

## Monitoring of High Risk Pregnancy by Non-Stress Test

Kranti Venkatrao Kendre\*, Preshit T. Chate\*

### Abstract

Fetal NST is a simple non-invasive test performed over 28 weeks of gestation during pregnancy. Antepartum evaluation of fetus at risk for damage or death in uterus remains major challenge in modern obstetrics. NST is a non-invasive easily performed, interpreted and readily accepted by the patient. It contains – baseline heart rate, beat to beat variability of FHR, presence or absence of accelerations, early accelerations, late accelerations and variable accelerations.

FHR device, Doppler ultrasound transducer, Tocodynameter, Event marker were used in fetal assessment. 50 pregnant patients were included having single fetus pregnancy with gestational age more than 30 weeks, hypertensive disorders of pregnancy, intrauterine growth retardation, post dates, liquor abnormalities and BOH. The patients having gestational age less than 30 weeks, ante partum haemorrhage, eclampsia, multiple pregnancy, ruptured membranes, congenital anomalies, and intra-uterine death were excluded from study. NST was performed in all cases with CTG and recording of fetal heart rate, fetal movement and uterine contractions were noted. The fetus was stimulated for 20 minutes externally and activity was noted. It was observed that PIH (28%) and post dates (32%) are the risk factors. Majority of patients were

primigravida (60%). The last NST results were with fetal outcome. Amongst NST reactive cases (33) meconium stained, Apgar score less than 7. Among non-reactive cases (74%) meconium stained. Apgar score less than 7 (75%) required ICU admissions.

**Keywords:** Pregnancy; NST Test; Reactive and Reactive Test; Fetal Outcome.

### Introduction

The fetal NST is a simple non invasive test performed in pregnancies over 28 weeks gestation. The term is named non-stress because no stress is placed on the Fetus during the test. Antepartum evaluation of the fetus at risk for damage or death in utero remains a major challenge in modern obstetrics. NST is non-invasive easily performed, interpreted and readily accepted by the patient. NSTs are classified as reactive and non reactive or normal NST is characterized by 2 or more Fetal heart rate accelerations of about 15bpm and lasting at least 15 seconds from the baseline within a 20 minute period. Non-reactive is characterized by lack of acceleration for a period of 40 minutes. The NST should be analyzed taking into consideration all the factors that provide information about the fetal wellbeing.

1. Baseline heart rate 110-160 bpm.
2. Beat to beat variability of the FHR.
3. Presence or absence of accelerations which are 3 types.
  - a. *Early Accelerations:* caused by head compression, benign and does not produce hypoxia or acidosis.
  - b. *Late Decelerations:* Indicative of utero-

\*Associate Professor, Dept. of Obstetrics & Gynaecology, MIMSR Medical College, Latur.

**Kranti Venkatrao Kendre**, Associate Professor, DDept. of Obstetrics & Gynaecology, Maharashtra Institute of Medical Science and Research, Medical College, Latur, Maharashtra 413531.  
E-mail: drvinayak1@gmail.com

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placental insufficiency.

- c. Variable deceleration caused by cord compression may disappear with change in the position.

#### *Aims*

To study the antepartum surveillance with NST and perinatal outcome in high risk pregnancies.

To prove the efficacy of NST as an effective tool for evaluation of fetal wellbeing.

#### **Materials & Methods**

The fetal heart rate is basic guideline which tells about fetal wellbeing by variation in basic heart rate pattern. Fetal heart rate monitor is a device with two components.

1. To recognize the heart rate
2. To identify the uterine contraction.

#### *Doppler Ultrasound Transducer*

The Multicrystal, wide angle ultrasound transducer is used for monitoring fetal heart rate. The signal is reflected from a moving structure i.e. ventricular wall and reflected beam is changed in frequency. This change in frequency with each systole is recognized as a cardiac event.

#### *Tocodynameter*

External device is strapped to maternal abdominal wall over the fundus for assessing the timing duration and strength of contraction.

#### *Event Marker*

To Mark fetal movement Graphic recording is graphed over screen on specialized paper by printer for permanent record.

In the present study 50 pregnant patients were included for NST.

#### *Inclusion Criteria*

1. Single ton pregnancy with gestational age >30 weeks.
2. Hypertensive disorders in pregnancy.
3. Intra-uterine growth retardation.
4. Post dates

5. Liquor abnormalities.
6. Bad obstetric history

#### *Exclusion Criteria*

1. Pregnant women with gestational age < 30 weeks or in labor.
2. Antepartum hemorrhage
3. Eclampsia
4. Multiple gestation
5. Ruptured membranes
6. Congenital anomalies
7. Intra-uterine fetal death

A detailed history of the pregnant women was taken and thorough clinical and obstetric examination was performed. All preliminary investigations including USG were done. The NST was performed in all of the cases with CTG in semi-fowlers position. Recording of the fetal heart rate, fetal movement and uterine contraction was done. If reactive pattern was not recorded within 20 minutes period; the fetus was stimulated externally and the test continued for another 20 minute period. If there is no reactivity in the extended period, the trace was considered as non-reactive.

Repeat testing was done depending upon gestational age, high risk factors, result of the test and compliance for follow-up. Twice weekly testing is advocated in women with post-term pregnancy, fetal growth retardation and PIH. Sometimes daily testing may be needed in women with severe pre-eclampsia.

#### **Observations & Results**

PIH (28%) & Postdates (32%) are the common risk factors

Majority of patients were (64%) primigravida.

Most of patients were of 19-21 years age groups.

Majority of patients were more than 40 weeks

Most of the patients had vaginal delivery.

In Majority of cases induction was failed induction and fetal distress.

The last NST results were with fetal outcome. Among NST reactive cases (33) meconium stained liquor was observed only in 3 cases, APGAR score >7 in only one case, and there were no NICU admissions. Amongst NST non-reactive cases (17) meconium stained liquor was observed in 9 cases (750%), APGAR score <7 in 9 cases (750%) and 8 of them required NICU admission.

**Table 1:** Distribution of risk factors

Cases	Pre-eclampsia	Post-dates	IUGR	BOH
50	14	16	11	9

**Table 2:** Gravida distribution

Cases	Primigravida	2 <sup>nd</sup> gravida
50	32	18

**Table 3:** Age distribution

Cases	19-21 Years	22-25 Years
50	30	20

**Table 4:** Gestational age-wise NST results.

Gestational age in weeks	No. of Patients	NST- normal	NST- abnormal
32-34	5	2	3
34-36	3	1	2
36-38	8	5	3
38-40	17	12	5
40 weeks	22	17	5

**Table 5:** Mode of Delivery

Cases	Vaginal	L.S.C.S.
50	26	24

**Table 6:** Indications for L.S.C.S.

Indications	No. of Cases
Failed induction	6
Failure of progress of labor	3
Fetal distress	5
Severe PIH	3
CPD	4
BOH	2
Breech	1

**Table 7:** Last NST Vs Mode of delivery

Last NST	No. of Cases	Vaginal	L.S.C.S.
Reactive	33	23	10
Non-Reactive	17	3	14

**Table 8:** Last NST Vs Perinatal outcome

Last NST	No. of Cases	Meconium Stained Liquor	Clear liquor	APGAR Score <7	APGAR Score >7	NICU Admission
Reactive	33	2	31	1	32	0
Non-Reactive	17	9	8	9	8	0

## Discussion

NST is simple, cheap, non-harmful, easily repeated and cost effective with low maintenance profile. The test group consists of 50 high risk patients at 32 or more weeks of gestational age. Major risk factors are PIH, post dates, IUGR pregnancies. Majority of patients with pre-eclampsia were primigravida.

52% had vaginal delivery and 48% had L.S.C.S. out of total patients taken for L.S.C.S., 14 had non-reactive NST and 10 had reactive NST. In our study,

the incidence of L.S.C.S. for fetal distress was high because most of the patients were referred as unbooked cases.

Out of 50 patients thick MSL was observed in 11 cases. Among them NST was Non-reactive in 9 cases. From the above results. It is seen that the incidence of perinatal morbidity increased when NST was abnormal. Among 17 cases with non-reactive NST 9 of them were born with low APGAR (<7) and 8 cases were admitted in NICU. Causes of NICU admission among 8 babies MSL [6] Tachypnoea [2].

*Summary*

This is a prospective study conducted in high risk patients in MIMSR medical college Latur after 32 weeks gestational age to evaluate the role of NST as a means of antepartum surveillance and in predicting the perinatal outcome. NST was reactive in 66% and non-reactive in 30%. Perinatal outcome 16% required NICU admission, mostly due to birth asphyxia, 18% of babies had APGAR score <7, among which majority had non-reactive NST.

**Conclusion**

Till the search for best single test for fetal wellbeing continues. NST can be taken as our guide for assessment of fetal wellbeing as a screening method and assess the optimum time for delivery.

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