A Prospective Observational Study On The Correlation Of Non Stress Test In The Latent Phase Of Labour With The Fetal Outcome In Singleton Term Pregnancies (37– 42 Completed Weeks) With Vertex Presenting Part

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Abstract: Background: Present study is to know the fetal outcome by doing Non Stress test in latent phase of labour. The Non Stress Test is the most accepted method of antenatal fetal surveillance. This test involves the use of Doppler-detected fetal heart rate acceleration coincident with fetal movements perceived by the mother. Materials and Methods: This study was conducted in the Department of Obstetrics and Gynecology, after approval from the Ethics Committee, from April 2018 to June 2019 on 200 patients who were admitted to the labour room with labour pains with the consent of the patient. Non stress test was done and the results interpreted. Results: Of 173 vaginal delivery patients, 103 patients(59.54%) had full term normal delivery without episiotomy, 57 patients (32.95%) had full term normal delivery with episiotomy and 13 patients(7.51%) had full term vacuum assisted vaginal delivery with episiotomy. 182 patients (91%) had reactive NST and 18 patients(9%) had a non reactive NST. 31 neonates(15.5%) were admitted to NICU, 168 neonates (84%) were healthy and on mother side,1 neonate(0.5%) was stillborn. Conclusions: Non Stress test is a non-invasive test which can be used as a good predictor of healthy fetus in normal pregnancies. NST is a useful tool to avoid obstetric litigation as parental expectation of a good outcome is extremely high.[S N Natl J Integr Res Med, 2020; 11(1):54-57]

Key Words: Non Stress test, Latent phase of labour, fetal outcome

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Introduction: The Non Stress Test is the most widely used and accepted method of antenatal fetal surveillance. It is usually performed on an outpatient basis and is readily interpreted.By the end of 1970s, the non stress test had become the primary method of testing fetal health. Freeman[1] and Lee and colleagues[2] introduced the non stress test to describe the fetal heart rate accelerations in response to fetal movement as a sign of fetal health.

This test involves the use of Doppler-detected fetal heart rate acceleration coincident with fetal movements perceived by the mother. Non stress test is the test of fetal condition and it differs from contraction stress test which is a test of uteroplacental function. Currently, non stress test is the most widely used *primary* testing method for assessment of fetal well-being and has also been incorporated into the biophysical profile testing system. The non stress test works on the hypothesis of intact neurologic coupling between the fetal CNS and fetal heart. In late gestation, a healthy fetus usually exhibits on an average 34 accelerations above the baseline fetal heart rate, every hour. These accelerations average 20-25 bpm in amplitude and approximately 40 seconds in duration.[3]

The presence of fetal hypoxia disrupts this pattern. A term fetus, usually has successive accelerations of heart rate every 40 minutes. However, fetus may exhibit heart rate accelerations for up to 80 minutes and still be normal. The absence of fetal heart rate acceleration is attributable often to quite fetal sleep state. CNS depressants such as narcotics and Phenobarbital, as well as the beta blockers like propranolol can reduce heart activity[4]. In chronic smokers, due to increase in fetal carboxyhemoglobin and a decrease in uterine blood flow; there is decreased fetal heart accelerations[5].

Procedure To Perform Non Stress Test:

- Usually done as an outpatient care.
- Time taken 20 minutes, rarely 40 minutes, in extended case.
- No contraindication.
- Patient may be seated in semi-Fowler's position or in a reclining chair.
- Care taken to avoid Supine hypotension syndrome, due to pressure on inferior vena cava by producing a left lateral tilt by placing a pillow or wedge below the right hip of the patient.
- Patient's blood pressure is to be recorded before starting the test and every 10 minutes subsequently.
- Place the Doppler ultrasound transducer to the maternal abdomen for measuring fetal heart rate. The tocodynamometer is also applied to detect uterine contractions.
- Fetal activity may be recorded by the patient using an event marker switch or noted by the assistant performing the test.

- A reactive test is considered when there are at least two accelerations of the fetal heart rate of 15 bpm amplitude and of 15 seconds duration observed over 20 minutes of monitoring.
- If no spontaneous fetal movement occurs in the initial 20 minutes of observation, the test is continued for another 20 minutes period of extended test. Manual stimulation of the fetus or increasing maternal glucose level has no evidentiary increase in fetal activity.
- If there is no acceleration, during a 40 minute period, the test is considered nonreactive6.

The Non Stress Test Is Analyzed Taking Into Consideration The Following Variables:

1) Baseline fetal heart rate(FHR)
2) Variability of the FHR
3) Presence or absence of accelerations
4) Presence or absence of decelerations6

Aims: To find out the incidence of various fetal outcomes by interpreting the fetal heart rate tracing using NICHD (National Institute of Child health and Human Development) Three Tier system as normal, indeterminate or abnormal. To show the diagnostic value of NST during the latent phase of labour, to determine the fetal outcome in pregnant women with singleton term pregnancies with vertex presentation, to improve the perinatal outcome by helping obstetricians in making early decisions regarding management of labour.

Objectives: To achieve an outcome of a healthy mother with a healthy baby at the end of labour.

Material And Methods: The study was conducted at the Sir T Hospital Bhavnagar, Antenatal Clinic, Labour ward and Post natal ward after approval from the Ethics committee, from April 2018 to July 2019 after taking consent from the patient. Maternity services are provided in the maternity building that consists of seven wards. Four wards which serve as the antenatal and postnatal wards have a total capacity of 90 beds. During a 24 hour period there are between 10 to 15 deliveries.

Inclusion Criteria: Subjects who are willing to participate in the study. Singleton pregnancies. Gestational ages 37-42 completed weeks. Cervical dilatation up to 4 cm. Presenting part vertex. Previous normal vaginal deliveries.

Exclusion Criteria: Subjects not willing to participate in the study.Pregnancies less than 37 completed weeks of gestation. Cervical dilatation more than 4 cm. Multiple pregnancies. All malpresentations,i.e., transverse lie, oblique lie, unstable lie, breech presentation, cord presentation, compound presentation. Previous cesarean section and any previous scar on the uterus. Contracted pelvis.

Methodology: A detailed history was obtained regarding the age, parity, socioeconomic status, antenatal care, duration of lower abdominal pain, discharge per vaginum, past history and personal history was noted. A thorough clinical examination with general and local examination was done. A detailed pelvic examination was done under aseptic precautions.

All patients satisfying the inclusion criteria admitted in the 1st stage of labour was subjected to Non stress test.

The test was done for 20 minutes with the patient in supine position. If the NST result was non reactive, the test was extended for 40 mins with corrective measures like oxygen, left lateral position and IV fluids.

Personal And Demographic Questionnaire: Name, age, Address, LMP, EDD, Gravida para Abortion history.

Vitals Recording: Maternal BP and pulse rate.

Investigations: Antenatal profile. Non stress test was performed to the patients under study after consent and reports of NST were made. Partographic monitoring of labour was done.

After Delivery The Fetal Outcome Was Followed Up: Mode of delivery, Indication of ceasarean section, Apgar score, Neonatal stay in postpartum ward and in NICU and neonatal outcome.

Results: As in table no 1, Out of 200 patients, 170 patients (85%) had Normal –category 1 NST, 15 patients (7.5%) had Indeterminate-category 2 NST, 15 patients (7.5%) had abnormal-category 3 NST. Those who had Indeterminate NST were subjected to extended NST of 40 minutes and were given O_2 support, IV fluids and left lateral position.

Table No 1: Category Of NST In The Present Study (N=200)

Category	No of patients	Percentage
1-Normal	170	85%
2-Indeterminate	15	7.5%
3-Abnormal	15	7.5%

Out of 200 patients, 182 patients (91%) had reactive NST and 18 patients (9%) had a non reactive NST. According to table no 2, Regarding the mode of delivery, out of 200 patients, 160 patients (80%) had full term normal delivery, 13 patients (6.5%) had full term vacuum assisted vaginal delivery and 27 patients (13.5%) had full term emergency LSCS.

Table 2: Mode Of Delivery Of The Patients In The Present Study (N=200)

Mode Of Delivery	No. Of Patients	Percentage
Full Term Normal Vaginal Delivery With Or Without Episiotomy	160	80%
Full Term Vacuum Assisted Vaginal Delivery With Episiotomy	13	6.5%
Full Term Emergency LSCS	27	13.5%

As per table no 3, among the 27 LSCS patients, 12 patients (44.5%) had LSCS due to thick MSL, 3 patients (11.1%) had LSCS due to fetal distress, 8 patients (29.6%) had LSCS due to non reactive NST and 4 patients (14.8%) had LSCS due to non progress of labour.

Table 3: Indication Of LSCS In The Present Study (N=27)

Indication	No. Of Patients	Percentage
Thick MSL	12	44.5%
Fetal Distress	3	11.1%
Non-Reactive NST	8	29.6%
Non Progress Of Labour	4	14.8%

Of the 31 neonates admitted in NICU, 3 neonates (10%) were admitted due to hypoxic ischemic encephalopathy. All of them had a non reactive NST. 12 neonates (39%) had meconium aspiration syndrome, of which 2 neonates (6.5%) had reactive NST and 10 neonates (32.5%) had a non reactive NST. 11 neonates (35%) had respiratory distress syndrome, of which 5 neonates (16%) had a reactive NST and 6 neonates (19%) had a non reactive NST. 1 neonate (3%) had low birth weight and 1 neonate (3%) had Ophthalmia Neonatorum both of them had a reactive NST. 3 neonates (10%) had neonatal jaundice, all of them had a reactive NST.

As per table no 4, of the 7 neonates who were on ventilator support following delivery, 4 neonates (57.14%) had reactive latent phase NST and 3 neonates (42.85%) had a non reactive latent phase NST.

Table 4: Correlation Of NST With Neonates In Ventilator Support (N=7)

No Of Neonates In Ventilator Support	Reactive NST	Non Reactive NST
07	04 (57.15%)	03 (42.85%)

Discussion: Non stress test also known as External Electronic Monitoring, is one of the available non-invasive screening techniques. It is a screening tool for monitoring fetal well being via using the relationship between fetal movement and fetal heart rate. Labour is the last stage of pregnancy and is important to assess feto-placental and utero placental efficient performance with the aid of NST.

NST is one of the determinant factors for health providers to decide between waiting, performing further assessment or to decide intervention. Maternal assessments are also related to fetal well being, which include vital signs, contractions, labour progression, amount of intake and output and the mother's response to labour. The latent phase of labour is the initial phase of labour during which contractionsbecome regular and cervical dilatation reaches 3-4 cm. Interpretation of electronic fetal heart rate data is based on the visual pattern of heart rate as potrayed on the chart recorder graph paper. As per NICHD (National Institute of Child health and Human Development) research second workshop in 1997, scaling factors recommended are 30 bpm per vertical cm (Range 30-240 bpm) and 3 cm per minute chart recorder paper speed.

With increasing fetal maturation, heart rate decreases that is from 16 weeks to term heart

rate decreases by 24 bpm that is 1 beat/min/week due to maturation of parasympathetic heart control (vagal tone maturation).

- Range is 120 to 160 bpm
- Bradycardia <110 bpm
- Tachycardia>160 bpm

Pragmatically, a range of fetal heart rate between 100 to 119 bpm in the absence of other changes, usually is not considered to represent fetal compromise. Such a low, but potentially a normal baseline heart rate has been attributed to head compression form occiput posterior to transverse positions, particularly in the second stage of labour. Fetal tachycardia caused by maternal infection typically is NOT associated with fetal compromise unless there are associated periodic heart rate changes or fetal sepsis.

Conclusion: Non Stress test is a simple, non invasive test which can be used as a good predictor of healthy fetus in normal pregnancies between 37-42 weeks of gestation. Participants with non reactive NST had more fetal complications than those with reactive NST results. The major goal of antepartum fetal surveillance in normal pregnancies without any risk factor is an appropriate and timely identification of fetuses at risk of morbidity and mortality and thus unnecessary delay in intervention can be avoided and better perinatal outcome could be achieved. Also important goal is to avoid unnecessary intervention in an uncompromised fetus. Routine electronic monitoring is accepted in high risk women, but normal pregnancies too require some reliable objective assessment to optimize the outcome. Probability of an adverse outcome such as meconium-stained amniotic fluid and asphyxia increases with a non reactive strip. NST is a useful tool to avoid obstetric litigation as parental expectation of a good outcome is extremely high.

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