قياس نسبة الفريتين فى تسمم الحمل

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توطئة للحصول على درجة الماجستير فى
أمراض النساء و التوليد

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تحت اشراف

الدكتور/ وليد هتلر الطنطاوى
أستاذ مساعدأمراض النساء والتوليد
كلية الطب – جامعة عين شمس

الدكتور/ ياسر أحمد زيتون
أستاذ مساعد كلينيكال باثولوجى ومناعة
كلية الطب – جامعة عين شمس

الدكتور/ تامر أحمد الرفاعى
مدرس أمراض النساء والتوليد
كلية الطب – جامعة عين شمس

كلية الطب
جامعة عين شمس
٢٠٠٨

Serum ferritin levels in preeclampsia

Thesis

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Master Degree in Obstetrics and Gynecology

Presented by

Baher Salah Saleh Ibrahim

M.B.B.CH. Assiut University ٢٠٠٠
Resident in Hurghada general hospital

Under supervision of

Dr. Waleed Hitler El-Tantawy

Ass. Professor of Obstetrics and Gynecology
Faculty of medicine
Ain shams university

Dr. Yasser Ahmed Zietoun

Ass. Professor of clinical pathology &immunology
Faculty of medicine
Ain shams university

Dr. Tamer Ahmed El-Refaie

Lecturer of Obstetrics and Gynecology
Faculty of medicine
Ain shams university

Faculty of medicine
Ain shams university
٢٠٠٨

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Serum ferritin levels in preeclampsia

By Baher Salah Saleh

Abstract

Preeclampsia, also known as toxemia, is a serious complication of pregnancy, characterized by high blood pressure, protein in the urine, and retention of fluid. Those affected need rest and close monitoring or, in severe cases, admission to the hospital. The condition usually resolves soon after delivery, but early delivery increases the risk of complications to the baby. This has to be balanced against delay, which increases the risk that eclampsia will develop, with seizures and organ damage threatening the lives of both mother and baby ***(Williams et al., ٢٠٠٧).***

Ferritin is a major iron storage protein found not only in spleen, liver and bone marrow, but also in mucosal cells of small intestine, in placenta, kidney, testes, skeletal muscle, and in circulating plasma***(Circhton, ١٩٧٣).***

Serum ferritin concentration ranges from ١٥ to ٣٠ ng/mL (higher in males), where values below ١٥ ng/mL are specific for storage iron depletion. Ferritin values more than ٣٠ ng/mL do not necessarily indicate overload. This is because ferritin synthesis is influenced by many factors other than iron ***(Milman, ّ ّ).***

Objective: The aim of this work is to compare between serum ferritin level in mild and severe preeclampsia, versus normotensive pregnancies.

Study Design: Case control study was conducted at Ain Shams University maternity hospital. It included ٦٠ women during the third trimester and divided into: Group ١ included ١٥ patients with mild preeclampsia; Group ٢, included ١٥ patients with severe preeclampsia; Group٣, included ٣٠ pregnant women with uncomplicated pregnancies (the control group). Withdrawal of venous sample for measurement of: a- hemoglobin and hematocrit values. b- platelet count. c- alanine aminotransferase, aspartate - aminotransferase, bilirubin, and creatinine. d- Prothrombin time and partial thromboplastin time. e- Ferritin by an ELISA technique.

Results: There was no significant difference between the three studied groups as regards age, parity, Hb, PT, PTT, ALT and Creatinine. There was significant difference between the three studied groups as regards AST. There was highly significant difference between the three studied groups as regards gestational age, SBP, DBP, platelets count. There was highly significant difference between the three studied groups as regards serum Ferritin. Significantly lower in control group than the other two groups (mild, severe) and significantly lower in mild group than the severe group. There was high significant correlation between ferritin in one hand and age, platelets count and PT in other one in mild group. There was significant correlation between ferritin in one hand and DBP and ALT in other hand in mild group. There was non significant correlation between ferritin in one hand and parity, GA, SBP, Hb, PTT, AST and creatinine in other one in mild group. There was high significant correlation between ferritin in one hand and ALT and Creatinine in other one in severe group. There was significant correlation between ferritin in one hand and DBP and AST in other hand in severe group. There was non significant correlation between ferritin in one hand and age, parity, GA, SBP, Hb, platelet count, PT and PTT in other one in severe group. There was significant correlation between ferritin in one hand and SBP and Hb in other one in control group. There was non significant correlation between ferritin in one hand and age, parity, GA, DBP, platelet count, PT, PTT, ALT, AST and creatinine in other one in control group. The ROC curve showed the best cut-off value which gives highest sensitivity and specificity for severe preeclampsia is that ١٨٥ ng/ml.

Conclusion: The level of serum ferritin was high in patients with preeclampsia and it correlates well with the severity of the disease.

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To my parents and my dear brother, for their everlasting love, care and encouraging.

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LIST OF ABBREVIATION

ALT	Alanine transaminase
AST	Aspartate transaminase
CR	Creatinine
DBP	Diastolic blood pressure
ELISA	Enzyme linked immunosorbent assay
GA	Gestational age
Hb	Hemoglobin
HELLP	Hemolysis, Elevated liver enzymes, low platelets
MP	Multipara
PG	primigravida
PLT	Platelet count
PT	Prothrombin time
PTT	Partial thromboplastin time
SBP	Systolic blood pressure
UA	Uric acid
Wk	Week

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INTRODUCTION

Preeclampsia, also known as toxemia, is a serious complication of pregnancy, characterized by high blood pressure, protein in the urine, and retention of fluid. Those affected need rest and close monitoring or, in severe cases, admission to the hospital. The condition usually resolves soon after delivery, but early delivery increases the risk of complications to the baby. This has to be balanced against delay, which increases the risk that eclampsia will develop, with seizures and organ damage threatening the lives of both mother and baby ***(Williams et al., ٢٠٠٧).***

Ferritin is a major iron storage protein found not only in spleen, liver and bone marrow, but also in mucosal cells of small intestine, in placenta, kidney, testes, skeletal muscle, and in plasma ***(Circhton, ١٩٧٣).***

In pregnancy, serum ferritin concentration is maximum at ١٢-١٦ weeks' gestation, and then falls with advancing gestation to reach a nadir at the third trimester ***(Milman,).***

Serum iron concentration was higher in patients with preeclampsia (mean of ١٣٥ μg/dl) compared to normotensive parturient (mean of ٦٢ μg/dl) and chronic hypertensive parturient (mean of ٧٢ μg/dl). Mean iron for patients with eclampsia was ٢٠٣ μg/dl and ١٣٧ μg/dl for patients with severe preeclampsia. Concomitant increase in serum ferritin (mean of ٥٩ ng/ml vs. ١٩ ng/ml for normals) persisted longer. When Hepatocellular injury occurred, mean ferritin increased to ٤٢١ ng/ml ***(Entman et al.,).***

Predelivery serum ferritin concentration was significantly higher in patients with preeclampsia than in healthy pregnant women. The serum ferritin was the best sensitive marker of the iron status parameters reflecting the preeclampsia and the result may support the role of iron as a catalyzer of oxidative stress and lipid peroxidation in pathophysiology of preeclampsia ***(Kwon et al., ٢٠٠٧).***

Hyperferritinemia in patients with preeclampsia appears to be attributable to the combined effects of increased ferritin synthesis and the release of intracellular ferritin from damaged cells. Hepatocellular, rather than placental, damage is the likely reason for the predominance of nonglycosylated ferritin in many women with preeclampsia ***(Hubel et al.,)***.

It would seem inadvisable, in the absence of evidence of iron deficiency, to give iron supplements to pregnant women at high risk for preeclampsia ***(Rayman et al.,)***.

The increases in serum iron and ferritin are striking and may even have the potential to be used diagnostically to warn of incipient preeclampsia. It is not known whether the rise in serum iron precedes or contributes to the clinical manifestations of preeclampsia, or is solely a result of the disease ***(Smith et al., ٢٠٠٧)***.

AIM OF THE WORK

The aim of this work is to compare between serum ferritin level in mild and severe preeclampsia, versus normotensive pregnancies.

PREECLAMPSIA

Almost ٢٠٠٠ years ago, the disorder was called eclampsia reflecting the description given by Celsus as pregnant women with seizures that abated with delivery. The late ١٨٠٠s, the increased blood pressure and urinary protein were noted to antedate the seizures, so the term preeclampsia was introduced as ″prae″ means in Latin ″before″. Eclampsia comes from the Greek words ″ek″ means ″out″ and ″Lampein″ means ″to flash″. Thus preeclampsia means ″before flashing out″ ***(Carone, ٢٠٠٧).***

Hippocrates (١٦٨٠) mentioned that during pregnancy, the occurrence of drowsiness, headache, heaviness and/or convulsions are generally bad. ***Mauriceau (١٧٠٥)*** was the first to differentiate between eclampsia and epilepsy.

Correlation between eclamptic convulsions and the development of edema, proteinuria and hypertension was not made clear until the ١٩th century, ***Simpson ( )*** pointed out that albuminuria and edema were almost inevitable forerunners of eclampsia; however he thought that eclampsia was manifestation of nephritis.

Bright (١٨٢٧) demonstrated that ″dropsy″ (edema) and albuminuria were not the only features of renal disease but also a feature of pregnancy complicated by eclampsia, and he named that condition Bright's disease.

Jurgen and Schmorl ( ) recognized characteristic hepatic lesions by using the newly developed cellular pathology and improved histological methods. They put eclampsia in an entity distinct from Bright's disease.