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The Role of 2nd Trimester Screening Test Parameters in Predicting the Birth Weight in Pregnancy

Pervin Karlı[1]*, Durmuş Ayan[2], Esra Güner[1], Ayşe Zehra Özdemir[3] and Osman Fadıl Kara[1]

1Department of Obstetric and Gynecology, Amasya University Research Hospital, Turkey

2Department of biochemsitry, Amasya University Research Hospital, Turkey

[3]Department of Obstetric and Gynecology, Ondokuz Mayıs University, Turkey

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***Corresponding author:** Pervin Karlı, Department of Obstetric and Gynecology, Amasya University Research Hospital, 05 000 Amasya, Turkey, Fax: 90 358 212 00 01; Tel: +9003583065000; Email: parpi2300@hotmail.com

Abstract

Introduction: The increasing popularity of double-test, the quadruple test and Non-Invaziv Prenatal Test (NIPT) has lead to a desreasing in the preference of the triple test in a clinical perspective. The clinical importance of triple test has been decreasing due to increasing popularity of ouble-test, the quadruple test and Non-Invaziv Prenatal Test (NIPT). Other tests cannot be replaced with alpha-fetoprotein (AFP) screening, however. Other tests cannot be used instead of AFP screening, however. Serum parameters tested in pregnancy can be partly considered as a guide of perinatal mortality and morbidity not only in the prediction of such diseases as preeklamsi and Intrauterıne Growth Restrıctıon (IUGR), but in determination of risk rates related to fetal trizomi, as well. Perinatal mortality and morbidity can be considered as a sign of direction, as serum markers in pregnancy are predictive of diseases such as preeclampsia and IUGR, as well as risk ratios of fetal trisomy.

Materials and methods: In this paper, we investigated whether the parameters of triple tests conducted between September 2017 and October 2017 in our clinic played a role in predicting the birth weight as well as whether these parameters had a relationship with other parameters.

Results: After a series of tests, it was found that there was a significant positive correlation between birth weight and birth age (p=0.009, r:0.199), a significant negative correlation between birth weight and serum AFP levels as well as a modest positive correlation between birth weight and baby weight (p=0.023, r:0.174).

Conclusion: In this paper, we found that only AFP from triple screening test parameters was related to birth weight significantly. AFP analysis can be regarded as a convenient approach in that it gives indicators showing that the birth weight is higher than normal levels. Since AFP is attached to importance in Neural tube defect (NTD) screening, it can be just enough to conduct AFP from triple screening paremeters which are taken over by quadruple and NIPT tests.

Keywords: Second trimester screening; Triple test; Prediction of birth weight; AFP; Esrtriol; HCG

Abbreviations: NIPT: Non-Invaziv Prenatal Test; IUGR: Intrauterıne Growth Restrıctıon; NTD: Neural Tube Defect; HEG: Hyperemesis Gravidarum

Introduction

Serum triple screening test used to be a popular test used in down-syndrome screening test until recently. The preference of it, however, is continuously decreasing due to the increasing popularity of quadruple tests, NIPT tests, and ultrasonographic examination which currently gives more detailed information. It can be argued that whether prefering new tests to this is an advantage or a disadvantage in terms of a screening test hasn't been certain yet. In this research, we attempted to examine the importance of triple screening test parameters on predicting birth weight.

Material and Method

A total of 170 patients who were between 18-45 ages and came to hospital for routine screening during 16th and 18th weeks of their pregnancy in September 2017 and October 2017 were recruited for this study and their triple screening test results were analysed retrospectively. The information on their birth weight was obtained via their birth registrations. In patient data, it was seen that the triple test had been conducted via chemiluminescence method with Immulite 2000 Hormone device. Paratemers had been calculated with Prisca 5 (versions: 5,0,2,37). The statistical analysis was conducted through SPSS 15 windows programme. The descriptive statistics were given as median, minumum, maximum and percentage. Spearman test from non-parametric tests was used since there wasn't normal distribution in data. To test the normality of distribution and homogenity, Skewness and Kurtosis values, histogram graphics and Shapiro-wilk tests were utilised. Mean, minimum and maximum values were used instead of standart deviation since the results didn't show normal distribution. The triple test was measured by the chemiluminescence method with the Immulite

2000 hormone device. The parameters were calculated with Prisca 5 (Version: 5,0,2,37). Statistical analysis was performed using the SPSS 15 for Windows program.

Findings

Diabetes status of the patients (n = 170): 164 (96.5%) not having diabetes, 3 (1.8%) unknown, 3 (1.8%) having diabetes. Smoking status of the patients: 151 (88.8%) not smoking, 16 (9.4%) smoking, 3 (1.8%) unknown. Gender rates of babies: 75 (44.1%) girl, 95 (55.9) boy. According to the results of Spearman Correlation Analysis, there was a significant positive correlation between birth weight and birth age (p=0.009, r:0.199), a significant negative correlation between birth weight and serum AFP levels and a modest positive correlation between birth weight and baby weight (p=0.023, r:0.174). It was also found that there was a significant positive correlation between diabetes and smoking status (p=0.001, r:0.367), a modest negative correlation between diabetes and AFP MoM (p=0.049, r:-0.152), and a modest negative correlation between diabetes and birth week (p=0.034, r:-0.163). Additionally, there was a modest positive correlation between smoking status and birth weight (p=0.024, r:0.173), a modest positive correlation between serum AFP levels and birth week (p=0.02, r: 0.179), a significant negative correlation between serum AFP levels and birth weight (p=0.001, r: -0.271). There wasn't any correlation between HCG and birth age (p=0.062, r:-0.144), diabetes (p=0.271, r:0.085), smoking (p=0.616, r:-0.039), birth week (p=0.088, r: -0.131), gender (p=0.072, r: -0.138), birth weight (p=0.460, r: -0.507), maternal weight (p=0.906, r: -0.009) (Table 1). There wasn't a correlation between UE3 (unconjuge estriol) and birth age (p=0.095, r:-0.129), diabetes (p=0.273, r:0.085), smoking (p=0.906, r:-0.009) birth week (p=0.830, r: -0.017) gender (p=0.164, r: -0.107) birth weight (p=0.945, r: 0.005) maternal weight (p=0.242, r: -0.090). There wasn't a correlation between other parameters and in-group.

Table 1:

Patient (n=170)	Birth Age (yıl)	Serum AFP (ng/ml)	AFP MoM	HCG MoM	UE3 MoM	NTD MoM	Pregnancy Week	Fetal Birth Weight	Weight of Patient
Medyan	27.5	41.6	1.06	0.87	0.91	1.06	17	3302.5	65
Minumum	19	1.12	0.44	0.16	0.38	0.44	15	790	40
maksimum	41	157	4.62	3.82	3.02	4.62	20	4360	107

Discussion

The triple test has been giving way to double-test, the quadruple test and NIPT tests across the world. In this research, we attempted to investigate the role of triple test in predicting the birth weight. Wald et al. compared the birth weights of 4198 pregnants with AFP levels and found that there was a significant negative relation. They also expressed that there was a relation between low level AFP and extended pregnancy period and increased birth weight, but elective early pregnancy was terminated due to incresed fetal weight [1]. Brock et al. [2] on the other hand, conducted a prospective study onn 103 pregnants and found that AFP levels were higher two-three times than averages. They put forward that 10% of those were 2,5 ki under the regular birth weights and the high level of AFP were together with premature birth [2]. In a study conducted on 1739 pregnants, the high level maternal AFP levels were related to low birth weight, low maternal weight and smoking rate. It was suggested that smoking and low maternal weight affected birth weight more than these screening tests [3]. Simpson et al. [4] investigated the relationshipm between second and third trimester maternal AFP levels and bad perinatal results and found no significant difference between third trimester AFP levels and pregnancy results, but found significant relation between second trimester AFP levels and premature rupture of mebran (PROM), preterm birth and low birth weight. This relationship wasn't found in other certain complications [4]. Lambert et al. [5] used PAPP-A levels in prediction of preeclampsia and found highly significant [5]. Peled et al. [6] conducted a study including 219 patients of whom 73 were diagnosed with Hyperemesis Gravidarum (HEG) and found HCG values of patients with HEG were much higher [6]. It was found that patients whose pregnancy-associated plasma protein-A(PAPP-A) and NT values were higher in first trimester screening had higher rates in giving large-for-gestational-age (LGA) births [7]. Parker et al. [8] compared the possible fetal weight in second trimester with the third age weight of the child and put forward that this may have a relation with body fat and obesity [8]. Morris et al. [9] screened five serum parameters 169, 637 and 382, 005 in terms of preeclampsia small for gestational age (SGA) in systematically (The data sources included Medline, Embase, Cochrane library, Medion) and found that these serum parameters had low predictive certainty and would be more significant if evaluated with other tests [9]. In our study, we found a perfect negative correlation between serum AFP levels and birth weight (p=0.001). We suggest that serum AFP levels can be an indicator of birth weight of the baby.

Conclusion

AFP from triple screening test parameters were found as significant in terms of prediction birth weight. Serum estriol and HCG levels were found to be no relation. From the findings of the study, we suggest that AFP from triple screening test parameters which isn't encountered among routine down syndrome screenings in many countries can be important in conducting serum screening alone since there isn't any other parameters giving information on NTD risk in second trimester and it isn't significant in prediction of fetal weight.

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