ACCELERATED CLOTTING TIME (A.C.T.)
A DETERMINANT OF FETAL MATURITY

By

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SUMMARY

Thromboplastic activity of amniotic fluid increases with gestation; thromboplastins being liberated by desquamated, degenerated-lysed fetal cells. A bedside test for fetal maturity based on A.C.T. was carried out, A.C.T. was correlated with L/S ratio, gestational age of the newborn by Dubwitz's criteria and the birth weight of newborn.

A.C.T. of 120 Sec. or less indicated a mature fetus and A.C.T. more than 120 Sec. suggested immaturity. L/S ratio of 1.8 or more indicated a mature fetus. Correlation between A.C.T. and gestational age was observed in 90% and that between A.C.T. and L/S in 82% samples. Association of A.C.T. with gestational age, L/S and birth weight of newborns gave a P value of < 0.001.

A.C.T. dominates over L/S ratio and established bedside parameters of fetal maturity by virtue of its accuracy, simplicity and specificity.

Introduction

Modern obstetrics is no longer confined to the process of child birth. One of its main objectives today is to ensure the wellbeing of the fetus in utero. In order to reduce neonatal morbidity and mortality, it is imperative to assess fetal maturity before birth, so that better intranatal and neonatal care can be provided to the newborn.

The study was carried out at Government Medical College, Nagpur in which Accelerated Clotting Time (A.C.T.) was estimated and compared with other established parameters of fetal maturity such as amniotic fluid lecithin sphingomyclin ratio in 95 cases and gestational age of newborn by Dübowitz criteria as well as birth weights of newborns in all the cases.

Material and Methods

One hundred and fifty-four patients between 28 to 43 weeks of gestation according to last menstrual period were studied, irrespective of age and parity. Majority of liquor samples were collected by vaginal amniotomy.

Method of A.C.T. Estimation

Two 10 ml plastic test tubes were placed in 37°C waterbath. To one test tube was added 1 ml of fresh amniotic

fluid to which 1.5 ml of maternal blood was added (immediately after being withdrawn) and clotting time noted when complete clotting occurs. This is A.C.T.

To the second test tube 2.5 ml of maternal blood was added and time required for complete clotting noted. This is control clotting time (C.C.T.).

Observations

secs L/S ratio was 1.8 or more, in 59 cases (95%). Whereas out of 23 cases where A.C.T. was > 120 sec 18 cases (54.5%) had L/S ratio of < 1.8.

Out of 16 false A.C.T. results only 2 were false positive and 14 false negative.

8 out of 14 false negative results were in Transitional zone, thus leaving behind only 8 absolute errors.

TABLE I
Gestational Age, A.C.T. and Birth Weights of Newborns

Gestational Age (Wks.)	No. of Cases	Range (A.C.T.) SEC	AVGE (A.C..) SEC	AVGE Birth Wt. (Gms)
28-35	42	80-240	164.5	1683.3
36-40	89	30-240	78.5	2642.7
41-43	23	30-110	62.3	2703.3
Total	154			

A.C.T. of 120 Sec or less suggested a mature fetus of 36 weeks or more while an A.C.T. of more than 120 sec indicated immaturity. Similarly it was observed that as the birth weight increases A.C.T. decreases.

The transitional zone for A.C.T. ranged from 115 sec to 135 sec.

Fetal pulmonary maturity was indicated by L/S ratio of 1.8 or more; the transitional zone being 1.5 to 1.8.

The above table shows close correlation between A.C.T. and gestational maturity. Out of 62 cases having A.C.T.   120

TABLE II
Association of Gestational Age, A.C.T. and L/S Ratio

A.C.T. (Sec.)	Gest. Age (Wks.)		L/S Ratio	
	≥36	<36	≥1.8	<1.8
≤ 120	103	2	59	3
>120	15	34	15	8

TABLE III
False A.C.T. Results

Range of Transitional Zone	115-135 Sec
No. of results in Transitional Zone	16 (10.3%)
* False A.C.T. results	16 out of 154 (10.3%)
* False negatives	14 (87.5%)
* False positives	2 (72.5%)
* False negative in Transitional Zone	8 (57.1%)
* False positives in Transitional Zone	Nil
* Absolute errors	8 (5.2%)

About 17% of Meconium stained liquor samples and 50% of the blood stained samples gave false A.C.T. results suggesting that A.C.T. is relatively unreliable in contaminated samples.

Of the 37 babies who developed respiratory distress syndrome, A.C.T. predicted R.D.S. in 35 cases while L/S predicted it in 34 cases. In one blood stained sample A.C.T. and L/S both failed to predict R.D.S.

When a Chi square test was calculated, association of A.C.T. with all the three parameters viz. L/S ratio, birth weight and gestational age gave a P value of less than 0.001 indicating a very strong association between A.C.T. and these parameters.

Conclusions

A poor judgement of fetal maturity may end up in premature birth, still birth or death due to postmaturity. In such circumstances to have at hand an accurate, simple bedside test of fetal maturity is absolutely necessary.

In coming years A.C.T. will certainely show a new way. Tests like L/S ratio which are difficult to perform and time consuming may hence forth be replaced by a rapid simple reliable index of fetal maturity i.e. A.C.T.