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RELATION OF PLGF IN THE FIRST TRIMESTER TO FETAL SGA OR IUGR

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ABSTRACT

PlGF determination today is of particular clinical importance in determining fetal-placental development. Placental growth factor PlGF is a human, genetically encoded protein.

Objectives. Evaluation of the impact of PlGF in the first trimester, with the fetal SGA / IUGR.

Material and method. The study is a prospective study conducted at the Special Gynecology Hospital "Mother Teresa", Skopje, and the Clinical-Biochemical Laboratory, Institute of Immunology at the University Clinical Center Skopje R, North Macedonia, from February 2019 - September 2010. 698 pregnant women were included in the study.

Outcomes. Out of all controlled patients in the period February 2019-June 2010, a total of 698 pregnant women were studied. increase in PlGF values, in 1 or 25 (25%) cases with SGA we have increased values of PlGF. PlGF level > 40 pg/ml cut-off resulted in 337 or (48.28%) cases, and in 361 or (51.71)% cases have an increase in PlGF < cut-off 40 pg/ml. Newborns with SGA / IUGR resulted in 4 or (0.57%) newborns, according to gestation evaluation criteria.

Results. In our study PlGF resulted in: sensitivity 75%, specificity 50%, PPV 75%, NPV 50%, P = 0.25 and R = 0.5.

Discussions. Assessment of placental development during pregnancy is one of the most important predictors of fetal development and pre-eclampsia. In modern acupuncture protocols, new diagnostic methods are of particular importance.

Conclusions. PlGF methods have their own difficulties due to the high cost of PlGF reagents, Opportunities for further study are opened, because a new database has been formed in this area of obstetrics from clinically validated and diagnosed patients. Ohet A computerized database of these problems is formed.

Keywords: placental growth factor, SGA/IUGR

INTRODUCTION

Diagnosis of pregnancy and fetal condition is achieved through several contemporary clinical, biochemical, physical and electronic methods for establishing a fetoplacental fetal diagnosis.

These processes result in typical physiological changes that can be observed in the mother, placenta and fetus. Trophoblastic implantation and fertilization of the placenta play a crucial role in its development as an organ for the transport of food and oxygen to the fetus (1,2).

As placental dysfunction occurs in the first trimester of adherence, the last decade provides the opportunity to placental markers early detection of patients at risk for acupuncture clinical disease and their association with prediction of fetal growth (3). Biomarkers include pregnancy-associated plasma protein-A (PAPP-A), placental growth factor (PlGF), tyrosine kinase-1 (sFlt-1), soluble endoglin (sEng), activin-A and inhibin Specific protein substances of placental origin have been recently identified in pregnancy, the determination of which is of great value in the pursuit of normal and pathological pregnancy, one of which is undoubtedly PlGF. New protocols have been introduced for diagnostic and predictive clinical application (4). It is a Doppler ultrasound method of the uterine arteries, which is very predictive of the occurrence of eclampsia in the pregnancy which then has a direct impact on fetal growth. Roughly 1 in 10 babies are SGA / IUGR, the incidence of SGA / IUGR is higher in people of color than in white people. In developing countries in 1/3 of the cases the native causes are JH-gestation, while in 25% of fetal causes of

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increased in utero stagnation is hunger (5). LBW has an incidence of 8-10% in developed countries and 63% in developing countries. Pre-eclampsia complicates 4-8% of pregnancies (6). The average weight of the newborn is 2,500 to 4,000 g with a length of 51 cm. The term low birth weight (LBW) refers to weight < 2,500 grams regardless of the age of the pregnancy. Most babies weighing < 2,500 g give birth prematurely (are born before week 37 of pregnancy). In contrast, the terms intrauterine growth restriction (IUGR) and small for fetal gestational age (SGA) are calculated with reference to the age of pregnancy (10). SGAs are fetuses who have birth weight less than 10% for their gestational age (8). IUGR is a term used for fetuses who fail to make their intrauterine growth optimal. These children are pathologically young, consequently those children have an increased risk for neurological problems, congenital malformations, hypoglycemia, hypocalcaemia, and respiratory distress syndromes (7,9). Synonymous for fetal malnutrition, chronic fetal distress, newborn with body mass in relation to SGA gestational age, increased intrauterine stagnation, (intrauterine growth retardation-IUGR (11) (see figure 1).

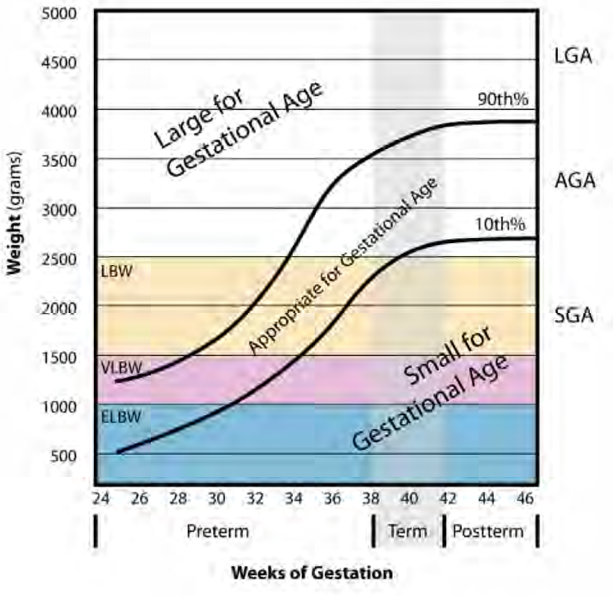

FIGURE 1. *Clasification of newborn weight and weeks of gestation*

Although some babies are constitutively small due to genetics (their parents are small), most SGA babies are small due to the growth problems that occur during pregnancy (12). If the baby's birth weight is below the 10th percentile for pregnancy, the baby is also SGA. It is important to note that not all SGA newborns are IUGR, they are simply younger than normal because their parents are younger (11,13).

Low birth weight (LBW), a newborn with low birth weight, is defined as a newborn weighing less than 2,500 grams irrespective of gestational age (14).

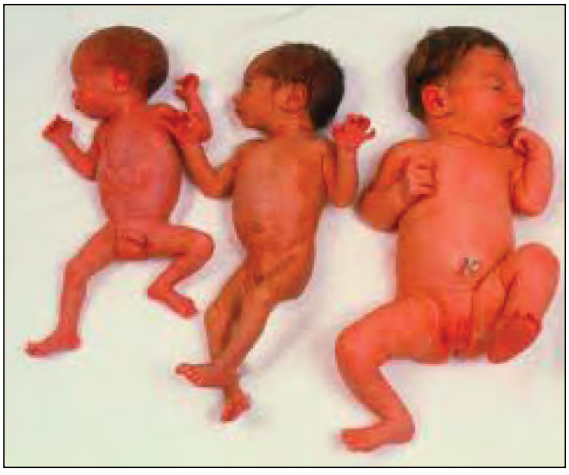

FIGURE 2*. Presentation of newborn SGA in relation to normal eutrophic newborn*

Accurate screening protocols exist throughout the world in the first trimester, but objective factors sometimes influence non-adherence to these protocols, such as non-screening of pregnancies, non-management of pregnancies by primary care physicians, and so on (15). As mentioned above, pre-eclampsia and increased fetal stagnation are linked (16). EPH-gestosis occurs in approximately 10-15% of first pregnancies and 5-10% of later pregnancies. Cases are diagnosed after the 34th week of pregnancy. Placental growth factor (PlGF) determination today receives particular clinical importance in determining feto-placental development. PlGF is a human protein, genetically encoded (17,18)

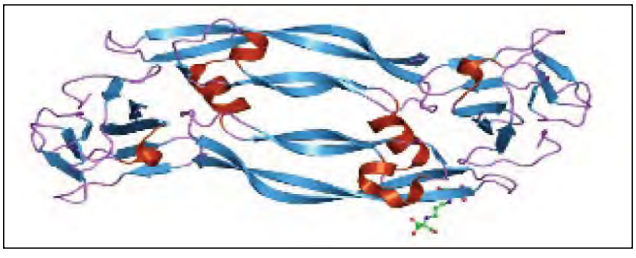

FIGURE 3. *Structure of PlGF*

PlGF is an angiogenic growth factor related to vascular endothelial growth factor produced exclusively by the trophoblast. In 2019, FIGO adopted PlGF as a screening method for pre-eclampsia.

In normal pregnancy, PlGF increases throughout pregnancy, reaching a peak of 26-30 weeks.

Placental growth factor depletion in the first trimester has been consistently found during pregnancy with pre-eclampsia – eclampsia in the first trimester.

OBJECTIVES

Impact assessment of PlGF parameters in the first trimester, with SGA / IUGR fetus.

MATERIALS AND METHOD

The study is a prospective study conducted at the Special Mother-Gynecology Hospital "Mother Teresa", Skopje, and the Clinical-Biochemical Laboratory, Institute of Immunology at the University Clinical Center, Skopje R, North Macedonia, in February 2019 The study included 698 pregnant, aged 17-41 years, mean age 28.73 years ± 3.5 months, between 11 + 0 and 15 + 1 week of gestation. PlGF values were calculated in the range of 3-200 pg/ml, cutt-of was calculated > 40 pg/ml, quantitative method of calculating PlGF values was used.

STATISTICAL CALCULATION OF VALUE

The collected data were recorded in Microsoft Access database, calculated using separate forms of Microsoft Exel 2007 and Windows 7. Computer data processing was performed with Statistica for Windows 8.0 and SPSS 8.0 for MS Windows. Test Fischer was used for group comparison (19, 20), the Mann-Whitney test was used to compare variables (21).

RESULTS

Out of all controlled patients in the period February 2018-February 2019, a total of 698 pregnancies were studied, mean age 28.73 years ± 3.5 months, minimum age of study was 17 years, maximum 42 years. resulted in SGA / IUGR in 3 or (75%) cases no increase in PlGF values, in 1 or (25%) cases with SGA increased values of PlGF. PlGF level > cut-off 40 pg/ml resulted in 337 (48.28%) cases, and in 361 cases (51.71%) we have an increase in PlGF < cut-off 40 pg/ml.

TABLE 1. *All pregnancies in study*

Born SGAI/UGR	Total 698	100%
SGA/IUGR	4	0.57%
EUTROPHIC	694	99.43%

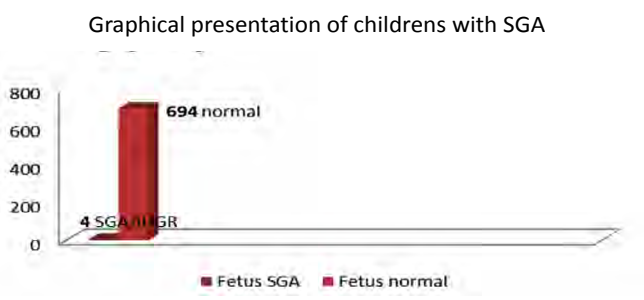

FIGURE 4. *Graphical representation of all studied born*

TABLE 2. *Fetuses with SGA*

Fetus resulted with SGA	In total 4 SGA	100%
No increased values of PlGF	3	75%
Increased PlGF	1	25%

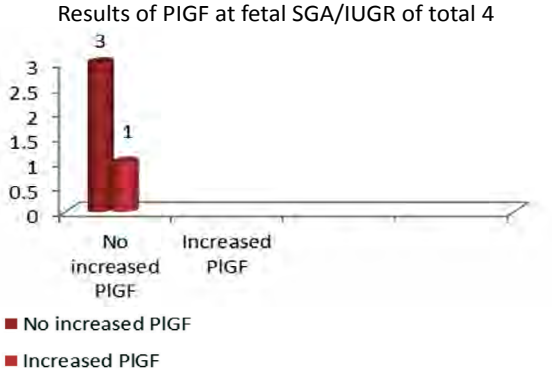

FIGURE 5. *Graphical presentation of 4 cases*

In our study PlGF resulted in: 75% sensitivity, 50% specificity, 75% PPV, 50% NPV. P = 0.25 R = 0.5. Confirming high reliability of PlGF early detection of pre-eclampsia and its impact on the newborn with SGA / IUGR.

DISCUSSION

Assessment of placental development during pregnancy is one of the most important predictors of fetal development and pre-eclampsia. In modern acupuncture protocols, new diagnostic methods are of particular importance. Utilizing these methods is often impossible, since their cost is high, a maximum coordination of primary and secondary level obstetricians is also required to increase diagnostic efficiency. Based on the results it is seen that in both diagnostic methods respectively PlGF it is confirmed the high predictive values of PlGF, but nonetheless that these parameters should be combined with other pregnancy diagnostic factors, and further research is needed on these two predictors of pregnancy. Fetus SGA / IUGR in 4 or 0.57%. Based on the group of children to whom PlGF analysis presents results of PlGF => cut-off measure-

ments of 40 pg/ml in 337 or (48.28%) cases, and in 361 or (51.71%) cases we have increased PlGF = < cut-off 40 pg/ml correlation of these values with presentation of SGA / IUGR shows minimal percentage of these children. Early diagnostic data may reduce inadequate sub-hospital controls, proper and adequate monitoring of these pregnancies, reduce the length of stay or exclude the need for hospitalization.

CONCLUSIONS

PlGF methods have their own difficulties due to the high cost of PlGF reagents, Opportunities for further study are opened, because a new database has been formed in this area of obstetrics from clinically validated and diagnosed patients. A computerized database of these problems is formed.

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