



Total and Differential Leucocyte Count in Preeclampsia

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ABSTRACT

Preeclampsia evokes inflammatory response. But whether inflammatory response observed is in relation to severity of preeclampsia is not clear. This study compared the total and differential leucocyte count between normotensive mothers and mothers with mild and moderate - severe preeclampsia. Total leucocyte count and differential leucocyte count was done in 92 normotensive mothers, 54 mothers with mild preeclampsia and 28 mothers with moderate-severe preeclampsia. Mothers with moderate to severe preeclampsia had higher total leucocyte count, differential neutrophil count and differential basophil count compared to normotensive mothers ($P < 0.05$). There was no significant difference in total and differential leucocyte count of mild preeclampsia group compared to normotensive group. Higher total leucocyte count, differential neutrophil count and basophil count occurs mainly in moderate to severe preeclampsia

Key words: preeclampsia, total leucocyte count, neutrophils, basophils



INTRODUCTION

The hypertensive disorders during pregnancy affect up to 8.0% of all pregnancies⁽¹⁾ and remain a major cause of maternal and neonatal mortality and morbidity worldwide.^(2,3) In women with preeclampsia, a history of symptoms is obtained antenatally, with the key alarming clinical symptoms being headache, vomiting, visual disturbances and epigastric pain. However the unpredictable onset and progression of these symptoms warrants the need for an early and appropriate detection.⁽⁴⁾ Over the years, a lot of interest has been directed at studies on the role of serum uric acid, urea and creatinine in the pathogenesis of pregnancy induced hypertension.^(5,6)

However there is a constant ongoing search for better predictors and prognostic factors to assess the progress and severity of this disease, hematological parameters being one among them.⁽⁷⁾ Additionally pregnancy induced hypertension is a multisystem disorder and may involve inflammatory response.⁽⁸⁾ Therefore this study was undertaken to assess the total leucocyte and differential leucocyte count in mothers with preeclampsia.

MATERIALS AND METHODS

This study was done in teaching hospitals attached to GEMS Hospital after obtaining permission from ethical committee of the institution overseeing human studies and consent from the study participants. 174 consecutive mothers in 20th week of gestational period were enrolled into the study, in whom fresh medical report on serum protein, total leucocyte and differential leucocyte count was available. Among them 82 were with clinical diagnosis of preeclampsia and 92 were normotensive mothers. Mothers with Pre-eclampsia were further classified into mild ($n = 54$) and moderate-severe ($n = 28$) based on the blood pressure recording.

A blood pressure recording of 140mmHg systolic blood pressure and 90 mm Hg diastolic blood pressure was taken as the cut off point for mild preeclampsia while a blood pressure recording of 160 mmHg systolic blood pressure or 100 mm Hg diastolic blood pressure was the starting point of moderate-severe preeclampsia. In this study the diagnosis of preeclampsia was based on the definition of American College of Obstetrics and Gynecologists.⁽⁹⁾ In all the subjects, height and weight was measured and body mass index was calculated using the formula weight in kilogram

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divided by height in meters squared. Systolic and diastolic blood pressure was measured in sitting position. Statistical analysis included analysis of one way variance, Kurskal- Wallis test followed by Dunn's multiple comparison test.

RESULT

Data is presented as mean ± SD. Data on comparison of baseline characteristics of mothers with preeclampsia and normotensive mothers are presented in table 1. Data on total leucocyte and differential leucocyte count in mild preeclampsia, moderate-severe preeclampsia and normotensive mothers is presented in table 2. Mean age of mothers with mild preeclampsia and moderate-severe preeclampsia was higher compared to normotensive mothers (p< 0.05, table 1). Mean age

of mothers with mild preeclampsia did not differ significantly compared to mothers with moderate – severe preeclampsia (table 1). Systolic and diastolic blood pressure of mothers with preeclampsia was significantly higher compared to normotensive mothers (p < 0.001, table 1). Systolic and diastolic blood pressure of moderate-severe preeclampsia was significantly higher compared to mothers with mild preeclampsia (p < 0.05, table 1). Urine protein was significantly higher in mothers with mild and moderate-severe preeclampsia compared to normotensive mothers (p < 0.001, table 1). Mean Urine protein of mothers with mild preeclampsia did not differ significantly compared to moderate – severe preeclampsia (table1). Mean body mass index of normotensive mothers and mothers with preeclampsia did not differ significantly (table 1).

Table 1 Baseline characteristics of preeclamptic and normotensive mothers (Values are mean ±SD).

| Variables | Mothers With Mild preeclampsia(n= 54) | Mothers With Moderate – severe preeclampsia (n = 28) | Normotensive mothers (n = 92) | F/KW value | P value |
|--------------------------------|--|--|-------------------------------|------------|----------|
| Age (years) | 29.44 ± 3.65* | 30.32 ± 4.11* | 27.60 ± 4.10 | 11.704 | 0.0029 |
| Body Mass index (kg/m2) | 26.22 ± 2.93 | 25.82 ± 2.70 | 25.56 ± 2.65 | 0.982 | 0.376 |
| Systolic blood pressure (mmHg) | 154.07 ± 10.00 ***† | 165 ± 8.38 ** | 117.71 ± 7.12 | 132.75 | < 0.0001 |
| Diastolic blood pressure(mmHg) | 95.55± 5.01***† | 105.35 ± 5.07** | 72.82 ± 4.52 | 147.28 | < 0.0001 |
| Urine protein | 7.17 ±1.61†† | 6.21 ± 1.12‡ | 5.31 ± 1.07 | 48.004 | < 0.0001 |

* P<0.05 compared to normotensive group (Dunn's multiple comparison).

** p< 0.001 compared to normotensive group

Total leucocyte count, differential neutrophil count and differential basophil count of mothers with moderate - severe preeclampsia was significantly higher compared to normotensive mothers (p< 0.05,table 2). Total leucocyte count, differential neutrophil count and differential basophil count of mothers with mild preeclampsia was not

significantly different compared to normotensive mothers (table 2). Differential eosinophil count, differential monocyte count and differential lymphocyte count of mothers with preeclampsia did not differ significantly compared to normotensive mothers (table 2).

Table 2. Total and differential leucocyte counts in preeclampsia and normotensive mothers (values are mean ±SD).

| Variables | Mild preeclampsia (n= 54) | Severe preeclampsia (n = 28) | Normotensive (n = 92) | F/kw value | P value |
|-------------------------------|----------------------------|--------------------------------|-----------------------|------------|---------|
| Total leucocyte count | 12774.25± 4772.14 | 13241.42 ± 4683.81* | 10889.67± 3122.78 | 8.307 | 0.015 |
| Differential neutrophil count | 77.29 ± 7.74 | 78.53 ± 11.418* | 75.11 ± 6.76 | 6.479 | 0.039 |
| Differential eosinophil count | 0.88 ± 0.81 | 0.75 ± 0.84 | 1.02 ± 0.94 | 2.062 | 0.356 |
| Differential basophil count | 0.55 ± 0.50 | 0.82 ± 0.66* | 0.45 ± 0.52 | 7.355 | 0.025 |
| Differential monocyte count | 0.88 ± 0.94 | 0.71 ± 0.46 | 0.47 ± 0.50 | 5.293 | 0.07 |
| Differential lymphocyte count | 19.44 ± 8.38 | 18.82 ± 6.48 | 19.15 ± 7.31 | 0.084 | 0.95 |

* p< 0.05 compared to normotensive group (Dunn's multiple comparison)

DISCUSSION

In the present study, urine protein was significantly higher in mothers with preeclampsia compared to normotensive mothers (table 1). But urine protein did not differ significantly between mothers with mild preeclampsia compared to mothers with moderate-severe preeclampsia. This finding suggests that although raised protein is a characteristic feature of pregnancy induced hypertension, this parameter may not be involved

in the progression of pathogenesis leading to severe preeclampsia. Neutrophil count was higher in mothers with moderate to severe preeclampsia compared to normotensive mothers (table 2). Canzoneri BJ et al too have observed increase in total leucocyte count in pregnancy induced hypertensive mothers.(10) Pregnancy induced hypertension is a multisystem disorder and may involve inflammatory response.(8) Thus higher leucocyte count especially of neutrophils observed in our study in moderate-severe preeclampsia

group could be one of the clinical manifestations of preeclampsia in moderate to severe state but not in mild state of preeclampsia. However, Sivakumar S et al have not observed any difference in total leucocyte count and differential neutrophil count in pregnancy induced hypertensive mothers compared to normotensive mothers.⁽¹¹⁾ In the present study basophil count was significantly higher in mothers with moderate to severe preeclampsia compared to normotensive mothers. Basophils appear in many specific kinds of inflammatory reactions. Thus increased basophil count observed in moderate to severe preeclampsia may be one of the characteristic features of inflammatory response induced by moderate to severe preeclampsia.

However all the studies do not confirm this observation. Lurie S et al did not find any increase in basophil count in mothers with preeclampsia compared to normotensive mothers.⁽¹²⁾ On the other hand Vonne J et al observed decreased basophil count in mothers with preeclampsia compared to normotensive mothers.⁽¹³⁾

CONCLUSION

Our study concludes that total leucocyte count is increased in moderate to severe preeclampsia. Among the differential leucocyte count, neutrophils and basophil count is increased in moderate to severe preeclampsia.

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