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ORIGINAL RESEARCH

Association between second trimester maternal serum alpha fetoprotein in 14-22 weeks and adverse pregnancy outcome

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ABSTRACT

Background:Alpha-fetoprotein (AFP) is the major serum protein in the embryonic stage and in the early fetal stage.This study assessed association between second trimester maternal serum alpha fetoprotein in 14-22 weeks and adverse pregnancy outcome.

Materials & Methods: 152 pregnancies were included in this study. Weight of the fetus was estimated by the Honarvar 2 equation and compared with real weight. The MSAFP levels are reported in ng/cc.

Results: Age group 18-22 years had 45, 23-27 years had 60 and 28-32 years had 47 patients. The difference was non- significant (P> 0.05). The mean MSAFP in pre-eclmpasia was 76.1, in without pre-eclmpasia was 41.3, in preterm laborwas 55.2, in without preterm labor was 41.0, in PROM was 42.7 and in without PROM was 43.8. The difference was significant (P< 0.05). MSAFP level in oligohydramnious was 78.2, in without oligohydramnious was 40.3, in stillbirth was 36.5, in without stillbirth was 45.2, in miscarriage was 40.7 and in without miscarriage was 43.1. The difference was significant (P< 0.05).

Conclusion: Pregnancies with an elevated MSAFP level are associated with adverse obstetric outcomes.

Key words: alpha fetoprotein,pre-eclmpasia, oligohydramnious

INTRODUCTION

A main aim of antenatal care is to intervene in high risk pregnancies. It has been suggested that maternal serum alpha-fetoprotein (MSAFP) screening, apart from identifying fetuses with open neural tube defects and chromosomal abnormalities, could also identify pregnancies at high risk of adverse outcomes.[1] Unexplained high levels of MSAFP have been associated with an increased risk of adverse pregnancy outcomes, such as fetal death before the 28th week, perinatal death, low birth weight (LBW), preterm labor, and other obstetric complication.[2]

Alpha-fetoprotein is normally produced during fetal and neonatal development by the liver, yolk sac and in small concentrations by gastrointestinal tract. In human beings, at 4-8 weeks of gestation, the yolk sac rivals the fetal liver in alpha-fetoprotein production.[3] As the yolk sac degenerates at 11.5 weeks, the liver overtakes the function of yolk sac to produce Alpha-fetoprotein.[4] Measurable concentrations appear in the maternal serum beginning at the end of

the first trimester reaching a maximum level during the second trimester. Maternal serum alphafetoprotein levels normally rise during pregnancy from a normal non pregnant level of 0- 20 ngm/ml to a mean level of 250ngm/ml at 32 weeks.[5] Some studies have reported that unexplained low levels of MSAFP have been associated primarily with an increased risk of fetal death, including spontaneous abortions and stillbirths.[6,7] The present study was conducted to assess association between second trimester maternal serum alpha fetoprotein in 14-22 weeks and adverse pregnancy outcome.

MATERIALS & METHODS

The present study comprised of 152 pregnancies. The consent was obtained from all patients. Data such as name, age, gender etc. was recorded. Birth weight, and gestational age at the time of MSAFP draw was recorded. Weight of the fetus was estimated by the Honarvar 2 equation and compared with real weight. The MSAFP levels are reported in ng/cc. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age groups (years)	Number	P value
18-22	45	0.52
23-27	60	
28-32	47	

Table I shows that age group 18-22 years had 45, 23-27 years had 60 and 28-32 years had 47 patients. The difference was non- significant (P> 0.05).

Table II Distribution based on variables

Variables	Number	MSAFP (ng/cc)	P value
Pre-eclmpasia	20	76.1	0.01
Without pre-eclmpasia	132	41.3	
Preterm labor	15	55.2	0.02
Without Preterm labor	137	41.0	
PROM	25	42.7	0.81
Without PROM	127	43.8	

Table II, graph I shows that mean MSAFP in pre-eclmpasia was 76.1, in without pre-eclmpasia was 41.3, in preterm labor was 55.2, in without preterm labor was 41.0, in PROM was 42.7 and in without PROM was 43.8. The difference was significant (P< 0.05).

Graph IDistribution based on variables

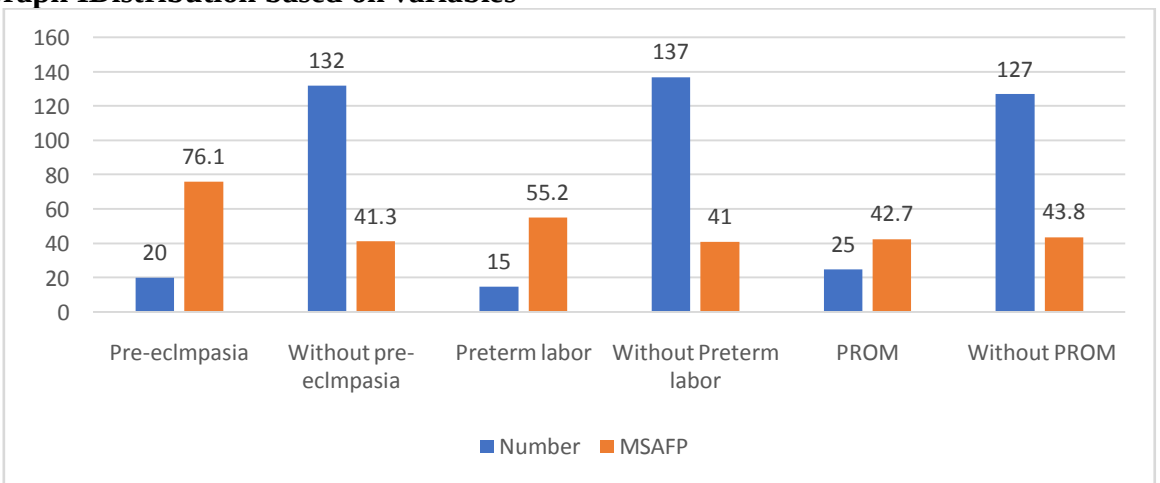
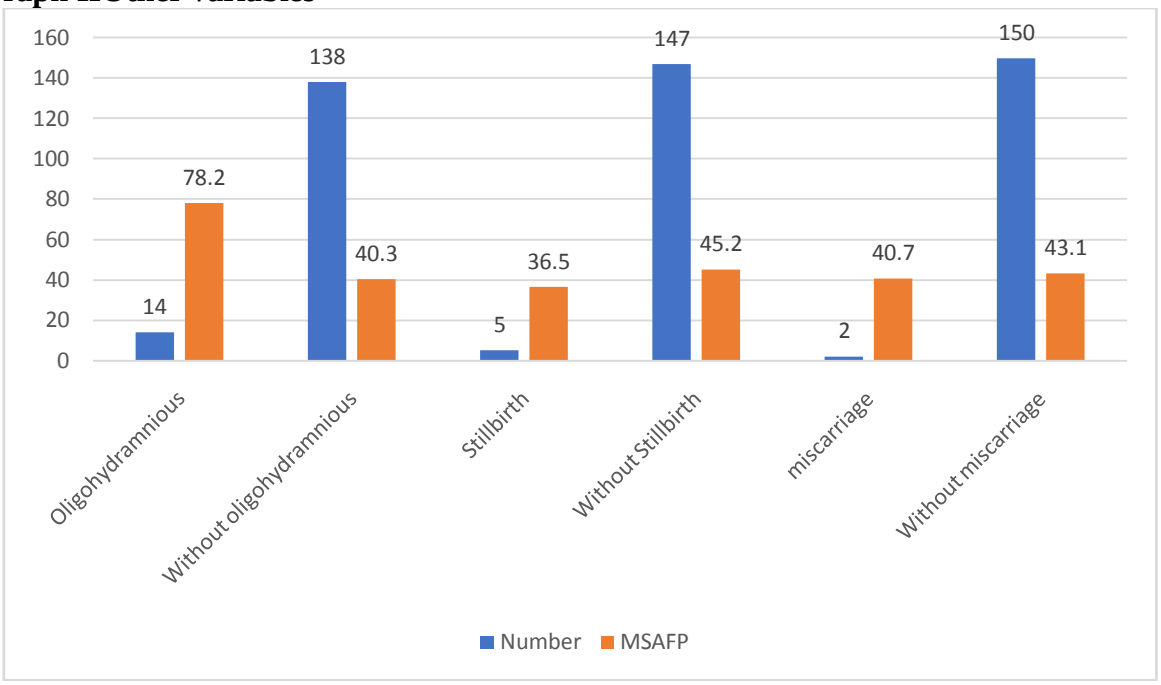


Table III Other variables

Variables	Number	MSAFP (ng/cc)	P value
Oligohydramnious	14	78.2	0.02
Without oligohydramnious	138	40.3	
Stillbirth	5	36.5	0.09
Without Stillbirth	147	45.2	
miscarriage	2	40.7	0.94
Without miscarriage	150	43.1	

Table III, graph II shows that MSAFP level in oligohydramnious was 78.2, in without oligohydramnious was 40.3, in stillbirth was 36.5, in without stillbirth was 45.2, in miscarriage was 40.7 and in without miscarriage was 43.1. The difference was significant (P< 0.05).

Graph IIOther variables



DISCUSSION

Antenatal care is not only about treating a pregnant lady but also predicting adverse pregnancy outcome and trying to prevent them.[8] Many screening tests are now available for predicting adverse pregnancy outcome and these range from non- invasive to invasive and serum alpha-fetoprotein level estimation is one of them.[9] Initially, maternal serum alpha-fetoprotein measurement has been used as an antenatal screening test for open neural tube defects and Down's syndrome. During gestation, Alpha-fetoprotein is present in the amniotic fluid as a result of fetal micturation.[10]Thefetal to maternal transfer of alpha-fetoprotein occurs by a transplacental and transamniotic route. The transfer of alpha-fetoprotein across the placenta once thought to be accomplished only by paracellulardiffusion, involves additional and more complicated mechanisms.[11] The present study was conducted to assess association between second trimester maternal serum alpha fetoprotein in 14-22 weeks and adverse pregnancy outcome.

In present study, age group 18-22 years had 45, 23-27 years had 60 and 28-32 years had 47 patients. Dehghani–Firouzabadiet al[12] determined the risk of adverse pregnancy outcome by maternal serum alphafetoprotein (MSAFP) level. They followed 295 pregnant women from MSAFP screening in the 14th to 22th week of gestation until the end of pregnancy and

information on pregnancy outcome have been recorded in questionnaires. Of 295 pregnant women, 270 had term labor and 25 had preterm labor. The frequencies of pregnancy outcomes were as following: 3 (1.01%) stillbirths, 25(8.47%) preterm labor, and 10 (3.4%) preterm rupture of membranous (PROM), 15 (5.1%) pre-eclampsia, 23 (7.8%) oligohydramnious, and 1 (0.33%) miscarriage. The mean of preterm labor was significantly associated with the higher level of MSAFP (P =0.021). The mean was 55.1 ng/cc in preterm labor and 41.1 ng/cc in term labor. Also, second trimester MSAFP levels were higher in women with pre-eclampsia.

We found that MSAFP level in oligohydramnious was 78.2, in without oligohydramnious was 40.3, in stillbirth was 36.5, in without stillbirth was 45.2, in miscarriage was 40.7 and in without miscarriage was 43.1. Mir et al[13] included 250 patients of gestational age between 14-22 weeks. Maternal serum alpha-fetoprotein was measured in human serum by microplateimmunoenzymometric assay by EIA-AFP kit. Maternal serum alpha-feto protein level was expressed in IU/ml. 23 (9.2%) participants out of 250 developed preterm labor. 21 out of 23 had raised value of maternal serum alpha-fetoprotein. 20 (8%) patients out of 250 patients developed oligohydramnios. 13 out of 20 had raised value of maternal serum alpha-fetoprotein. 14 (5.6%) patients out of 250 developed pre-eclampsia, 11 out of 14 had raised values of maternal serum alpha-fetoprotein. 7 (2.8%) patients out of 250 developed premature rupture of membrane (PROM). 4 out of 7 had raised values of maternal serum alphafetoprotein.

Simpson et al[14] suggested that women with PROM showed elevated second trimester MSAFP. Krause TG et al[15] found that pregnant women with extreme maternal serum alpha-fetoprotein values in the second trimester have an increased risk of fetal and infant deaths.

CONCLUSION

Authors found that pregnancies with an elevated MSAFP level are associated with adverse obstetric outcomes.

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