

URINARY OESTRIOL EXCRETION IN NORMAL PREGNANCIES

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SUMMARY

Serial weekly urinary oestriol excretion was done in 80 normal pregnancies in the last trimester of pregnancy.

Oestriol excretion was found to be rising in an exponential fashion until the thirty third week of pregnancy after which an abrupt rise was seen upto term. A wide variation was seen at any one gestation period but oestriol values never fell below 12 mg./24 hours in the last 4 weeks of gestation. Low values or rapidly falling values denoted fetal jeopardy.

The birthweight of the newborn showed a direct relationship with final Oestriol values but Apgar score showed no such relationship.

Introduction

The exciting and at times alarming aspect of obstetrics is that the element of surprise remains. We do not know when an infant will be born alive and vigorous and yet small for dates showing signs of Intrauterine malnutrition, or born fresh dead but well nourished and apparently normal in appearance.

Urinary Oestriol levels provide a good prognostic indicator of fetal well being and have been used to monitor fetoplacental functions in the last trimester of pregnancy. Urinary Oestriol is derived from the fetoplacental unit, maternal ovary and maternal liver. After the first sixty days of

pregnancy the placenta becomes the major source of Oestrogen. Excretion in urine is the major pathway for the elimination of this hormone. The excretion is progressive and increases from 0.1 mg per 24 hours in the first trimester to levels of 20-50 mg per 24 hours as term approaches.

The present study is concerned with serial measurements of Oestriol levels in the second half of pregnancy in normal pregnancies with a view of diagnosing any associated placental insufficiency and to establish the correlation if any between the Oestriol values and the birthweight of the new born.

Material and Method

A total of 80 normal pregnancies with no known risk factor were selected. The

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study included all patients irrespective of age, parity, socio-economic status and literacy status in the last trimester of pregnancy. Serial weekly estimations of 24 hour urinary Oestriol was done in these patients by the method of Bachman and Pettit. During delivery the evidence of fetal distress was sought by clinical methods and after delivery the birthweight of the new born was recorded.

Observations and Results

There was no correlation of Oestriol values with the age group, parity, socio-economic status and literacy status.

Oestriol excretion in normal pregnancies

A total of 80 normal pregnancies were studied in this series. The cases were grouped according to the period of pregnancy without any consideration to age and parity of the patients. Table I illustrates the normal Oestriol values that have been established by the present study. Oestriol excretion increases steadily during the last trimester of pregnancy from

13.9 gms per 24 hours at 24-29 weeks gestation to 26.5 mg per 24 hours at 38-41 weeks of gestation. Oestriol levels were found to be increasing in an exponential fashion until the thirty third week of pregnancy after which an abrupt rise was seen upto term. A wide variation was seen at any one gestation period but Oestriol values never fell below 12 mg/24 hours in the last 4 weeks of gestation.

Mode of Delivery and Apgar Score

The Mode of delivery and Apgar Score in these 80 pregnancies is shown in Table II. As shown in Table II, in the first group (Oestriol <13 mg/24 hours) there were 4 spontaneous deliveries and 2 caesarean sections for fetal distress. The mean Apgar Score was 8.5. In the second group (Oestriol 13-15 mg/24 hours) there were no Caesarean sections. All patients delivered normally. Mean Apgar Score were 8.25. In the third group (Oestriol >15 mg/24 hours) there were 40 normal deliveries and 8 caesarean sections (6 elective and 2 for fetal distress). The mean Apgar score was 9. As shown by the above figures most of

TABLE - I
OESTRIOL EXCRETION IN NORMAL PREGNANCIES

Weeks of Gestation	Range Mg/ 24 hours	No. of cases	Mean Oestriol level mg/24 hours
24-29	8-22	20	13.9
30-33	12-22	16	16.75
34-37	15-30	20	22.25
38-41	12-32	24	26.5

TABLE - II
MODE OF DELIVERY AND APGAR SCORE IN NORMAL PREGNANCIES

Final Oestriol values	Spontaneous labour	Induced labour	Caesarean section	Apgar score
13	4	—	2	8.5
13-15	16	10	—	8.25
> 15	30	10	8	9

the patients had spontaneous labour and delivered normally (50). The incidence of caesarean section was very low (10) and the indications were mainly elective or failed induction. Only 4 caesarean sections were done for fetal distress. These patients had shown a definite fall in oestriol values just before term. There was no relation between oestriol values and Apgar Score.

Correlation between Oestriol Excretion and Fetal Weight

There was a direct relationship between birth weight and oestriol values in normal pregnancies. These determinations were done within 1 week at delivery.

Perinatal Mortality

There was no perinatal mortality in our series of normal pregnancies.

Discussion

The use of oestriol estimation as a prognostic indicator of fetal well being is well established. Much work has been done on Oestrogen Metabolism during pregnancy. Smith and Smith (1947) found that excretion of Oestriol steadily increase during pregnancy and far exceeds the values obtained for Oestrone and Oestradiol. Previously it was thought that the mother and placenta were responsible for the increased production of Oestrogen during pregnancy. Recently it has been established that the placenta and the fetus operate as a biosynthetic unit for the significant rise of Oestriol excretion during pregnancy. Where there is fetal jeopardy or an alteration in the fetoplacental exchanges mechanism, Oestriol synthesis by the placenta is impaired and less than normal amounts of Oestriol are excreted by the mother (Bird and Reeves 1969).

The results in the present study demonstrated that oestriol excretion increases with advancing maturity. This finding correlates well with the increasing activity of the fetus and fetoplacental unit which is contributing more and more for the production of Oestriol as it grows in size in late pregnancy.

The values for urinary Oestriol excretion in the present study were higher than levels reported by Zondek et al 1959 and Taylor et al 1969. But, the values are almost the same as found by Wray and Russel 1963 and Fradsen et al 1960.

In our study Oestriol excretion was related to fetal weight. An oestriol value of 12 mg/24 hours or more has been associated with a mature infant. Such correlation has been of assistance in selecting the optimum time for repeat caesarean section or other elective caesarean sections. Such correlation between Oestriol values and birth weight of babies was also found by Greene and Touchstone 1963 and Belling 1967. However many failed to find any such relationship between Oestriol values and birth weight (Klopper and Billiwicz).

In conclusion the results of this study indicate that Oestriol excretion in urine rises in an exponential fashion until the thirty third week of pregnancy after which an abrupt rise was seen. In instance of fetal Jeopardy there was a definite fall in Oestriol values. Hence, serial determinations of urinary Oestriol excretion can help to reduce perinatal mortality in 2 ways:

1. Certain infants at or near term may be salvaged by timely delivery in the presence of low values or rapidly falling values provided that frequent de-

terminations are carried out.

- 2. Certain pregnancies in which placental insufficiency is suspected can be carried to greater maturity if daily urinary Oestriol values reveal that intrauterine fetal death will not occur.

References

- 1. *Beling, C.G.: Advances in Obstet and Gynec Vol. I Edited by Marcus S.L. and Marcus L. The Williams and Williams C. Baltimore USA P-988, 1968.*
- 2. *Bird, C.C. and Reeves, B.D.: Amer. J. Obstet Gynec. 105:552, 1969.*

- 3. *Fradsen, V.A. and Stakemenn, G.: Urinary excretion of Oestriol during Pregnancy. Danish M. Bull. 7:97, 1960.*
- 4. *Green, J.W. and Touchstone J.C.: Amer. J. Obstet Gynec. 85-1, 1963.*
- 5. *Klopper, A., Billewicz, W.Z. and Thomson, A.M.: Obstet. Gynec. Brit. Comm, 70:1024, 1963.*
- 6. *Smith, G.V. and Smith, O.W.: West J. Surg. 55:288, 1947.*
- 7. *Taylor, E.S., Bruns, P.D., Drose, V.E.: Oestriol excretion in normal and complicated pregnancies. Amer. J. Obstet. Gynec. 81:825, 1961.*
- 8. *Wray, P.M. and Russel, C.S.: J. Obstet. Gynec. Brit Cmm 704, 1963.*
- 9. *Zondek, B. and Pfifer, V.: Acta Obstet and Gynec. Scandinar. 38:742, 1959.*