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TO PREDICT PIH BY STUDYING MIDTRIMESTER SERUM BETA HCG AND ALFA FETOPROTEIN AND ITS ROLE IN FETO-MATERNAL OUTCOME

KEYWORDS: maternal serum beta HCG, maternal serum AFP, PIH.

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ABSTRACT

Background: PIH is the most common cause of feto-maternal morbidity and mortality worldwide. The objective of this study was to determine the predictive value of mid-trimester serum beta-HCG and Alfa fetoprotein in PIH and its Fetomaternal outcome.

Method: A total 200 women, fulfilling the inclusion and exclusion criteria between 12- 24 week of gestation were enrolled, whose serum beta HCG and alfa fetoprotein values were determined by radioimmunoessay at enrollment and their multiple of medians were calculated, values≥2MoM were considered raised. They werefollowed till delivery for the PIH development andwere categorized into PIH and normotensive group and fetomaternal outcomes were measured in respective groups.

Results: Out of 200 patients taken, 14 had spontaneous abortion, only 178 were followed for outcome measurement. Of 178 patients, 31(17.5%) developed PIH and 147(82.5%)remained normotensive. In PIH group mean value of serum beta HCG and S.AFP was 68472.29 ± 15018.87 and 119.36 ± 36.88 respectively whereas in normotensives it was27728.61 ± 5689.66 and 40.26 ± 11.09 respectively.29(93.5%) out of 31 PIH patients had beta HCG ≥2MoM whereas Only 3(2%) out of 147 normotensive patients had beta HCG value ≥2MoM making sensitivity and specificity of ≥2MoM beta HCG in PIH prediction is 93.5% and 97.96% respectively. Similarly,26(83.9%) out of 31 PIH patients have S.AFP ≥2MoM whereas Only 3(2%) of normotensive patients have S.AFP value ≥2MoM making sensitivity and specificity of ≥2MoM S.AFP in PIH predictionis 83.8% and 97.9% respectively. Maternal complication abruption (9.6%), preterm labor (22.5%), post-partumhemorrhage (22.58%),oligohydramnios (22.5%), derangedDoppler (9.68%) were higher in PIH group.Still birth (3.23%) and IUD (6.45%), IUGR (25%), were higher in PIH group.

Conclusion: Our study concludes that if second trimester serum beta HCG and serum AFP values were ≥2MoM, it was associated with development of PIH and poor fetomaternal outcome.

INTRODUCTION

"An ounce of prevention is worth a pound of cure."

In developing nation, like India, Pregnancy Induced Hypertension (PIH) rank second only to anemia with approximately 7-10% of all pregnancies being complicated by some form of hypertensive disease. PIH complicates approximately 6% of pregnancies globally with national incidence of 15.2% and is the most important cause of maternal and neonatal morbidity and mortality

In spite of improvement in maternal and neonatal care, pregnancy induced hypertension and its sequale are a dreaded complication of pregnancy. It is indeed a constant endeavor of obstetrician to identify the risk involved in pregnancy and its possible prediction. If prediction becomes possible, prevention can be done well in time. Several tests have been proposed but none has been accepted due to their low predictive value. There is a constant search for better markers to predict the disease in time and stop the progression and severity of disease so as to prevent complications.

Beta HCG is secreted by placenta after implantation and its value can be measured in maternal serum throughout the pregnancy. Similarly AFP is a glycoprotein produced by the fetal liver and gastrointestinal tract which crosses the placenta in small amount and can be measured in the maternal serum.Abnormal placentation is one of the initial event in PIH,and it is hypothesized that during mid-trimester, immunological changes occur in the trophoblast, result in secretory response, which is seen as the rise in these markers.

AFP and beta HCG are found to increase prior to the development of the disease since the placental changes began to occur before the clinical manifestation starts.Hence, these markers can help in prediction of disease before its commencement so that complications could be prevented.

OBJECTIVES

To study the association of mid trimester serum beta HCG and AFP levels in development of PIH and its role in fetomaternal outcome in PIH and normotensive group.

MATERIALS AND METHODS

This prospective study was conducted in the department of Obstetrics and Gynecology at Kasturba Hospital, after ethical clearance from the institutional ethical committee. Total 200 Primigravida / multigravida women attending antenatal clinic with singleton pregnancies with a period of gestation between 12- 24 week (as detected by last menstrual period or early scan available) who has yet not developed PIH,were enrolled in our study after taking written informed consent.

After estimating the values of serum beta HCG and serum AFP.Values greater than 2 MoM were considered as high values. The study subjects were followed throughout pregnancy for development of PIH. Study group was then categorized into two categories; PIH group and normotensive group. Then their feto-maternal outcomes were measured.

STATISTICAL DATA EVALUATION

Statistical evaluation was done by using SPSS (Statistical package of the social sciences). Qualitative variables were expressed as numbers & percentages, while quantitative variables were expressed as means. p value less than 0.05 was considered as significant.

RESULTS

Out of 200 patients taken, 14 had spontaneous abortion, 8 of them had missed abortion before 20 weeks of gestation and hence only 178 could be followed for outcome measurement. Out of 178 patients who were followed, 31 developed PIH and 147 of them were remained normotensive

TABLE 1: Distribution ofcases according to maternal serum beta HCG and AFP values in MoM:

Multiple of median (MoM)		Group		P value
		Normotensive(n=147)	PIH(n=31)	
Beta HCG	<2	144 (97.96%)	2 (6.45%)	**<.0005**

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	>2	3 (2.04%)	29 (93.55%)	
AFP	<2	144 (97.96%	5 (16.13%)	**<.0005**
	>2	3 (2.04%)	26 (83.87%)	

TABLE 2: Comparison of beta HCG values and AFP values in PIH and normotensive group.

	PIH group	**Normotensive group**	**P value**
serum Beta HCG (IU/ml)	68472.29 ± 15018.87	27728.61 ± 5689.66	<.0005
Serum.AFP (ng/ml)	119.36 ± 36.88	40.26 ± 11.09	<.0005

mean +SD

TABLE 3: Relationship of beta HCG(IU/ml) values according to normotensive and hypertensive status

		Group		**P value**
		Normotensive(n=147)	PIH(n=31)	
S.BETA HCG	<30000	128 (87.07%)	0 (0.00%)	**<.0005**
	30001-40000	14 (9.52%)	2 (6.45%)	
	40001-50000	2 (1.36%)	0 (0.00%)	
	50001-60000	2 (1.36%)	8 (25.81%)	
	60001-70000	0 (0.00%)	7 (22.58%)	
	70001-80000	1 (0.68%)	7 (22.58%)	
	80001-90000	0 (0.00%)	6 (19.35%)	
	90001-100000	0 (0.00%)	1 (3.23%)	

TABLE 4: Relationship of S.AFP (ng/ml) values according to normotensive and hypertensive status

		Group		**P value**
		Normotensive(n=147)	**PIH(n=31)**	
S.AFP	1) <100	144 (97.96%)	5 (16.13%)	<.0005
	2) 100-120	3 (2.04%)	7 (22.58%)	
	3) 120-140	0 (0.00%)	8 (25.81%)	
	4) 140-160	0 (0.00%)	11 (35.48%)	

TABLE 5: Maternal complications

	Group		**P value**
	Normotensive(n=147)	PIH(n=31)	
ABRUPTION	1 (0.68%)	3 (9.67%)	<.005
HELLP	0 (0.00%)	1 (3.23%)	0.174
DER COAG	0 (0.00%)	3 (9.68%)	0.005
DIC	0 (0.00%)	1 (3.23%)	0.174
ECLAMPSIA	0 (0.00%)	2 (6.45%)	0.030
PULM EDEMA/EMBOLISM	0 (0.00%)	0 (0.00%)	-
ARF	0 (0.00%)	0(0.0%)	-
PRETERM LABOUR	5 (3.40%)	7 (22.58%)	0.0001
OLIGURIA	0 (0.00%)	1 (3.23%)	0.174
DEATH	0 (0.00%)	0 (0%)	-
DERANGED DOPPLER	2 (1.36%)	3 (9.68%)	0.038
OLIGOHYDRAMNIOS	5 (3.40%)	7 (22.58%)	0.0001
PPH	14 (9.52%)	7 (22.58%)	0.0001

TABLE 6: Mode of delivery

		Group		**Total**	**P value**
		Normotensive(n=147)	PIH(n=31)		
MODE OF DELIVERY (V/F/C.S)	Forceps	4 (2.72%)	2 (6.45%)	6 (3.37%)	0.0002
	LSCS	27 (18.37%)	16 (51.61%)	43 (24.16%)	
	Vaginal	116 (78.91%)	13 (41.94%)	129 (72.47%)	

TABLE 7: Fetal outcomes:

Fetal complications	**PIH group (n=147)**	**Normotensive group(n=31)**	**P value**
IUD	2 (6.45%)	1 (0.68%)	0.007
IUGR	8(25.8%)	6 (4.08%)	0.0001
Preterm birth	20 (64.52%)	7 (4.76%)	<.0005
Term birth	11 (35.48%)	140 (95.24%)	<.0005
APGAR at 1 min	6.54 ± 1.32	7.75 ± 0.73	<.0005
APGAR at 5 min	7.04 ± 1.43	8.43 ± 0.68	<.0005

OBSERVATION

Patients with serum beta HCG and AFP value ≥2MoM found to develop PIH .29 (93.5%)out of 31 PIH patients had beta HCG values ≥2MoM whereas only 2(6.5%) have beta HCG values <2MoM, similarly 26(83.8%) of PIH patients had serum AFP value ≥2MoM and only 5(16.2%) have values <2MoM (table 1)

PIH group has higher mean values for both serum beta HCG and AFP as compared to normotensive group with p value <0.0005(table 2).Majority of the PIH patients had beta HCG values >50,000 whereas most of normotensives (87.07%) had beta HCG values less than 30,000(table 3). Similarly,98% of normotensives had serum AFP values ≤100 ng/ml whereas in normotensives these values are higher going up to 160ng/dl (table 4).

PIH group has higher occurrence of maternal complication as compared to normotensive group. PIH has higher occurrence of following:abruption (9.6%), preterm labor (22.5%), post-partumhemorrhage (22.58%),oligohydramnios (22.5%), derangedDoppler (9.68%) (table 5).

Table 6 shows 51.6% of PIH patients had LSCS as compared to only 18.3% in normotensive group.78.9% had normal vaginal delivery in normotensive group as compared to 41.9% in PIH group, which is statistically significant=0.0002

Fetal outcomes summarized in table 7 shows significant difference in APGAR score and rate of preterm birth, IUGR and IUD between the PIH and normotensive group.

DISCUSSION

Pregnancy Induced Hypertension (PIH) is an obstetric disorder that affects 6–8% of pregnancies worldwide. PIH has high morbidity and mortality rates.The pathogenesis of Preeclampsia (PE) remains unknown, and many theories related to the etiology of PE pose great challenges. To date, there is no effective treatment for PIH and its complications. Therefore, a reliable predictor for PIH would play an important role in early prevention and intervention and also to predict the severity of disease for rational gestational management.

In our study there is an association between raised serum beta HCG(≥2MoM) and subsequent development of PIH. Kabucku et al (1998)[1] and Yaron et al[2], also found that the women with beta HCG levels greater than 2 MoM are more prone to develop PIH. Most researchers indicated that an unexplained elevation of serum hCG significantly correlated with the occurrence of PIH[3-5].

We also found significant association between high maternal serum AFP and PIH. In many studies unusually high AFP values have been associated with pre-eclampsia and or gestational hypertension[6] .Räty et al[7] also found the AFP values in the severe pre-eclampsia group differed significantly from all other groups.

Our study shows Beta HCG value≥2MoM for prediction of PIH has sensitivity of 93.55% and specificity of 97.96% with positive predictive value 92.46% and negative predictive value of 98.27 %. And Serum AFP value≥2MoM for prediction of PIH has sensitivity of 83.87% and specificity of 97.96% with positive predictive value of 89.66% and negative predictive value of 96.64%. when both were combined sensitivity of the test for PIH prediction was 83.87% and specificity of 97.96%.

CONCLUSION

The present study confirmed the higher value of second trimester maternal serum AFP andbetaHCG levels as predictors of PIH and poor fetomaternal outcome.We have evaluated both the serum

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markers and compared their specific values as predictors of outcome. Giventhe significant increase in the risk of adverse pregnancy outcomes associated with abnormal serum marker levels, the clinician should be alerted and steps taken to diagnose some of these complications (e.g. preeclampsia, eclampsia, intrauterine growth restriction) as early as possible, because this may prevent some of the associated morbidity and mortality.

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DECLARATION
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REFRENCES

1. Kabukcu A, LutfuOnderoglu S, Laheli Y. Women with elevated second trimester human chorionic gonadotropin level are at increased risk for preeclampsia. Turk J Med Sci. 1998; 28:273–276.
2. Yaron Y, Cherry M, Kramer RL et al. Second-trimester maternal serum marker screening: maternal serum alphafetoprotein, beta-human chorionic gonadotropin, estriol, and their various combinations as predictors of pregnancy outcome. Am J ObstetGynecol1999; 181:968-74.
3. Luckas M, Hawe J, Meekins J, Neilson J, Walkinshaw S. Second trimester serum free beta human chorionic gonadotrophin levels as a predictor of pre-eclampsia. ActaObstetGynecolScand 1998;77(4):381-4.
4. Benn PA, Horne D, Briganti S, Rodis JF, Clive JM. Elevated second-trimester maternal serum hCG alone or in combination with elevated alpha-fetoprotein. ObstetGynecol 1996;87(2):217-22.
5. Ashour AM, Lieberman ES, Haug LE, Repke JT. The value of elevated second-trimester beta-human chorionic gonadotropin in predicting development of preeclampsia. Am J ObstetGynecol 1997;176(2):438-42
6. Wenstrom KD, Owen J, Davis RO, Brumfield CG. Prognostic significance of unexplained elevated amniotic fluid alpha-fetoprotein. ObstetGynecol 1996;87(2):213-6.
7. Räty R, Koskinen P, Alanen A, Irjala K, Matinlauri I, Ekblad U. Prediction of pre-eclampsia with maternal mid-trimester total renin, inhibin A, AFP and free betahCG levels. PrenatDiagn 1999;19(2):122-7.