

Mean platelet volume as a predictor of preeclampsia

Thesis

*Submitted for partial fulfillment for the M.Sc. Degree
in Obstetrics and Gynecology*

By

Fathy Shazly Ahmed

M.B.BCh.

Resident of Obstetrics and Gynecology

El-Galaa Teaching Hospital

Supervised by

Prof. Dr. Maged Abo Seda

Professor of Obstetrics and Gynecology

Ain-Shams University

Dr. Ahmed Abd El-Kader

Lecturer of Obstetrics and Gynecology

Ain-Shams University

Faculty of Medicine

Ain-Shams University

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قياس حجم الصفائح الدموية للتنبؤ بحالات ما (قبل تسمم الحمل)

رسالة توطئة للحصول على درجة الماجستير فى علم
التوليد وأمراض النساء

مقدمه من

طبيب / فتحى شاذلى أحمد
بكالوريوس الطب والجراحة

تحت اشراف

الاستاذ الدكتور/ ماجد أبو سعده

استاذ علم التوليد وأمراض النساء
كلية الطب - جامعة عين شمس

الدكتور/ أحمد عبد القادر فهمى

مدرس علم التوليد وأمراض النساء
كلية الطب - جامعة عين شمس

جامعة عين شمس
كلية الطب - القاهرة

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Abstract

60 women were included into the statistical analysis and 25 (41.6%) of them developed pre-eclampsia during follow-up. Our study revealed an increase in MPV in hypertensive pregnant women who developed later pre-eclampsia and the cut-off value of MPV was 9.5 fl and above. However, there was no increase in MPV neither in hypertensive pregnant women who did not develop later pre-eclampsia nor in pregnant women who were normotensive throughout their gestation and did not develop later pre-eclampsia.

In our study results, the correlation between high MPV and development of pre-eclampsia was highly significant; it showed a high specificity of 84% and a sensitivity of 92% with a $p < 0.0001$

Keywords:

Mean platelet volume; pre-eclampsia; platelet; gestational age; haemostatic system; pregnancy.

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 List of Abbreviations

List of abbreviations

Ob/Gyn.	Obstetrics and Gynecology
ADAMTS13	A disintegrin and metalloproteinase with a thrombospondin type 1 motif, member 13.
ADPase	Adenosine diphosphatase
ADP	Adenosine diphosphate
AFI	Amniotic fluid index
Ag II	Angiotensin II
ALT	Alanine transaminase
ANOVA	Analysis of variance
APCR-V	Activated protein C resistance – V
AST	Aspartate transaminase
AT III	Anti-thrombin III
ATP	Adenosine triphosphate
BTG	Beta-thromboglobulin
CAD	Coronary artery disease
CD	Cluster of differentiation
CI	Confidence interval
COX-1	Cyclooxygenase -1
CVA	Cerebrovascular accident
DNA	Deoxyribonucleic acid
EDTA	Ethylene diamine tetraacetic acid
ET	Essential thrombocytopenia
fl	Femtoliter = 10^{-15} Liter

 List of Abbreviations

FMV	Flow-mediated vasodilatation
GA	Gestational age
GLM	General linear models
GP	Glycoprotein
hCG	Human chorionic gonadotropin
H2O2	Hydrogen peroxide
HELLP	Hemolytic anemia, elevated liver enzymes, low platelet count
HIT	Heparin-induced thrombocytopenia
HLA-G	Histocompatibility leucocyte antigen-G
hsCRP	High sensitive C-reactive protein
IGF-1	Insulin-like growth factor-1
ILβ	Interleukin β
IL6	Interleukin 6
ITP	Immune thrombocytopenic purpura
IUGR	Intra-uterine growth restriction
LDH	Lactate dehydrogenase
LDL	Low density lipoprotein
LIBS1	Ligand-induced binding site 1
LIGHT	Lymphotoxin-like Inducible protein that competes with Glycoprotein D for Herpes virus entry mediator on T lymphocytes.
MI	Myocardial infarction
mmHg	Millimeter of mercury
MPV	Mean platelet volume

 List of Abbreviations

NHBPEP	National High Blood Pressure Education Program
N	Number
NO	Nitric oxide
NPV	Negative predictive value
NSAID	Non steroidal anti-inflammatory drugs
O₂	Oxygene
P	Probability
PAC1	Postsynaptic density and cytoskeleton enriched -1
PAF	Platelet activating factor
PAOD	Peripheral artery occlusive disease
PAR-1	Protease activated receptor type 1
P2Y-1	Purinergic receptor, G-protein coupled 1
PDGF	Platelet derived growth factor
PDW	Platelet volume distribution
PE	Preeclampsia
PECAM	Platelet endothelial cell adhesion molecule
PGD2	Prostaglandin D2
PGI2	Prostacyclin
PIGF	Placental growth factor
PLT	Platelets
PPV	Positive predictive value
PRP	Platelet-rich plasma
PV	Prevalence
r	Correlation coefficient

 List of Abbreviations

RANTES	Regulated upon activation, normal T-cell expressed and secreted.
RIBS	Receptor-induced binding site
RNA	Ribonucleic acid
ROC	Receiver operating characteristic curve
ROS	Reactive oxygen species
RR	Relative risk
sCD40L	Serum soluble CD40 ligand
SD	Standard deviation
sFlt-1	Soluble form tyrosine kinase like receptor type-I
Tct	Thrombocrit
TFG	Transforming growth factor
Th1	Helper T-cell type 1
Th2	Helper T-cell type 2
TNF-α	Tissue necrotic factor-alpha
Trc	Platelet count
TTP	Thrombotic thrombocytopenia
TXA2	Thromboxane A2
VEGF	Vascular endothelial growth factor
vWF	Von willebrand factor
$\alpha\delta$SPD	Alpha-delta platelet storage pool deficiency
12-HETE	12-hydroxyeicosatetreanoate

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Introduction

Pre-eclampsia (PE) is a pregnancy-specific multisystem disorder that is characterized by development of hypertension and proteinuria after 20 weeks of gestation, resolving by 6-12 weeks postpartum in a previous normotensive women (*Sibai et al., 2003*). It occurs in about 5% to 10% of all pregnancies and results in substantial maternal and neonatal morbidity and mortality (*Cunningham et al., 2005*).

Although the etiology of preeclampsia is still unclear, recent studies and successive hypothesis have been proposed, each being challenged by subsequent publications, the current most plausible hypothesis involves abnormal placentation leading to placenta ischaemia (*Chun Lam et al., 2005*).

The pursuit of safe, reliable, and cost-effective screening tests for the prediction of preeclampsia has been the goal of researchers for many decades, with the aim of improving maternal and fetal surveillance, despite the fact that the only current effective treatment remains delivery.

Many candidates have been examined, including serum β -human chorionic gonadotropin, fibronectin, uric acid, urinary kallikrein, and urinary calcium, and angiotensin among others, but none has proven to be specific and sensitive enough to be of clinical value.