

## Study of biochemical marker in preeclampsia

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**Conflicts of Interest:** Nil

### Abstract

**Background:** Preeclampsia has a major impact on perinatal and maternal morbidity and mortality. In India, the incidence of preeclampsia is reported to be 8-10% among the pregnant women.

**Aim:** To compare Serum PAPP-A levels in pre-eclamptic women with normotensive pregnant women.

**Methods:** The present study was carried out at Osmania Medical college & General Hospital in the Department of Biochemistry. The study comprised of 88 subjects. The Study subjects was divided into 2 groups i.e., Group-I (n=44) normotensive pregnant women as controls and Group-II(n=44) preeclamptic women as cases. Measurement of Serum PAPP-A level is done by ELISA. Statistical analysis was done by unpaired t- test.

**Results:** In this study, pre-eclamptic women had lower levels of Serum PAPP-A ( $0.65 \pm 0.39$  MOM or  $2.245 \pm$

$0.6457$   $\mu\text{gm/ml}$ ) in comparison with normotensive pregnant females ( $1.09 \pm 0.08$  MOM or  $20.77 \pm 1.615$   $\mu\text{gm/ml}$ ).

**Discussion:** The Preeclamptic women exhibited significant decrease in Serum PAPP-A levels. These findings suggest that decreased levels of Serum PAPP-A are responsible in the causation of the Preeclampsia.

**Conclusion:** Thus, PAPP-A can be used as an early biochemical marker to diagnose Preeclampsia leading to reduction in maternal and perinatal mortality and morbidity.

**Keywords:** Serum PAPP-A, Preëclampsia, Biomarker, Insulin-like growth factor.

### Introduction

A pregnant woman is said to be preeclamptic when after 20 weeks of gestational age without any previous history of hypertension, the systolic blood pressure is greater

than or equal to 140 mmhg and the diastolic blood pressure is greater than or equal to 90 mm hg which is accompanied by proteinuria ( $\geq 300$  mg).<sup>1</sup>

Preeclampsia is of two types: early onset and late onset. If preeclampsia is seen in a female of less than 34 weeks gestational age, then it is called early onset. If preeclampsia is seen in a female of greater than 34 weeks gestational age, then it is called late onset.<sup>2</sup>

Papp-a which belongs to metzincin superfamily<sup>3</sup> is a protease released by syncytiotrophoblast which will break down insulin like growth factor binding protein and thereby the levels of insulin like growth factor i will be increased.<sup>4</sup>

This system is very essential for the maturation of placenta and so pregnant women with decreased levels of papp-a are found to be preeclamptic. Hence decreased levels of papp-a can predict the occurrence of pe and hence it can be used as a marker for the occurrence of pe and many adverse consequences of pe can be avoided.<sup>5</sup>

Preeclampsia is occurring because of disordered cytotrophoblast migration in spiral arterioles. There is also greater production of thromboxane and lesser generation of prostaglandins.<sup>6</sup>

The objective of the present study is to find out the role of serum papp-a as a potential early screening biochemical marker in pregnancy and to prevent pregnancy related complications.

### **Aim**

To compare serum papp-a levels in pre-eclamptic women with normotensive pregnant women.

### **Materials and Methods**

The present study was carried out at Osmania medical college and general hospital in the department of biochemistry during December 2015 to may 2017.the study comprised of 88 subjects. Study subjects were

divided into 2 groups i.e. Group-i (n= 44) normotensive pregnant women as controls and group-ii (n= 44) preeclamptic women as cases. Written informed consent was obtained from all study subjects.

### **Inclusion criteria**

- Group – I (controls): pregnant females having bp<140/90 mmhg, gestational age >20weeks
- Group – II (cases): pre-eclampsia diagnosed pregnant women having bp >140/90 mmhg, gestational age > 20weeks

### **Exclusion criteria**

1. Chronic hypertension
2. Pregnancy with twins
3. Other medical disorders like renal or liver failure

### **Biochemical parameter investigated**

Serum papp-a. Measurement of serum papp-a levels was done by elisa. (Erba mannheim).

Units for the measurement of serum pregnancy associated plasma protein- a (papp-a) are micrograms / milliliter and multiple of median (mom).

### **Specimen collection**

3 ml of venous blood was collected taking aseptic measures in red vacutainers. then blood was allowed to clot, and centrifugation was done. Serum was separated and then in the separated serum papp-a levels were measured.

### **Observations and results**

The present study was done at Osmania medical college and general hospital in the department of biochemistry during December 2015 to may 2017.the study consists of 88 subjects. Study subjects were divided into 2 groups consisting of 44 subjects in each group. Group-i normotensive pregnant women as controls and group-ii preeclamptic women as cases. Statistical analysis was

done by unpaired t-test and the graphs were obtained for mean and standard deviations.

The mean ± sd of papp-a were studied in the total cases and controls. Mean value of papp-a was high in group i when compared with group ii.

Table 1: Mean And Standard Deviations In Between The Groups

Parameters	Group I (n=44) (Controls) Normal pregnancy (mean± SD)	Group II (n=44) (Cases) Preeclampsia pregnancy (Mean ± SD)	P value
Serum PAPP-A µgm/ml	20.77 ± 1.615 (16.2 – 23.2)	2.245 ± 0.6457 (0.4–1.95)	≤ 0.0001 Significant
MOM	1.09 ± 0.08 (0.8 – 1.1)	0.65 ± 0.39 (0.2 – 1.03)	≤ 0.0001 Significant

P value was statistically significant.

Decreased in the values of serum PAPP-A was noted in Group II (Preeclampsia cases) with mean and SD of 1.22 ± 0.7425 µgm/ml and the range was 0.4–1.95. The mean and SD of PAPP-A in group I (Control group, normotensive pregnant women) was 20.77 ± 1.615 µgm/ml and the range were 16.2– 23.2 and significant correlation was noticed (P < 0.0001)

In the study done by ozkanozdamar<sup>7</sup> papp-a levels were decreased in the preeclamptic women and it was correlating with our present study. Similar findings were found in the study done by nick a. Bersinger et al<sup>8</sup>. In this present study, low levels of serum papp-a are seen in preeclamptic females when compared to normal pregnant females and the p value was < 0.0001 and it was statistically significant.

**Conclusion**

Preeclampsia is associated with increased maternal and neonatal morbidity and mortality. Early detection of preeclampsia can be done by estimating biochemical marker papp-a levels in serum. In preeclampsia decreased serum papp-a levels are observed because of abnormal placentation. Hence, papp-a can be considered as an early diagnostic marker in the detection of preeclampsia.

**References**

1. David m. Carty, christian delles, and anna f. Dominiczak. Novel biomarkers for predicting preeclampsia. Ncbi. Trends cardiovasc med. 2008 jul ;18 (5): 186-94
2. Anna yliniemi, kaarinmakikallio, teemukorpimaki, heikkikouru, jaanamarttalaand markku ryynanen.combination of papp-a, fhcgβ, afp, plgf,

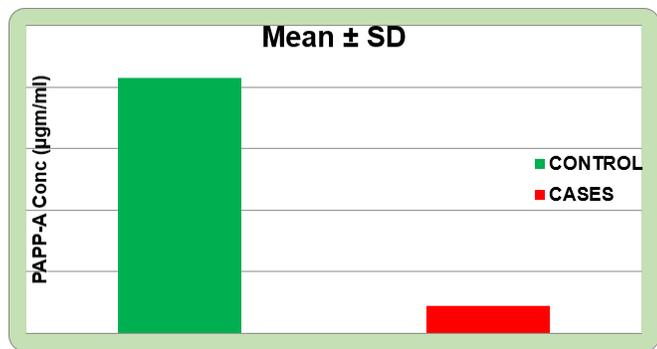


Figure 1: Mean ± Standard Deviations of Serum Papp-A In Group-I & Group-II

**Discussion**

In the present study, it has been observed that in group-i (controls) the mean ± standard deviation of serum papp-a is 1.09 ± 0.08 mom (20.77 ± 1.615 µgm/ml) and in group-ii (cases, preeclamptic women) the mean ± standard deviation of serum papp-a is 0.65 ± 0.39 mom (2.245 ± 0.6457 µgm/ml).

- stnfr1, and maternal characteristics in prediction of early-onset preeclampsia. *Clinical medicine insights: reproductive health*. 2015;9 :13-20.
3. Cheryl a. Conover, laurie k. Bale, michael t. Overgaard, edward w. Johnstone, ulla h. Laursen,ernst-martin füchtbauer., et al . Metalloproteinase pregnancy-associated plasma protein a is a critical growth regulatory factor during fetal development. *Development and disease, development* 131. 2004; 1187-1194
  4. M. Gentile, m. Schifano, s. Lunardi, c. Nanini, f. Moscuzza, c. Sergiampietri., et al. Maternal papp-a levels at 11 - 13 weeks of gestation predict foetal and neonatal growth —papp-a growth predictor. *Open journal of obstetrics and gynecology*. 2015 june 24 ; 5: 365-372.
  5. Nargesmoslemi zadeh, farshad naghshvar,sepidehpeyvandi, parandgheshlaghi, and sara ehetsami. Pp13 and papp-a in the first and second trimesters: predictive factors for preeclampsia? *International scholarly research network, isrn obstetrics and gynecology volume, 2012, article id 263871, 6 pages.*
  6. John m. Davison, volker homuth, arun jeyabalan, kirk p. Conrad, s. Ananth karumanchi, susan quaggin ., et al. New aspects in the pathophysiology of preeclampsia. *Journal of the american society of nephrology*. 2004, 15: 2440–2448.
  7. Ozkanozdamar, ismet gun, ugurkeskin, necmettin kocak, ercumentmungen. The role of maternal serum beta-hcg and papp-a levels at gestational weeks 10 to 14 in the prediction of pre-eclampsia. *Pak j med sci*. 2014 may; 30(3): 568-573.
  8. Nick a. Bersinger and ronnaug a. Odegard. Second- and third-trimester serum levels of placental proteins in preeclampsia and small-for-gestational age pregnancies. *Acta obstetgynecol scand*. 2004; 83: 37—45.