www.jmscr.igmpublication.org
Impact Factor (SJIF): 6.379
Index Copernicus Value: 79.54
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossrefDOI: https://dx.doi.org/10.18535/jmscr/v6i11.152

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Platelets distribution width is common hematological finding in HIV infection

Authors
Prof. Dr C.V. Kulkarni[1], Prof. Dr A. Panchonia[2], Dr Sachin Sharma[3]
[1]Head of Pathology Department, MGM Medical College, M.Y. Hospital Indore MP
[2]Professor, MGM Medical College, M.Y. Hospital Indore MP
[3]Assistant Professor, MGM Medical College with M.Y. Hospital Indore, MP
Corresponding Author
Dr Sachin Sharma
Assistant Professor, MGM Medical College with M.Y. Hospital Indore, MP, India
Email: *sachinchanderi@gmail.com*

Abstract
Aim and Objectives: *Discuss relevant laboratory findings raised PDW with age and sex distribution. Establish care guidelines for HIV infected person and altered haematopoiesis resulting in with raised red cell distribution width. 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, Red cell distribution width 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 study out of 300 HIV cases 189 cases (63%, n=300) shows increased PDW in which male cases are 125 cases (66.48%, n=188) and female cases are 64 (57.14%, N=112).*
Conclusion: *PDW is commonly affected haematological parameter in HIV infective cases. higher red blood cell distribution width is associated with a worse virologic and clinical situation in HIV infected.*

Introduction

All peripheral blood cells have been observed in patients with HIV infection with the exception of thrombocytopenia, which can occur in asymptomatic individuals with relatively mild immune deficiency, anaemia and leucopenia are both more frequent and severe in patients with advanced immunodeficiency. Peripheral red blood cells in patients with anaemia are typically normchromic and normocytic and exhibit a varying degree of anisocytosis and poikilocytosis. The perturbation in red cell size and shape is reflected in an increased red cell distribution width.

Macrocytosis is rarely seen. However, in patients receiving therapy with zidovudine, macrocytosis

is present in the majority of patients, occasionally with mean corpuscular volumes as high as 120 or greater. Rouleux formation and increased background staining may also be seen; this likely reflects the presence of concomitant hypergammaglobulinemia. As noted previously, schistocytes and nucleated red cells are present in patients with HIV-associated TTP.

Peripheral blood neutrophils are showed striking dysplastic features, which included detached nuclear fragments, acquired Pelger-Huet anomaly chromatin clumping, neutrophils with strangely shaped nuclei, and a high nucleocytoplasmic ratio and macropolycytes.

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-Hüet 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. Anaemia is the most common haematological abnormality found in children and adult with HIV infection. The etiology of anaemia in adult with HIV infection is multifactorial, and managing anaemia can involve a variety of modalities. HIV infection and its direct effects on HSCs and stromal elements can lead to anaemia. Opportunistic infection and myelosuppressive drugs might also cause anaemia.

Material & Methods

Study area and design: 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 a observational hospital based study over a period of time from 2010.

Ethical consideration: Detailed general, systemic examination along with complete details of patient and informed consent was obtained from all study participant do from 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 period of time from 2010

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

Complete Blood Count (CBC) and Peripheral Smear

Materials: Purple vacutainer tube or capillary collector (EDTA)**,**Slides and blue capillary tube**,** Needle or lancet**,** Vacutainer holder**,** Alcohol swab**,** Cotton balls**,** Absorbent materials**,** Slide case

Procedure

1. Specimen is collected into EDTA (purple) vacutainer. (5 or 7ml volume)

- Blood smears must be made from freshly collected specimen and must be prepared within four hours of collection. A well-made peripheral smear is thick at the frosted end and becomes progressively thinner toward the opposite end. The "zone of morphology" (area of optimal thickness for light microscopic examination) should be at least 2 cm in length. The smear should occupy the central area of the slide and be margin-free at the edges.

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

Following Base line investigation were done for all 300 patients.

Hemoglobin in grams/dl–(Cyanmethhaemoglobin method of automated blood cell counter analyzer) and further confirmation by Sahli"s manual method in case of suspicious readings.RBC counting and RBC indices parameters MCV, MCH, MCHC, PCV & PDW - automated cell counter analyzer RBC morphology study under oil immersion manual stained smear study method .Total and differential leukocyte count - automated cell counter analyzer & confirmed by oil immersion manual stained smear study method, Platelets counts - automated cell counter analyzer & confirmed by oil immersion manual stained smear study method Other counting parameters and morphological changes done under automated cell counter analyzer & confirmed by manual oil immersion smear study method

Results

Table.1 Sex distribution of study cases

Sex	Case	(%) n=300
Male	188	62.66%
Female	112	37.34%
Total case Study – 300	300	100%

- Out of 300 study cases males are more commonly affected (62.66%) (n=300) than female 37.34% (n=300)

Table 2 Age distribution of study cases

Age	No. of cases	% (n=300)
0-10	9	3.00%
11-20	19	6.33%
21-30	62	20.66%
31-40	132	44.00%
41-50	57	19.00%
51-60	14	4.66%
61-70	7	2.33%

Out of 300 study cases HIV positive patients are most commonly i.e.44% (n=300) in age group of 31-40 years while least common (1%, n=300) in age of above 60 years.

Sex distribution of different age groups

Age	Male	Female
0-10	4	5
11-20	15	4
21-30	35	27
31-40	78	54
41-50	40	17
51-60	11	3
61-70	5	2

- Among male most commonly affected age group is found to be 31-40 years with 41.48% involvement (n=188). Among female also most commonly affected age group is found to be 31-40 (48.21%, n=112).
- In Our study youngest HIV infected male 5 year old boy (our case serial no =11 and art reg. No 225072 and oldest male is 65 year (our case Serial No =292, Art Reg. No. 318651).
- Our study youngest HIV infected female 5 year old girl (our case serial no =89 and Art reg. No=317521 and oldest female is 69 year (our case serial no =33, art reg. No. = 316130).

Platelet count in the blood can be rapidly measured using an automated haematologic analyser. Platelet indices are biomarkers of platelet activation. They allow extensive clinical investigations focusing on the diagnostic and

prognostic values in a variety of settings without bringing extra costs. Among these platelet indices, plateletcrit (PCT), mean platelet volume (MPV), and platelet distribution width (PDW) are a group of platelet parameters determined together in automatic CBC profiles; they are related to platelets' morphology and proliferation kinetics.

PDW is an indicator of volume variability in platelets size and is increased in the presence of platelet anisocytosis[17]. PDW is a distribution curve of platelets measured at the level of 20% relative height in a platelet-size distribution curve, with a total curve height of 100% (18). PDW directly measures variability in platelet size, changes with platelet activation, and reflects the heterogeneity in platelet morphology (13,20). Under physiological conditions, there is a direct relationship between MPV and PDW; both usually change in the same direction (20). Meanwhile, there are conflicting reports in the literature about the relationship between platelet volume and numbers, which suggests that they are affected by different mechanisms (5,21-25).

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 stains.

Observation & Discussion

	VALUE	Prognosis		
			No.	%
PDW high	17-20 %	Poor prognosis	63	63.00%
PDW normal	Between 15- 16 %	Good prognosis	36	36.00 %
PDW low	<14%	Not significant	01	01%

- Data analysis in increased PDW with the difference of sex distribution under 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.

Discussion

PDW is also commonly affected haematological parameter in HIV infective cases. In our study out of 300 HIV cases 189 cases (63%, n=300) shows increased PDW in which male cases are 125 cases (66.48%, n=188) and female cases are 64 (57.14%, N=112). So increased PDW is also very significant finding in our study. Defined Increased PDW is defined when red cell distribution width is > 14.5%. Cut-off value of increased PDW reference by Dacie and Lewis practical haematological book 10/e and Shirish M Kothalkar Essentials of haematology and various other studies. A "higher red blood cell distribution width is associated with a worse virologic and clinical situation in HIV infected .Increase PDW also with the reference of Hoffman haematology text book and various other study.

Conclusion

Age & Sex-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.

Platelets Distribution Width (PDW)- PDW is also commonly affected haematological parameter in HIV positive cases. In our study out of 300 HIV cases 189 cases (63%, n=300) shows increased PDW in which male cases are 125 (66.48%, n=188) and female cases are 64 (57.14%, N=112).

Acknowledgement

I will convey special thanks to my guide Professor Dr C.V. Kulkarni and coguide Dr. A. Panchonia to give me an immense support and valuable needy guidance for this work.

References

1. Rosario Palalios et al. In "Red cell distribution width in patient with HIV infection" at Spain in infectious disease unit of virgin Dela Victoria Hospital, Malaga during 2007 (sample size all HIV

positive cases under follow-up testing) (Journal of Internal Medicine 2012 vol. 2 page 7-1

2. Sanchez - Chaparro MA. et al. In "high red cell distribution width is associated with the metabolic syndrome" (J. Diabetes care 2010 (1) pp 33-40.
3. Abdel-Monem H, Prakasam A, Thiagarajan P. Howell- Jolly Body-like Inclusions in neutrophils of transplant recipient in association with ganciclovir therapy. Arch Pathol Lab Med 2010;134:809–10.
4. Ajay Wanchu et al. in the "profile of heamatological abnormality of Indian HIV infected individual" in PGI Chandigarh over a period of 2 years from 2007-09 India when sample size n=200. In this study also show anaemia is most common hematological finding in HIV positive cases. (BMC blood disorders 2009, 9:5doi:10-1186/1417-2325-9-5
5. Albini A, Barillari G, Benelli R et al: Angiogenic properties of human immunodeficiency virus type 1 Tat protein. Proc Natl Acad Sci USA 92:4838, 1995
6. Amballi AA et al. in retrospective study of "Demographic pattern and haematological profile in people living with HIV /Aids" in a University Teaching Hospital Sagamu, Ogun State over a five years period of time from 2000 to 2005. [Scientific Research and Essay vol. 2 (8) pp v 315-318 August 2007) (Sample size n=162)]
7. Attili SVS et al. "Hematological profile of HIV patient in relation of immune status a hospital based cohort study" from Varanasi North India (Turk. J. Hematol. 2008 vol. 25 13-19.
8. Baillieres best tract res clinical heamotol 2000 June 13 (2) : 215-30. "Hematological aspect of HIV infection." Evans RH Scadden DT, Harvard Medical School, Boston USA.
9. Barbara J. Bain et al. –" The haematological features of HIV infection" at Department of haematology, St. Marry Hospital Campus of Imperial College, London (American J. Of Haematology, 2008;(83):738)
10. Daniel Nii Aryee Tagoe et al in a case control study of " profiling hematological changes in HIV patient attending fevers clinic" at the central regional hospital in Cape Coast Ghana , over a six month period when sample size n=150 (Archives of APPLIED SCIENCE RESEARCH ,2011,3(5) 326-33
11. Deepak Arora in the "longitudinal changes in hematological manifestation of HIV infection in the multicentre AIDS cohort study in department of microbiology Adesh Institute of Medical Science and Research Bathinda" over a 2 year period of time from 2007 to 2009. [Biomedical research 2011, 22(1):103-106].
12. Dysplastic neutrophils with the reference of study of brain B.J. (American Journal of haematol 2008. 83.738) and Baillieres best et al (Jour. Pract. Res. Clin Haematol 200 Jun 13 (2) 215-30)
13. Kasthuri AS et al. in a study of "hematological manifestation of HIV infection at HIV tertiary care" center over a period time March 1998 to August 1999. Majority was in patient and a few outpatients Bangalore. Sample size (n=100) HIV infected patient. Indian Journal sex transmission disease 2006 vol. 27 No. 1-9.
14. Mocroft A. et al. anaemia is an independent predictive marker for clinical prognosis in HIV infected patient from across Europe, Euro SIDA study group (AIDS 1999; (28):943-50.)
15. 132.R. Palacios et al. In "higher red blood cell distribution width is associated with a

worse virologic and clinical situation in HIV infected patient in observational cross sectional study" (Journal Int AIDS Soc. 2010:13

16. Robertson DL, Hahn BH, Sharp PM. (1995). "Recombination in AIDS viruses". J Mol Evol. 40 (3): 249–59. doi:10.1007/BF00163230. PMID 7723052.