HUMAN PLACENTAL LACTOGEN IN NORMAL PREGNANCY

by

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Human placental lactogen (HPL) is secreted by syncytiotrophoblast of the placental epithelium (Sciarra *et al*, 1963). It is observed during pregnancy and progressively rises with the duration of gestation (Beck *et al*, 1965; Samman *et al*, 1969), HPL estimation is considered as a good index of placental function (Saxena *et al*, 1968) and a rapid fall in HPL level indicates placental ischemia, anoxia or necrosis (Selenkow 1963). In India Rastogi and Sinha (1976) and Raghvan *et al* (1977) reported levels of HPL during normal pregnancy using reagents obtained from U.S.A. The values reported by various workers show wide variability. Saxena *et al* (1968) attributed the variation to antigen, potency and dilution of antibody and to some extent the technic used. Genazzani *et al*, 1971 believe that the differences may be due to standard Preparations used.

HPL estimation kit is now freely available from Radiopharmaceutical section. Bhabha Atomic Research Center, Trombay, Bombay, and with its availability it is the kit which will be used in India and hence it is necessary to have base line values of H.P.L. in different periods of pregnancy using this kit.

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Material and Methods

Sixty patients from antenatal clinic of the Zenana Hospital at various periods of pregnancy were studied. Venous blood sample was collected from anticubital vein in a dry autoclaved syringe. It was stored in a refrigerator and test was performed within few hours. Only those women who definitely knew the date of their last menstrual period were included in the study. Women with bad obstetric history, abnormal pregnancy or associated medical diseases were not included.

The serum samples were diluted before testing depending on the period of pregnancy as follows:

Duration of pregnancy	*Dilution*
30—70 days	—
71—90 days	1:20
91—180 days	1:50
181—to term	1:100

Serum HPL levels were measured by a preincubated double antibody radioimmunoassay employing I^{125} labelled HPL and dextran charcoal Separation of bound and unbound hormone. The assay employed detection of HPL by the ability of the hormone to compete with I^{125} labelled HPL for antibody binding sites. Labelled material bound to antibody is

seperated by adsorbing on charcoal. The rates of antibody bound HPL to free I^{125} HPL reveals the concentration of unlabelled HPL in the sample under assay. This is done by comparison with the amount of HPL standard necessary to cause equivalent decline in the bound to free I^{125} HPL ratio. This is possible by preparing a standard curve. The details of the technic are provided along with the kit. The counting was done in well type of ECIL scintillogram. The whole procedure takes 4-5 hours.

Observations

The standard curve obtained is shown in Fig. 1. Sixty pregnant women were studied. They were studied in 8 groups according to the gestational period. The first group was 9-12 weeks pregnancy and last was 36-40 weeks pregnancy. The mean HPL at 9-12 weeks of gestation period was 253 ± 132 mg/ml. At 36-40 weeks it reached to 6680.0 ± 1541 ng/ml. The values at different periods of gestation are shown in Fig. 2 and Table I.

In 14 cases relationship between serum HPL level and placental and foetal birth weight was studied. The serum HPL level was detected at term within 10 days of the expected date of delivery. The findings are shown in Table II.

Statistical analysis shows statistically significant correlation between placental weight and serum HPL ($r = 042$ and $P < 0.20$).

TABLE I

Mean H.P.L. Level with S.D. in Normal Pregnancy at Different Gestational Age

Gestation age in weeks	No. of pt.	HPL Level mean in ng/ml	HPL in ng/ml	S.D.
1. 9 — 12 weeks	5	253.3	0.25	± 131.9
2. 13 — 16 weeks	4	1397.5	1.4	± 506.7
3. 17 — 20 weeks	4	2292.0	2.3	± 238.8
4. 21 — 24 weeks	5	2198.0	2.2	± 254.3
5. 25 — 28 weeks	9	4092.2	4.1	± 548.8
6. 29 — 32 weeks	12	5108.3	5.1	±1155.6
7. 33 — 36 weeks	11	6290.9	6.3	± 806.5
8. 37 — 40 weeks	10	6680.0	6.7	±1540.9

TABLE II

Relationship Between HPL Level and Placental and Foetal Weight

No. of cases	Serum HPL ng/ml mean ± (SD)	Placental weight gms. mean ± SD	Correlation coefficient or value	P value
14	6248 ± 1391	414 ± 43	0.9	<0.01
No. of cases	**Serum HPL level ng/ml mean ± SD**	**Foetal weight Kg mean ± SD**	**Correlation coefficient or value**	**P value**
14	6248 ± 1391	283 ± 0.23	0.42	<0.02

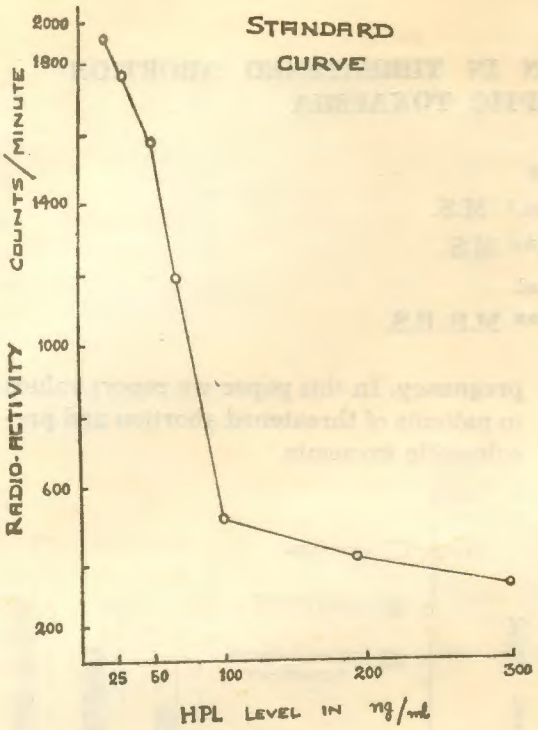

Fig. 1

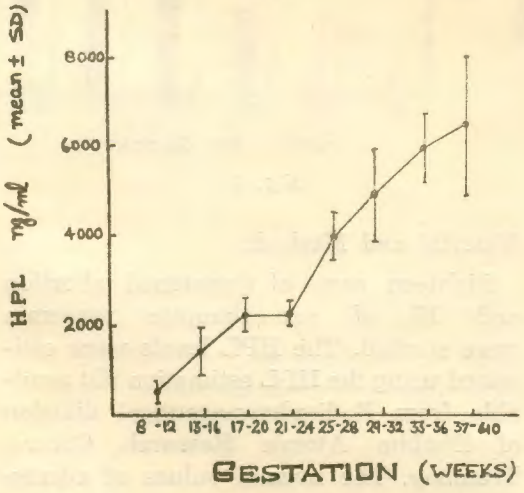

Fig. 2

Discussion

The general pattern of rise of HPL with duration of pregnancy and correlation between placental weight, foetal weight and serum HPL level at term is well established but the absolute values differ from author to author ranging from 3.9-25 ng/ml. These differences are thought to be due to the different standard preparations used (Genazzani *et al*, 1971). In India Raghvan *et al* (1977) found HPL level at term to be 9796 ± 950 ng/ml and Rastogi *et al* (1976) found it to be 4066 ± 860 ng/ml. Both these authors used imported standards and reagents. The present paper reports values in normal subjects as studied by HPL Kit available in India itself, and these standards are of greater value of reference baseline for future studies in India where this locally made Kit will be available freely and will be used often.

Summary

HPL values have been estimated by a kit of estimation locally available in this country. Normal beseline values of HPL in various periods of pregnancy are worked out.

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