

Maternal Serum PAPP - A Level in Early Pregnancy as a Screening Test for Prediction of Pre-Eclampsia

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Abstract: ***Background and aim:** Preeclampsia remains a major problem of modern obstetrics with insufficiently elucidated etiology. Early detection would diminish maternal and fetal mortality and morbidity. Pre eclampsia is a multi system disorder and develops typically after 20 weeks of gestation with proteinuria in previously normotensive and non proteinuric women. Incidence of hypertensive disorders contributes to 9% of maternal mortality in Asia and 12% in India. Preeclampsia is associated with reduced production of the PAPP-A and several studies have reported that during the clinical phase of PE the maternal serum PAPP-A concentration is reduced. **Aim:** The aim of this study is to determine the serum values of PAPP-A in the first trimester of pregnancy and subsequently with risk factor for preeclampsia. In order to evaluate their relevance in the predictor of preeclampsia. This study is to investigate the prognostic value of abnormal serum PAPP-A as predictor of preeclampsia. **Methods:** It is a prospective randomized observational study in Pregnant woman in first trimester coming to regular Antenatal OPD in the Department of Obstetrics and gynecology, government Rajaji Hospital attached to Madurai Medical College, Madurai for the period is 8months. The study is conducted on 200 cases. The study subjects will be followed up till delivery for each visit pt advised to check BP, urine albumin and watch for development of preeclampsia. **Results:** In our study, most of the patients were between the age group of 20 to 35years. There is significant difference between development of preeclampsia in a women with decreased levels of serum PAPP-A compared with elevated levels of PAPP-A. **Conclusion:** In our study there is significant independent contribution from maternal serum PAPP-A which was found to be decreased in screening of PE women compared to normotensive pregnant women. Early prediction of Preeclampsia could potentially improve the outcome by close surveillance of the patient and would be the basis of the prophylactic medications, starting from the first trimester to improve placental invasion, uteroplacental circulation and so decreasing the prevalence of the disease.*

Keywords: preeclampsia, pregnancy associated plasma protein A, predictor ultrasonography

1. Introduction

Pre-eclampsia, is still the most common medical complication of pregnancy. Women with mild and moderate degrees of gestational hypertension can often be treated conservatively and be delivered at or near term with good perinatal outcome. However severe pre-eclampsia developing in late second or early third trimester is associated with a marked increase in perinatal morbidity and mortality. Pre eclampsia is a complex clinical syndrome involving multiple organ systems and still remains the principal cause of maternal and perinatal mortality and morbidity. The search for an ideal predictive test and preventive measure remains challenging. In our study, we have made an attempt to analyse efficacy of placental location determined by ultrasonography done at 18-24 weeks in predicting women at risk of developing pre-eclampsia. Hypertensive disorders complicates 5 to 10 percent of all pregnancies, and together they are one member of the deadly triad—along with haemorrhage and infection—that contributes greatly to maternal morbidity and mortality. The condition is associated with reduced production of the PAPP-A and several studies have reported that during the clinical phase of PE the maternal serum PAPP-A concentration is reduced. These reduced levels of serum PAPP-A precede the clinical onset of the disease and are evident from both the second and first trimesters of pregnancy.

2. Materials and Methods

It is a prospective randomized observational study in Pregnant woman in first trimester coming to regular Antenatal OPD in the Department of Obstetrics and gynecology, government Rajaji Hospital attached to Madurai Medical College, Madurai for the period is 8months. The study is conducted on 100 cases. The study subjects will be followed up till delivery for each visit pt advised to check BP, urine albumin and watch for development of preeclampsia. All singleton pregnant females irrespective of parity belonging to the gestational age 11-13+6 weeks attending the out patient and in patient department of Obstetrics and Gynaecology in Madurai medical college and hospital, Madurai. 5ml of venous blood sample is collected in a SST (serum separator tube) containing clot activator and serum separator gel. This tube will be placed in an ice pack covered by maintaining temperature less than 16 degree PAPP-A levels analysed by immunofluometry method. All pregnant women included in the study were advised to come to the antenatal care clinic monthly till 28 weeks, every 2 weeks till 36 weeks and weekly till delivery. At every visit morning urine sample was collected from the patients and urine analysis was performed to detect proteinuria and arterial blood pressure was measured to detect hypertension.

3. Results

At the beginning of the study, 100 pregnant women were included. follow up until the time of delivery. Totally 100

pregnant women were taken into study and have been followed up until term and have been delivered in our institution. Demographic data and clinical features of pregnant women are presented in the table given below. 37 women developed pre-eclampsia from a total of 100 participants, 11 developed early pre-eclampsia and the other 26 developed late pre-eclampsia

Table 1

PAPP – A	No. of Cases	%
100 to 300	42	42
> 300	58	58
Total	100	100

Table 2

BP Systolic / Diastolic	PAPP - A[<300]	PAPP - A[> 300]
120 / 80	0	12
130 / 85	2	17
130 / 90	2	16
135 / 80	2	6
140 / 90	4	2
140 / 95	17	2
145 / 90	11	1
150 / 95	4	2
Total	42	58
P'value	<0.001 Significant	

Totally 37 cases become preeclamptic during followup out of 32 pt belong to low PAPP-A category with high sensitivity

Table 3

Preclampsia/ Normal	Preclampsia	Normal	Total
PAPP - A[< 300]	28	14	42
PAPP - A[> 300]	7	51	58
Total	35	65	100
P'value	<0.001 Significant		

4. Discussion

The findings of our study demonstrate that the maternal serum PAPP-A concentration at 11 - 14 weeks of gestation in normal pregnancies increased, whereas in preeclamptic women there was slight decrease with the cutoff value of <1.235 with sensitivity of 90% and specificity of 23.4%. Consequently, as in the case of Preeclampsia the measured concentration of PAPP-A must be adjusted for these variables before comparing results with pathological pregnancies. Previous studies comparing Preeclampsia with controls either have made no corrections for the measured PAPP-A or they corrected only for gestation. These results are in agreement with most previous studies, which reported reduced serum PAPP-A not only during the clinical phase of the disease but also during the second and first trimesters of pregnancy.

5. Conclusion

- 1) The measurement of maternal serum PAPP-A at 11-14 weeks of gestation has very high predictive value for pre-eclampsia in pregnancy when other co-morbidities are excluded therefore it can be used as diagnostic marker for preeclampsia.
- 2) In our study maternal serum PAPP-A levels evaluation at 11-14 weeks of pregnancy alone significantly play

role in prediction of pre-eclampsia.

- 3) Early prediction of PE could potentially improve the outcome by close surveillance of the patient and would be the basis of the prophylactic medications, starting from the first trimester to improve placental invasion, uteroplacental circulation and so decreasing the prevalence of the disease.
- 4) Pregnancy with PAPP-A levels < 10th percentile was significantly associated with an increased risk of preeclampsia. Sensitivity of this test is 91.95%. Therefore, pregnant women with low PAPP-A levels in the first trimester should be considered to be at increased risk of preeclampsia.
- 5) As we are doing Aneuploidy screening routinely can be used as screening test for prediction of preeclampsia which is comparatively cost effective and time consuming
- 6) The sensitivity of combined Test like PAPP-A, PIGF, BETA HCG with uterine artery Doppler is around 96.7% but even with the PAPP-A value alone we are getting sensitivity of 91.5%. So the low income countries like India this PAPP-A Level alone plays a major role in early prediction of preeclampsia

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