ASSESSMENT OF ESTROGEN AS A CONTROL OF FETOPLACENTAL FUNCTION TEST IN PATIENTS WITH BAD OBSTETRIC HISTORY

by

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In 1927, Smith and Achheim, Zondek and Smith in 1928 demonstrated that during pregnancy, there is a rise in the urinary estrogen excretion and the subsequent disappearance of the same, in detectable amounts takes place after delivery. Stewart in 1951 showed that estrogens are produced in syncytium layer of placenta. In 1956, Diczfaculy and Lindkvist stated that estrogens are secreted and are metabolised by fetus and have identified estriol-3-sulfate in fetal meconium. Hence estrogen assessment is not of placental function but may be called as fetoplacental function. The estrogen levels found by Brown (1956) during the menstrual cycle in which pregnancy occurred were very similar to those found during the preceding cycle upto the middle to luteal phase, after which it continues to rise slowly. The estrogen levels begin to rise rapidly at about 7th week after last menstrual cycle and thereafter follow a smooth curve which flattens somewhat towards the end of pregnancy. Venning (1948) thought that this change in estrogen levels after 7 weeks might be due to changeover from corpus luteum to placenta as major producer of estrogen. Cummings *et al* (1969) have suggested that estrogen/creatinine ratio may be assessment of fetoplacental function. Klopper and Biilewicz (1963), Frandsen and Stakemann (1961), Coyle and Brown (1963) and Behlin (1963) found that quantitatively important is estriol and it amounts to 90% of estrogen found in pregnancy.

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Material and Method

In the present study, total estrogens were estimated in normal pregnant and diabetic pregnant women. The number of normal subjects were 105. Fifteen subjects in gestational period from 12 weeks to full term. These subjects had normal glucose tolerance test and had normal creatinine clearance.

In diabetic group, serial studies were performed. There were 8 subjects at 12 weeks gestation, 6 were added at 16th week gestation. Eleven more subjects were included at 20th week of gestation. All these diabetic subjects had bad obstetric history, such as habitual abortions,

premature still birth and full term still birth. The antidiabetic treatment was administered according to severity of diabetes and patients with constitutional tolerance of the drug. Oral antidiabetic therapy was administered for mild diabetic, Lente insulin for mild and moderate and plain insulin for severe diabetic with occasional check up with fasting and post-lunch blood sugar levels. These subjects also had normal creatinine clearance.

(1) Total estrogens were estimated by method of Cohen (1966).

(2) Creatinine clearance from Microanalysis in Medical Biochemistry, 5th Ed., p. 241. I. D. P. Wooten.

Results

TABLE I

Total Estrogens (mg/24 hrs.) in Pregnancy

Gestation	Normal (± S.D.)	Diabetes (± S.D.)
12 weeks	0.95 ± 0.106	0.85 ± 0.19
16 weeks	2.56 ± 0.641	1.22 ± 0.26
20 weeks	5.65 ± 0.797	2.69 ± 0.80
24 weeks	10.04 ± 3.15	4.62 ± 0.90
28 weeks	13.42 ± 1.25	8.77 ± 1.60
32 weeks	16.10 ± 4.05	12.98 ± 3.08
Full term	23.40 ± 4.69	18.62 ± 2.67

The differences between groups are not significant.

TABLE III

Creatinine Clearance (ml/min)

Gestation	Normal pregnancy	Diabetic pregnancy
12 weeks	77.45	76.02
16 weeks	83.30	76.27
20 weeks	85.63	77.16
24 weeks	89.64	82.68
28 weeks	89.39	89.02
32 weeks	93.76	88.52
Full term	93.12	90.52

Discussion

The 'p' values between normal pregnant group and diabetic pregnant are insignificant and therefore denote that diabetes in diabetic group of pregnancies was successfully controlled. From Table I it appears that total estrogen continued to rise till full term pregnancy period in both the groups. However, differences between the two groups were insignificant. Even in Table II Lente insulin or plan insulin treated diabetes, the difference between normal group of pregnancy and in diabetic group of pregnancies are insignificant. Table III shows that both these groups had normal creatinine clearance. The results obtained in the present study of normal pregnant women are lower than estrol levels obtained by (Banerjea, 1962; Wray *et al*, 1963; Green *et al*, 1963; Klopper, 1963), because total estrogen

TABLE II

Total Estrogen Levels in Diabetic Pregnant Patients on Various Drugs (mg/24 hours)

Gestation	Oral (phenformin HCl) antidiabetic drug	Lente insulin	Plain insulin
12 weeks	0.95	1.00	0.60
16 weeks	2.56	1.25	1.00
20 weeks	5.65	2.17	3.27
24 weeks	10.04	3.90	5.27
28 weeks	13.42	9.17	9.80
32 weeks	16.10	19.00	13.32
Full term	23.40	13.32	18.17

estimation was done by Cohen (1966) method and total estrogen contains 90% estriol and also belonging to low socio-economic class where the possibility of beta nutritional deficiency occurs.

The slow rise in estrogen in diabetic pregnancy from 16 weeks to 24 weeks may be attributed to the retarded rate of conversion of H.C.G. to estrogen in syncytial tissue of placenta due to inhibitory effect of the disease. Hence the production is less upto 20 weeks of gestation in diabetes. However, estrogen rise has been noted without any complications in diabetic pregnancy, and no hazards were noted to foetus. Thus, in conclusion, we could say that antidiabetic drug could be effective in controlling pregnancy and this could be achieved by assessment of foeto-placental function test.

Summary

During pregnancy, diabetes was controlled by antidiabetic therapy. Assessment towards the control of the progress of pregnancy within the normal limits, was carried out by serial determination of urinary estrogen (24 hours) and creatinine clearance in both normal gravidas and diabetic gravidas. The differences between the two are statistically insignificant, hence the control over diabetic gravida was effective.

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