



## TO RULE OUT THE RISK OF DEVELOPING PIH WITH HIGH SERUM B-HCG LEVELS IN EARLY PREGNANCY

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### ABSTRACT

Aim Of This Study Is To Test The Hypothesis That Women With High Serum B-Hcg Levels In Early Pregnancy Are At Higher Risk Of Developing PIH (4). In This Study The Serum B-Hcg Is Measured In 13th-20th Weeks Of Gestation Of All Pregnant Mothers By Quantitative Determination Of Human Chorionic Gonadotropin (B-Hcg) By Electro-Chemiluminescence Immunoassay. As Level Of Serum B-Hcg Declines After 16th Weeks A Raised Level Can Assess Its Correlation With Pre-Eclampsia

### KEYWORDS

Serum B-hcg Levels, Early Pregnancy, Maternal Hypertensive Disorders

### Article History

Received

08/02/2018

Accepted

27/04/2018

Published

05/06/2018

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### INTRODUCTION-

Pregnancy Induced Hypertension (PIH) Is A Unique Disease Seen Only In Pregnancy Affecting 5-10 % Of All Pregnant Women<sup>1</sup>. World Health Organization (WHO) Systemically Reviews Maternal Mortality Worldwide And Data Are As High As 16% Of Maternal Deaths Were Reported Due To Maternal Hypertensive Disorders. There Are Four Types Of Hypertensive Disease Of Pregnancy (According To American College Of Obstetrics And Gynecology 2013)<sup>(1)(2)(3)</sup>

1. Gestational Hypertension: De Novo Onset Of Pregnancy For The First Time After Mid Pregnancy I.E. After 20wks, Of >140 Mm Of Hg Systolic And > 90 Mm Of Hg Diastolic Without Preeclampsia Syndrome, Hypertension Resolve By 12<sup>th</sup> Week Postpartum<sup>(1)</sup>
2. Preeclampsia And Eclampsia Syndrome
3. Chronic Hypertension Of Any Etiology
4. Preeclampsia Superimposed On Chronic Hypertension

Preeclampsia - Preeclampsia Is Defined As New Onset Hypertension  $\geq 140/90$  Mm Hg After 20 Weeks Of Pregnancy With Proteinuria  $\geq 300$  Mg/24 Hours Or  $\geq 1+$  Dipstick. It Is A Pregnancy Specific Syndrome That Can Affect Virtually All Organ Of The Body.<sup>(1)(9)</sup>

Etiopathogenesis Though Not Very Clear, In Preeclampsia Incomplete Trophoblastic Invasion (Up To Decidua) Leads To High Resistance Low Flow Utero - Placental Circulation (Ischemia).B-Hcg Is A Glycoprotein, Almost Solely Produced By Syncytiotrophoblast Of The Placenta, Detected In Maternal Plasma 7-9 Days After Mid-Cycle Surge And Peaks 100,000 Miu/Ml Between 60th And 80th Days After Menses. At 10-12 Wks Plasma Level Begins To Decline, And Nadir Is Reached Approximately By 16wks. Plasma Level Maintains At This Level Throughout The Pregnancy.

Aim Of This Study Is To Test The Hypothesis That Women With High Serum B-Hcg Levels In Early Pregnancy Are At Higher Risk Of Developing PIH<sup>(4)</sup>. In This Study The Serum B-Hcg Is Measured In 13th-20th Weeks Of Gestation Of All Pregnant Mothers By Quantitative Determination Of Human Chorionic Gonadotropin (B-Hcg) By Electro-Chemiluminescence Immunoassay. As Level Of Serum B-Hcg Declines After 16th Weeks A Raised Level Can Assess Its Correlation With Pre-Eclampsia<sup>(5)(15)</sup>.

### RESULTS-

#### Table 1. Incidence Of Preeclampsia In The Study Population

		Number(200)	Percentage
Preeclampsia	Developed Yes	16	8%
Preeclampsia	Developed No	184	92%

**Table 2. Frequency distribution of Age in study population:**

Age(in years)	<18	18-20	21-25	26-30	>30
Frequency	3	50	86	48	13
Percentage	1.5	25	43	24	6.5

**Table 3. Comparison Of Age With Development Of Preeclampsia:**

Age ( in years)	Developed preeclampsia		p Value	Significance
	No	Yes		
	Mean $\pm$ Std.	Mean $\pm$ Std.		
	Deviation	Deviation		
23.69 $\pm$ 4.03	22.81 $\pm$ 3.31	0.399	Not Significant	

**Table 4. Frequency Distribution Of Gravida In Study Population**

Gravida	1	2	3	4	5
Frequency	121	65	12	1	1
Percentage	60.5	32.5	6	0.5	0.5

**Table 5. Comparison of gravida with development of preeclampsia:**

	Developed preeclampsia		Total	p Value	Significance
	No	Yes			
Gravida	1	112(60.87)	9(56.25)	121(60.5)	0.010
	2	61(33.15)	4(25)	65(32.5)	
	3	10(5.43)	2(12.5)	12(6)	
	4	0(0)	1(6.25)	1(0.5)	
	5	1(0.54)	0(0)	1(0.5)	
Total	184(100)	16(100)	200(100)		

**Table 6. Frequency distribution of preeclampsia according to MOM value**

	MOM msBhCG(IU/mL) (13-20 weeks)		Total	p Value	Significance
	<2	$\geq 2$			
Developed preeclampsia	No	178(97.27)	6(35.29)	184(92)	<0.001
	Yes	5(2.73)	11(64.71)	16(8)	
	Total	183(100)	17(100)	200(100)	

**Table 7. Comparison of MOM value of MS  $\beta$ -hCG with development of preeclampsia**

	Developed preeclampsia		Total	p Value	Significance
	No	Yes			
MOM M S $\beta$ -hCG	<2	178(96.74)	5(31.25)	183(91.5)	<0.001
	2-2.9	6(3.26)	7(43.75)	13(6.5)	
	Total	184(100)	17(100)	200(100)	

(IU/mL) (13-20 3- weeks)	3- 3.9	0(0)	3(18.75)	3(1.5)		
	>=4	0(0)	1(6.25)	1(0.5)		
Total		184(100)	16(100)	200(100)		

## RESULTS-

Study Shows Incidence Of Preeclampsia In The Population Which Is 8%. Most Patients Were Aged 21-25 Years (43%). Majority Of Cases Were Of Primigravida (60.5%), And 2nd, 3rd, 4th And 5th Gravidas Were 32.5%, 6%, 0.5% And 0.5% Respectively. Preeclampsia Developed 56.25% In Primigravida (N=121), 25%, 12.5%, 6.25% And 0% In 2nd (N=65), 3rd (N=12), 4th (N=1) And 5th (N=1) Gravidas Respectively. Among The 17 Cases Whose MOM B-Hcg Was >2, 11 Developed Preeclampsia, 5 Cases Among 183 Developed Preeclampsia Yet Their MOM B-Hcg Level Was Normal. 1 Patient Had MOM Value >=4 And Developed Preeclampsia. 3 Cases Had MOM 3-3.9 And All Developed Preeclampsia. Out Of 13 Cases Having MOM 2-2.9, 7 Developed Preeclampsia. 183 Cases Had MOM <2 And Only 5 Developed Preeclampsia.

## DISCUSSION-

The Overall Aim Of This study find Whether B-Hcg Is A Possible Predictor Of Preeclampsia. This Study Was Conducted In 200 Pregnant Women Attending OPD In Dept. Of Obstetrics And Gynaecology, Medical College, Kolkata, Over A Period Of 12 Months During The Year 2014-2015, From 1st April To 31st March. This Was A Blind Prospective Observational Study. The Cases Were Randomly Allocated. vAntenatal Women With Gestational Age Between 13-20 Weeks With Singleton Pregnancy Were Included In The Study. Dating Was Based On The Last Menstrual Period Or An Early Sonogram. All Patients Were Enrolled In 1st Trimester Of Pregnancy. Patients With Chronic Hypertension, Twin Pregnancy, Molar Pregnancy, Chromosomally Abnormal Foetus, Diabetes, Chronic Renal Disease, Autoimmune Disorders, Thrombophilias, Family History Of Diabetes Mellitus, Hypertension, Cardiovascular Diseases And History Of Pre-Eclampsia Or Eclampsia Were Excluded From The Study. After Taking Detailed History, General And Obstetrical Examination Was Done With Informed Consent Forms. Routine Investigations, Liver Function Tests, Kidney Function Tests And Determination Of Serum B-Hcg Was Done. Based On All Routine Examination, Symptoms And Signs, Study Is Carried Out In All 200 Mothers To See How Many Mothers Develop Preeclampsia. All These Patients Were Followed Up Till Delivery For The Development Of Preeclampsia (Defined As Bp  $\geq$ 140/90 Mm Hg And Urine Dipstick Protein  $\geq$ 1+). Maternal Serum B-Hcg Was Done Between 13 And 20 Weeks Of Gestation According To Mothers Visit In Early 2nd Trimester (Between 13-20 Weeks). The Level Of B-Hcg Is Then Divided By The Median Concentration Of B-Hcg For The Given Week Of Pregnancy To Generate A Multiple Of The Median Value (Mom). B-Hcg Levels Is Considered Raised If The Levels Will Be >2mom. Then Patients Were Evaluated For Development Of Preeclampsia, Its Severity Among Themselves, Maternal And Foetal Outcome. The Relationship Has Been Established Between The Raised B-Hcg And Development Of Preeclampsia Along With Various Maternal And Foetal Outcome. In The Study, As Shown In Table No.6 Mom Value >=2 Of B-Hcg (13-20 weeks) Was Found In 17(8.5%) Mothers Out Of 200. 11 (5.5%) Out Of 17 Mothers Having Mom Value >=2 Developed Preeclampsia (Sbp  $\geq$ 140, Dbp  $\geq$ 90, Dipstick  $\geq$ 1+), With P Value <0.001, And Found Significant. Out Of 183 Patients Not Preceded preeclampsia By Raised Mom Value (<2) 5 (2.5%) Patients Developed Patients Having Higher Mom Value Had Increased Severity Of Preeclampsia. One Patient Had Mom Value >4, And 3 Had Mom (3-3.9). All The 4 Patients Had Preeclampsia While Out Of 13 Having Mom (2-2.9), 7 Developed Preeclampsia. 1 Patient Having Mom >4 Had Severe Preeclampsia (Bp  $\geq$ 160/110mmhg Of Hg, Dipstick 2+). 3 Patients Having Mom Value >3 Also Had Higher Blood Pressure And More Dipstick Values. Increasing Blood Pressure Association Was Found With Higher Mom Values For All Weeks Of Pregnancy After 20 Weeks With P <0.001. A Study Was Conducted In Department Of Obstetrics And Gynecology, SMS Medical College, Jaipur From July 2008 To August 2009 On 200 Pregnant, Normotensive, Nonproteinuric Women Selected Randomly Between The Gestational Age 13-20 Weeks Attending The ANC Clinics. Out Of 200 Cases, 178 (89 %) Were Finally Evaluated. Of Whom 22 (12.36 %) Cases Developed PIH. B-Hcg Levels Were Considered Raised If The Levels

Were >2mom. 20 (83.33 %) Out Of 24 Cases With B-Hcg Levels >2mom Developed PIH Against 2 (1.2%) Cases Out Of 154 Having B-Hcg Levels  $\leq$ 2 Mom (P Value <0.001). Also, Higher Levels Of B-Hcg Are Associated With Increased Severity Of PIH (P Value <0.01). The Sensitivity Was 90.91 %, Specificity Was 97.44 % And Positive Predictive Value Was 83.33 %<sup>(8)</sup>. The Association Of Mom Of B-Hcg With Preeclampsia Was Also Found Significant By Desai And Rao. In This Study By Desai And Rao, 62 Cases Out Of 90 (68.9 %) With Values Of B-Hcg > 2MOM Developed PIH Against 21 Cases Out Of 130 (16.15 %), Having A B-Hcg Value < 2 MOM. The Difference Was Statistically Significant (P Value <0.001)<sup>(7)</sup>.

## CONCLUSION-

In this study, 16 cases (8%) had developed preeclampsia. 17 cases had raised  $\beta$ -hCG. 58.8% of patients having  $\beta$ -hCG >2 MOM at early 2nd trimester, later developed preeclampsia. Thus, association of  $\beta$ -hCG with preeclampsia is established and early 2nd trimester  $\beta$ -hCG values can be taken as predictive indicator of preeclampsia.

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