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Human Chorionic Gonadotropin Level in Iraqi Women with Pregnancy-Induced Hypertension

Saja Muhanad Bayram[1, 2], Lina A. Salih[2] and Samia. A. Eleiwe[3]
[1] *(Department of Medical Laboratory Techniques, Al-Esraa University College, Baghdad, Iraq)*
[2]*(Biology Department, College of Science, University of Baghdad, Baghdad, Iraq)*
[3]*(Department of histology, anatomy, and embryology, college of Medicine University of Mustansiriyah*)
Corresponding Author: Saja Muhanad Bayram1

Abstract:*Pregnancy-induced hypertension (PIH)is a major pregnancy complication that lead to maternal mortality.Here, we have scrutinized the correlation between serum level of biochemical parameters and oxidative stress parameter in PIH.Serum samples were collectedfromeighty Iraqi women (forty women with pregnancy-induced hypertension as patients group, twenty normotensive pregnant women as a positive control, and twenty normotensive non-pregnant women as a negative control) all groups were diagnosed clinically. A questionnaire form included for all studied groups and contain Age and gestational age. Serum □-hCG hormone levelwas determined for all studied groups. Age range was between (17-50) years and there were no significant (P<0.01) differences in means between all studied groupswhile the gestational age showed that there was a significant difference in first trimester means of PIH and positive control. Data analysis also showedthatserum level of□-hCG hormonewas a highly significant increasein PIH in compared to control groups. Serial estimation of serum β-hCG can be important to use as a marker of disease and also can be used in better early management of established cases that lead to preeclampsia and eclampsia.*

Keyword: *PIH, β-hCG, Iraq, Baghdad.*

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I. Introduction

Pregnancy-induced hypertension (PIH) it is also called preeclampsia (PE) It's a maternal syndrome characterized by high blood pressure (≥140/≥90 mmHg), tissue edema, proteinuria, abnormal clotting, abnormal liver and renal functions as a result of placental involvement [1]. It is one of the most potential and common life-threatening complications of pregnancy. The occurrence of disease is 5% to 15% in general population of pregnant women and can lead to maternal and fetal morbidity. Preeclampsia usually occurs in nulliparous women than in multipara ones with the maternal blood pressure normalizing after delivery but still has the potential to develop essential hypertension in future [2]. The clinical manifestation generally arise in late pregnancy and regress after delivery of the concepts. PIH is a primary pregnancy problem that causes various complication such as premature delivery, abruption placentae, fetal growth retardation, and fetal death, as well as mortality and morbidity of maternal [3].

Human chorionic gonadotropin (hCG) is a hormone of significant importance in the promotion, maintenance and establishment of human pregnancy. It has been clearly demonstrated that hCG uses multiple autocrine, endocrine and paracrine actions on a variety of gestational and non-gestational cells and tissues. These actions are directed to promote trophoblast invasiveness and differentiation, placental growth, angiogenesis in uterine vasculature, hormone production, modulation of the immune system at the maternal-fetal interface, inhibition of myometrial contractility as well as fetal growth and differentiation [4].

Human chorionic gonadotropin was expressed by placental trophoblasts during pregnancy and a numerous trophoblastic tumors, such as male germ cell tumors, for which hCG is a valuable marker [5]. The relationship of serum hCG with preeclampsia has been documented by various studies [6]. In a study attempted to determine whether serum hCG levels reflect a different trophoblastic secretory response of preeclampsia in turkey, they found a strict relationship between severe preeclampsia and elevated serum β-hCG levels, indicating that there should be an abnormal placental secretory function in patients with severe preeclampsia [7].

This study aim to determine the level of human chorionic gonadotropin hormone in Iraqi women with pregnancy-induced hypertension in compression to normotensive pregnant and non-pregnant woman.

II. Materials And Methods

2.1 Participant

Eighty participant womeninvolved in this study during their attendance at Fatima al-Zahraa hospital in Baghdad through the period from October 2017 to January 2018. Women were selected as follows: forty women with pregnancy-induced hypertension as a patient group, twenty normal pregnantwomen as a positive control, and twenty non-pregnant women as a negative control.

2.2 Sample Collection

Five milliliters of venous blood has been collected from pregnancy-induced hypertension, normotensive pregnant, and non-pregnant women using a clean plain tube and allowable to clot at 37°C for 10 minutes. Then it has been centrifuged for 5 minutes at 2500 rpm until serum separated. Serum was reserved at -20°C until used.

2.3 Demographic parameter

A questionnaire form included for all studied groups and contain Age and gestational age.

2.4 Determination the levels of □-hCG in serum

By using an Electrochemiluminescence immunoassay (ECLIA) kit cobas®e411 (Roche, Germany), □-hCG serum levels were measured in women with PIH in addition to normotensive pregnant and non-pregnant women, following the manufacturer's instructions.

2.5 Statistical Analysis

The Statistical Analysis System- SAS (2012) program was used to effect of different factors in study parameters. The minimum significant difference LSD test (ANOVA) was used to significant compare between means. Estimate of the Correlation coefficient between parameters in this study (SAS. 2012).

III. Resultsand Discussion

3.1 Age distribution

All groups have age range between (17-50) years. There were no significant ($P<0.01$) differences in means between all studied groups. The mean of ages in first category (≤ 20 years) for pregnancy-induced hypertension (PIH) women was 19.500 ±0.267 year in compared with positive control (normotensive pregnant women) and negative control (normotensive non-pregnant women) means 19.667 ± 0.333, and 19.400 ± 0.600 years respectively. While in second category (21-30 years) the mean of age in PIH was 25.824 ± 0.792 years in compared with control +ve and control –ve means 25.091 ± 0.719 and 25.730 ± 1.001 years respectively. Last category (>30) ages mean in PIH was 36.533 ± 1.901 compared with control +ve and control –ve means36.67 ± 1.926 and 36.60 ± 1.990 years respectivelyshownin**(** Table 1 and Figure 1).

Table .1 Age distribution in the studied groups

Group	Mean ± SE (year)		
	≤20	**21-30**	**>30**
PIH	19.500 ±0.267 a	25.824 ± 0.792 a	36.533 ± 1.901a
Control +ve	19.667 ± 0.333 a	25.091 ± 0.719 a	36.67 ± 1.926 a
Control -ve	19.400 ± 0.600 a	25.730 ± 1.001 a	36.60 ± 1.990 a
LSD value	NS	NS	NS
P-value	0.930	0.814	0.789
** ($P<0.01$): Means having with the different letters in same column differed significantly.			

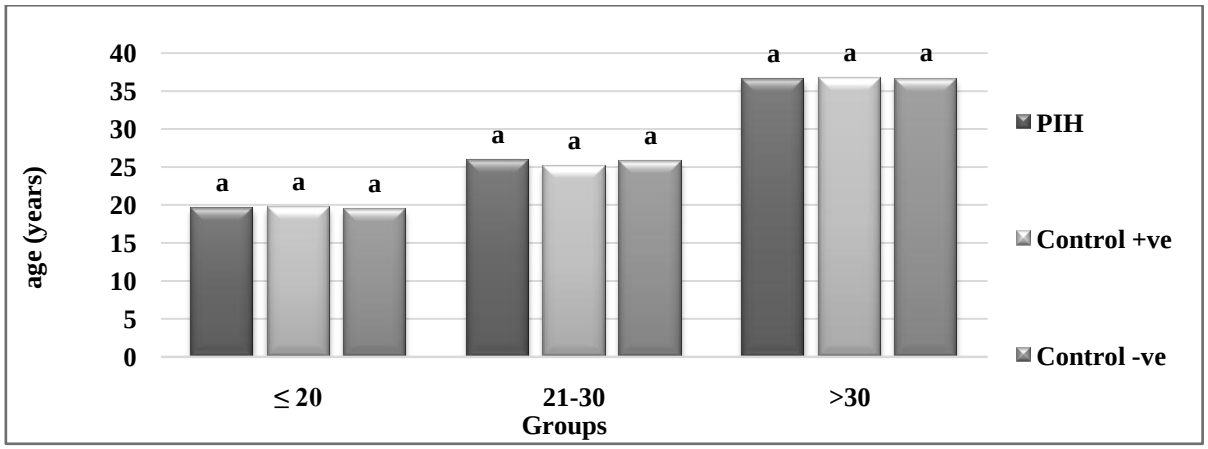

Fig. 1 Age distribution in the studied groups

Age has an important effect on the occurrence of hypertensive disorders of pregnancy. All women under 20 years or over 30 years have an increased chance of hypertension [8]. In present study age distribution, means showed no significant differences between all groups.Many different previous studies have been shown there was no significant variances in age [6, 9].

3.2 Gestational age distribution

The gestational age was calculated from first day of last menstrual period and further confirmed by ultrasonography to all studied groups and the present study showed that there was a significant difference in first trimester means of PIH and positive control 8.200 ± 1.113 and 5.444 ± 0.529 week respectively. While the means in second and third trimester showed no significant differences ($p<0.05$) between PIH and positive control (20.36 ± 1.003, 20.60 ± 1.833 weekand 36.809 ± 1.046, 37.166 ± 0.615 week respectively) as shown in **(**Table 2 and Figure 2)

Table. 2 Compare between different groups in gestational age

Group	Mean ± SE (week)		
	First trimester (1-12 week)	Second trimester (13-27 week)	Third trimester (28-40 week)
PIH	8.200 ± 1.113 a	20.36 ± 1.003 a	36.809 ± 1.046 a
Control +ve	5.444 ± 0.529 b	20.60 ± 1.833 a	37.166 ± 0.615 a
LSD value	2.668 *	3.957NS	2.153 NS
P-value	0.025	0.905	0.783
* (P<0.05): Means having with the different letters in same column differed significantly			

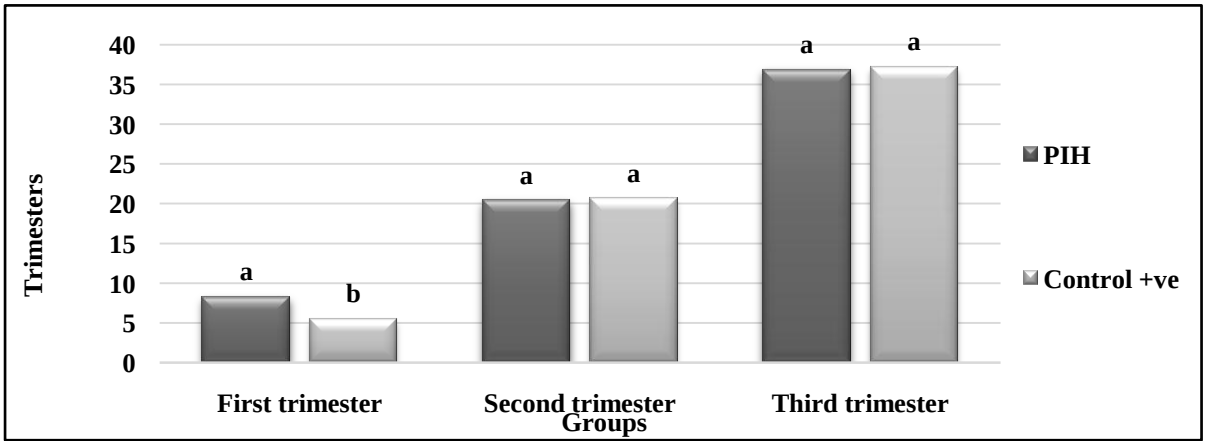

Fig. 2 Compare between difference groups gestational age.

Many different previous studies have been reported that there was no significant variances in gestational age between many groups in compared with PIH [9].

3.3 Human Chorionic gonadotropin hormone determination

The obtained result also showed that maternal serum level of β-hCG in PIH women was significantly higher ($P<0.05$), (9601.43 ± 78.71 miu/ml) than positive and negative control groups (4344.50 ± 423.93 miu/ml and 8.83 ± 4.64 miu/ml respectively), (Table 3 and Figure 3).

Table3. Compare between difference groups in β-hCG

Group	Mean ± SE of β-hCG (miu/ml)
PIH	9601.43 ± 78.71 a
Control +ve	4344.50 ± 423.93 b
Control -ve	8.83 ± 4.64 c
LSD value	578.49 **
P-value	0.0001
**** (P<0.01). Means having with the different letters in same column differed significantly.**	

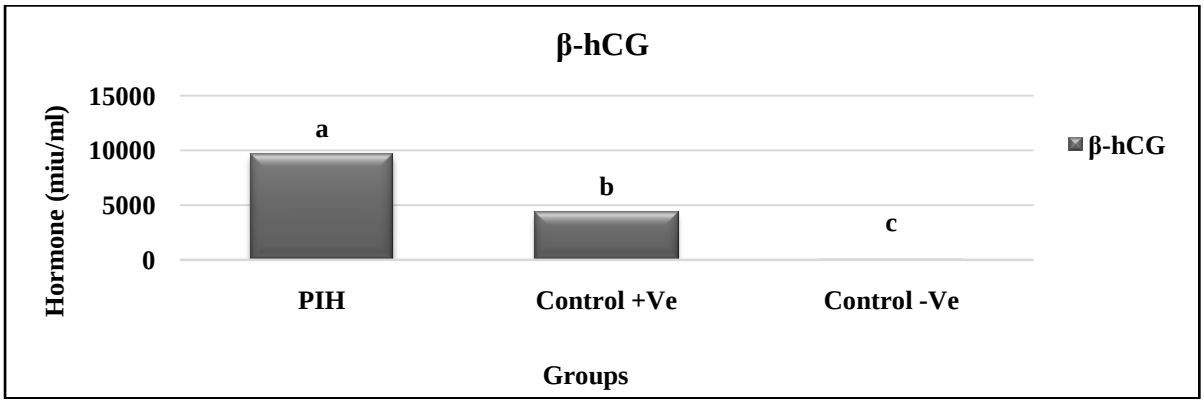

Fig.3 Compare between difference groups in β-hCG hormone

Many studies also have been demonstrated that maternal serum concentrations of beta human chorionic gonadotropin (β-hCG) were significantly greater in the PIH women [10-12]. Although the regulation mechanism of gestational hCG remains largely unknown, it is mostly established that syncytiotrophoblas is secreted β-hCG. Also, β-hCG production has been shown to increase when normal placental villi in organ culture were maintained under hypoxic condition [13].

It is well recognized that hCG can act straight on arterial vascular tension and on trophoblast function including syncytiotrophoblast differentiation and secretion and spiral arteries invasion and transformation [14] . Increasing of hCG secretion is supposed to reflect early endothelial dysfunction and/or placental damage [15]. Using hCG as an indicator of cytotrophoblast differentiation, this results are reliable with the results of Gurbuz, which showed that serum levels of hCG increase according to the severity of preeclampsia [16].

IV. Conclusion

Serial estimation of serum β-hCG can be important to use as a marker of disease and also can be used in better early management of established cases that lead to preeclampsia and eclampsia.

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