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A Descriptive Analysis For Tlc And Rbc For Type 2 Diabetic

Chandra Sekhar A.[1*], Bhanu Prakash G.[2], Sesha Pavani G.[3]
[1]Department of Physiology, Sri Balaji Medical College, Renigunta, Tirupathi, Andhra Pradesh, India.
[2]Department of Physiology, Sri Balaji Medical College, Renigunta, Tirupathi, Andhra Pradesh, India.
[3]Department of Physiology, Sri Balaji Medical College, Renigunta, Tirupathi, Andhra Pradesh, India.
Dr.A.Chandra Sekhar EMAIL: dracs687@gmail.com

Abstract

Red cell distribution (RDW) width has been established as being affected in patients with diabetes, especially with poor glycemic control. Further, studies have shown that there is a certain degree of anemia, even in young males with type 2 diabetes, as associated to healthy volunteers. High RDW designates impairment of erythropoiesis, reflecting chronic inflammation and increased levels of oxidative stress. In this study, the mean HB was 12.81 mg/dl with 95% CI of 12.56 -13.07, which reflects mild anemia. A mean Hb of 11.17±4.42 g/dl in diabetics as compared to 14.11 g/dl in the non-diabetic Indian population. The mean MCV in this study population was 84.52 fl while the mean MCH was 27.59 pg, which are within normal limits, indicating that the anemia observed is probably a normocytic normochromic anemia due to chronic disease. In the present study, the mean RDW was 13.76 (95% CI 13.45-13.95) in the study population. This study also observed that Red cell distribution width (RDW) was meaningfully higher in diabetic patients than in control subjects.

Keywords: RDW, CI, Hb , MCV, erythropoiesis, glycemic control

I INTRODUCTION

In this section presents introduction of this research work. A major headachewith diabetes is that it is an Iceberg disease. Inapparent, the undiagnosed proportion of subjects withdiabetes is on the increase in emerging economies like India due to theless developed healthcare systems.[1] The recent IDF atlas estimates that in India alone, around 36.0 million people are living undiagnosed with diabetes, which also has led to theincreasing burden of complications which are irreversible in the long term like the vascular complications especiallyaffectingthe eyes, the heart, the kidneysandthe nerves. [2] The study on subjects aged between 20 and85 years assessed the occurrence of noncommunicable diseases in South India in a classical undeveloped village.[3] They observed that the proportion of population classified, based on the HbA1c criteria as Diabetes and Prediabetes was more than 50%. They also observed that in known hypertensive subjects, theproportion with suboptimal control were 40%.[4] About one-third of the subjects had Elevated cystatin C levels, Dyslipidemia.[5] In comparison with ICMR-INDIAB study in rural Tamil Nadu, the burden observed in their study was higher.They concluded that 1/3rd to ½ of this study population was at risk of cardiovascular disease, with poor control of preexisting

cardiovascular risk factors.[6] Platelet distribution width was wider in T2DM (0.93, 0.09-1.76; N = 471). They concluded that subjects with Type 2 DMtends to have higher mean platelet volume, higherplatelet distribution width values, but a similar platelet count on comparison with subjects without T2DM and the use of these indices as biomarkers of CVD biomarker needs additional investigation.[7]

In these articles represents sector 2 of these articles explains the feature on the related works. In section 3 presents the materials and methods adopted and section 4 presents the particulars of the experimentations and discussions. Finally segment 5 accomplishes the articles by allocation our implications and upcoming strategies.

II RELATED WORKS

In this segment represents focuses the related works of this research work. The Populationwithdiabetes in India arose from about 32.7 million in 2003 to about35.5million in 2006, 40.9 million in 2007, 50.8 million in 2010, 61.3million in 2011, 65.1 million in 2013 and recently about 69.2 million in 2015. The estimates for 2040 is around 123.5 million.In a multicenter surveyconducted from 1972 to 1975 by ICMR across six cities and the adjoining rural areas,the overall national prevalence was projectedto bearound 2.1%. The chief complication in type 2 diabetes mellitus and in pre-diabetics.[8] They madea web searchincluding PubMed, EMBASE, and Web of Sciencepublished through 2014 in English and picked up selectedcase-control and cross-sectional studies providing data on mean platelet volume, width of the platelet distribution, or platelet count in T2DM subjects,IFG, IGT, or metabolic syndrome and compared them with healthy controls.[9] [10] Then, in the year 2001, theNational Urban Diabetes Survey which was conducted acrosssix large cities of India,reported an age-standardized prevalence ofaround 12.1%. The WHO-ICMR study on NCD Risk Factor Surveillance conducted between 2003 to 2005, in 44,523 subjects who were between 15–64 years of age in urban and rural areas of 6 states,estimated the proportion of subjects with self-reported diabetes was 4.5%.[11]

The large ICMR-INDIA DIABETES is also known as ICMR-INDIAB study. It is an epidemiological study which describes the prevalence at national levels.[12] It estimated the proportionof subjects withdiabetes and prediabetes in Indiaby Facing capillaryand 2-hourpost glucose load.[13] The results of Phase I study reported the proportion of subjects with diabetes among 14000 people in 2011 as 10.4%, 8.4%, 5.3% and 13.6% in states of Tamil Nadu,Maharashtra, Jharkhand, and Chandigarh, separately.They observed that in these states theprevalence of diabetes in urban areas was greater thanin rural areas. Centered on their report in2011, the total proportion of people living with diabetes wasprojected to bearound 62.4 million in India.Besides this, this study also revealed that India had alarge proportion of subjects with prediabetes, about 77 million people, with the impendingpotential to progressto type 2 DM.In Phase I of the ICMR-INDIAB study, it was imminent that the age for commencement of diabetes was set around25–34years.[14] Supporting this,the Chennai Urban Rural Epidemiology Studyknown as CURES study, which was showed in Chennai, southIndia, about 5%were suffering fromdiabetes in the age group of 25–34 years.The CURES study, which is a larger and also a more representative study,estimatedthattheincidence rates per 1000 person-years werearound22.2for

diabetes, about29.5for pre-diabetesand it was about 51.7 for any dysglycemia.And also in thesame study population, about 19.4% of the subjects who were normal glucose tolerantand58.9% of thesubjects who wereprediabetic advanced to diabetes.[15]

III MATERIALS AND METHODS

In this part presents the materials and strategies for this exploration work. Spellbinding investigation was done by mean and standard deviation for quantitative factors, recurrence, and extent for absolute factors. Information was likewise spoken to utilizing proper graphs like bar chart, pie outline, and box plots. The affiliation amoung glycemic control boundaries and different quantitative result factors was surveyed by plotting the information on dissipate plots and figuring individual relationship coefficient. P esteem < 0.05 was considered factually huge. IBM SPSS variant 22 was utilized for factual examination.

IV RESULTS AND DISCUSSIONS

In this section focuses the results and discussions of this research work. Various RBC, WBC, and platelet-relatedhematological indices were considered as primaryoutcome variables. Blood glucose related parameters were considered as primary explanatory parameters.

Table 1: Descriptive analysis for Total & differential leucocyte count in study population (N=160)

Parameter	Mean ±STD	Median	Min	Max	95% C.I. for EXP(B)	
					Lower	Upper
TLC	8403.13 ± 1401.19	8400	5200	11100	8184.35	8621.90
NEUTROPHILS	59.08 ± 9.37	59.40	32.00	81.00	57.62	60.55
LYMPHOCYTES	28.75 ± 7.38	28.70	8.90	49.70	27.60	29.90
MONOCYTES	6.26 ± 1.62	6.20	2.00	10.70	6.01	6.51
EOSINOPHILS	3.74 ± 2.71	3.10	0.00	17.00	3.31	4.16
BASOPHILES	0.47 ± 0.29	0.40	0.00	1.80	0.42	0.51

The mean TLC was 8403 ± 1401.19 cells with minimum 5200 cells and the maximum 11100 cells (95% CI 8184.35 to 8621.90). The mean Neutrophils was 59.08 ± 9.37 cells with minimum 32.00 and maximum 81 (95% CI 57.62 to 60.55). The mean Lymphocytes was 28.75 ± 7.38 cells with minimum 8.90 and maximum 49.7 (95% CI 27.60 to 29.90). The mean Monocytes was 6.26 ± 1.62 cells with minimum 2.0 and maximum 10.7 (95% CI6 to 7.44) The mean Eosinophils was 3.74 ± 2.71 cells with minimum 0 and maximum 17 (95% CI 3.31 to 4.16). The mean Basophils was 0.47 ± 0.29 cells with minimum 0.40 and maximum 1.80 (95% CI 0.42 to 0.51). in the study population.

Table 2: Descriptive analysis for Red blood cell counts & indices in study population (N=160)

Parameter	Mean ±STD	Median	Min	Max	95% C.I. for EXP(B)	
					Lower	Upper
RBC	4.65 ± 0.53	4.61	3.45	6.38	4.57	4.73
HB	12.81 ± 1.62	12.80	8.90	16.90	12.56	13.07
PCV	39.22 ± 5.42	38.75	20.50	51.90	38.37	40.06
MCV	84.52 ± 6.56	85.20	65.80	99.50	83.50	85.55
MCH	27.59 ± 2.7	27.60	19.40	35.50	27.17	28.01
MCHC	32.38 ± 1.14	32.35	25.60	38.00	32.20	32.56
RDW	13.7 ± 1.6	13.40	9.00	19.60	13.45	13.95

The mean RBC was 4.65 ± 0.53 cells with minimum 3.45 and the maximum 6.38 (95% CI -4.57 to 4.73). The mean HB was 12.81 ± 1.62 g/dL with minimum 8.90 and maximum 16.90 (95% CI 12.56 to 13.07). The mean PCV was 39.22 ± 5.42 % with minimum 20.50 and maximum 51.90 (95% CI 38.37 to 40.06). The mean MCV was 84.52 ± 6.56 fL with minimum 65.80 and maximum 99.50 (95% CI 83.50 to 85.55). The mean MCH was 27.59 ± 2.7 pg with minimum 25.60 and maximum 35.5 (95% CI 27.17 to 28.01). The mean MCHC was 32.28 ± 1.14 % with minimum 25.60 and maximum 38 (95% CI 32.20 to 32.56). The mean RDW was 13.76 ± 1.6% with minimum 9.00 and maximum 19.60 (95% CI 13.45 to 13.95) in the study population.

In order to establish a relationship between inflammation and control of diabetes, the present study evaluated changes in neutrophil-lymphocyte ratio (NLR) with changes in FBS, PPBS and HbA1c. It was found that there was a statistically significant association among and all three parameters namely, FBS, PPBS and HbA1C and Neutrophil lymphocyte ratio and this correlation was found to be statistically significant (P value<0.05). Similar to this, Shiny et al. (2014)[19] also observed a significant positive correlation. Buyukkaya E et al. (2014)[58] also observed a significant correlation between the Metabolic syndrome criteria and inflammation as described by increase in NLR. In a current study from india by khandare et al (2017)[66],NLR was found to be higher in patient with diabetic nephropathy.hence it can be inferred that NLR can predict poor glycemic control and diabetic patients with high NLR should be carefully monitored to prevent diabetic complications. The RDW tended to linearly increase with increase in HbA1c levels. Nada A M (2015) [20] in their study also observed that Red cell distribution width (RDW) was higher in patients with uncontrolled glycemia (HbA1c >7%) than those with good control (HbA1c </=7%; P=0.035). Lippi G et al (2014)[15] also demonstrated that HbA1c was significantly positively related with RDW values even after alteration for age and gender.

V CONCLUSION

Finally this work concludes that the Platelet lymphocyte ratio (PLR) is being increasingly recognized as a prophet of outcome in patient hospitalized with diabetes. Mertoglu et al[65] reported that NLR meaningfully upsurges in prediabetic and diabetic patients, while PLR meaningfully decreases in prediabetes and early stages of diabetes but upsurges in later stages. The present study, however, failed to demonstrate a statistically significant correlation between PLR and glycemic parameters (FBS, PPBS and HbA1c). This may be because the study is not adequately powered to detect the association.

In the present study, there was no statistically significant association among platelet count and glycemic control. The relationship between HbA1c and platelet indices such as Mean platelet volume and Platelet distribution width were not evaluated in this study.

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