

SERIAL PLASMA LEVELS OF OESTRIOL AND HPL IN HIGH RISK PREGNANCIES

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INTRODUCTION

The biosynthesis and metabolism of hormones are some of the most important functions of the foeto-placental unit.

Since changes of plasma levels of some hormones are expression of functional states of foeto-placental unit, it's possible to control high risk pregnancies by endocrine monitoring.

Oestriol and human placental lactogen (HPL) are most indicative hormones.

HPL is produced by syncytiotrophoblast. Its P.M. is ranging from 19,000 to 30,000.

Human placental lactogen levels are indicative of placenta or trophoblast's function during first weeks of pregnancy.

At present oestriol's dosage is the elective test for monitoring the foetal well-being.

Total plasma oestriol comprehends non conjugated E_3 and conjugated E_3 .

Dehydroepiandrosterone - sulphate (DHAS) is main precursory of foetus and of mother supplied to placenta to synthesis of oestrogens.

The synthesis of DHA by foetal suprarenal glands and high levels of 16- α -hydroxylase in the foetal liver permit great production of 16- α -hydroxydehydroepiandrosterone-sulphate. For that purpose oestriol's synthesis is higher than estrone's and 17- β -oestradiol's synthesis.

In this work we have studied plasma HPL and oestriol level changes in high risk pregnancies.

MATERIAL AND METHODS

We have studied 37 high risk pregnancies.

The pathology of pregnant women comprehends hypertensive disorders, diabetes mellitus, bad obstetric history, intrauterine growth retardation.

Table 1 reports pathology of pregnant women divided in groups.

Hypertension was considered severe when the sistolic blood pressure was 140 mmHg or more with or without proteinuria.

All the diabetic patients were insulin-dependent.

SUMMARY

Authors have studied plasma human placental lactogen (HPL) and oestriol levels in 37 pregnant women affected by severe hypertensive disorders, diabetes mellitus, bad obstetric history, intrauterine growth retardation.

They point out validity of associated and seriated dosages of these hormones because they are expression of foetus wellbeing and of placental function to survey high risk pregnancies.

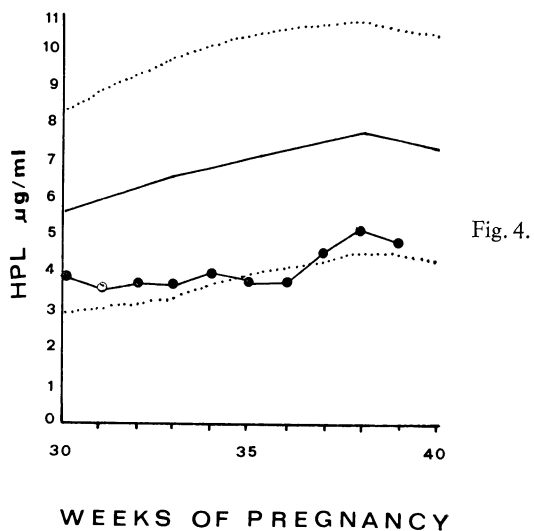
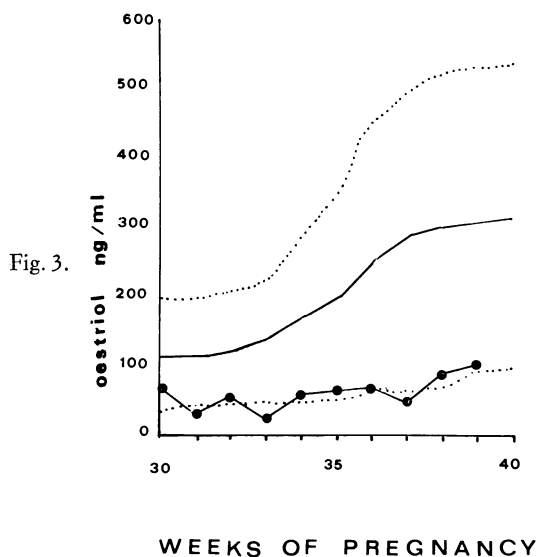
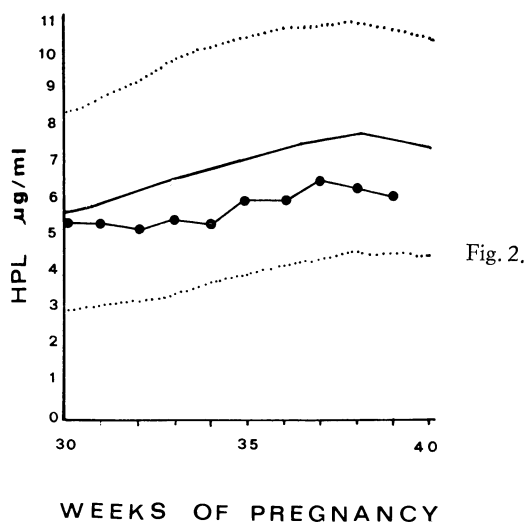
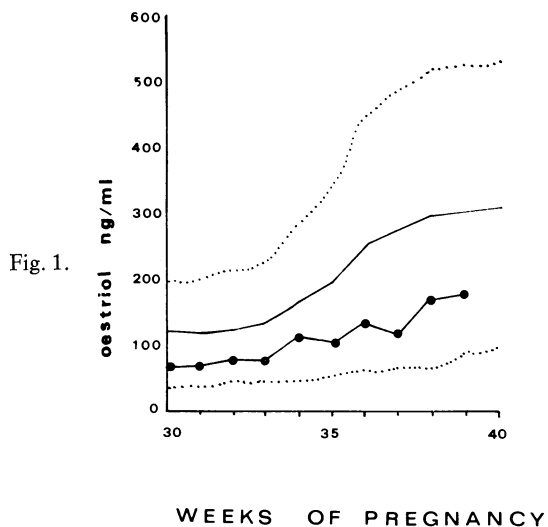
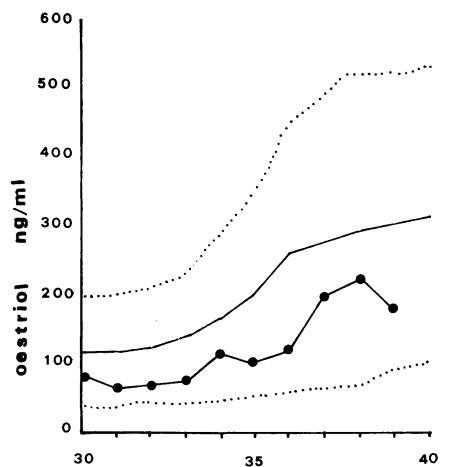


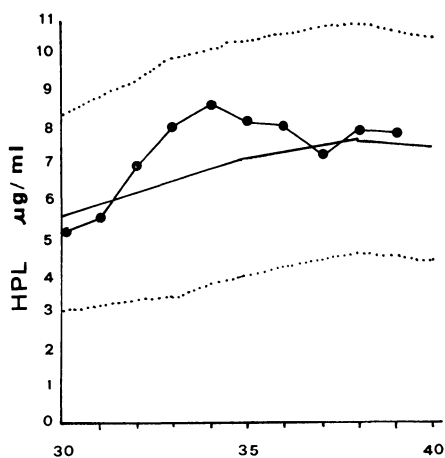
Fig. 1: Plasma oestriol levels in pregnancies with hypertensive disorders and with normal babies. — Fig. 2: Plasma HPL levels in pregnancies with hypertensive disorders and with normal babies. — Fig. 3: Plasma oestriol levels in pregnancies with hypertensive disorders and with dismature babies. — Fig. 4: Plasma HPL levels in pregnancies with hypertensive disorders and with dismature babies.

Fig. 5.



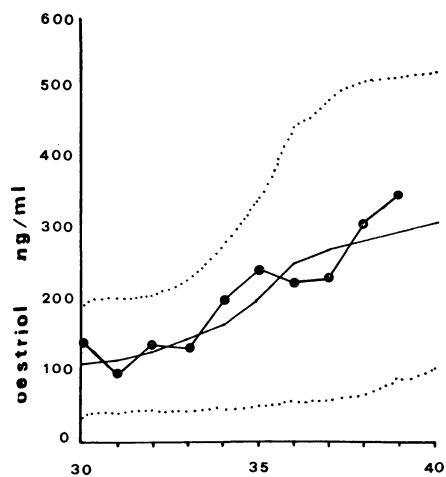
WEEKS OF PREGNANCY

Fig. 6.



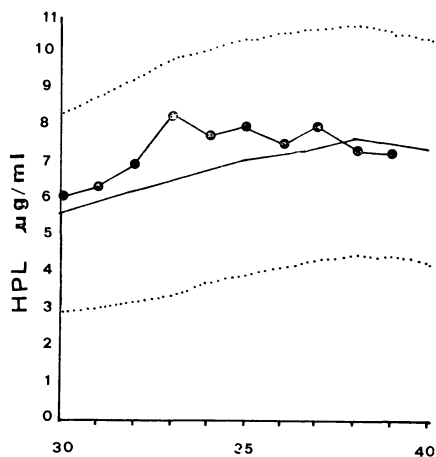
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Fig. 7.



WEEKS OF PREGNANCY

Fig. 8.



WEEKS OF PREGNANCY

Fig. 5: Plasma oestriol levels in pregnancies with diabetes mellitus. — Fig. 6: Plasma HPL levels in pregnancies with diabetes mellitus. — Fig. 7: Plasma oestriol levels in pregnancies with bad obstetric history. — Fig. 8: Plasma HPL levels in pregnancies with bad obstetric history.

Table 1.

Clinical groups	No. of patients
Severe hypertensive disorders of pregnancy	10
Diabetes mellitus	8
Bad obstetric history	9
Intrauterine growth retardation . .	10

The diagnosis of intrauterine growth retardation had been made by repeated ultrasonographic investigation.

Serial blood samples were done at 8 a.m.

Plasma total oestriol and placental lactogen values were measured weekly between 30 weeks gestation and delivery.

The mean plasma total E_3 and HPL of the pregnant women were compared to the corresponding mean values of normal pregnant patients.

The hormonal determinations were assayed in duplicate by rapid radioimmunoassay (RIA), using the standard Kits of the Radiochemical Centre, Amsterdam.

RESULTS

Hypertensive disorders of pregnancy.

There were 10 patients with severe hypertensive disorders of pregnancy.

The first group consisted of 7 cases where foetal growth appeared to have been insignificantly affected. The babies weights were normal and they were not dismature.

The mean plasma oestriol (fig. 1) and HPL (fig. 2) values were low but still within one standard deviation of the normal.

The second group consisted of 3 cases where the babies were dismature. The mean plasma oestriol (fig. 3) and HPL (fig. 4) levels were below 1 S.D. of normal.

Diabetes mellitus.

The mean plasma oestriol levels (fig. 5) of these 8 patients were low but within 1 S.D. of normal.

The mean plasma HPL levels (fig. 6) were normal.

Bad obstetric history.

9 patients were monitored. They have normal present pregnancy with spontaneous deliveries with babies not dismature

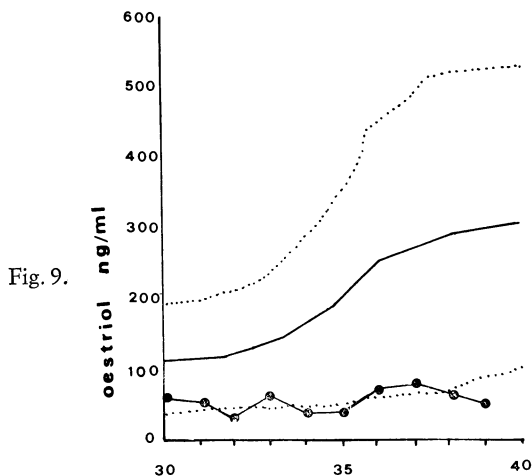


Fig. 9.

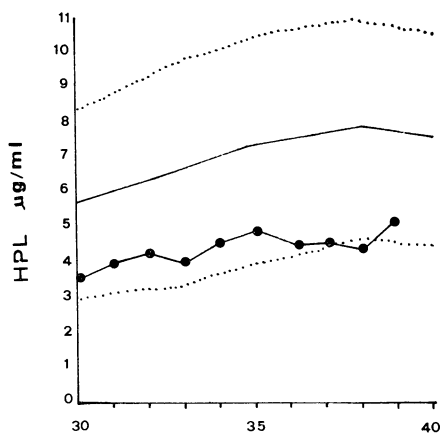


Fig. 10

WEEKS OF PREGNANCY

WEEKS OF PREGNANCY

Fig. 9: Plasma oestriol levels in pregnancies with intrauterine growth retardation. — Fig. 10: Plasma HPL levels in pregnancies with intrauterine growth retardation.

and with normal birthweight.

Previous pregnancies of these patients were affected by cesarean section, EPH gestosis, stillborn or intrauterine foetal death.

The mean plasma oestriol (fig. 7) and HPL (fig. 8) values were normal.

Intrauterine growth retardation.

The mean plasma oestriol (fig. 9) and HPL (fig. 10) values were low.

DISCUSSION

Serial plasma levels of oestriol and HPL are important for foetal wellbeing surveillance in pregnant women affected by hypertension associated to intrauterine growth retardation survejed by repeated ultrasonographic investigation.

The present study confirms previous reports of Lindburg and Nilsson⁽³⁾, Masson^(4,5), Spellacy⁽⁷⁾ in similar pathological situations. These Authors have always found that low or falling levels of plasma oestriol and HPL precede the foetal intrauterine death in pregnant women affected by severe hypertension or eclampsia.

We found normal levels of plasma oestriol and HPL in pregnant women that referred pathology in previous pregnancies. Present pregnancies have been normal with spontaneous deliveries. The babies were not dismature and had a normal birthweight. Therefore, levels of these hormones reflected good course and outcome of pregnancies.

We found normal levels of plasma HPL in diabetic pregnant women; plasma levels of oestriol were lower to normal range.

Our data are in accordance with the findings of Lindburg⁽³⁾, Masson^(4,5), Genazzani⁽¹⁾, Spellacy⁽⁷⁾, Spona and Janisch⁽⁸⁾.

It must be pointed out that oestriol's behaviour doesn't reflect the foetal wellbeing in pregnant women affected by severe diabetes mellitus. In fact elevated values of plasma oestriol may reflect a large foeto-placental unit by inadequate metabolic control.

Plasma oestriol level changes are registered "day to day" and compared to normal changes.

Plasma HPL levels are registered change to change daily and compared to normal daily changes.

In the last weeks of pregnancy normal levels of plasma oestriol increase progressively. It's important that this increase results in the seriated hormonal dosages.

Klopper⁽²⁾ reports that constant levels of plasma hormones are indicative of abnormal synthesis of oestriol.

"Day to day" changes in the same subject are most important clinical data. In normal pregnancy "day to day" changes of plasma total oestriol are ranging from 13 and 14%⁽⁶⁾.

True circadian rhythm of HPL has not been found^(3,7,9). But these Workers have found marcatated fluctuations during 24 hours in normal pregnant women. They have also found fluctuations in consecutive seriated dosages during period smaller than 24 hours.

In conclusion, the present investigation confirms the importance of associated and seriated dosages of plasma oestriol and HPL for monitoring high risk pregnancies.

The plasma serial levels of these hormones reflect the foetal wellbeing and placental function.

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