HAEMATOLOGICAL MARKERS OF DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS

AYAD ATWEEN[1], Prof. (Dr). PRAKASH ASWANI[2]

1- M.sc research scholar, Medical Lab Technology-Pathology, NIMS Medical College and Hospital, Jaipur- India, Pin Code 302002.

2- (M.sc MLT Guide), Pathologist, NIMS Medical College and Hospital, Jaipur.

Abstract : The relation between hematological markers among patients with active disease of Rheumatoid Arthritis (RA) shown a significant change in hematological parameter but cannot be used as specific and sensitive method to diagnosis of RA diseases. Whereas many hematological parameters are effecting by systemic inflammation. **Aim:** To investigate possible relationships between the hematological markers and disease activity of RA. **Materials and methods:** A total of 50 samples were collected from RA patients at NIMS and SDM Hospital, Jaipur-India. Whereas samples subjected to laboratory investigations, RF by Dry chemistry method, CBC by hematological analyzer/ five parts, Hb by SLS method and ESR by Automated Analyzer. **Results:** A total of 50 samples in RA patients as 42 were female and n= 8 were male). 27 patients with high disease activity (RF>100 IU/ml) group A and 23 patients with mild to moderate disease activity (<100 IU/ml) group B. The incidence of disease regarding to the gender (4:1) F/M. Hb in group A was significant low with average (8.50 gm/dl) comparing with group B. RBCs count doesn't shown important change whereas n= 46 (92%)   was normal and n= 6 (8%) patients was abnormal. WBC count observed elevated in 2 patients (4%) with average (14.76 ths/ul) compare with normal average of WBC count (7.59 ths/u). In deferential count, neutrophils increased (79.6%), Lymphocyte decreased n=11 (21.05%), Neutrophils lymphocyte Ratio (NLR) was raised n=13 (8.87%), Platelets increased (507.7) and Platelets Lymphocyte ratio (PLR) was insignificant change (12.9%). ESR elevated (60.1mm/hr), RBCs morphology showed (72%) normochromic and (28%) showed Microcytic hypochromic of total cells. **Conclusion:** Hematological markers in RA patients demonstrated a limited correlation, this evidence based on the effective markers which can be used to assessment the RA disease and thus can help in improve the methods of diagnosis and clinical management of RA.

Key words:- Rheumatoid arthritis; Hematological markers; Hemoglobin in RA; Active disease of RA.

I.   INTRODUCTION

Rheumatoid arthritis (RA) is a chronic systemic autoimmune disorder characterized by a symmetrical inflammation of the synovial and it is the most common form of inflammatory arthritis affecting approx. 1.0% of the general population worldwide.[1-2] Associated with swelling, stiffness and pain, advanced disease stages can lead to substantial loss of functioning and mobility, RA is an autoimmune disease, whereby the body's immune system attacks its own tissues.[3] Several contributors to RA pathogenesis have been identified in recent years; genetic factors, cigarette smoking, auto antibodies rheumatoid factor, infectious agents, as well as nutritional and hormonal factors. [4] Also the pathogenesis includes the release of cytokines and matrix metalloproteinase's from inflammatory cells.[5] Rheumatoid arthritis known as adult disease because it is mostly found in third to fifth decades of age, With higher incidences reported in females more than males in ratio 2:1 and 3:1.[2-6] Erythrocyte sedimentation rate (ESR) is marker of the inflammatory response status in patients with Rheumatoid arthritis due to their reliability, reproducibility and cost effectiveness.[2-7] Additionally; Platelet count, white blood cell, red blood cell, spelling leukocyte count (DLC) is parameters of the complete blood count (CBC) test, which are usually used by clinicians for routine follow-up of Rheumatic arthritis disease.[2-8] Both neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR) are reported to be increased in various inflammation-related diseases, but their clinical significance in Rheumatoid arthritis (RA) remains unclear.[9] Blood smear of Rheumatoid arthritis patients showed a normochromic normocytic anemia.[10]

II.   Material and methods

A total of 50 samples were collected from Rheumatoid arthritis patients who attended (OPD) at National Institute Medical College and Hospital (NIMS) and Santokba Durlabhji Memorial Hospital (SDMH), department of Rheumatology laboratory, Jaipur, Rajasthan

–India. Laboratory investigations methods include complete blood count by Automated Hematology Analyzer XN series (XN-1000, 5part) system RBCs counts, WBCs by Flow cytometer system, Hb by SLS Method, Erythrocyte sedimentation rate Automated ESR analysis, Serum rheumatoid factor by Dry Chemistry system, Neutrophil lymphocyte ratio by manual method, Platelets lymphocyte ratio by manual method.

2.1 Population and Sample

The study was conducted on Rheumatoid arthritis patients who attended (OPD) of National Institute Medical College and Hospital (NIMS) and Santokba Durlabhji memorial Hospital (SDMH).

2.2 Data and Sources of Data

Present study carried out at National Institute of Medical Science College and hospital (NIMS), which is the largest referral and main teaching college in Jaipur, Rajasthan –India. Samples were collected at Santokba Durlabhji memorial Hospital (SDM) Hospitals, department of rheumatology laboratory.

3. Results:

In this study, fifty samples were collected from RA patients attended at NIMS Hospital n=18 cases and 32 attended at SDM Hospital, we found limited relation between Hematological marker and active disease of RA e.g. Hb Normal= 76% while abnormal= 24% only Figure 3, RBCs =92% normal while 8% abnormal Figure 4. The study show the percent of Female patients are more prevalence comparing with male by (4:1).

Chart 1: Distribution of Rheumatoid Arthritis regarding to Gender and average of Age.
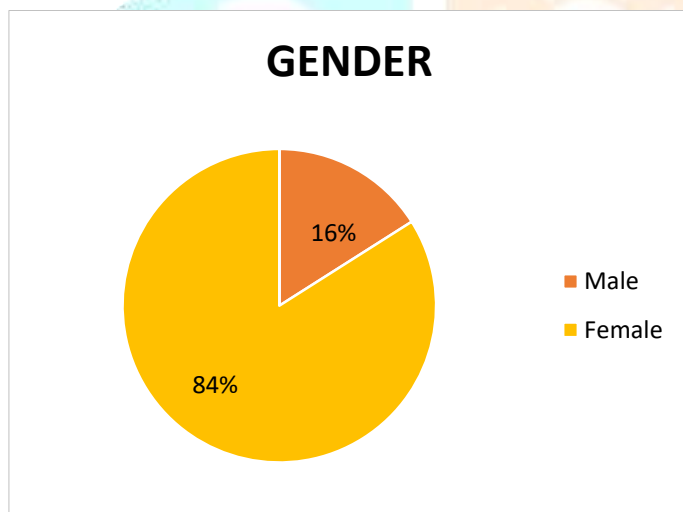

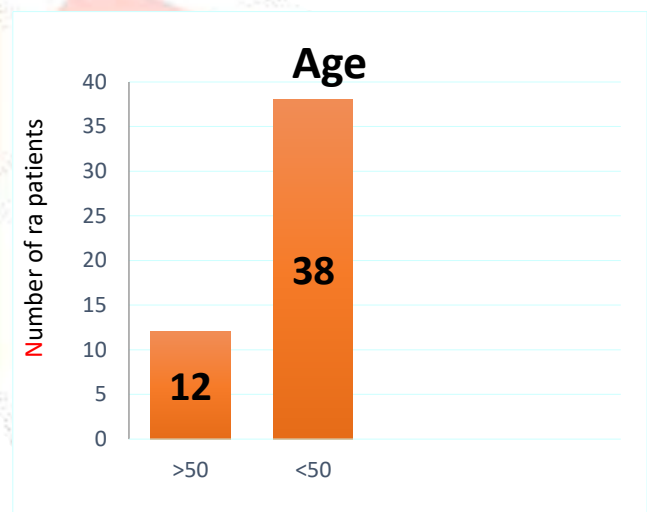Figure 1: Distribution of RA disease regarding to gender

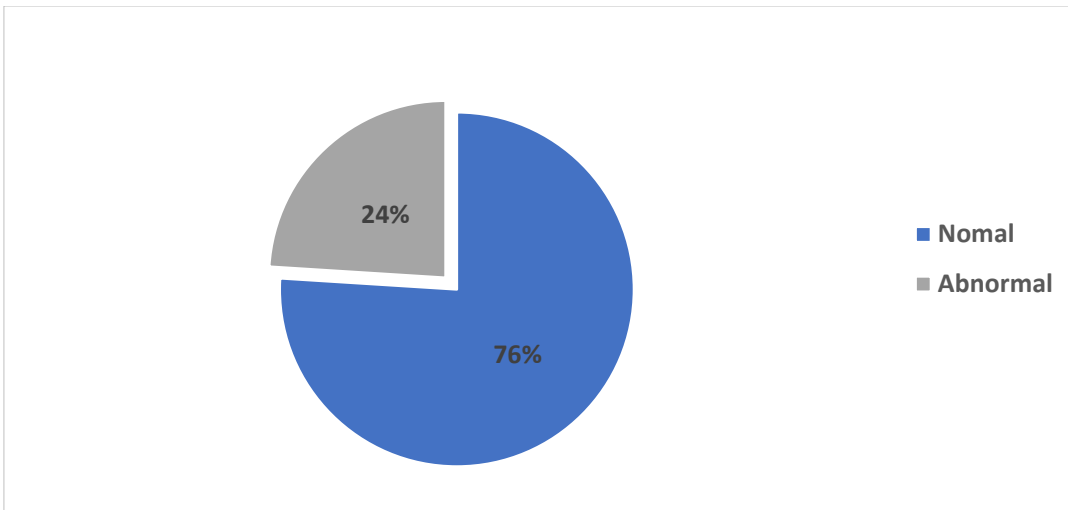
Figure 2: Average of RA patients Age

Figure 3: Hemoglobin level among RA patients

Table 1: Distribution of Hemoglobin level among RA patients.

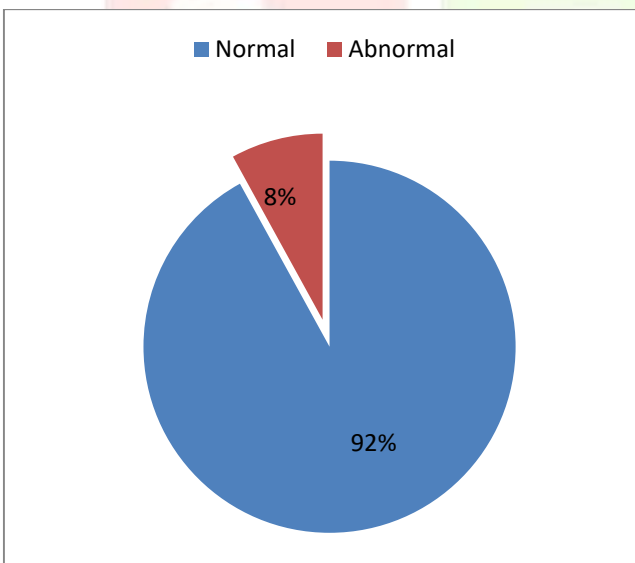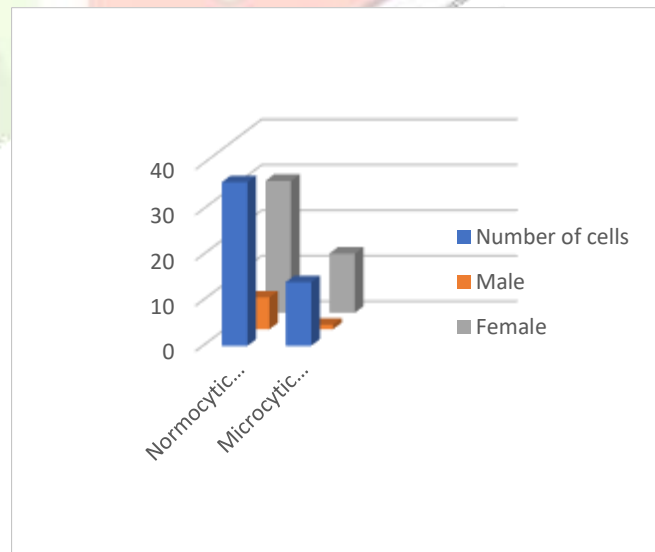| Status	Number	Male	Female	Average of Age	Hb average
Normal	38	8	30	44.28	12.71
Abnormal	12	0	12	37.83	8.50
Total	50	8	50	41.0	10.6

Figure 4: RBC in 50 RA patients.

Figure 5: RBCs Morphology in RA patients
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Table 2. Distribution of different test (plts, NLR, LPR, ESR, RA serum factor)

Name of cells test	Total number of patient	Number of normal value	Number of abnormal value	Average of normal value	Average of abnormal value	Average of total number
Platelet	50	44	6	290.41	507.7	329.54
NLR	50	37	13	8.87	4.27	7.67
LPR	50	50	0	12.9	0	12.9
ESR	50	12	38	19.33	60.1	50.38
RA serum factor	50	0	50	0	143.74	143.74

Discussion:

The mean of activity is necessary in RA disease, as the hematological markers level affected only in severity of rheumatoid disease mod. The Study was focused on demonstrating the relationship between different hematological markers (Hemoglobin level, red blood cells count, white blood cells count, platelets count, and Differential leukocyte count, Neutrophils Lymphocyte ratio (NLR), platelet lymphocyte ratio (PLR) and morphology of Red blood cells. So that this evidence based on the effective markers which can be used to assess the RA disease and thus can help in improving the methods of diagnosis and clinical management of RA. In the present study, we observed that the percent of patients regarding to gender Male to Female was 4:1. As the female has large chance to be effected by RA disease more than male, this supporting by previous studies. Sherine e. Gabriel et al.[11-12.]

RA autoimmune disease called as (adult disease), in this study we demonstrated that the elder people have wide chance to effect by Rheumatoid arthritis compared with older, the average of patient's age 42.74 years. Also, the present study clearly proved that the patient with high disease activity "RF serum >100 IU/ml" had significantly lower Hb value (average = 8.50 ml/dl) than the patients with low to moderate disease activity in male and female as what the previous studies showed.[13]

Patients with severe and moderate RA disease activity shown no significant change in RBCs count compared with low disease activity patients. WBC count, this study showed that the total white leukocyte count increases with increase in disease activity in RA patients. Regrading to platelets count we observed that platelets count level dramatically increase with increases level of disease activity (average 549.83*10^3/ul). This result supported by the study which done [14]

Deferential counts of leukocytes showed significant change in level of deferential counts in active disease of RA patients comparing with low or normal RA patients and we found that the Lymphocyte (average 21.05%) had more effected than Neutrophils (average 79.6%).
Significant increase in ESR level was observed in RA disease patients, RA disease activity play role in ESR level. It's showed that the most RA patient had high level in ESR values. This result support by Haitao Fu, Baodong Qin et al. Neutrophil- and Platelet-to-Lymphocyte Ratios are Correlated with Disease Activity in Rheumatoid arthritis. 2015;61.
This study also found that Neutrophils lymphocyte ratio (NLR) evaluated in level regard to rise in disease activity. But this study showed that the Platelets lymphocyte ratio (PLR) had no important change with RA disease patients, which is consistent with a previous study done by Ibrahim Tekeoglu, et al:" hematological markers of disease activity in Rheumatoid arthritis" (2015).

Conclusion: Hematological markers in RA patients demonstrated a limited correlation, this evidence based on the effective markers which can be used to assessment the RA disease and thus can help in improving the methods of diagnosis and clinical management of RA.

References

1-   Hennie G. Raterman, Monnickendam et al. Rheumatoid arthritis; The link between thyroid dysfunction, cardiovascular disease and B cell targeting ", 2013.

2- Ibrahim Tekeoglu, et al. Overlooked hematological markers of disease activity in Rheumatoid arthritis. 2015.

3- Ninja Szotek et al. Rheumatoid arthritis (RA): More than an Inflammatory Disorder? – A Systematic Review. S0114774 University of Twente, Enschede April 2010 .

4- Hennie G. Raterman, Monnickendam, et al. Rheumatoid arthritis; The link between thyroid dysfunction, cardiovascular disease and B cell targeting. 2013.

5- Anne Havemose-Poulsen, JytteWestergaard, et al. Periodontal and Hematological Characteristics Associated With Aggressive Periodontitis, Juvenile Idiopathic Arthritis, and Rheumatoid arthritis. doi: 10.1902/jop.2006.050051.2006.

6- Gideon Nesher , et al. Version of Record online : DOI: 10.1111/j.1532-5415.1991.tb01653.

7- BunyaminKisacik, Abdurrahman Tufan, et al. Mean platelet volume (MPV) as an inflammatory marker in ankylosing spondylitis and Rheumatoid arthritis. 9 April 2008.

8- DuyguTecer, MelekSezgin, ArzuKanık, et al. Can mean platelet volume and red blood cell distribution width show disease activity in Rheumatoid arthritis. 2016

9- HaitaoFu ,Baodong Qin , Zhide Hu, et al. Neutrophil- and Platelet-to-Lymphocyte Ratios are Correlated with Disease Activity in Rheumatoid arthritis. 2015;61.

10- S. J. Bowman et la. Hematological manifestations of Rheumatoid arthritis". Rheumatology Department, Division of Immunity and Infection. UK 2002.

11- David a, et la. Etiology of Rheumatoid arthritis. A Historical and Evidence-Based   Perspective,K.C. Chung (ed.), Clinical Management of the Rheumatoid Hand, Wrist, and Elbow. 2016., DOI 10.1007/978-3-319-26660.

12- Sherine . Gabriel et al. The epidemiology of Rheumatoid arthritis in rochester, Minnesota. 1955–1985,Vol. 42, No. 3, March 1999, pp 415–420.

13- Manas, Gopinath et al (2017) worked on "Study on Association between Common Haematological Parameters and Disease Activity in Rheumatoid arthritis". Journal of Clinical and Diagnostic Research. 2017 Jan, Vol-11(1): EC01-EC04.

14- Gu lsu M emelpamuk, O zdenvural et al. " Increased platelet activation markers in Rheumatoid arthritis : Are they related with subclinical atherosclerosis?". DOI: 10.1080/09537100701210057.