

Use of Biochemical Markers in Predictive and Diagnostic Means in Diagnosing Obstetrical Pathologies in Albania

Genc Kabili[1] Rustem Celami[2] Diamantis Daphnis[3] Ela Petrela[4] Denisa Golemi[1] Lediana Thano[1]
1.Obstetrician and Gynecologist, University Hospital of Obstetrics and Gynecology K. Gliozheni, Tirana, Albania
2.Obstetrician and Gynecologist at American Hospital of Tirana, and Professor at Faculty of Medical Technical Sciences, University of A. Xhuvani, Elbasan
3.Ph.D. Embryologist, Mediterranean Fertility Center & Genetics, Chania, Crete, Greece
4.Professor at Public Health Faculty, University of Medicine, Tirana, Albania

Abstract
Background:
The majority of published scientific papers concerning the role of biochemical markers of first trimester such as PAPP-A and free-ß-hCG in predicting future pregnancy complications enhance the importance of these parameters.
Objective:
To evaluate the role of biochemical markers parameters in other pregnancy disorders after first trimester such as Fetal Growth Restriction, Preeclampsia, Preterm Birth, Stillbirth, Fetal Macrosomia.
Materials and methods:
As a part of a prospective study, we did study 866 patients that were followed from the beginning of pregnancy to delivery, after giving their agreement. Quantity and quality research methods were used and data was analyzed by *IBM* SPSS *Statistics*.
Results:
Our data of showed that 11.4% of this cohort presented one of the above respective pathologies. The risk was better related to MoM PAPP-A than free-ß-hCG. Patients with MoM PAPP-A less than cut off 0.5, has double risk of having the pathology comparing to those patients with
Conclusions:
Consequently, the value of counseling the patient so early, with the information taken from evidence based medicine, has importance for them, in order to be more careful after having the results, and make regular control with their physician.
Keywords: Biochemical markers, pregnancy complications, Down syndrome.

Introduction

A number of proteins in the maternal circulation have been found during the time of pregnancy. Many of these are made or modified by the placenta. Differences in levels of some of the proteins have been observed in patients carrying a fetus with Down syndrome and certain other chromosome abnormalities. The discovery of these slight differences in protein levels has been largely based on observation- we really don't know why they work in most cases. Nevertheless, we can take advantage of these differences in screening protocols. These are referred to as biochemical markers. Certain patterns of biochemical markers have been associated with fetal Down syndrome as well as other conditions.[1,2] It is important to know that these proteins change during pregnancy, so interpretation requires an knowledge of the gestational age. Also, the effectiveness of these proteins varies with gestational ages. For example, differences in protein levels may be observed during the second trimester but not the first, while other proteins show differences during the first trimester but not the second.

The aim of this study is to evaluate the role of biochemical markers parameters in other pregnancy disorders after first trimester such as Fetal Growth Restriction, Preeclampsia, Preterm Birth, Stillbirth, Fetal-Macrosomia and other.

Materials and methods:

As a part of a prospective study, we did study 866 patients that were followed from the beginning of pregnancy to delivery, after giving their agreement. Quantity and quality research methods were used and data was analyzed by *IBM* SPSS *Statistics 2015*.

Results and discussion

Our prospective study of total population 866 patients resulted that 11.4% presented one of the above respective pathologies namely Fetal Growth Restriction, Preeclampsia, Preterm Birth, Stillbirth and Fetal-Macrosomia. Illustrated in chart 1.

Chart 1

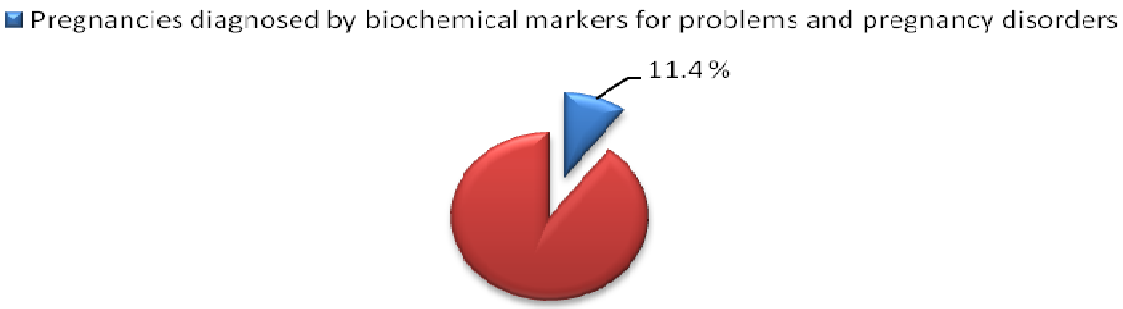

Chart 1. Pregnancy disorder other than Down syndrome diagnosed by biochemical markers

Biochemical markers are used to assess maternal, placental and fetal health. They help to diagnose and monitor maternal conditions to name a few, IUGR, preterm labour, gestational diabetes and gestational hypertension, pre-eclampsia, trophoblastic disease and fetal chromosomal abnormalities such as Down's syndrome. These biochemical and hormonal tests constitute only one aspect of obstetric care. They should be used together with clinical findings and imaging, particularly ultrasonography.

The prevalence of gestational diabetes mellitus ranges from 1 to 14% depending on the populations studied.[1, 2] Screening for gestational diabetes mellitus is strongly advocated at 26-28 weeks of gestation. This enables early intervention which results in significant improvements in both fetal and maternal outcomes.

Pre-eclampsia occurs typically in the third trimester and affects 4-8% of pregnancies.[4] It constitutes a triad of pregnancy-associated hypertension, that is, there is no pre-existing hypertension, marked proteinuria - greater than 300 mg daily and pathological edema. It is thus critical that urinary dipstick testing for protein, which can be fully quantitated if required, is performed at each antenatal visit together with blood pressure measurement and careful examination for edema. Other findings include rises in serum uric acid, which can antedate the onset of hypertension, urea and creatinine. Low haemoglobin and platelet concentrations are informative if the patient is suspected to have the severe form of pre-eclampsia - haemolysis-elevated liver enzymes-low platelets - HELLP. In the absence of pre-existing pathology, these biochemical parameters should return to normal after delivery.

Down's syndrome is one of the common causes of fetal growth retardation. It is the result of either partial or total trisomy of chromosome 21 and is a major obstetric concern, particularly in older women.[1, 2] Important biochemical markers include alpha fetoprotein, HCG, unconjugated oestriol, pregnancy-associated plasma protein-A, serum inhibin-A and free β-HCG. These markers are used in various combinations and together with ultrasound to increase the detection rate of Down's syndrome. It cannot be over emphasised that the gestational age must be correct in order for screening parameters to be accurate.

Between 11 and 13 weeks, serum pregnancy-associated plasma protein-A, free β-HCG and ultrasound assessment of nuchal thickness are most commonly used in the assessment of Down's syndrome.[5] Due to the changing concentrations of these markers in the normal pregnant population, the results are mathematically corrected for easy comparison. The nuchal thickness is increased in Down's syndrome and approximately 70% of cases will be detected by ultrasound in experienced centres.[1,2] In combination with biochemical markers, the detection rate increases to 85-90%.[1,2] Abnormal results can be followed up with direct karyotyping using chorionic villous sampling, but this carries a 0.5-1.0% risk of pregnancy loss in the first trimester.[1,2]

In the second trimester, screening for Down's syndrome traditionally employs the triple test of maternal serum HCG, serum unconjugated oestriol and alpha fetoprotein at 15-18 weeks of gestation. Some laboratories also measure serum pregnancy-associated plasma protein-A. The combination of these markers and maternal age delivers a 60-65% detection rate, but this includes the 5% of women who have a false positive result.[1, 2] Transnuchal thickness in the mid to late second trimester does not correlate well with Down's syndrome and does not add to the value of biochemical markers.[1,2]

The results of Down's syndrome screening in the first and second trimester are expressed as the proportion of affected pregnancies is accomplished using a risk-assessment program that incorporates nuchal thickness (only in the first trimester), biochemistry results and maternal age.[5]

Conclusion

Down syndrome biochemical markers levels are altered in those patients who subsequently developed preeclampsia, Fetal Growth Restriction, Preterm Birth, Stillbirth and Fetal-Macrosomia and may be a useful screening test for such disorders during pregnancy.

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