Assessment of Iron Status in Pregnant Ladies with Preclampsia

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ABSTRACT

Background
Preeclampsia is one of the most important complications of pregnancy that is associated with increased morbidity and mortality. Therefore, the relationship of iron status with preeclampsia was under investigation.

Objective
The objective of this was estimated Iron status (Iron, Ferritin, TIBC, Transferrin) in pregnant women and pre-eclamptic women.

Methodology
This case control study, 100 pregnant women (50 normal pregnant, 50 pre-eclamptic women of age ranging between 16-38 years and having gestational age between 26 to 36 weeks. This study carried in Midwives Hospital, Omdurman from January to march 2015. In the subjects serum concentrations of iron and TIBC were estimated using ferrozine method using Bio-System. Ferritin and Transferrin were estimated using immune Enzymometric Assay (TOSOH-A1A-360).

Result
(Mean± SD) in iron status (Iron, Ferritin, TIBC, Transferrin) in normal pregnant women respectively were (89.70±7.92, 20.08±7.38 342.96±52.96, 26.71±4.78). While in the preeclamptic women respectively were (172.80±11.27, 86.00±19.85, 252.76±55.68, 70.08±14.19).

Conclusion
From this study, all iron profile (Iron, Ferritin, and Transferrin) were significant higher while TIBC was significant lower.

Keywords: preeclampsia, Iron status, pregnant women, Sudan.

INTRODUCTION
Preeclampsia is a multisystem disorder of unknown etiology and is unique to pregnant women after twenty weeks of gestation. It is progressive disease with a variable mode of presentation and rate of progression (1). Hypertension, proteinuria, excessive weight gain and edema are the classic clinical manifestation (2). Preeclampsia occurs in about 6% of the general population (3). The incidence varies with geographic location. Predisposing factors are nulliparity black race, maternal age below 20 or over 35 years, low socioeconomic status, multiple gestation, hydatidiform mole, polyhydramnios, twins, obesity and underlying renal disease(4). Iron and hematins proteins, play important roles as catalysts of lipid per-oxidation in tissues. Iron promotes lipid per-oxidation perhaps facilitated by the hyper-lipidemia consequent to the tremendous mobilization of lipid that occur in the later half of human gestation(5). Transitional metals, especially iron, which are abundant in the placenta, are important in the production of free radicals(5,7). The approximate doubling of transferrin saturation in pre-delivery sera of women with preeclampsia relative to controls result from combined effect of increased serum iron and decreased total serum transferrin concentration(9). Mean ferritin levels were significantly elevated in both pregnancy induced hypertension and eclampsia as compared to controls(10). Maternal ferritin concentration is primarily a reflection of maternal, iron status, and a high level is associated with unfavorable outcome(6). Mean value of serum iron is significantly

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increased in the pre-eclamptic women in comparison to controls whereas mean values of both total iron binding capacity and unsaturated iron binding capacity are significantly decreased in pre-eclamptic women in contrast to controls(11). The objective of these study was measure iron status(Iron, ferritin, TIBC and transferring) in preeclamptic woman.

MATERIAL AND METHODS

Study was carried out to evaluate iron status in pregnancy induced hypertension and to explore the possible contributory role of iron to the etiology and pathogenesis of preeclampsia in the period was from January to march 2015 in Midwives Hospital, Omdurman. Study was performed on 100 pregnant women of age ranging between 15-38 years and having gestational age between 26 to 36 weeks. 50 obstetric patients were identified as having preeclampsia according to specific criteria. Gestational hypertension was defined as an increase of 30 mm Hg systolic or 15 mm Hg diastolic blood pressure compared with values obtained before 20 weeks gestation or an absolute blood pressure >140/90 mm Hg after 20 weeks gestation if earlier blood pressure were not known. Proteinuria was defined as >500 per 24 hr urine collection or >2+ on a voided or >1+ on a catheterized random urine specimen. 50 healthy pregnant subjects were taken as controls, having uncomplicated pregnancies and were normotensive throughout gestation and without proteinuria. Collection of blood samples for the study about 5ml of venous blood was collected under aseptic precaution in a sterile bulb from selected subjects. Then the serum is separated by centrifugation which is used for estimation of iron, Ferritin and TIBC. In the subjects serum concentrations of iron and TIBC were estimated using ferrozine method using Bio-System and ferritin was estimated using immuno enzymometric Assay (TOSOH-A1A-360). Transferrin saturation was calculated by the following formula.

Transferring Saturation%=(100x(Serum iron/TIBC)

These data were analyzed using SPSS soft were to calculate t-test (mean±SD).

RESULT

Table 1. The demographic in study population

<table>
<thead>
<tr>
<th>Parameter (Means SD)</th>
<th>Control (n=50)</th>
<th>Case (n=50)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years me</td>
<td>26.64±5.49</td>
<td>27.50±4.65</td>
<td>0.060</td>
</tr>
<tr>
<td>Weight in kg</td>
<td>70.12±6.29</td>
<td>80.18±6.32</td>
<td>0.00</td>
</tr>
<tr>
<td>BMI</td>
<td>25.92±0.89</td>
<td>29.06±1.78</td>
<td>0.00</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>118.26±7.66</td>
<td>169.60±16.03</td>
<td>0.00</td>
</tr>
<tr>
<td>Diastolic blood pressure</td>
<td>77.70±5.36</td>
<td>106.82±7.82</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 2. Iron status (Iron, ferritin, TIBC, Transferrin) in study population

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Control(n=50)</th>
<th>Case(n=50)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron (Mg/dl)</td>
<td>89.70±7.92</td>
<td>172.80±11.27</td>
<td>.000</td>
</tr>
<tr>
<td>Ferritin (ng/ml)</td>
<td>20.08±7.38</td>
<td>86.00±19.85</td>
<td>.000</td>
</tr>
<tr>
<td>TIBC (Mg/dl)</td>
<td>342.96±52.96</td>
<td>252.76±55.68</td>
<td>.000</td>
</tr>
<tr>
<td>Transferrin (%)</td>
<td>26.71±4.78</td>
<td>70.08±14.19</td>
<td>.000</td>
</tr>
</tbody>
</table>

DISCUSSION

Preeclampsia is still one of the leading causes of maternal and fetal morbidity and mortality. The etiology of this disorder remains exclusive to human pregnancy is an enigma. Recent evidence suggests there may be several underlying causes or predispositions leading to endothelial dysfunction and causing the signs of hypertension, proteinuria and edema-findings that allow to make the diagnosis of the syndrome of Preeclampsia (12,13). Many hypotheses have been offered and include prostacyclin thromboxane imbalance, endothelial dysfunction and immunogenetic and absolute or relative placental ischemia (14,15). There is no difference in maternal age between normal pregnant and pre-eclamptic women but significant difference between weight, height, systolic, and diastolic was found in both groups. Normal women has a decrease in serum iron and ferritin during the third trimester of pregnancy as their stores of iron are depleted because of feto-placental demand and required expansion of red cell mass(16,17). However, elevated level of serum iron is observed in pre-eclamptic as compared to normal pregnant women, a study supported by (8,11,18). Total iron binding capacity (TIBC) is low in pre-eclamptic group as compared to control(19). A measure of the iron binding reserve of serum is also significantly lower in women with preeclampsia relative to normal
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pregnancy(7). Serum ferritin is found elevated in pre-eclamptic group, which is in agreement with study conducted by(18). Serum ferritin is a reliable indicator of total body iron status in non diseased individuals, with low concentration diagnostic of iron deficiency. However a high ferritin does not always signify iron excess (7). High ferritin was associated with increased risk for preterm delivery and neonatal asphyxia, while the lower ferritin level was associated with decreased risk of preeclampsia, pre labour rupture of membranes (20). Increased concentration of serum ferritin during third trimester may be part of an acute phase response, which suggests maternal infection and increased risk of poor pregnancy outcome (16). Increased percent saturation of transferrin in pre-eclamptic group is observed, which is in agreement with data collected by (7).

CONCLUSION

This study found all iron status (Iron, Ferritin, Transferrin) was significant higher in preeclampsia, while TIBC was significant lower.

REFERENCES

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