COMPARATIVE STUDY OF SOME HAEMATOLOGICAL PARAMETERS IN ABO COMPATIBLE AND NON COMPATIBLE MATERNAL FOETAL GESTATION

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ABSTRACT

Objectives: To carry out comparative study of some haematological parameters in ABO compatible and incompatible maternal foetal gestation.

Methodology: A total of 260 subjects comprising of 130 postpartum women within the age range of 22-35 years, with good obstetrics history and normal delivery with their 130 neonate babies were included is the study. ABO blood group of mothers with their babies, were carried out to classify compatible and non compatible gestation. Haematological parameters viz ; Packed cell volume(PCV), White blood cell count(WBC), Platelet count, erythrocyte sedimentation rate(ESR), and reticulocyte count were carried out on blood samples from the mother and baby.

Result: Eighty pairs were found to be ABO compatible, while 50 were incompatible. Student t- test was used to test the means for significance at p<0.05. There was significant increase in the PCV, non significance in WBC count, platelet count ESR and no significant increase in reticulocyte count of incompatible compared with compatible while the babies showed no significant increase in PCV, WBC, Platelet count, ESR, as well as no significant reduction in reticulocyte count of incompatible compared with compatible.

Conclusion: Considerable differences do exist in the haematological parameters of compatible when compared with incompatible maternal - foetal gestations. Evaluation of biochemical compositon of compatible and incompatible placenta is therefore recommended for elucidation.

KEY WORDS: Haematological parameters, ABO compatible, ABO incompatible, maternal- foetal.

INTRODUCTION

The placenta circulation brings into close relationship two circulations: the maternal and foetal where exchange of nutrients between the placenta and foetus occurs through transport mechanisms which includes simple diffusion, osmosis, simplified transport, active transport, vescicular transport.¹²

The ABO blood group discovered by Karl Landsteiner in 1900 & concluded by Decastello and Sturl 1902 is among the most important
blood group systems. ABO inheritance through three allelomorhic genes ABO can result in a baby having a blood group different from both mother and father and during pregnancy maternal foetal ABO incompatibility do occur.

Foetal and maternal blood come into close proximity in the villi of the placenta whose main functions include, gaseous exchange, excretion, maintenance of homeostasis, hormone secretion, haemopoiesis, and hepatic metabolic activities. Haematological parameters (packed cell volume, White blood cell count, platelet count, erythrocyte sedimentation rate, reticulocyte count) have been useful in the assessment of the state of health of individuals in several studies. A comparison of the effect of ABO compatibility and incompatibility gestation on haematological parameters of both mother and baby was desired by this study.

METHODOLOGY

The study was conducted, at the labour wards of Ladoke Akintola University of Technology Teaching Hospital, the Primary Health Center Atelewo, and Our Lady of Fatima Catholic Hospital Jaleyemi, all in Osogbo metropolis. South Western Nigeria between January to June 2009. Ethical approval was obtained from the Ethical Community of Ladoke Akintola University of Technology Teaching Hospital Management Board, and the Health Management Board of the Ministry of Health of Osun state.

A total of 260 comprising of 130 postpartum women with the age range of 22-35 years with good obstetrics history and normal delivery with their 130 neonate babies were included in the study. Exclusion criteria for the study were women with the following health problems,

* High blood pressure
* Metabolic disorders e.g. diabetes

Collection of blood samples from mother and baby was done with the assistance of a Consultant Obstetrician. 2ml of whole blood was collected from mother and baby into EDTA sequestrated bottle to achieve 1mg EDTA / ml of blood. It was gently mixed for two minutes and stored at 4°C. ABO blood group was carried out on 130 pairs of mother and baby. Haematological parameters viz PCV, WBC, Platelet count, ESR, reticulocyte was carried out on mother and baby samples according to the method of Dacie and Lewis et al.

RESULTS

Fifty pairs were found to be ABO incompatible while 80 were compatible, giving a ratio of 0.6:1. Table-I shows mean value ± S.D of all the haematological parameters done in which the t-test was computed to test for significance using P ≤ 0.05 as significant and P > 0.05 as not significant. The PCV of mothers that were compatible with their babies (26.44±4.491) was significantly lower than PCV of mothers with incompatible babies. (29.68±4.491)(< 0.05). The other parameters tested did not show any significance between the ABO compatible and incompatible gestations.

DISCUSSION

ABO compatibility gestation frequency of 62% when compared with incompatibility of 38% shows a wide distribution difference in the two groups of the area studied. The incidence of maternal foetal ABO compatible gestations is a pointer to the difficulty experienced in resolution of paternity dispute involving compatible maternal foetal gestation which will be more cumbersome than incompatible maternal foetal gestation.

The close proximity of the foetal and maternal blood circulation in the villi of the placenta where nutrients including immunoglobulin are exchanged necessitates the concern to investigate the hematological response of mother and child in incompatible gestation compared with compatible gestation.

Nutrient transport protein in the placenta cells mediates active and passive transfer of nutrients from mother to baby and waste product from baby to mother for excretion.

The significant increase of the PCV of incompatible mothers when compared with compatible may be explained homeostatically. Osmolarity of the placental nutrient transport protein-
biochemical constituent in compatible gestation is different from that of incompatible. The red cell antigen similarity in compatible and dissimilarity in incompatible gestation may be a contributing factor to the difference in the osmolarity of the placenta, with the incompatible having a higher value, which will cause movement of water from mother's circulation to the placenta, resulting in hemoconcentration. This gives higher PCV in mothers with incompatible gestation. Also compatible gestation gave a higher but not significant ESR level than in incompatible suggesting difference in protein (albumin and globulin) distribution ratio between the two groups.

The study showed a higher population of cells in all cell lines in incompatible than compatible with significant selective preference to the erythrocyte cell lines suggesting higher bone marrow activity in incompatible than compatible. The non significant increase in white blood cell count of incompatible babies compared to compatible may be as a result of physiological innate immune response to the incompatible maternal foetal relationship.

**CONCLUSION**

Considerable differences do exist in the haematological parameter of compatible when compared with incompatible maternal foetal gestations. Evaluation of biochemical composition of compatible and incompatible placenta is therefore recommended for elucidation.

**REFERENCES**


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**Table-I: Showing mean value ± S.D of all the haematological parameters**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Compatible Mean ± S.D</th>
<th>Incompatible Mean ± S.D</th>
<th>T-Test</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCV (Mother)</td>
<td>26.44±4.491</td>
<td>29.68±4.491</td>
<td>2.279</td>
<td>0.032</td>
</tr>
<tr>
<td>WBC count (Mother)</td>
<td>8088.00±2555.700</td>
<td>10300.00±3209.063</td>
<td>1.638</td>
<td>0.114</td>
</tr>
<tr>
<td>Platelet count (Mother)</td>
<td>163520.00±30411.173</td>
<td>177240.00±33096.173</td>
<td>1.638</td>
<td>0.137</td>
</tr>
<tr>
<td>Reticulocyte (Mother count)</td>
<td>0.968±0.462</td>
<td>0.896±0.463</td>
<td>-0.483</td>
<td>0.634</td>
</tr>
<tr>
<td>ESR (Mother)</td>
<td>62.52±34.204</td>
<td>47.36±27.398</td>
<td>-1.611</td>
<td>0.120</td>
</tr>
<tr>
<td>PCV(Baby)</td>
<td>45.20±5.642</td>
<td>45.32±5.893</td>
<td>0.074</td>
<td>0.942</td>
</tr>
<tr>
<td>WBC count (Baby)</td>
<td>11556.00±3591.550</td>
<td>13180.00±3316.750</td>
<td>1.992</td>
<td>0.058</td>
</tr>
<tr>
<td>Platelet count (Baby)</td>
<td>205520.00±39493.797</td>
<td>210920.00±39061.831</td>
<td>0.562</td>
<td>0.579</td>
</tr>
<tr>
<td>Reticulocyte count (Baby)</td>
<td>4.04±1.007</td>
<td>3.584±0.6408</td>
<td>-1.836</td>
<td>0.079</td>
</tr>
</tbody>
</table>

S.D standard deviation