Total and fetal circulating cell-free DNA, angiogenic, and antiangiogenic factors in preeclampsia and HELLP syndrome

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BACKGROUND Preeclampsia (PE) is a hypertensive disorder of pregnancy characterized by hypertension and proteinuria. The HELLP syndrome is the most severe form of PE. The aim of the present study was to determine different potential biomarkers that may help us perform an early diagnosis of the disease, assess on the severity of the disease, and/or predict maternal or fetal adverse outcomes. METHODS We measured serum levels of total and fetal circulating cell-free DNA (cfDNA), soluble endoglin, soluble form of vascular endothelial growth factor receptor, and placental growth factor in a healthy control group of pregnant women (n = 26), patients with mild (n = 37) and severe PE (n = 25), and patients with HELLP syndrome (n = 16). RESULTS We observed a gradual and strong relationship between all the biomarkers mentioned and the range of severity of PE, with the highest levels in patients with HELLP syndrome. Nevertheless, only the values of total cfDNA were able to significantly differentiate severe PE and HELLP syndrome (20 957 ± 2 784 vs. 43 184 ± 8 647 GE/ml, P = 0.01). Receiver operating characteristic (ROC) curves were constructed (i) for the healthy group with respect to the groups with PE and (ii) for patients with PE with respect to the group with HELLP syndrome; sensitivity and specificity values at different cutoff levels were calculated in each case. The maximum ROC area under the curve value for PE and HELLP

syndrome (with respect to controls) was 0.91 (P < 0.001). CONCLUSIONS The measured biomarkers of cell damage, angiogenesis, and antiangiogenesis may reflect the severity of PE, with higher levels in patients who develop HELLP syndrome. In addition, these biomarkers may also help predict adverse fetal and maternal outcomes. © American Journal of Hypertension, Ltd 2017.

angiogenic factors

antiangiogenic factors

blood pressure

cell-free DNA

HELLP syndrome

hypertension

hypertension in pregnancy

maternal-fetal adverse outcomes

preeclampsia.

angiogenic factor

aspartate aminotransferase

biological marker

DNA

endoglin

fetal circulating cell free DNA

lactate dehydrogenase

placental growth factor

unclassified drug

vasculotropin receptor

vasculotropin receptor 1

angiogenic protein

cell free nucleic acid

endoglin

ENG protein, human

FLT1 protein, human

PGF protein, human

placental growth factor

vasculotropin receptor 1

adult

adverse outcome

angiogenesis

Article

aspartate aminotransferase blood level

blood pressure measurement

blood sampling

comparative study

controlled study

diastolic blood pressure

disease severity

early diagnosis

female

fetus circulation

fetus death

fetus outcome

gestational age

HELLP syndrome

human

major clinical study

male

maternal serum

newborn

prediction

preeclampsia

pregnant woman

priority journal

protein urine level

receiver operating characteristic

reference value

sensitivity and specificity

systolic blood pressure

area under the curve

blood

case control study

differential diagnosis

genetics

HELLP syndrome

predictive value

preeclampsia

pregnancy

severity of illness index

third trimester pregnancy

upregulation

Adult

Angiogenic Proteins

Area Under Curve

Case-Control Studies

Cell-Free Nucleic Acids

Diagnosis, Differential

Endoglin

Female

HELLP Syndrome

Humans

Placenta Growth Factor

Pre-Eclampsia

Predictive Value of Tests

Pregnancy

Pregnancy Trimester, Third

ROC Curve

Severity of Illness Index

Up-Regulation

Vascular Endothelial Growth Factor Receptor-1