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Research Paper

Association of Neutrophil to Lymphocyte ratio(NLR)and Platelet to lymphocyte ratio (PLR) with Gestational Diabetes Mellitus

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Aim : this study was aimed to investigate role of neutrophil to Lymphocyte ratio(NLR) and Platelet to lymphocyte ratio (PLR) to screen GDM
Methods: 63 pregnant women with GDM and 69 pregnant women without GDM were included in the study.They were divided into two groups based on the IADPSG criteria. In all the patients demographic and laboratory parameters including NLR and PLR were calculated.
Results: Mean and SD were calculated for all the variables. An independent sample t test was done between the groups. Hb, TLC, NLR and PLR did not show significant differences between the two groups.
Conclusion: There was no significant difference in the levels of NLR and PLR ratio between GDM women and normal pregnant women.
Key Words: *Gestational Diabetes, Neutrophil to lymphocyte ratio, platelet to lymphocyte ratio*

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I. Introduction:

Gestational diabetes (GDM) is glucose intolerance that occurs in pregnant women and is characterized by onset or detection during pregnancy.[1] Data from high-income countries indicate that GDM complicates approximately 5% to 7% of pregnancies[2,3] .GDM is a global health concern, and in India, the condition affects as many as 5 million women annually[4] . GDM poses risks for both the mother and fetus. It is associated with an increased risk of obstetrical complications and adverse fetal outcomes. These include preeclampsia[5], Cesarean delivery[6], stillbirth[7] , macrosomia[8], and hypoglycemia[9].Therefore screening for GDM is important to prevent complications both fetal and maternal and to assess risks both during and after pregnancy.

Hyperglycaemia is known to cause immune dysfunction, adversely affecting neutrophil chemotaxis, macrophage function and phagocytic responses, leaving diabetic patients more susceptible to infections and related comorbidities [10].GDM being a hyperglycemic state, interest has been shown in number of inflammation markers, as it is considered a low grade inflammation state, likeinterleukins(ILs),tumornecrosisfactor-alpha(TNF-a),interferon, transforming growthfactor-β,adiponectin,leptin,resistin,visfatin,andC-reactive protein (CRP) and association has been demonstrated in thesestudies[11–16].Given the limitation of cost in developing countries of these markers it is imperative to develop such tests that will be easily available and cost effective and applicable at primary level of healthcare.

NLR and PLR have been investigated as markers of inflammation in a number of conditions like metastasisincancers[17]andinflammatoryboweldisease[18], as prognosticmarkersinischemicheartdisease[19], and asscreening tests for complications associated with DM.NLR has also been investigated for its role to predict GDM[20].Therefore in this study we attempt to study its role in predicting GDM by comparing ratio of NLR and PLR of GDM cases with normal healthy controls.

II. Subjects and Methods:

The cross sectional study was performed in the Gynecology and Obstetrics department of our Institute .After proper consent, history was recorded and based on IADPSG criteria pregnant women were divided into two groups-GDM those who fulfilled the GDM criteria and control group who had blood glucose in the normal

range following a OGTT .In both the group blood analysis including CBC was done and NLR and PLR was calculated and tabulated for statistical analysis.

III. Results:

The study involved 131 pregnant women grouped into two groups GDM and control group. The demographic characteristics and laboratory results of all the pregnant women studied are shown in table 1.

Table1: Demographic characteristics and laboratory results of all the patients in the present study

	GDM (n=63)	NGDM (n=68)	P value
Age (years)			
Mean ±SD	**29.20±3.6**	**28.88±3.39**	**.813**
Min-Max	**22-36**	**21-38**	
Parity			
Mean ±SD	**2.38±1.56**	**2.12±.98**	**.58**
Min-Max	**1-10**	**1-5**	
Gestational Age(weeks)			
Mean ±SD	**34.73±2.134**	**34.53±3.842**	**.801**
Min-Max	**28-36**	**20-36**	
Abortions (n)			
Mean ±SD	**.49±1.2**	**.18±.45**	**.27**
Min-Max	**0-7**	**0-2**	
Hb (g/dL)			
Mean ±SD	**10.55±1.36**	**10.35± 1.71**	**.745**
Min-Max	**6.3-13.3**	**6.7-14.3**	
TLC($\times 10^3$ cells/µL)			
Mean ±SD	**9.27± 2.40**	**9.07±2.16**	**.706**
Min-Max	**4-17.3**	**4.80-18.00**	
NLR			
Mean ±SD	**3.78±1.61**	**3.61±1.53**	**.562**
Min-Max	**1.0-11.40**	**1.36-8.90**	
PLR			
Mean ±SD	**112.51± 61.49**	**96.33±46.11**	**.396**
Min-Max	**27.33-205.71**	**31.30-338.88**	

Table 2: Demographic characteristics and Laboratory measurements of Hb ,TLC ,NLR,PLR ratio of the study group(GDM) and control group .

	Maximum and minimum	Mean ±SD
Age in years	21-38	29.04 ±3.48
Gestational Age (weeks)	20-36	34.63 ± 3.12
TLC (cells/mL)	4-18	9.17 ±2.28
Hb(g/dL)	6.3 -14.3	10.44 ±1.55
NLR	1-11.4	3.70 ±1.57
PLR	27.33-338.88	104.73 ±55.03
Abortions(n)	0-7	0.37 ±0.93
Parity(n)	1-10	2.24±1.29

The paired comparisons of the GDM and control group showed that the mean age of the GDM group was slightly higher but was not statistically significant (p>0.05).The women in GDM group had higher mean gestational age than non GDM group but was not statistically significant (p>0.05). There was history of higher number of abortions in previous pregnancies in GDM group than non-GDM group but the difference was not statistically significant. The parity of GDM group was higher as compared to non GDM group. Laboratory

characteristics of hemoglobin and TLC in both group did not have significant difference statistically (p>.0.05).NLR and PLR ratio did not differ significantly between GDM and control group (p>0.05).

IV. **Discussion**:

GDM is a hyperglycemic state and like diabetes mellitus considered a low grade inflammatory state known as 'metainflammation',as suchinterest has been shown to study inflammation markers like interleukins(ILs),tumornecrosisfactor-alpha(TNF-a),interferon, transforming growthfactor-β,adiponectin,leptin,resistin,visfatin,andC-reactive protein (CRP) to predict association of low grade inflammation and diabetes, in one such study Pitsavos C et al [14]showed a positive association between low-grade inflammation and diabetes in a population-based sample of men and women without any evidence of cardiovascular disease.

In a study done by Yilmaz et al[20] average TLC was 7.715($\times 10^3$cells/μL) in the GDM group .In our study we found themean TLC9.27($\times 10^3$cells/μL) (SD= 2.16), hence higher than determined by Yilmaz et al. A high leucocyte count is a marker of inflammation and key toinsulin resistance that is central to GDM and DM is related to increased cytokine production because of inflammation.

The study by Yilmaz et al also showed that NLR ratio was 3.0 in GDM group vs 2.26 in non GDM group and it was statistically significant. In our study NLR ratio was 3.78 in GDM group (higher than that of study by Yilmaz et al) vs 3.61 in non GDM group but there was no statistical significance. Our results of NLR and PLR in GDM group of 3.78 and 112.51 respectively were comparable to those of Sargin et al[21]which showed that in GDM mean NLR ratio was 3.5 and mean PLR ratio was 119.83 and there was no statistical significant difference with p value >0.05.Similarly a study by Fahima SM et al[22] showed NLR value was 3.16(SD=1.84) and the difference between GDM and non GDM was not significant.

The findings in our study although points towards the role of inflammation in GDM but at the same time the NLR and PLR as inflammation markers were not significant enough to rely upon to predict GDM, while some of the previous studies supported our findings some differed with our findings.

V. Conclusion:

On the basis of our study NLR and PLR do not show significance as markers for GDM.

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