The Role of Measurement of Maternal Serum C-Reactive Protein, Fibrinogen and Serum Ferritin in Assessment of The Severity of Preeclampsia

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List of appreviations

PE: preeclampsia

NHBPEP: National High Blood Pressure Program

CRP: C-reactive protein

IL: Interleukin

TNF: Tumor Necrosis Factor

PIH: Pregnancy Induced Hypertension

MAP: Mean Arterial Pressure

ACOG: College of Obstetricians and Gynecologists

IUGR: Intra Uterine Growth Restriction

BMI: Body Mass Index

SD: Stander Deviation

GA: Gestation Age

MPET: Mild Preeclampsia

SPET: Severe Preeclampsia

LDL: low-Density Lipoprotein

HDL: High-Density Lipoprotein

NOS: Nitric Oxide Synthetase

PAF: Platelet Activating Factor

PECAM-1: Platelet Endothelial Cell Adhesion Molecule-I

NK: Natural Killer

AT: Angiotesin

PA: Plsminogen Activator

HCG: Human Chorionic Goanadotrophin

HPL: Human Placental Lactogen

HLA: Human Leucocytic Antigen

SGOT: Serum Glutamic-Oxaloacetic Transaminase

SGPT: Serum Glutamic-Pyruvic Transaminase

LDH: Lactic Dehydrogenase

FP: Fibrinopeptides

Fg: Fibrinogen

HMW-Fg: High Molecular Weight Fibrinogen

LMW-Fg: Low Molecular Weight Fibrinogen

VLMW: Very Low Molecular Weight Fibrinogen

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INTRODUCTION

Pre-eclampsia (PE), the disorder, almost 2000 years ago, was called eclampsia reflecting the description given by Celsus as pregnant women with seizures that abated with delivery. In late 1800s, the increased blood pressure and urinary protein were noted to antedate the seizures ***(Chesley, 1978)***. So the term preeclampsia was introduced as "prae" means in Latin "before", Eclampsia comes from the Greek word "ek" means "out" and "lampein" means "to flash". Thus preeclampsia means "before flashing out" ***(www.MedFriendly.com: Preeclampsia.htm)***

Pre-eclampsia (PE), is a leading cause of maternal and fetal morbidity and mortality ***(Sibai et al., 1993 and De Swiet, 2000)***. It is usually defined as the onset of hypertension and proteinuria after 20 weeks of gestation in previously normotensive non-proteinuric pregnant women ***(National High Blood Pressure Program (NHBPEP), 2000)***. If left untreated, PE can progress to a convulsive state known as eclampsia ***(Mahmoudi et al., 1999)***. In the Western world, it affects between 2 and 7% of all pregnancies, but the incidence in other geographic areas with different ethnic or social

characteristics can be up to three times greater ***(Sibai, 2003).*** A worldwide incidence of 8,370,000 cases per year has been estimated ***(Villar et al., 2003 and Sibai, 2003).*** In developing countries, 42% of maternal deaths are attributed to this disorder, which is also the major reason for preterm delivery ***(Lòpez-Jaramillo et al., 2001)***.

According to Redman and colleagues, some diseases in pregnancy, and especially PE, are part of a more generalized intravascular inflammatory reaction ***(Redman et al., 1999***).

This systemic inflammatory response involves both the immune system and the clotting and fibrinolytic systems ***(Rangel-Fruasto et al., 1995).*** Mediators of such inflammatory response are altered in women with PE, including increased C-reactive protein (CRP) ***(Teran et al., 2001)***. Also, there were studies evaluating fibrinogen in PE ***(Pepple et al., 2001 and Belo et al., 2002)***. However, little is known about whether or not there is a correlation with the severity of the disease ***(Ustun et al.,*** **2005).**

C-reactive protein (CRP), being a sensitive marker of tissue damage and inflammation, can be a potential marker for the inflammatory response characteristic of PE. The hepatic synthesis of CRP increases in response to inflammatory

cytokines such as IL-1, IL-6, and TNF-α, which are responsible for inflammatory response and maternal endothelial activation in PE. Conflicting data have been published regarding the predictive role of CRP in pregnant women for transient hypertension and PE. ***(Tjoa et al., 2003 and Qiu et al. 2004).***

Fibrinogen is an important acute phase reactant, which might therefore correlate with PE and its severity ***(Frishman. 1998 and Redman et al., 1999)***. The relationship between the levels of fibrinogen and PE has also been studied, but there were conflicting reports on fibrinogen levels ***(Ustun et al.,*** **2005).**

Serum ferritin is elevated in a variety of conditions associated with non-utilization of iron and destruction of tissues such as in hemolytic anemia, hepatic damage, inflammation and neoplasm ***(Prieto. 1975)***. Subclinical hepatic damage is known to occur in pregnancy induced hypertension (PIH) and eclampsia and this is reflected by elevated liver enzymes ***(Killman et al., 1975)***. The hepatic damage may result in the leakage of ferritin into the circulation resulting in hyperferritinemia, more so in eclampsia duo to the acute damage ***(Raman et al., 1992).***

Aim of the work

The aim of this work was to establish whether a single measurement of maternal serum C- reactive protein (CRP), fibrinogen and/or serum ferritin had a correlation with the severity of the disease in patients presented with preeclampsia in the third trimester of pregnancy using mean arterial pressure (MAP) as an indicator of the severity of the disease.

PREECLAMPSIA

Introduction:

Preeclampsia is a pregnancy-specific hypertensive disorder that usually occurs after 20 weeks of gestation but can occur earlier with fetal hydrops or hydatiform-mole, preeclampsia this is unlike gestational hypertension in which there is associated proteinuria and edema ***(Decherney et al., 2003).***

Definition:

Preeclampsia is defined, according to the National High Blood Pressure Education Program Working Group, as a syndrome consisting of hypertension and proteinuria that may be also associated with myriad other signs and symptoms, such as edema, visual disturbances, headache and epigastric pain ***(NHBPEP, 2000).***

Hypertension is defined as persistent blood pressure elevation to 140 mmHg systolic or greater, or 90 mmHg diastolic or greater on two occasions > 6 hours apart. Significant proteinuria is defined as more than 0.3 gm a 24-hour urine collection or 0.1 gm/L (more than 2+ on the dipstick) in at least two random samples collected 6 hours or