	15	0.0797	
E	Presence of Detached Nuclear Fragment	182	0.968	
F	Hypogranularity and Occasional Pelger form	160	0.85	

- Among the 188 cases of male 182 (96.80%) show Presence of Detached Nuclear Fragment and only 10 cases (5.31%) shows Neutropenia.
- the Upton's "N-1"chi-sq.x2 value=2.980, P=0.084 and Pearson's chi-square x2 value = 2.998 P = 0.083.
- Data analysis in following hematological parameters with the difference of sex distribution under the Extended Mantel-Haenszel test for trend of chi -Squares test.
- Chi-sq. test X2 Value = 1.388 [DF = 1] 2-sided P = 0.239
- For trend in a given direction: P = 0.119

DISCUSSION

The term dysplastic neutrophils include various morphologic changes in neutrophils like-Presence of detached nuclear fragment, Presence of cytoplasmic vacuolation ,Toxic granulation, Hypo granularity and occasional Pelger huet form ,Left shift of leucocytes series,Neutropenia.

In our 300 study cases, 291 case (97.00% n=300) shows presence of detached nuclear fragment, in which female 109 case (97.32% n=112) while male 182 cases (96.80% n=188) shows detached nuclear fragment. Second most common finding of our study is cytoplasmic vacuolation, 276 (92.00% n=300) out of 300 case show this finding In case of female 99 cases (88.39% n=112) while is males 177 cases (94.14% n=188) show cytoplasmic vacuolation. Third most common finding of Dysplastic Neutrophils is toxic granulations. 262 (87.33 n=300) out of the 300 case show this finding, in case of female 96 case (87.71% n=112) while male 166 case (88.29) n=188) shows toxic granulation. Fourth significant finding in Dysplastic Neutrophils is Hypo granularity and Pelger huet form of neutrophils 256 case (85.33% n=300)

female cases are 96 (85.71% n=112) males cases are 160 (85.00% n=188)

- Neutropenia is defined when Absolute Neutrophils count is <1500/cumm with the reference of Wintrob's clinical haematology 11/e and various other study.
- Other significant finding of our study left shift of leukocyte series, in this case band form of neutrophils (stab cells) also appreciated. In our study 22 case (7.33% n=300) shows band cells. In case of female 7 case (6.25% n=112) & male 15 case (7.99% n =188) show stab cells.

In our study 14 cases (4.6%) n=300 shows Neutropenia in which male cases are 10 (5.31%,n=188) and female cases are 4 (3.57% n=112) Suresh et al. Study shows 22.7% neutropenia.

CONCLUSION

In our study of 300 cases, where 188 (62.66%.n=300) are males while 112 (37.34%, n=300) are females ,highest prevalence of hematological manifestation of HIV positive patient i.e. 44% is found between 31-40 years of age. Haematological peripheral smear finding of dysplastic neutrophils . In our study detached nuclear fragment is most common finding of dysplastic neutrophils and least common finding is Neutropenia.

In our 300 study cases, 291 case (97.00% n=300) show presence of detached nuclear fragment, in case of females 109 case (97.32% n=112) while in males 182 cases (96.80% n=188) show detached nuclear fragment. Second most common finding of our study is cytoplasmic vacuolation, 276 (92.00% n=300) out of 300 cases shows this finding with 99 case in female (88.39% n=112) and 177 cases

in males (94.14% n=188). Third most common finding of Dysplastic Neutrophils is toxic granulations. 262 (87.33% n=300) out of the 300 cases shows this finding, with 96 cases in female (87.71% n=112) and 166 cases in male (88.29% n=188). Fourth significant finding in Dysplastic Neutrophils is Hypo granularity and Pelger huet form of neutrophils 256 cases (85.33% n=300) show this finding with 96 cases in females (85.71% n=112) and 160 cases in males (85.00% n=188). Other significant finding of our study left shift of leukocyte series, in this case band form of neutrophils (stab cells) also appreciated. In our

study 22 cases (7.33% n=300) shows band cells. In case of female 7 cases are reported (6.25% n=112) & in male 15 cases are seen (7.99% n=188). Least significant finding of our study is neutropenia. In our study 14 cases (4.6% n=300) shows Neutropenia in which 10 cases are males (5.31%, n=188) and 4 cases are females (3.57% n=112).

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