International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 05, 2020
ISSN: 1475-7192

The value of serum albumin level as a predictor of the incidence of hypertensive disorders in pregnancy at Samawa Province

Wurood Mahdi Al-Silaykhee[1]

Abstract

The aim of this research is to determine the seriousness of preeclampsia based on serum albumin levels. Methodology: According to their blood pressure, 100 women were split into four groups: regulation (n=22), gestational hypertension (n=25), moderate preeclampsia (n=29), and extreme preeclampsia (n=24). Concerned regarding the serum albumin amounts of each woman being compared. In addition, race, gestational age, parity, systolic blood pressure, and diastolic blood pressure were both taken into account. When serum albumin levels are compared between the classes, there is a substantial difference (p0.05). The age gap between control and extreme preeclampsia is substantial (p=0.04), according to the results. There was a statistically significant gap in gestational age between the control and other groups (p0.05), as well as a statistically significant difference in systolic and diastolic blood pressure between the groups (p0.05). Conclusion: In moderate and extreme preeclampsia, serum albumin levels are lower than in usual and hypertensive conditions, according to this report.

Keywords: *Pregnancy; Preeclampsia; Severe preeclampsia; Serum albumin*

I. Introduction

Preeclampsia is a hypertensivedisorder with multisystem involvement , usually occurs after 20 weeks of gestation [1].Hypertension approximately occurs in 12-22% of pregnancies [2].The general prevalence of preeclampsia in pregnancy is between 2-8 % of all pregnancies [3].Incidence of eclampsia in Baghdad ; Iraq according to World Health organization research in 2010 was 20.28 % [4].Perinatal mortality rates are increased 2- to 3- folds in hypertensive mothers and early onset preeclampsia is associated with a 4- folds increased in stillbirth risk [1].During the past two decades , the incidence of preeclampsia has increased by 25% in the united states [5].

Preeclampsia is characterized by an elevated blood pressure equal to or more than 140/90 mmHg on two separated occasions in a previously normotensive woman , accompanied by proteinuria (300 mg in 24 hours) and blood pressure normalizes by six weeks postpartum[6].Severe preeclampsia is diagnosed in the presence of these criteria : -(1) systolic blood pressure greater than 160 mmHg or diastolic blood pressure greater than 110 mmHg (2) thrombocytopenia – platelet counts less than 100,000µL-; (3) epigastric pain or liver transaminase levels twice normal ;(4)pulmonary edema ;(5)retinal hemorrhages or papilledema [1].

[1] *Department of Gynecology & Obstetrics , College of Medicine, Al-Muthanna University, Iraq.*

Hypertensive disorders of pregnancy include : gestational hypertension , preeclampsia , eclampsia and chronic hypertension [7]Gestational hypertension characterized by raised blood pressure of ≥ 140/90 mmHg without proteinuria(<300mg per 24 hours) . Preeclampsia is defined as raised blood pressure of ≥ 140/90 mmHg on two separated readings , that is first discovered in the second trimester of pregnancy and proteinuria ≥ 300 per 24 hours .Eclampsia is preeclampsia superimposed by convulsions . Chronic hypertension is a hypertension diagnosed before pregnancy [3] .

The mechanisms of hypertension in pregnancy are largely unknown [2].The pathophysiology of preeclampsia is thought to be placental[3].Women with abnormal pregnancies e.g. hydatiform mole ,suggesting that the presence of trophoblast tissue provides a trigger for the illness . Biopsies of placental bed reveal a patchy trophoblastic invasion in preeclampsia .The cause is not known but may reflect abnormal adaptation of maternal immune system [6]. The specific risk factors that predispose to preeclampsia:-

1) first pregnancy

2) preeclampsia in any previous pregnancy

3)family history of preeclampsia

4)Age ≥ 40 years

5)Body mass index ≥ 35

6)multiple pregnancy

7) proteinuria ≥0.3g/24 hour or diastolic blood pressure ≥ 80 mmHg at booking visit

8)preexisting diseases including e.g. renal disease , diabetes ,antiphospholipid syndrome ,chronic hypertension and autoimmune disease [6,8].

Prevention of preeclampsia is best started before 16 weeks gestation in which most of the transformation of the spiral arteries occurs ,to avoid the maternal and perinatal complication [9].

1)Dietary changes and exercise:Interventions include aerobic exercise and weight loss,reduce salt intake ,increase potassium intake , zinc supplementation and magnesium supplementation [3,9].

2)Trial of aspirin :- A trial of aspirin(150 mg)might be effective in prevention of preeclampsia if used at week 16 till the end of 32 weeks of pregnancy[3].3)Vitamin D may have a protective role against preeclampsia [9].

4)Antioxidant vitamins:- A high dose of antioxidants e.g. vitamins E and C can be used for preeclampsia prevention [3].

Complication of preeclampsia [10]:-

A/maternal complication

1) seizure

2) hypertensive encephalopathy or cerebral edema due to vasospasm and hypoxia

3) intracranial hemorrhage

4) Renal dysfunction

5)Retinal detachment

6)HELLP syndrome (defined as : hemolysis, elevated liver enzyme levels and low platelet levels) .

7)placental abruption

8) systolic and diastolic myocardia dysfunction and pulmonary edema .

9)DIC and hemorrhage

10) Death

B/ perinatal complication :- Including stillbirth or neonatal death ,bronchopulmonary dysplasia ,oligohydramnios and fetal growth restriction , it has been estimated that 9-20 % of stillbirth is directly related to hypertensive disorder of pregnancy. Preeclampsia is a significant contributor to iatrogenic preterm birth and neonatal morbidity [11].

II. Material and methods

This cohort study was done in Al Samawah maternal and child teaching hospital , enrolled between August 2018 and November 2018 .Total 100 women ,age between 17-26 years who participated in the study were divided into 4 groups:

1) Control group ; 22 women having no hypertension .

2) 25 women with hypertension and no protein in urine .

3) 29 women with mild preeclampsia .

4) severe preeclampsia group consist of 24 women .

This study was approved the medical ethics committee of the college of medicine university of Al Muthanah . In the selected cases we exclude chronic illnesses such as chronic kidney diseases , chronic hypertension and diabetes mellitus .

We are concerned about the age,weeks of gestation , systolic blood pressure and diastolic blood pressure for each woman in this study .A blood samples were aspirated for the estimation of serum albumin level and the reference value is 3.40 g/dl – 4.8 g/dl. For estimation of albumin in urine , a random urine specimen was collected and a dipstick urine measurement for albumin was done .To evaluate the distribution of blood pressure and serum albumin we divided the groups into 2 subgroups according to the age : G1(17-21) years and G2 (22-26) years .

III. Results

The results of the distribution of blood pressure and serum albumin are shown in Table (1).There was no significant difference between the age groups ($p>0.05$) for all our involved groups .

Table (1):Distribution of systolic ,diastolic blood pressure and serum albumin according to age groups for control , Gestational hypertension , mild preeclampsia and sever preeclampsia groups.

ge groups (years)	**control**			**Gestational Hypertension**			**Mild Preeclampsia**			**Sever Preeclampsia**		
	BP	BP	erum albumi n g/dl	BP	BP	S erum albumin g/dl	BP	BP	S erum albumin g/dl	BP	BP	erum albumi n g/dl
1 7-21	14.75± 4.35	9.00 ±1.12	.621±0. 111	42.58± 2.021	4.75± 3.38	3.44 ± 0.04	52.56± 1.788	03.50± 2.309	.136 ±0.087	63.44± 2.651	13.56± 3.358	.855 ±0.050
2 2-26	15.9 ± 3.87	8.10±0. 99	.616±0. 112	44.38± 2.181	7.15± 2.57	.415 ±0.053	53.23± 2.242	04.46± 2.634	.167 ± 0.078	66.40± 3.776	16.60± 3.680	.841 ±0.044
value	.102	.750	.979	.90	.431	0 .065	.468	.445	0 .463	.212	.857	.649

*represents a significant difference at p≤0.05 using independent sample T test. Data are expressed as Mean ±SD .SBP=Systolic blood pressure (mmHg).DBP=Diastolic blood pressure (mmHg).

Maternal characteristics analysis

The clinical characteristics of 100 pregnant women are shown in Table (2) .There were no significant differences in age between control group and gestational hypertension (p= 0.65) , control group and mild preeclampsia group (p=0.9) . But there was a significant difference between control group and severe preeclampsia group (p =0.04).

The analysis of parity shows no significant between control and gestational hypertension , mild preeclampsia and sever preeclampsia (p= 0.84 , p = 0.51 and p= 0.23 respectively) .

Gestational age analysis shows the following results ; the differences between control and the other groups were significant (p < 0.05).

Table (2):comparison of maternal characteristics between control ,gestational hypertension ,mild and sever preeclampsia groups .

	Control	**Gestational hypertension**	**Mild Preeclampsia**	**Sever Preeclampsia**	**P value**
Number	22	25	29	24	/
Age (years)	21.091 ± 1.477	21.320 ± 1.2819	21.034 ± 2.3827	22.125±1 .4283	a-0.111 b-0.65 c-0.9 d-0.04
Parity	0.818 ± 0.795	0.76 ± 0.83	1.00 ± 1.10	1.167 ± 1.12	a-0.47 b-0.84 c-0.51 d-0.23
Gestational age (weeks)	39.045 ± 0.7854	37.8 ± 0.7638	36.00 ± 0.8018	36.00±0.978	0.000

*represents a significant difference at $p \leq 0.05$ using ANOVA. Data are expressed as Mean ± SD. /=statistical analysis is not implemented . a- represents the total difference between the groups ,b-represents the difference between control and gestational hypertension ,c-represents the difference between control and mild preeclampsia ,d-represents the difference between control and sever preeclampsia .NS = not significant .

Serum albumin and blood pressure analysis

The results are shown in Table (3) .The analysis shows a statistically significant difference in serum albumin level between control ,gestational hypertension ,mild preeclampsia and sever preeclampsia ($p<0.05$)

There was a statically significant difference in systolic and diastolic blood pressure between control and the other groups ($p<0.05$).

Table (3):comparison of serum albumin ,systolic and diastolic blood pressure between the studied groups.

	control	**Gestational Hypertension**	**Mild preeclampsia**	**Sever preeclampsia**	P value
S.	3.61±	3.42±	3.15 ±	2.84 ± 0.046	0

albumin g /dl	0.109	0.048	0.0831		.000
Systolic blood pressure (mmHg)	115.27±4.18	143.52±2.256	152.86±2.38	165.29±3.64	0.000
Diastolic blood pressure (mmHg)	78.59±1.14	96.00±3.17	103.931±2.46	115.458±3.79	0.000

*represents a significant difference at $p \leq 0.05$ using ANOVA. Data are expressed as Mean ± SD.

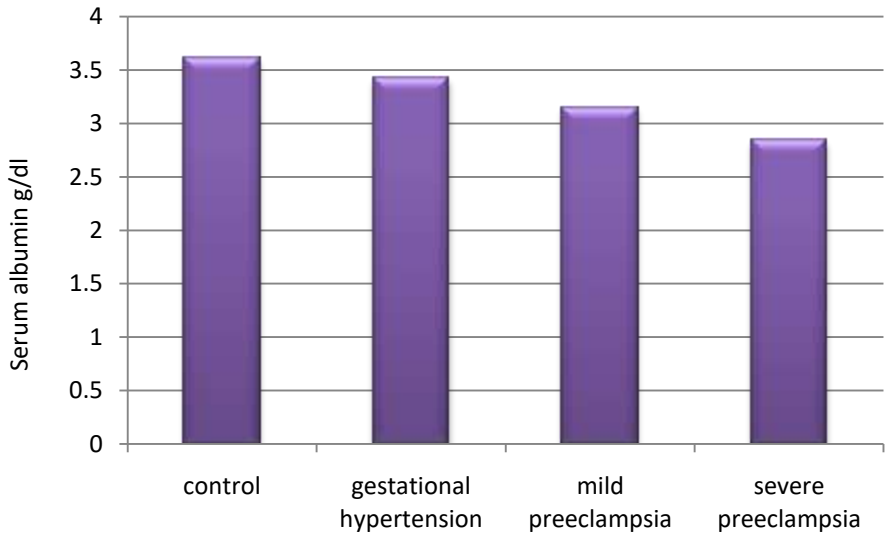

Figure (1): Bar chart shows serum albumin level in each group

As shown in Figure (2) ; women with mild and sever preeclampsia will give birth preterm .

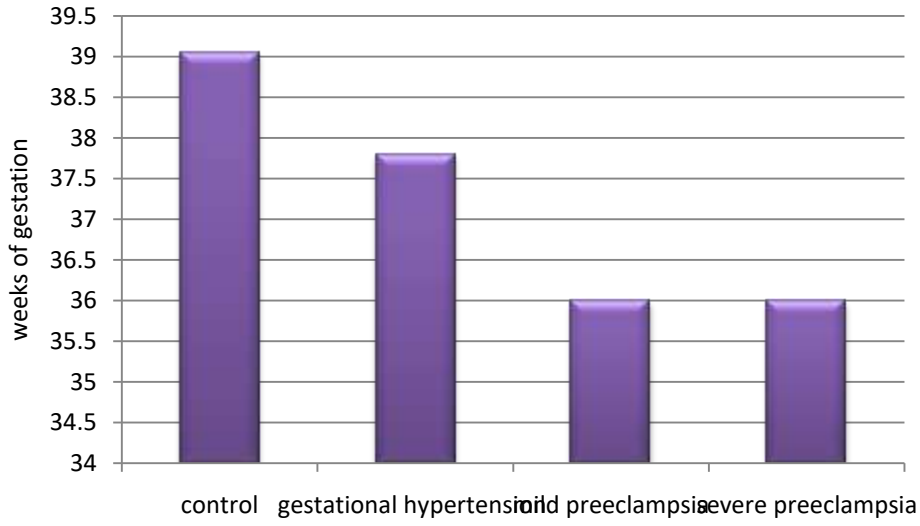

Figure (2): Bar chart shows gestational age in each group

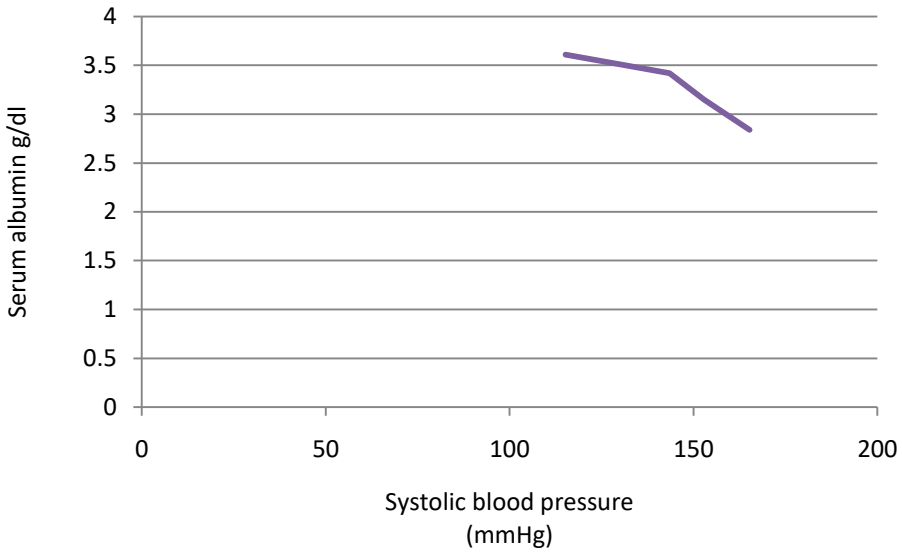

Figure (3): The correlation between systolic blood pressure and serum albumin level

IV. Discussion

Preeclampsia remain a leading cause of maternal morbidity and mortality .This study has shown a significant relation between severe preeclampsia and low gestational age either due to iatrogenic termination of pregnancy or due to preterm labour .This agreed by Cruz ,et al [12] and Chen H ,et al [13]. This study found that serum albumin level is significantly related to the severity of preeclampsia .This agreed by Gojnic ,et al [14] where 60 patients diagnosed as preeclampsia and nearly all severe cases had albumin values below 3g/dl .According to this results parity is not related to the severity of preeclampsia .This is agreed by a study done by Basima Al Ghazali, et al [15]where 100 patients were divided into 4 groups and found that no significant difference in parity when comparing between the groups .

V. Conclusion and Recommendation

This study showed that serum albumin level is lower in mild and sever preeclampsia comparing with normal and hypertensive cases. Prediction of severity of hypertensive disorders in pregnant women is possible with serum albumin level and they should have their Serum albumin level measured.

References

[1]American College of Obstetricians and Gynecologists ;Task force on hypertension in pregnancy .Hypertension in pregnancy .Report of the American College of obstetricians and Gynecologists . Task force on Hypertension in pregnancy .Obstet Gynecol 2013;122:1122-31 .

[2]Diagnosis and management of preeclampsia and eclampsia .ACOG practice Bulletin number 33 .American college of obstetricians and Gynecologists . Obstet Gynecol 2002; 99:159-67 .

[3]Duley L. preeclampsia and hypertensive disorders of pregnancy Br.Med Bull 2003 ;67;161-176 .

[4]Mayson Jabir , Imad Abdul Salam , Wafa Al-Hilli, et al . Maternal near miss and quality of maternal health care in Baghdad ,Iraq ; BMC pregnancy and child birth 2013 13:11 .

[5]Wallis AB ,Saftlas AF ,Hsia J , Atrash HK . Secular trends in the rates of preeclampsia ,eclampsia, and gestational hypertension , united states ,1987-2004.AMJ hypertens 2008 ; 21: 521-6 .

[6] Pre-eclampsia and other disorders of placentation . In :Obstetrics by Ten Teachers. Ed. Baker NP .Nineteenth Edition .Book Power . London. 2011;10: 120-131 .

[7]Siphiwe Shaba, Seter Siziya. Prevelance rate for hypertensive disorders of pregnancy and correlates for women admitted to the maternity ward of a tertiary hospital in Zambia. Asian Pac .J.Health Sci.,2015; 2(3):31-35.

[8] Kirsten Duckitt ,Deborah Harrington . Risk factors for pre-eclampsia at antenatal booking :Systematic review of controlled studied. BMJ. 2005 Mar 12 ;330(7491):565 .

[9]A Han, E Bujold ,S Sharma ,et al . preventing preeclampsia and its complication .FIGO Text book of pregnancy Hypertension 2016 Mar ;40(3) :102-123 .

[10]Mackay A.P. ,Berg C.J.and Atrash H.K. (2001) pregnancy related mortality from preeclampsia and eclampsia . 97: 128-130 pmid : 11275024 .

[11]BA payne , C Hanson ,S Sharma , et al , Epidemiology of hypertensive disorders of pregnancy . FIGO textbook of pregnancy hypertension 2017 Mar; 40(3):64-75.

[12]Cruz MO, Gao W ,Hibbard JU. Obstetrical and perinatal outcomes among women with gestational hypertension, mild preeclampsia ,and mild chronic hypertension .Am J obstet Gynecol 2011 ;205(3):260.el-9 .

[13] Chen H , Tao F, Fang X , Wang X . Association of hypoproteinemia in preeclampsia with maternal and perinatal outcomes :A retrospective analysis of high –risk women .J Res Med Sci 2016 ;21:103.

[14]Gojnic M, Petkovic S , Papic M , Mostic T , Jeremic K , Vilendecic Z ,Djordjevic S . Plasma albumin level as an indicator of severity of preeclampsia . Clin Exp Obestet Gynecol 2004; 31(3):209-10 .

[15]Basima Al Ghazali ,Ahlam Abdul – Hussein Al- Taie , Raheem J.Hameed .Study of the clinical significance of serum albumin level in Preeclampsia and in detection of its severity. American Journal of BioMedicine 2014 ;2(8):964-974 .