

EXCRETION OF URINARY ESTRIOL IN HIGH RISK PREGNANCIES

by

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Introduction

There has been a growing interest in the use of urinary estriol determinations as a useful laboratory aid in the clinical management of high risk pregnancies since the initial reports of Frandsen and Stakeman (1960) and others (Greene and Touchstone, 1963; Beischner, 1967).

The close correlation between fetal welfare and 24 hour urinary estriol levels has been established and confirmed by many investigators. (Stephen and Ronald, 1968; William and Luthar, 1970 and Donald, 1973). A rising or high estriol level assures the safety of the fetus in the uterus. A low stationary or falling value of estriol may indicate fetal jeopardy.

This procedure was initially carried out in 200 cases during different weeks of normal gestation to establish the normal values and their range in Indian women.

In the present study, results of single or serial estriol assays in high risk pregnancies is evaluated in relation to their ultimate outcome.

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In many cases, only single assay was carried out and no follow-up was available. In those cases the values are assessed as low or normal in relation to the weeks of gestation and to the clinical symptoms.

Material and Methods

During the past 3 years, 350, 24 hours' urinary estriol determinations were carried out in 244 women with different obstetric complications as shown in Table I.

TABLE I
Clinical Conditions in Studied Cases

Clinical Condition	No. of cases	Urine Samples
Toxemias	37	64
B.O.H.	120	160
I.U.G.R.S. (Placental insufficiency)	31	50
Hydramnios and Multiple pregnancy	14	26
Vesicular mole	4	5
Threatened abortion	27	33
Post-date pregnancy	11	12
Total	244	350

Urinary estriol was carried out by Frandsen's procedure (1963). Creatinine value between 0.8-1.3 gm/24 hours was interpreted as indicative of a complete 24 hours' collection.

Results and Comments

The normal estriol excretion curve

shows a steady rise until about 28-30 weeks and thereafter a more pronounced increase takes place.

nios showed higher than normal values in 19.2 per cent samples, normal levels in 15.4 per cent samples and low to very

TABLE II
Estriol Levels in Different Clinical Conditions During Late Pregnancy

Clinical Condition	No. of Urine Samples	Estriol Values/24 Hours		
		Normal	Low <Mean- 2 S.E.	Very Low <Mean-3 S.E.
Toxaemia mild or moderate	36	55.6%	44.4%	0
Toxaemia severe	28	0	10.4%	89.6%
I.U.G.R.S. (Placental insufficiency)	50	0	38.0%	62.0%
Post-date pregnancy	12	41.7%	58.3%	0
B.O.H.	76	97.0%	3.0%	0
Hydramnios and multiple pregnancy	26	19.2%	30.7%	34.7%
		15.4%		

Table II shows the estriol levels in different clinical conditions during late pregnancy when active clinical intervention could be justified.

In the toxemia group, it was found that low or very low levels were associated with the severe variety, whereas in the mild to moderate type 55.6 per cent of samples showed normal values. In the IUGR syndrome or in cases of placental insufficiency, all the samples showed low to very low values. In the group of post-date pregnancies 41.7 per cent showed normal values and 58.3 per cent showed low values. Most of the patients who had had obstetric history showed normal values and only 3 per cent fell in the low group. Increased size of the uterus as noted in multiple pregnancy or hydram-

low values in the remaining 65.4 per cent samples.

Table III shows estriol levels in various clinical conditions during early pregnancy which are interesting from an academic point, but where the clinician cannot really do much. Patients with B.O.H. are likely to come under active antenatal surveillance and the estriol values in most cases, i.e., 95.7 per cent were normal.

In cases of bleeding during early second trimester of pregnancy 85.5 per cent of the samples showed low to very low values.

There were 5 cases of vesicular mole and all of them showed very low levels as expected since in such cases, the estriol is derived from maternal precursors only.

TABLE III
Estriol Levels in Different Clinical Conditions During Early Pregnancy

Clinical Condition	No. of Urine Samples	Estriol Values/24 Hours		
		Normal	Low Mean-2 S.E.	Very Low Mean-3 S.E.
B.O.H.	84	95.7%	4.3%	0
Threatened abortion	33	14.5%	40.0%	45.5%
Vesicular mole	5	—	—	100%

TABLE IV
Relation of Estriol Values to Pregnancy Outcome

Estriol Value	Total No. of Cases (150)	Premature Delivery	S.B.	Small Fetus	Abortion	F.T.N.D.
Low	26	5	-	5	9	7 (27.0%)
Very Low	50	-	13	20	17 (4 V. Mole)	-
Normal	71	-	-	-	-	71 (100%)
High	3	-	-	-	-	3 (100%) (Multiple Pregnancy)

Table IV is of practical importance since it shows the relation of estriol values to pregnancy outcome. It shows that normal estriol values were associated in all cases with normal F.T.N.D.

Higher than normal values were noted in 3 cases and all the 3 of them had multiple pregnancies. Low estriol values were associated with prematurity, low weight fetus or abortion. Only seven cases, i.e., 27 per cent had normal fetal outcome.

Very low levels of estriol were associated with still birth, small weight babies and abortion out of which 4 were vesicular mole. None of these cases had normal term babies.

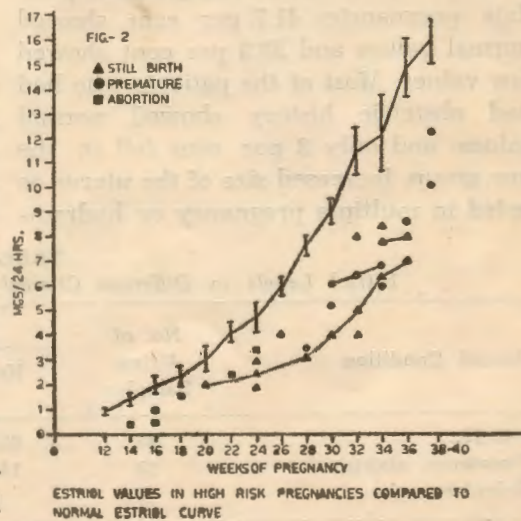
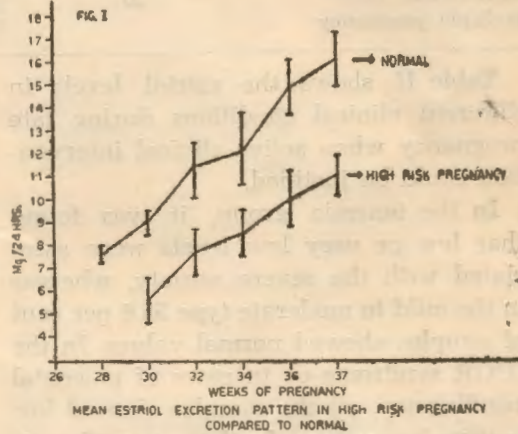
Figure 1 shows normal estriol excretion pattern as compared to the mean values obtained in our group of high risk pregnancies obtained during different weeks of pregnancy. It graphically demonstrates that the mean values in the latter group were much lower than found in normal pregnancy.

Figure 2 gives a graphic representation of high fetal risk associated with low estriol values.

Discussion

The results of this study clearly emphasize the useful role of urinary estriol

estimations in high risk pregnancies, especially during late pregnancy where



the fetus is of sufficient maturity to justify clinical intervention.

Low estriol values or falling estriol values in serial assays denote failing fetoplacental unit and may indicate the need for interruption of pregnancy prior to intrauterine fetal death. The laboratory values thus may serve as a useful guide in addition to the clinical picture in the management of the patient.

Normal estriol values or rising estriol values even in the lower range of normality were associated with normal outcome. However, frequent or serial determinations of urinary estriol are necessary to adequately evaluate a complicated pregnancy.

In cases of early complicated pregnancy during the second trimester or before 30-32nd week, normal estriol values or rising values assure current and future well-being of the fetus. Thus that fetus may be allowed to gain additional maturity thereby avoiding potential complications of prematurity.

Thus estriol assays are useful in predicting intrauterine fetal well-being and can serve as a source of positive assurance to the clinician in the management of high risk pregnancies.

Summary

Determination of urinary estriol assays are considered a useful test of fetoplacental function. In this study urinary estriol value in high risk pregnancies (Threatened abortion, B.O.H., Toxemias,

Vesicular mole, Intra-uterine growth retardation syndrome, Hydramnios, Multiple Pregnancy, Post-date pregnancy) are evaluated in relation to the final outcome in 244 cases. The results emphasize the usefulness of this estimation especially during late pregnancy where low or falling values correlated very well with failing fetoplacental unit. This assay could thus serve as a useful guide in the clinical management of such patients.

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