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ORIGINAL ARTICLE

The Relationship of Pregnancy-Associated Plasma Protein A and Human Chorionic Gonadotropin with Adverse Pregnancy Outcomes: A Prospective Study

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Abstract

Purpose This prospective study investigated the relationship between pregnancy-associated plasma protein A (PAPP-A) and human chorionic gonadotropin (hCG) and adverse pregnancy outcomes in the Iranian population.

Materials Overall, 994 singleton pregnant mothers of 18–35-year old were referred for first-trimester screening tests, including PAPP-A and β-hCG, at the age of 6 days and 11–13 weeks, and were followed until the end of their pregnancy. The adverse pregnancy outcomes, PAPP-A, and β-hCG serum levels were recorded and analyzed. The sensitivity and specificity of the test were measured by calculating the area under the curve of receiver operating characteristic curve (ROC).

Results The mean serum level of PAPP-A and β-hCG was 1.10 ± 0.69 and 1.09 ± 0.8 MoM, respectively. Pregnancy-associated plasma protein A, regardless of its percentile, showed a significant relationship with the incidence of preeclampsia, preterm birth, and fetal low birth weight ($p < 0.001$ for each). However, the relationship between PAPP-A and abortion was not significant ($p > 0.05$). According to ROC, the results indicated that PAPP-A had a significant relationship with the incidence of preeclampsia, preterm birth, and fetal low birth weight ($p < 0.001$). However, β-hCG levels showed no significant relationship with adverse pregnancy outcomes.

Conclusions The result of this study revealed that lower level of PAPP-A and β-hCG could be a predictive factor in preterm labor. Also, this study indicated that PAPP-A measurements could be a screening test for adverse pregnancy outcomes, such as preeclampsia, low birth weight and preterm labor.

Keywords PAPP-A · β-hCG · Preeclampsia · Preterm labor · Low birth weight · Abortion

Introduction

Pregnancy-associated plasma protein A (PAPP-A) is secreted by the placenta and enters directly into maternal circulation. The concentration of PAPP-A increases till the end of pregnancy and is detectable in maternal serum since the blastocyst implantation period. It is one of the principal markers measured in Down syndrome screening and should be performed between 11 and 14 weeks of gestational age. The serum markers for Down syndrome could influence pregnancy outcomes in the first and second trimesters [1]. Human chorionic gonadotropin (hCG) is the first hormone detected in pregnancy. It is produced by placenta, and its rapid rise in material serum or urine is an ideal marker for confirmation of conception [2]. As reported in the literature, maternal serum markers, such as PAPP-A and β-hCG, are related to adverse pregnancy outcomes, such as fetal growth

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