



ORIGINAL ARTICLE

Association of Serum Albumin Level in Predicting of Preeclampsia among Pregnant Women in Dhaka City of Bangladesh

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Abstract

Background: Serum albumin level is very important during the pregnancy for the good outcome of delivery. **Objective:** The purpose of the present study was to see the association of serum albumin level in predicting of preeclampsia among the pregnant women. **Methodology:** This descriptive cohort study was conducted in the OPD of the Department of Obstetrics and Gynaecology at Rajshahi Medical College Hospital, Rajshahi, Bangladesh from January 2013 to December 2014 for a period of two (2) years. This study was carried on pregnant woman attending in outdoor department of Gynaecology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh before 20 weeks of pregnancy who were healthy normotensive primigravidae with singleton pregnancy. Healthy normotensive primigravidae with singleton pregnancy were enrolled in this study before 20th weeks and were followed up after 28th weeks of pregnancy. The data of serum albumin in gm/dL before 20th weeks and after 28th weeks of pregnancy were collected. **Result:** A total number of 75 pregnant women were finally included in this study. PE was identified in 12(16%) women out of 75 patients on the basis of one or more following parameters. Mean serum albumin in 1st visit was 3.84±0.41 gm/dL. No association was found between development of preeclampsia and levels of serum albumin in early trimester of pregnancy (p=0.960). **Conclusion:** In conclusion serum albumin level is not a predictor of development of preeclampsia among the pregnant women in early stage. [*Journal of Current and Advance Medical Research* 2019;6(2):83-86]

Keywords: Serum Albumin Level; Prediction; Preeclampsia; Pregnant Women

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Introduction

Preeclampsia (PE) is known as the disease of the multiple theories. Among them genetic, immunological circulatory factors, uterine vascular change and endothelial dysfunction are important¹. Biochemical tests suggested for PE are urinary calcium, urinary Kallikrein to creatinine ratio, serum alpha foeto protein, human chorionic gonadotrophin, plasma fibronectin, serum inhibin, serum urate, hematocrit, antithrombin III and plasminogen activator inhibitors². Among these urinary calcium, urinary Kallikrein to creatinine ratio and plasma fibronectin are relatively simple tests that have been used for screening in the second trimester. However, the predictive ability of individual tests has varies widely and many simply detect early disease. In most cases of PE all the above factors are found to be associated in varying frequency and combination. It is clear that no test reliably predicts PE².

During normal pregnancy the decrease in the serum albumin has been observed by various workers. It has been reported that all the different fractions of plasma protein diminish in patients suffering from severe toxemia of pregnancy³ and a study in PE and eclampsia with special reference to protein stabilization treatment. University of Pittsburgh 1936 suggested that it is due to disturbance in the protein metabolism. So serum albumin level may serve as an indicator of PE⁴. Mean serum albumin level was significantly lower in those who develop PE². It is important therefore to identify women who are at high risk of developing the disease early in pregnancy. This is because early identification of biochemical markers of the disease would not only facilitate selective recruiting of those at increased risk for PE but also help in determining those patients who are more likely to benefit from interventional measures should a therapeutic intervention prove successful. Therefore this present study was undertaken to see the association of serum albumin level in predicting of preeclampsia among the pregnant women.

Methodology

This was a descriptive cohort study which was conducted in the OPD of the Department of Obstetrics and Gynaecology at Rajshahi Medical College Hospital, Rajshahi, Bangladesh. This study was carried out from January 2013 to December 2014 for a period of two (2) years. This study was carried on pregnant woman attending in outdoor department of Gynaecology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh before 20

weeks of pregnancy who were healthy normotensive primigravidae with singleton pregnancy. Pregnant women who fulfill the inclusion and exclusion criteria were constituted as the study population for the research. Women with multiple pregnancies, chronic hypertension, diabetes mellitus, chronic renal disease were excluded from this study. Healthy normotensive primigravidae with singleton pregnancy were enrolled in this study before 20th weeks and were followed up after 28th weeks of pregnancy. The data of their age, serum albumin in gm/dL before 20th weeks and after 28th weeks of pregnancy were collected. All the collection data were recorded in pre designed data sheet. Data were checked for validity were coded and entered into computer for analysis by using SPSS software programme. Obtained results were evaluated and analyses statistically. Statistical significance were done at appropriate level ($p < 0.05$ or $p < 0.01$) by applying relevant statistical tests. All the women enrolled in the study were explained about the nature and purpose of the study and only those who gave consent were included in this study. Also clearance from the Ethical Review Committee of Rajshahi Medical College, Rajshahi was taken to carry this study.

Result

At first 100 pregnant mothers were enrolled for the study. On the basis of inclusion and exclusion criteria 75 pregnant women finally included in this study. All were before 20th weeks of pregnancy without any complication or any risk factor for developing PE. Among them PE developed in 12 patients, the rest 63 patients not developed preeclampsia, remain normotensive.

Table 1: Changes in clinical and biochemical parameters at follow up

Parameters	Mean± SD	Cut-off-value
Age(years)	21.02±2.05	
Height (cm)	155.25±5.40	
Weight (kg)		
1st visit	57.40±4.13	
2nd visit	65.44±4.88	
Serum Albumin (gm/dl) 1st visit	3.84±0.41	≤4.00

Among the study group incidence of PE was 16%. PE was identified in 12(16%) women out of 75 patients on the basis of one or more following parameters such as hypertension (SBP, DBP, MAP

and degree of proteinuria. There was no association between development of preeclampsia and decrease levels of serum albumin in early trimester of pregnancy ($p=0.960$).

Mean serum albumin in 1st visit was 3.84 ± 0.41 gm/dL (Table 1). Table 2 showed study population gestational age during their enrollment in the study, 20(26.7%) at 10 weeks 31(41.3%) at 11 weeks and 24(32%) at 12 weeks.

Table 2: Distribution of study population according to gestational age during enrollment in the study

Gestation age at entry (weeks)	Frequency	Percentage
10	20	26.7
11	31	41.3
12	24	32.0
Total	75	100.0

Table 3: Association between Serum Albumin and preeclampsia (n=75)

Serum Albumin	Preeclampsia		RR (95% CI)	χ^2 *(P value)
	Developed	Not developed		
Low	6 (50.0%)	32 (50.8%)	0.974 (0.34-2.74)	0.003 (0.960)
Normal	6(50.0%)	31(49.2%)		
Total	12(100.0%)	63(100.0%)		

*Data were analyzed using Chi-square (χ^2) test.

Table 3 showed the association between serum albumin and preeclampsia. Preeclampsia was developed in 12 cases of which 6 (50.0%) cases had low serum albumin and the rest 6 (50.0%) cases had normal serum albumin level. Among 63 cases preeclampsia was not developed of which 32(50.8%) cases had low serum albumin level and the rest 31(49.2%) cases had normal serum albumin level. There was no association between development of preeclampsia and levels of serum albumin in early trimester of pregnancy ($p=0.960$).

Discussion

This study was designed to prospectively evaluate the possibility of early prediction of the subsequent development of PE using estimation of levels of some known biochemical substances affected by the disease in serum samples of healthy primigravidae with singleton pregnancy⁵. The selection of primigravidae with singleton pregnancy was based on the knowledge that these groups of women are more prone to developing the disease when all other risk factors are excluded. Those with conditions such as multiple gestation, chronic hypertension, diabetes mellitus and renal disease were carefully excluded from the study⁶.

For a predictive test to be of value in the identification of women at high risk of developing PE, the test should be altered early enough in pregnancy to allow for the institution of preventive measures. This was the justification for the selection of the study⁷.

The concomitant study of several tests was to compare their respective performances alone and in combination. The mean SBP, DBP and MAP value were all significantly higher in the PE group. This was expected in view of the criteria used for the diagnosis of the disease. The mean arterial pressure (MAP) has been shown to be predictive of PE, although some other studies indicated otherwise⁸.

However, the inclusion criteria used in some of these studies were slightly different from those of the present study. For instance, some of the studies included patients with mixed parity (nulliparous and multiparous women), some with chronic hypertension and renal disease⁹. In addition the tests were carried out late in pregnancy when the effects of the disease were often manifest with patients already having symptoms. It was also possible that the effect of PE on the renal system in early pregnancy might be minimal as to produce any detectable change in the serum levels of these substances. It was interesting to find that the mean serum albumin concentration in those remained normotensive was higher than that of the PE group. This was at variance with the generally known concept of hypoalbuminaemia being a feature of pregnancies complication by PE¹⁰. However, significant proteinuria was not a feature of the patients at booking when the estimations were made. Therefore, a larger study is required to properly define the value of serum albumin estimation early in pregnancy in the prediction of PE. There was no association between development of preeclampsia and levels of serum albumin in early trimester of pregnancy ($p=0.960$).

The limitations in the conduct of this study was recruitment of patients into the study using the strict exclusion criteria affected the number eligible for the study because our patients in our country rarely book early in pregnancy unless they develop complications.

Conclusion

The findings of this study showed that estimation of serum albumin level in early pregnancy was not significant in early pregnancy were significant in the prediction of PE. However, the mean serum albumin levels is significantly lower in those who developed PE. A larger study is therefore recommended to properly define the value of estimation of serum albumin in early pregnancy in the prediction of PE.

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