

**COMPLEMENTARY USE OF AMNIOTIC FLUID STUDY WITH
CLINICAL NON-STRESS TEST (NST) FOR ASSESSMENT
FETAL WELL-BEING—A NEW PROTOCOL**

by

BULUSU RATNA,* M.B.,B.S.

and

N. N. ROY CHOWDHURY,** M.O. (Cal.), Ph. D., F.R.C.S. (Edin.),
F.R.C.O.G., F.A.C.S., F.A.M.S.

Introduction

The Non Stress Test (NST) is based on the fact that fetal movement is typically associated with transient acceleration of the fetal heart rate which is a reliable sign of fetal well-being in the antenatal period (Lee and Drukker, 1979). A non-reactive NST has high false negative values, and so, a contraction stress test (CST) has been advised in such cases. In the present study, amniocentesis with the study of physical characteristics of the liquor amnii and Clement's Shake Test was used as a complementary aid to NST in high-risk cases and post term pregnant women to evaluate the fetal well-being.

Such tests are essential to avoid unnecessary interference like induction of labour or caesarean section with a resulting premature baby. They can really pick up the high-risk cases which need immediate intervention. NST requires a continuous fetal heart monitoring with the help of expensive electronic gadgets which are not available in many of the hospitals in our country. However, care-

ful and observant screening with the help of stethoscope and patient's co-operation is possible.

Materials and Methods

Twenty-two patients categorised as high-risk cases and admitted in the antenatal wards of Eden Hospital, Medical College, Calcutta, were selected for this preliminary study. Among them, the majority were post dated or were uncertain about their last menstrual period, along with other risk factors.

(A) Non-Stress Test:

(1) Patient is placed in supine position and head elevated 30 degrees to prevent supine hypotensive syndrome, in a quiet room.

(2) Blood pressure—checked initially and then at the end of the test.

(3) Baseline FHS is counted with the help of a stethoscope every 30 seconds for 10 minutes noting rate and any uterine contractions.

(4) To have acceptable fetal movements (FM) both mother and the observer (by uterine palpation) must concur that a FM is occurring. This, the mother is instructed to indicate by the movement of her right hand index finger.

(5) Each study period lasted for a

*SRF of CSIR, Post Graduate Trainee, Medical College, Calcutta.

**Professor, Department of Obstetrics and Gynaecology, Medical College, Calcutta.

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minimum of 10 minutes and a maximum of 20 minutes.

(6) As soon as fetal movement started, the counting of FHS was started afresh for a period of 30 seconds. This count multiplied by 2 gave the fetal activity acceleration per minute. If the FM continued for more than 30 seconds the counting was continued upto 60 seconds.

The results of NST are depicted below:

Reactive—If 2 or more fetal activity accelerations occur per 20 minutes with a duration of more than 20 seconds and of at least 15 beats/minute amplitude.

Non-reactive—No fetal activity or no demonstrable fetal heart rate change in response to movement.

Reactive with excessive fetal movements—3-5 movements per 10 minutes each lasting for 40 seconds to 1 minute or even longer.

Suspicious—Where fetal movements are less than 2 per 20 minutes or the FM do not last for 20 seconds.

(B) Amniocentesis—This is performed after the NST.

The patient is informed what is to be done, as her co-operation is essential. The abdomen is palpated to note the side of fetal limbs and a convenient point is selected where amniocentesis would be successful. The fetal heart sounds are noted before and after amniocentesis. The puncture is made with the help of No. 18 lumbar puncture needle on the abdomen of the patient on the side of fetal limbs, while the patient holds her breath. A sample of 3 ml. of amniotic fluid is collected. The needle is withdrawn with a smart pull while the patient holds her breath again. The puncture site is sealed with cotton soaked in Tinc. Benzoin Co. The turbidity, colour and presence of flakes in the fluid are noted. The liquor

is then subjected to Clement's Test (1972) provided it is not meconium stained.

Results

Age and Parity—It is shown in Table I that 13 (59%) of the 22 subjects were above the age of 25 years and majority i.e. 16 (72.7%) were primigravidae.

TABLE I
Age and Parity

Age in years	No. of patients	Parity	No. of patients
<20	1	0	16
21-25	8	1	4
26-30	11	2	2
>30	2	2	0
Total	22		22

Types of high-risk factors—In some of the patients, more than one risk factors were present as is evident from Table II.

TABLE II
Types of High-risk Factors

Risk Factors	No. of cases
Post dated/? Wrong dates	12
Severe hypertension/PIH	5
Gross SFD with scanty liquor	6
Pregnancy after prolonged infertility	1
Bad obstetric history	1
C/o less fetal movements	1
Elderly primigravid	5

Results of NST (Table III)—NST was found to be reactive in 18 instances in 16 patients (Two patients had repeat NST after 1 week). Non-reactive NST was noted in 4 patients and reactive NST with excessive fetal movements was found in 2 patients.

Results of Amniocentesis (Table IV)—In 10 cases, the amniotic fluid was

TABLE III
Results of NST

Results of NST	No. of instances
Reactive	18 (in 16 pts.)
Non-reactive	4
Reactive but excessive fetal movements	2

TABLE IV
Results of Amniocentesis

Results of Amniocentesis	Cases
Clear and turbid; Clement's Test +ve.	10
Meconium stained with flakes	5
Scanty liquor/dry tap	3
Clear liquor with intermediate maturity or immature	4

clear and turbid with shake test positive. In 5 others it was meconium stained with flakes. Dry tap due to scanty liquor occurred in 3 instances. Immaturity or intermediate maturity was the results of shake test in 4 cases.

Mode of Delivery with Fetal Outcome—It is evident from Table V that majority of cases (63.6%) had normal vaginal delivery. Of the 2 babies which had intrauterine death, NST in the first case was reactive but liquor tap was dry. On the 5th night following NST the patient felt tumultuous movements of the fetus but did not inform the sister on duty or the Doctor and the next morning there was cessation

of fetal movements. In the second case, NST was non-reactive and amniocentesis yielded again a dry tap. A warning to perform immediate LSCS straight away was given as the patient was post dated by 5 days and had severe intra uterine growth retardation but was not received with much alertness and so 36 hours later the patient complained of cessation of fetal movements.

Discussion

Baskett *et al* (1981) have pointed out that audible detection of fetal heart accelerations is remarkably accurate in 95.6% cases with the help of the audible signal from fetal pulse detector. In our cases with the help of stethoscope with counting of FHS per 30 seconds, we could differentiate reactive from non-reactive in all cases. Complementary testing of liquor amnii gives a clear assessment of not only the intra uterine environment of the fetus, but also its maturity with the help of a simple bed side test (Shake Test) and positively reduces the indications for CST. In 3 of the 4 non-reactive NSTs, the amniotic fluid was meconium stained indicating intrauterine fetal distress and so delivery was undertaken without subjecting the patient to CST. A new category was detected in this study where NST was reactive but there were excessive fetal movements. Amniocentesis in these cases exhibited meconium stained fluid. Both the cases were terminated by

TABLE V
Mode of Delivery and Fetal Outcome

Mode of Delivery	No. of cases	Birth Weight	No. of babies
Normal Delivery	14 (63.6%)	<2500 gm.	4 (1 IUD)
Forceps	0	2500-3000 gm.	15 (1 IUD)
LSCS	8 (31.8%)	>3 Kg.	3
		Intrauterine death —	2
		Living —	20

caesarean section as the risk factors also indicated LSCS.

Of the 20 reactive NSTs detected, amniocentesis helped to detect fetal distress with excessive fetal movement in 2 cases, to defer termination by induction or LSCS in 15 others. Unsuccessful tap due to very scanty liquor occurred in 3 instances, of which IUD occurred in 2 instances, one after 36 hours and the other after 5 days of NST + Amniocentesis.

Miyajaki and Miyazaki (1981) identified that in post-term pregnancies NST was misleading by giving false reassurance of fetal well-being in 8% cases. In 10 post-term patients in our series, fetal condition could be successfully assessed with the help of NST and amniotic fluid study.

Conclusions

1. NST with the help of stethoscope can be performed in any hospital where expensive gadgets are not available, just with a little patience on the part of the observer and patient's co-operation.

2. Careful and gentle palpation of the abdomen reveals an area where the tap for amniocentesis is likely to be successful.

3. By performing amniotic fluid study and shake test more information regarding the fetus and its environmental status

can be obtained thus reducing the instances for CS Testing.

4. Unnecessary premature intervention in the so called post-dated pregnancies can also be avoided, especially so because we are not well provided with good premature baby care units.

5. In conclusion, non-stress test along with amniocentesis and study of liquor amnii can be safely employed in high risk cases excepting those of antepartum haemorrhage where the indication for termination of pregnancy is purely maternal.

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