THE STUDY OF AMNIOTIC FLUID URIC ACID AND CREATININE IN ASSESSING GESTATIONAL AGE IN NORMAL AND ABNORMAL PREGNANCIES

by

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Induction of labour is the appropriate treatment in abnormal pregnancies such as diabetes, pre-eclamptic toxaemia, hypertension and postmaturity. The accurate assessment of gestational age is vital before induction is undertaken. The knowledge of the biochemical changes in the amniotic fluid in these complicated pregancies is therefore essential in assessing foetal age.

The present study was undertaken to determine the amniotic fluid uric acid and creatinine levels in normal as well as abnormal pregnancies above 37 weeks of gestation. The normal values were compared with those obtained in abnormal pregnancies and any deviation in the value noted.

Material

Sixty-two pregnancies were studied. Twenty-six were normal and 36 were abnormal pregnancies.

Complicated pregnancies were
(i) Pre-eclamptic toxaemia—9 cases.
(ii) Postmaturity—18 cases.
(iii) Diabetes—4 cases.
(iv) Placental insufficiency—5 cases.

Creatinine—Creatinine was estimated by Folin-Wu method.

In normal pregnancies, the value ranged between 1.9% and 3.2 mg%, with a mean value of 2.5 mg%. With the exception of one specimen which gave a reading of 1.9 mg%, all other readings were above 2 mg% (accurate assessment in 96.15%). All the women delivered within 10 days of the study, and babies weighed between 1900 gms and 3800 gms. Four babies weighed less than 2500 gms, but creatinine level was more than 2 mg%. There was no positive correlation between the creatinine level and the birth weight.

Group I

Postmaturity—There were 3 cases with creatinine level below 2 mg%, but the babies weighed over 3000 gms. Accurate prediction of foetal age was seen in 15 cases (83.3%). A linear rise in the level with increasing weeks of gestation was not observed in this group.

Diabetes: All the 4 cases showed creatinine level over 3 mg% at and above 37 weeks gestation. The babies weighed over 3000 gms.

P.E.T.—The creatinine values were similar to those found in normal preg-

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nancies for the corresponding period of gestation. It is however pertinent to point out that these PET patients had received treatment at the time of amniocentesis.

Placental Insufficiency—The creatinine level was within the normal range for the corresponding period of gestation. Only 1 baby weighed less than 2500 gms.

Uric acid—Group I—Uric acid level varied between 6.8-13.5 mg% with a mean value of 9.0 mg%.

Twenty of the 26 normal pregnant women studied after 37 weeks of gestation showed uric acid level over 8 mg%. Considering 8 mg% as an index of foetal maturity correct assessment was obtained in only 76.92% cases.

One false negative reading of 6.8 mg% at 39 weeks also had a low creatinine level of 1.9 mg% but the baby weighed 2800 gms at birth. Four babies weighed less than 2500 gms but uric acid level was within the normal range in each of these cases. Uric acid showed no positive bearing to foetal weight.

Uric acid values were scattered and failed to show a linear rise with advancing pregnancy.

Group II

Postmaturity—One patient showed uric acid level 0.8 mg at 43 weeks but creatinine level was normal and the baby weighed over 2500 gms. There was no linear rise in the uric acid level with each week of advancing pregnancy.

Diabetes—Uric acid was more than 10 mg% in all the 4 diabetic mothers.

P.E.T.—No significant variation was observed in this group. Two cases demonstrated uric acid below 7.5 mg% at 39 weeks, but the babies weighed over 2500 gms.

Placental Insufficiency—Uric acid was within the normal range in all these cases.

Discussion

The effect of various complicated pregnancies on the amniotic biochemical readings was studied and any modification required in the maturation index could be effected.

Postmaturity—A linear rise in the biochemical readings was not observed in the present series. Therefore, these tests are of no diagnostic value in postmaturity.

Diabetes—Creatinine as well as uric acid levels were higher than the mean value for the corresponding period of gestation. It is prudent to take note of this before undertaking induction if due consequences of prematurity are to be avoided. Perhaps other parameters like L/S ratio would be more useful in diabetic pregnancies.

P.E.T.—Our findings tally with those described by Pitkin and Zwirek (1967), who observed normal readings in PET cases. Roopanarine Singh (1973) and Sinha (1975) however obtained higher values in PET cases, but the levels returned to normal once the PET was controlled. The normal values obtained in the present study may be due to the treatment our patients had received at the time of study. McAllister *et al* (1973) obtained high uric acid levels in those PET cases who received diurectics.

Placental Insufficiency—The biochemical study revealed normal values for the corresponding period of gestation. Our findings are similar to those of Sharp (1968) in identifying small for date babies as the levels had no bearing on foetal weight. Roopanarine Singh (1973) was the only author who observed a positive correlation between creatinine level and fotal weight.

Summary

The urine acid and creatinine are useful in the accurate estimation of foetal age. However, their values are limited in abnormal pregnancies, and perhaps the aid of other parameters may be helpful in assessing gestational period.

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