

BIOCHEMICAL AND CYTOLOGICAL ANALYSIS OF AMNIOTIC FLUID FOR ESTIMATING FOETAL MATURITY

By

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SUMMARY

One hundred and twenty samples of amniotic fluid were studied for their surfactant content using Clements foam test and for their orange cell count using Nile Blue sulphate test. The results were compared with gestational length and actual neonatal outcome. Foam test was found to be more useful in predicting prematurity whereas Nile Blue Sulphate test was more reliable in postdatism.

Introduction

Amniotic fluid has been increasingly submitted to biochemical and cytological scrutiny in order to establish means of assessing foetal maturity. In certain obstetric states, the intrauterine foetal environment may progressively deteriorate to a point where it may be safer to deliver the baby rather than permit the pregnancy to continue. However in such states it is important to ascertain foetal maturity prior to undertaking induction of labour so that the premature baby thus delivered does not succumb to hyaline membrane disease.

In a country like India, where patients are not certain of their menstrual histories, study of amniotic fluid may provide a means for assessment of gestational length.

Material and Methods

One hundred and twenty samples of amniotic fluid were obtained just prior to delivery. These were studied for their

surfactant content using the simple foam test as described by Begneaud *et al* (1969) Clements *et al* (1972), Gluck (1971). Two millilitres of amniotic fluid was centrifuged, and a drop of the deposit admixed with 1 drop of 1% Nile Blue Sulfate Gordon and Brosens (1967) and Mandelbaum *et al* (1967). The stained drop of amniotic fluid was examined under the microscope. Percentage distribution of orange cells based on a 200 cell count was determined for each sample.

The biochemical and cytological data was correlated with the clinical obstetrical data and the neonatal outcome.

Results

The results of the foam test in 120 samples of amniotic fluid were analysed and compared with the obstetric data of gestational length and are shown in Table I.

Out of 6 cases with gestational length less than 37 weeks, 3 had intermediate result and 3 had negative result with the foam stability test. However, out of the 98 patients with gestational length between 37 to 41 weeks, 18 patients showed

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TABLE I
Foam test results

Gestational length	Total	Positive	Intermediate	Negative
32-34 weeks	2	—	—	2
34-37 weeks	4	—	3	1
37-41 weeks	98	72	18	8
Over 41 weeks	16	11	5	—

intermediate and 8 had negative result, showing that false negatives do occur. just prior to amniocentesis revealed the following data: (Table III)

The results of orange cell count in the 120 samples studied and compared with obstetric data is shown in Table II.

In all cases with gestational period below 37 weeks, an orange cell count below 10% was obtained. However, in 14 patients with gestational length between 36 to 41 weeks, and in 1 case of post-datism, a count less than 10% was obtained. In 12 cases out of 16 pregnancies beyond 41 weeks, a cell count exceeding 20% was observed.

An evaluation of the obstetric status

TABLE III
Obstetric Status

Term pts. (37-41 weeks)	91
Postdatism	7
Diabetes Mellitus	6
PIH	4
BOH	3
Placenta previa (conservative management)	3
IUGR	3
Elective Caesarean section	2
RH isoimmunization	1
Polyhydramnios	1

The neonatal outcome in comparison with the prognostication of the test results is shown in Tables IV and V.

TABLE II
Orange cell count results

Gestational length	Total	<10%	10-20%	>20%
32-34 weeks	2	2	—	—
34-37 weeks	4	4	—	—
37-41 weeks	98	14	72	12
Over 41 weeks	16	1	3	12

TABLE IV
Results with foam test

Result	No. of cases	Actual neonatal outcome
Negative	11	2 babies died of RDS 2 had moderate asphyxia 2 had mild asphyxia
Intermediate	26	1 baby died of asphyxia at birth All the rest had no respiratory difficulty and survived
Positive	83	All babies were well and survived

TABLE V
Results with Nile Blue Sulphate test

Orange Cell Count %	No. of cases	Actual neonatal outcome
<10	21	Only 8 cases premature
10-20	75	All babies mature and did well
>20	24	Only 14 babies post-mature

Conclusion

In our opinion, amniocentesis prior to premature induction is valuable. No babies with positive foam test developed hyaline membrane disease, although out of 11 cases showing a negative foam test, only 2 died of RDS and 2 others had moderate asphyxia neonatorum.

The orange cell count is less reliable in assessing maturity. Although 21 samples

were indicative of prematurity, only 8 babies were found to be premature on pediatric evaluation at birth. Whereas out of 24 samples with orange cell count above 20, 14 babies appeared postmature. He therefore feel that the foam test is a more reliable test where prematurity is expected, whereas the Nile Bue sulfate test appears more reliable in cases of post-maturity.

References

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