HUMAN PLACENTAL LACTOGEN IN HYPERTENSIVE DISORDERS OF PREGNANCY

by

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For the last many years, the Obstetricians have been searching for reliable methods of identifying high-risk pregnancies by assessing placental functions. One such method recently tried is estimation of human placental lactogen, synthesised by syncytiotrophoblast, by radioimmunoassay in the maternal serum.

Teoh *et al* (1971) observed that the HPL level less than 4 ug/ml at term indicated gross placental insufficiency and carried a poor foetal prognosis. The reliability of serum HPL level as an indicator of placental function is enhanced by its short half life of 20 minutes, and also because its autonomous production is not altered by stress, postural change, maternal metabolism and endocrine changes.

The present study of estimating serum HPL was undertaken to assess its value in cases of P.E.T., eclampsia and hypertension in pregnancy.

Material and Observations

Fifty-two normal pregnancies were studied and 91 estimations in hypertensive disorders were carried out.

The total of 91 estimations on P.E.T. cases were as follows:

1.	Mild P.E.T.	64
2.	Severe P.E.T.	22
3.	Eclampsia	2
4.	Essential hypertension	3
	Total	191

Fifty-two normal pregnancies were studied at different periods of gestation as follows:

28 weeks	2 cases
32 weeks	6 cases
33 weeks	2 cases
34 weeks	7 cases
35 weeks	1 case
36 weeks	9 cases
37 weeks	5 cases
38 weeks	8 cases
39 weeks	5 cases
40 weeks	7 cases
	52 cases

Fig. I shows the normal HPL values at different periods of gestation after 28 weeks of pregnancy.

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MILD P.E.T.

Weeks of gestation	No. of cases	Mean HPL value	Mode of delivery	Average birth weight	Placental weight	Remarks
31-32 wks.	9	3.13 ug/ml Normal level 4.1 ug/ml	All induced at 38 weeks. One had L.S.C.S. for foetal distress.	2.8 kg	390 gms.	
33-34 wks.	11	9 cases— 3.23 ug/ml 2 cases— 3.05 ug/ml Normal level 4.8 ug/ml	All induced at 38 weeks. Two had L.S.C.S. for foetal distress. Two cases with IUGR had HPL level of 3.10 ug/ml and 3.00 ug/ml. Both induced at 38 weeks.	9 cases— 2.7 kg. 2 cases— 2.4 & 2.3 kg.	360 gms. 360 gms. & 310 gms.	Cases associated with IUGR had lower levels of HPL. Foetal weight was also low.
35-36 wks.	15	4.35 ug/ml. Normal level 6.5 ug/ml.	Induction at 38 weeks and one had L.S.C.S. for foetal distress.	2.4 kg.	350 gms.	Case of Caesarean section for foetal distress showed HPL value of 3.38 ug/ml.
37-38 wks.	20	5.1 ug/ml Normal level 7 ug/ml.	All induced at 38 weeks gestation. One L.S.C.S. for foetal distress. Baby died 2 days later. Birth weight 2.4 Kg. and placenta 340 gms. HPL level 4.9 ug/ml. Foetal death occurred in one case two days prior to planned induction. HPL level was 3.4 ug/ml. Another patient with gross placental insufficiency showed HPL of 2.3 ug/ml. Baby weight 2.2 kg. and placental weight 320 gms.	2.5 kg.	360 gms.	Placental insufficiency and foetal distress were associated with lower HPL and low birth weights.
39 weeks	3	4.79 ug/ml	Vaginal delivery	2.8 kg.	460 gms.	
40 weeks	6	6.0 ug/ml Normal range 7.5 ug/ml.	Vaginal delivery	2.7 kg.	390 gms.	

Severe P.E.T.

Weeks of gestation	No. of cases	Mean HPL value	Mode of delivery	Birth weight	Placental weight	Remarks
26 wks.	1	1.08 ug/ml Normal 2.2 ug/ml. Repeat HPL at 34 wks. was 3.28 ug/ml Normal 4.8 ug/ml.	Induction at 36 weeks. B.P. 190/140. Albuminuria 1+	1.8 kg.	300 gms.	
30 wks.	1	2.2 ug/ml	Induction at 37 weeks	3.4 kg.	450 gms.	
31 wks.	1	0.92 ug/ml	Stillborn baby delivered at 33 weeks	1.2 kg.	200 gms.	
32 wks.	4	2.0 ug/ml Normal 4.1 ug/ml	Induction at 38 weeks	2.1 kg.	330 gms.	
33-34 wks.	4	2.4 ug/ml	Three induced at 38 weeks. One with B.P. 200/140 + Albuminuria was induced at 36 weeks. Baby weighed 1.5 kg. and placenta weighed 200 gms. HPL level was 2.10 ug/ml.	2.5 kg.	350 gms.	
36 wks.	8	5 ug/ml Normal 6.5 ug/ml	Seven induced at 38 weeks. One woman induced at 36 weeks. Baby weighed 2.1 kg. died 24 hours later. Placenta weighed 260 gms.	2.5 kg.	350 gms.	
38 wks.	3	5.2 ug/ml Normal 7 ug/ml	Induced at 38 weeks	2.3 kg.	300 gms.	
		Essential Hypertension				
32 wks.	1	2.2 ug/ml	Induced at 38 weeks	3 kg.	420 gms.	
35 wks.	1	4 ug/ml	Induced at 38 weeks	2.7 kg.	390 gms.	
37 wks.	1	4.9 ug/ml.	Induced at 38 weeks	2.5 kg.	340 gms.	

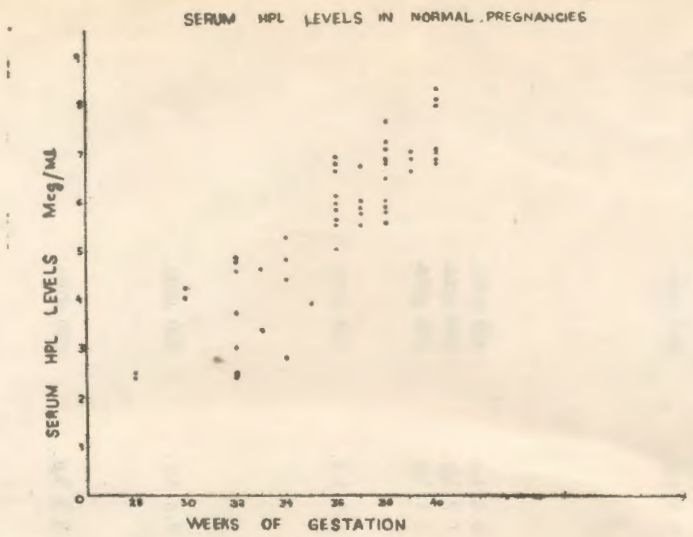

Fig. 1

Eclampsia

Two cases of eclampsia were studied. One patient showed HPL of 3.35 ug/ml at 34 weeks gestation. She delivered a stillborn baby 6 hours after admission. Baby weighed 2.0 kg and placenta 230 gms. Second patient had aclampsia at 32 weeks. Caesarean section was done for uncontrolled fits and failed induction. Stillborn baby weighed 1.2 kg and placenta 200 gms. HPL was 2.1 ug/ml (Normal 4.1 ug/ml).

Discussion

Hypertensive disorders in pregnancy are often associated with structural and functional changes in the placenta. This can affect the HPL secretion by the syncytiotrophoblast. The degree of placental insufficiency can thus be estimated and induction at appropriate time can save the baby.

Mild P.E.T.—Of the 64 cases, 54 showed low serum HPL levels (84.3%). The low HPL values with corresponding low birth and placental weights were statistically significant. Our findings tallied with that of Spellacy (1970), Teoh *et al* (1971); Genazzani *et al* (1971) who too observed low HPL level in P.E.T. Bhatia *et al* (1979), Verma (1970) and Seppala (1970) failed to find a satisfactory correlation between HPL level and foetal outcome.

Cohen *et al* (1973) observed levels as low as 1/3 the normal if P.E.T. was complicated by intrauterine death. In the present series, 6 of the 7 cases with foetal distress showed low HPL levels. One patient with IUD showed HLP level of only 3.4 ug/ml at 38 weeks, though the stillborn baby weighed 2.6 kg and placenta weighed 350 gms.

Five of the 6 cases of P.E.T. complicated by placental insufficiency demonstrated low HPL levels.

It was thus possible to anticipate a threat to the foetal well being if HPL level was low. Crosignani *et al* (1974) suggested

that HPL level less than 4 ug/ml at term indicated impending foetal danger.

Severe P.E.T.—The serum HPL level was low in all cases of severe P.E.T., and the level was lower if P.E.T. was associated with placental insufficiency and still lower if intrauterine death occurred. Fig. 2 Zukerman *et al* (1972) too reported

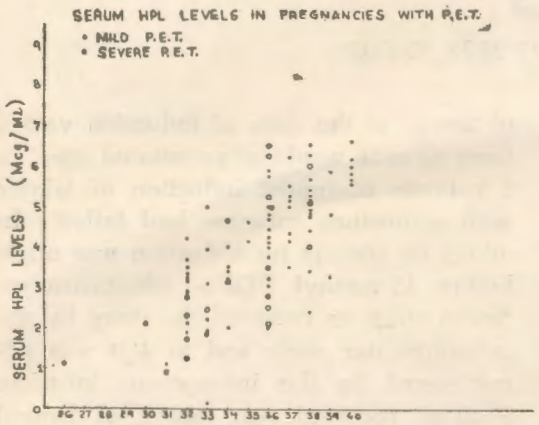

Fig. 2

similar observations. Letchworth and Chard (1972) observed lower levels in mild P.E.T. than severe P.E.T., findings contrary to our own. Kundu *et al* (1978) and Lindberg and Nilson (1973) found a good correlation between low HPL values and foetal as well as placental weight.

Similar to the report by Spellacy *et al* (1966) and Teoh *et al* (1971) both the cases of eclampsia showed very low HPL levels.

All 3 cases of essential hypertension were under medical care, and therefore the HPL levels, the foetal and placental weights were within the normal limits.

Summary

1. Low HPL levels were observed in cases of P.E.T. The levels were lower in severe P.E.T. than in mild P.E.T. Similarly, lower levels were seen in cases of P.E.T. associated with placental insufficiency and intrauterine death.

2. HPL study is useless in eclampsia, as the urgent temination of pregnancy is indicated.

3. Serial estimation may be of greater value in monitoring placental function, and foetal growth.

Serum HPL estimation is a valuable armamentarium in reducing perinatal mortality in P.E.T. in modern obstetrics.

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