

# EVALUATION OF THE ACCELERATED CLOTTING TIME AS AN INDEX OF FOETAL MATURITY

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## SUMMARY

To find out efficacy of accelerated clotting time for measuring foetal maturity, 104 cases irrespective of age and parity (55 normal pregnancies and 49 women with one or the other complication of pregnancy) were selected, cases with accurately known last menstrual periods were only included in the study. One sample of liquor amnii was collected from each case either by abdominal amniocentesis or by vaginal amniocentesis or during caesarean section. Analysis of amniotic fluid was done within 4 to 6 hours after collection of sample. The fluid thus collected was tested for (a) Accelerated clotting time—to see the thromboplastic activity of amniotic fluid, (b) Nile Blue Sulphate test—to see the percentage of orange stained cells in the amniotic fluid.

Amniotic fluid thromboplastic activity was estimated by both methods separately, as described by Hastwell (1974, 1978) and Yaffe et al (1977), to see the efficacy of each method. Accelerated clotting time of 110 seconds or less usually indicated a maturity of more than 36 weeks and when accelerated clotting time exceeded 110 seconds. The gestation was mostly less than 36 weeks. There was no appreciable difference in two methods but significant association was found between the two tests.

## Introduction

The accurate assessment of foetal maturity is one of the most important problems faced by an Obstetrician from day to day and it is not uncommon for the foetal maturity to be in doubt late in pregnancy. A fair percentage of pregnant women are doubtful about the dates of their last menstrual period. Since pre-

maturity and its problems are associated with major areas of perinatal mortality, termination of pregnancy before term, prior to onset of labour is frequently accepted as a solution to certain complications of pregnancy for years and even today, the assessment of maturity of foetus in utero is commonly done by employing crude and traditional methods which are inaccurate in assessing the foetal maturity.

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Various investigations have been pressed into service as an aid for con-

firmation of foetal maturity but each of them have some drawback. In this study the "Accelerated clotting time" which is a very simple method and can be estimated by the patient's bedside, without any special equipment has been done in comparison with Nile Blue Sulphate.

#### Material and Methods

Analysis of 104 amniotic fluid samples was done, obtained from these women after complete clinical evaluation and proper history taking, women who had regular periods and definite about their last menstrual period were considered. The study was conducted in 55 normal and 49 complicated pregnancies with gestational period ranging from 30 weeks to 43 weeks. The gestation age was calculated by using Naegle's Rule.

Amniotic fluid was obtained by trans-abdominal amniocentesis in 33 cases, transvaginal in 54 cases and during caesarian section in 17 cases. The accelerated clotting time was estimated by modification of quick's one stage method Yaffe *et al* (1977) and it was compared with the method of Hastwell, G. B. (1974), in the same sample of amniotic fluid. The Nile Blue Sulphate test was done in all the patients at the same time for comparing the efficacy of accelerated clotting time as a test for foetal maturity. The blood stained and meconium

stained amniotic fluid samples were discarded and not included in the study.

#### Observations

The patients were between the age group of 17 to 30 years. Primigravida were only 28 (26.92%) and second gravida were 33 patients (31.75% and rest were above that. The gestation age ranged from 30 to 43 weeks.

TABLE I  
Distribution of Maternal Complications

Type of pregnancy complication	No. of cases
P.E.T.	25
PET with anaemia	2
PET with dysmaturity	2
Pregnancy with anaemia	11
Essential hypertension with dysmaturity	4
Hydramnios with anaemia	2
Twin pregnancy	3
Total	49

It is evident from the Table II and Table III that increase of gestation decreases the ACT. In group 30-36 weeks with method ACT<sub>1</sub> 84.2% cases has ACT more than 110 seconds but 94.4% in group above 40 weeks. Similarly in ACT<sub>2</sub> method 78.4% cases in group 30-36 have more than 110 seconds and in group above 40 weeks 88.5% have less than 110 seconds.

TABLE II  
Relationship between Period of Gestation and ACT Estimated by Hastwell Method (ACT<sub>1</sub>)

Period of gestation in weeks	No. of cases	ACT less than 110 seconds		ACT more than 110 seconds	
		No.	%age	No.	%age
30-36	19	3	15.8	16	84.2
37-40	50	45	90.0	5	10.0
Above 40	35	33	94.3	2	5.7
Total	104	81	77.88	23	22.12

TABLE III

*Relationship between Period of Gestation and ACT Estimated by Quick's Method (ACT<sub>2</sub>)*

Period of gestation in weeks	No. of cases	ACT less than 110 seconds		ACT more than 110 seconds	
		No.	% age	No.	% age
30-36	19	4	21.6	15	78.4
37-40	50	44	88.0	6	12.0
above 40	35	31	88.5	4	11.5
Total	104	79	75.96	25	24.04

The difference in the efficacies of two different tests for estimation of ACT was also evaluated by (t) testing the value was not statistically significant  $P < 0.05$  meaning thereby that there is no real difference between the two methods of estimating ACT.

It is evident from the Table IV that there was a relationship between the percentage of orange stained cells by Nile Blue Sulphate staining and period of gestation. No fat cells were demonstrated or percentage was very low when the gestation was less than 36 weeks, except in a few cases and percentage of cases with high fat cell counts between 30-50 per cent and above 50 per cent exceeded with the advancing gestation and after 37 weeks there was not a single case where no fat cells were demonstrated or counts were less than ten per cent.

The relationship between ACT and Nile Blue Sulphate test was found, it was evident that ACT was more than 110 seconds in a larger number of cases when the orange cells were below 10 per cent. The thromboplastin activity became faster with the increasing gestation and increasing percentage of fat cells with the result ACT decreased and was less than 110 seconds in 47 cases out of 49 with orange cells count above 50 per cent. On applying Chi-Square test a significant association between the ACT and Nile Blue Sulphate test ( $P < 0.05$ ) was found.

#### Discussion

In later weeks of pregnancy, the accurate assessment of foetal maturity can be the real dilemma for the Obstetrician

TABLE IV

*Relationship between the Nile Blue Sulphate Test and Period of Gestation in Weeks*

Period of gestation in weeks	No. of cases	Percentage of orange stained cell by Nile Blue Sulphate							
		0-10		10-30		30-50		Above 50	
		No.	%	No.	%	No.	%	No.	%
30-36	19	12	63.16	5	26.32	1	5.26	1	5.26
37-40	50	—	—	11	22.00	14	28.00	25	50.00
Above 40	35	—	—	2	5.72	10	28.57	23	65.71
Total	104	12	11.54	18	17.31	25	24.04	49	47.11

Remarks  $X^2 = 18.38$ ,  $df = 1$ ,  $P < .001$ .

particularly when various pregnancy complications threatening the life of the foetus in utero. Mayer (1926) first described the syndrome of amniotic fluid infusion into the circulation during labour. Hastwell, G. B. (1974) noticed that ACT greater than 110 seconds usually indicated a premature foetus, less than 36 weeks except in two cases. Conversely, an ACT of 110 seconds or less usually indicated mature foetus. The present study is in confirmity with the above data.

ACT-1 (Hastwell, G. B. method) gave an overall incidence of 6.7 per cent false negative results and there was no false positive results. Out of these 5.7% results were transitional and there was only 0.96% absolute error by this method.

ACT-2 (estimated by Yaffe *et al*) gave

an overall incidence of 10.5% false results out of which 9.6% were false negative and 0.96% were false positive, but only 0.96% of false negative absolute error was found by the method.

Significant association was found between ACT and Nile Blue Sulphate test, and Nile Blue Sulphate Test had wide range of transitional results (13.8%) when the foetus was mature.

Age, parity and maternal complications had no bearing on thromboplastic activity of amniotic fluid or Nile Blue Sulphate test.

#### References

1. Mayer, J. R.: Brazil Med. 2: 301, 1926.
2. Hastwell, G. B.: Aust. N.Z.J. Obstet. Gynaec. 84: 35, 1977.