ORIGINAL ARTICLE

Prevalence of Thrombocytopenia among Normal Pregnant and Preeclamptic Females attending Antenatal Care

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ABSTRACT

Aim: To determine the level of platelet count, mean platelet volume (MPV) and platelet distribution width (PDW) in normal pregnant females and those with preeclampsia.
Study design: A comparative study was carried out on 105 pregnant females. Out of which, 52 were normal pregnant females and 52 were pre eclamptics. They were tested for platelet count, MPV and PDW and the subsequent data was recorded.
Results: Out of 52 pre eclamptic patients, 21(40%) females had mild PE and 31(60%) females with severe PE. Mean of the platelet count in group A was 302±70.4 $x10^9$/l and in group B was 223±76.5$x10^9$/l and difference was highly significant statistically ($p<0.01$). P-value for mean platelet volume (MPV) in the control (A) and severe preeclamptics (B2) was 0.06 and for platelet distribution width(PDW) it was 0.01 and both values were significant .
Conclusion: Low platelet count was observed in preeclamptic females and highly significant correlation observed between platelet count and severity of PE. MPV and PDW were high in those patients in whom platelet count was low.
Keywords: Preeclampsia (PE), Platelet count, Thrombocytopenia (TC), MPV and platelet distribution width.

INTRODUCTION

Platelet count <$150x10^9$/L is called thrombocytopenia. When platelet count is in the range of 100-$150x10^9$/L, it is of mild type of thrombocytopenia, if 50-100 $x10^9$/L, it is moderate thrombocytopenia and if count is <$50x10^9$/L, it is severe type of thrombocytopenia[1]. A condition in which pregnancy associated with increased blood pressure is called as Preeclampsia (PE). High blood pressure and proteinuria in pregnant females with >20^{th} week of pregnancy is called pre eclamsia[3]. PE is associated with multiple types of hematological abnormalities. There is increase in procoagulants when there is abnormal stimulation of hemostatic mechanism thus causing dysfunction of clotting system. When there is stimulation of platelets and the clotting mechanism, hypercoagulable state occurs.

In normal pregnancy, platelet count is reduced because of many factors i.e., hemodilution, more utilization of platelets and platelet aggregation. In one study, thrombocytopenia was present in 7-8% of normal pregnant females[4] but in other research, it was 5-8%[2]. In pre eclampsia, there is increased activation of platelets by vascular damage. There is also stimulation of clotting system in small vessels and causing platelet aggregation and, as a consequence, severe thrombocytopenia observed[1]. In another study, platelet count is low in 30-50% of females with severe PE when comparing with mild PE and normal pregnant females[5]. Moderate to severe thrombocytopenia shows the severity of the condition and it is the sign of worsening of pre eclampsia and an indication of early delivery[4]. During activation of platelets, MPV and PDW increase. Platelet distribution width is more specific indicator of platelet activation than mean platelet volume. The use of MPV and PDW could predict activation of coagulation more efficiently[6].

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METHODOLOGY

A comparative study was conducted at the Department of Pathology, PGMI, Lahore for six months.The study was performed on 104 subjects. Control group (A) included 52 normal pregnant females and group B included 52 pre eclamptic females, both in their third trimester. Group B was further divided into Group B1: Mildly pre eclamptic patients and Group B2 with severe disease. Written consent was taken and a questionnaire was filled for each patient and tests were performed within 4 hours of phlebotomy on Sysmex KX-21N hematology analyzer. **T**he data was analyzed by employing the SPSS version 20, mean±SD was given for the quantitative variables. Student t-test was applied for the comparison of the variables. The p value ≤ 0.05 was considered as statistically significant. The Pearson correlation coefficient was calculated as a measure of linear relationship among the variables.

RESULTS

The detail of results is given in tables 1, 2, 3, 4**.** Correlation of platelet count with high blood pressure in preeclamptic females had a value of $r = - 0.49$ ($p < 0.01$). The negative correlation indicated inverse relationship between the two variables i.e., with the rise in blood pressure, there is fall in platelet count observed.

Table 1: Age Distribution

Age (Yrs)	Control A	Group B
21-25	28	29
26-30	17	19
>30	07	04
Total subjects	52	52

A vs B, p=0.93 (Non significant
Group A= Normal pregnant Patients,
Group B= Pre eclamptic patients

Table 2: Platelet count in patients and controls

Platelets(x10^9/l)	Control A	Group B1	Group B2
<150	0	0	10(32.3%)
150 – 450	52 (100%)	21(100%)	21(67.7%)
Total Subjects	52 (100%)	21(100%)	31(100%)

AvsB1, p=0.62(NS), AvsB2, p<0.01(HS)
B1vsB2, p<0.01(HS)
Group A= Normal pregnant Patients,
Group B1= Mildly Pre-eclamptic patients
Group B2= Severely Pre-eclamptic patients

Table 3: Mean platelet volume in patients and controls

MPV (fl)	Control A	Group B1	Group B2
7–11 (Normal)	50 (96.2%)	17(81%)	14(45.2%)
11.1–15 (High)	02 (3.8%)	04(19%)	17(54.8%)
Total Subjects	52 (100%)	21(100%)	31 (100%)

AvsB1(p=0.2, NS), A vs B2, P = 0.06 (significant),
B1 vs B2 (p= 0.02, significant)
Group A= Normal pregnant Patients,
Group B1= Mildly Pre-eclamptic patients
Group B2= Severely Pre-eclamptic patients

Table 4: Platelet distribution width in patients and controls

PDW (fl)	Control A	Group B1	Group B2
9–14 (Normal)	41 (78.8%)	14 (66.7%)	10(32.3%)
14.1–22 (high)	11 (21.2%)	07 (33.3%)	21(67.7%)
Total Subjects	52 (100%)	21 (100%)	31 (100%)

A vs B1, p= 0.9(NS), A vs B2, p=0.0014(significant)
B1vsB2, p=0.035(significant)
Group A= Normal pregnant Patients,
Group B1= Mildly Pre-eclamptic patients
Group B2= Severely Pre-eclamptic patients

DISCUSSION

In this study, patients having pre eclampsia were mostly <30 yrs of age, so it is the disease of young females. In normal pregnant patients, all the subjects had platelet count within the normal range and this study is not consistent with the results of Levy and Murphy (2002) who observed 7-8% of females with normal pregnancies having platelet count on the lower side[4].

In mild preeclamptic patients (B1), there was normal platelet count which was in agreement with one study conducted[7]. In this study, 32.3% of severe preeclamptic patients (B2) had low platelet count and Macey (2010) has reported thrombocytopenia in severe preeclampsia with the frequency range of 30-50%. In this study, the statistical difference between control (A) and mild preeclampsia (B1) was non significant (p>0. 62) while that between control (A) and severe preeclampsia (B2) was significant (p<0.01).

While comparing platelet count and blood pressure, in the current study, a negative correlation of r = - 0.49 (p<0.01) was observed i.e. a rise in blood pressure was associated with low platelet count.

In the present study, MPV and PDW were observed to be significantly high in severe pre eclamptics and a progressively higher number of patients had high level of these parameters as there was a progression from mild to severe disease. These results were consistent with observations made by Dadhich (2012)[7]. Another study also showed a relationship between platelet indices and severity of preeclampsia [9].

In a study by Vagdatli et al, there was a significant increase in MPV (P<0.01) and PDW (P<0.01) in patients with platelet activation compared to control subjects. PDW showed a significant increase from the first to the third trimester of pregnancy (P=0.09)[8]. The same was observed in the present study with a high MPV in 54.8% and high PDW in 67.7% of severe preeclamptics. So measurement of MPV and PDW may be considered to assess the severity of the disease.

CONCLUSION

PE is a disease of younger females and platelet count was significantly low in severe pre eclamptics. In mild PE, platelet count was low as compared to normal pregnant females. A significant correlation was found between the drop in platelet count and the severity of PE. The low platelet count showed ongoing coagulopathy. MPV and PDW were high in patients of low platelet count. Patients with severe PE had significant decrease in platelet count and increase in PDW and MPV as compared to the mildly pre eclamptic females.

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