



Roll of Non Stress Test in High Risk Pregnancy

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ABSTRACT

Maternal and fetal health is now prime consideration in modern Obstetrics. High risk pregnancies like preeclampsia, anaemia , oligohydroamnios, cardiac disease etc. require vigorous monitoring of pregnancy and labour to prevent fetal mortality and reduce morbidity. Non stress test (NST) is now considered gold standard test in screening of high risk pregnancy. Non stress test is safe, easy to use and widely available method. Study shows that early detection of fetal distress can help early intervention and reduce chances of fetal mortality. However rate of caesarean section is slightly increased .

KEYWORDS: fetal health, fetal mortality, high risk pregnancy, non stress test

INTRODUCTION:

In India considerable reduction in maternal mortality and morbidity has been achieved due to low parity, awareness, education, medical facilities and improved health condition ,but unfortunately it is not true in case of fetus. Improvement in perinatal care in last 20 years has resulted in a dramatic decrease in perinatal mortality¹. These advances include improvements in technological aspects of NICU and better fetal surveillance .Primary purpose of fetal surveillance is to detect fetal hypoxia and acidosis which are the common causes of fetal death and to possibly avoid perinatal mortality and morbidity.

Since last three decades, NST has been accepted as a primary fetal surveillance for high risk pregnancies. NST includes monitoring of fetal heart rate and its patterns in adjunct to uterine activity and external stimulus.

In developing countries, where advanced equipments for intense fetal monitoring are still not available at many peripheral areas, Non Stress test is still a valuable test, as it is easy to use, less expensive, noninvasive, less expertise required, interpretation is easy and can be taught to even nursing staff personnel.

The rationale of NST for antepartum evaluation is presence of acceleration of FHR with fetal movement which indicates intact responsive central nervous system.

AIMS AND OBJECTIVES:

- To evaluate the efficacy and diagnostic value of NST for antenatal surveillance.
- To detect fetal distress at an early stage and assess the usefulness in decision making.
- To compare the mode of delivery with the test results.
- To correlate the test results with different parameters of adverse fetal outcome.

METHODOLOGY:

This is a prospective study of 100 High Risk pregnancies who were attending antenatal outdoor department and admitted in our tertiary care institute in Obstetric and Gynecology Department with labour pains. Study included all High Risk patients with gestational age 34 wks and more.

High Risk Pregnancy include-

Maternal condition-

- ◇ Pregnancy induced Hypertension
- ◇ Anemia
- ◇ Oligohydramnios
- ◇ Premature rupture of membranes
- ◇ Gestational Diabetes
- ◇ Abruptio placenta
- ◇ Placenta previa
- ◇ Postdatism
- ◇ Previous caesarean section
- ◇ Bad obstetric history
- ◇ Diabetes mellitus
- ◇ Chronic hypertension
- ◇ Acute febrile illness
- ◇ Seizure disease
- ◇ Cardiac disease

Fetal condition-

- ◇ Intra uterine growth retardation
- ◇ Rh Isoimmunisation
- ◇ Fetal hydrops

➤ PROCEDURE:

- Patient is placed in semi-fowler position, Tococardiographic equipment is applied to maternal abdomen and uterine activity is observed.
- FHS are located first with ordinary stethoscope
- The ultrasound transducer is placed over maternal abdomen after applying coupling gel, and FHR is traced for minimum 10 minutes.
- Event marker is given in the hand of patient after explaining her to press when she perceives the fetal movement.
- Test is considered REACTIVE when two or more than two accelerations in FHR clearly recorded in 20 minutes period with each acceleration of >15 bpm (beats per minutes) and lasting for more than 15 seconds, usually occurring simultaneously with fetal activity.
- If no spontaneous fetal movement occurs in 20 minutes of observation, test is continued for another 20 minutes. Then fetal movement is provoked by external manipulation. If still there is no acceleration with spontaneous or repeated external stimuli during 40 minutes of period, test is considered as NON REACTIVE.

C) INTERPRETATION AND FOLLOW UP

❖ CRITERIA FOR REACTIVITY:

- National Institute of Child Health and Human Development (NICHD) workshop on FHR monitoring concurred that a minimum threshold for acceleration recognition- that is, amplitude of 10

- bpm (<32 weeks gestational age) versus 15 bpm (>32 weeks gestational age) –should reflect gestational age norms¹³.
- For the Vibroacoustic stimulation (VAS), a single qualifying acceleration must occur after application of stimulus.
 - **REACTIVE TRACING :-**
at least two acceleration with amplitude more than 15 bpm for 15 seconds in 20 minutes¹⁴.usually associated with episode of fetal movements and normal baseline variability.
 - **NONREACTIVE TRACING:-**
Tracing with no FHR acceleration or inadequate acceleration that is <15 bpm or decreased FHR variability

➤ **SINUSOIDAL:-**
Superimposed on nonreactive pattern. Modanlou and Freeman,1982, proposed strict criteria -

- Smooth undulating FHR pattern with a baseline FHR stable at 120-160 bpm
 - long term variability with frequency of 2-5 cycles per minutes
 - amplitude of 5-15 beats/ minutes
 - flat short term variability.
 - Oscillation of sinusoidal waves form above or below the baseline.
 - Absence of accelerations.
- Seen in –
- Severe Anemia with Rh isoimmunisation
 - Feto maternal haemorrhage
 - Twin twin transfusion syndrome
 - Vasa previa with bleeding
 - Fetal intracranial hemorrhage
 - Severe fetal asphyxia
 - Maternal administration of narcotics- characteristic sine frequency of 6 cycles per minute
 - Chorioamnionitis
 - Umbilical cord occlusion (Murphy and associates, 1991)
- **UNSATISFACTORY:-**
Tracing not adequate for interpretation

➤ **SALTATORY:-**
Rapidly occurring couples of acceleration and deceleration causing relatively large oscillation of baseline FHR.

FOLLOW UP:

- Appropriate use of NST must consider gestational age at test initiation, the frequency of test repetition and the mode of test follow up.
 - Interval between tests may vary according to specific medical/ obstetric conditions.
Since the screening performance of the NST declines with increasing test interval, most protocols recommend at least weekly testing.
 - Reactive NST should be repeated weekly for outdoor patients and biweekly for indoor patients.
 - Non- reactive NST should be repeated after 24 hours and if still non reactive then termination of pregnancy should be considered.
 - Result of NST with the mode of delivery may affect the following variables of adverse perinatal outcome-
- Fetal distress in labour
 - 1 and 5 minutes APGAR score<7
 - Admission in NICU
 - Neonatal seizures
 - Perinatal mortality

OBSERVATIONS AND DISCUSSION

TABLE-1 REGISTERED OR EMERGENCY PATIENTS

Pt STATUS	NO. OF PATIENT (n=100)	PERCENTAGE(%)
REGISTERED	85	85%
EMERGENCY	15	15%

Table-2 HIGH RISK FACTOR

HIGH RISK FACTOR	NO.OF PATIENTS (n=100)	PERCENTAGE(%)
PIH	30	30%
ECLAMPSIA	11	11%
IUGR	10	10%
ANEMIA	7	7%

POSTDATED	14	14%
OLIGOHYDROAMNIOS	15	15%
PLACENTA PREVIA	4	4%
FEVER	5	5%
CARDIAC DISEASE	1	1%
CHRONIC HTN	1	1%
TWINS	2	2%

Above Table contains various high risk factors in total which can be present as a sole risk factor or in combination with others.

TABLE-3 NUMBER OF TIMES NST DONE

NO. OF TIMES NST DONE	NO. of Patients (n=100)	PERCENTAGE (%)
1	22	22%
2	54	54%
3	16	16%
4	8	8%

Above table suggests that in current study, most patients (54%) NST was done twice during active phase of labour.22 % patients had undergone NST only once due to either early detection of fetal distress or other factors which influence mode of delivery. Only in 8% cases NST was done four times during labour to consider its reactivity.

TABLE-4 RESULTS OF NST

NST	NO OF PATIENTS(n= 100)	PERCENTAGE(%)
REACTIVE	54	54%
NONREACTIVE	46	46%

TABLE 5 MODE OF DELIVERY

MODE OF DELIVERY	NO OF PATIENTS (n=100)	PERCENTAGE(%)
VAGINAL	48	48%
CAESAREAN	52	52%

**TABLE 6
MODE OF DELIVERY IN NST REACTIVE AND NONREACTIVE CASES**

Mode of delivery	NST	
	REACTIVE (n=54)	NON REACTIVE(n=46)
VAGINAL DELIVERY	42(77.77%)	6(13.04%)
CAESAREAN	12(22.22%)	40(86.95%)

Data from above table suggests that in our study out of 54 patients having reactive NST, 22.22% patient had caesarean section, while out of 46 patients, having nonreactive NST, 86.95 % had caesarean section. This shows that a significant no. of patients underwent caesarean section when NST is nonreactive.

**TABLE-7
BABY STATUS AT DELIVERY
ACCORDING TO RESULT OF NST**

NST	BABY WELL	BABY NEEDED RESUSTITATION
NONREACTIVE NST	26(56.52%)	20(43.47%)
REACTIVE NST	40(74.07%)	14(25.92%)

TABLE 8- INDICATIONS OF LSCS IN CASES WITH NON-REACTIVE NST

INDICATIONS	NO OF PATIENTS (n=40)	PERCENTAGE (%)	BABY STATUS	
			WELL	NICU ADMISSION REQUIRED
PIH	8	25%	5	3
ECLAMPSIA	6	15%	4	2
FETAL DISTRESS	12	30%	8	4
MSL	8	20%	6	2
Oligohydramnios	6	15%	5	1

TABLE-9 PERINATAL OUTCOME ACCORDING TO NST RE-

ACTIVITY:

MODE OF DELIVERY	BABY WELL	BABY NEEDED RESUSCITATION	BABY EXPIRED
VAGINAL (n=48)	35 (72.91%)	13 (27.08%)	1 (2.08%)
CAESAREAN (n=52)	32 (61.53%)	20 (38.46%)	1 (1.92%)

Above data shows that baby outcome is relatively good when NST is reactive. Only 25% children required resuscitation, as compared to NONREACTIVE NST where 43 % children needed resuscitation. Perinatal mortality was only 1, which was due to aspiration syndrome. This shows that NST reactivity significantly affect perinatal outcome. (P=0.012)

This suggests that when NST is nonreactive, early delivery by either vaginal or caesarean route is indicated. Thus NST results can help in early decision making to achieve optimal maternal and fetal outcome.

Table-10 outcome of Fetal surveillance Test

TEST	SENSITIVITY	SPECIFICITY	PPV	NPV
NST	71.42%	67.7%	60%	77%

SUMMARY AND CONCLUSION

In this study, 100 high risk cases were selected randomly and subjected to electronic fetal monitoring.

Results show that majority of young women in their second to third decade of life having low parity were at maximum risk. Study shows that early registration and regular antenatal visits were mandatory to identify and properly manage high risk factors at earlier stage.

Intermittent electronic monitoring is a variation of continuous electronic monitoring. This method is used during a period of half an hour at the start of labour, and subsequently at regular intervals for a period of about twenty minutes.

In present study, in 46% high risk pregnancies intermittent NST showed nonreactivity. Test was repeated or extended and termination of pregnancy was considered depending on severity of high risk factor, nonreactive NST, patient's gestational age and previous mode of delivery.

Results of study shows that in patients with nonreactive NST, timely

Treatment with IV Fluids, oxygenation, left lateral position and timely intervention by termination of pregnancy either by caesarean or instrumental vaginal delivery can reduce fetal morbidity and mortality with reduced NICU admission rate. From this study though it appears that caesarean rate has increased (52%) it also shows that perinatal mortality rate is not increased.

As in high risk pregnancies perinatal morbidity and mortality rate is very high, judicious use of electronic fetal monitoring can detect fetal jeopardy from fetal hypoxia and metabolic acidosis at early stage and timely intervention can improve perinatal outcome. Now a days, safe methods of operative delivery, better anesthesia technique and good antibiotics make caesarean delivery safer than difficult instrumental vaginal delivery. More over improved education and acceptance of various family planning methods compels safer obstetric practice as fetal loss is now not accepted.

NST has sensitivity of >70% with specificity >60%. It can be used as a screening procedure in high risk cases to detect compromised fetus early. But the major risk associated with electronic fetal heart rate monitoring is a false-positive test that may result in unnecessary surgical intervention. Meta-analysis of all published randomized trials has shown that EFM is associated with increased rates of surgical intervention resulting in increased costs.

Other disadvantages of NST is restriction of movement during the application and low specificity with concomitant interventions. There are chances of fetal damage due to continuous use of ultrasonic monitoring. Moreover there are no universal guidelines for the interpretation of NST.

Current evidence indicates that the routine use of EFM leads to an increased caesarean section and operative vaginal delivery rate and a reduction in the rate of neonatal seizures.

Thus, antenatal and intrapartum fetal electronic monitoring is a useful noninvasive tool in High risk cases to determine early fetal distress.

In developing countries like India, in the periphery where advanced equipments for fetal monitoring is not available, NST is a very useful non-invasive screening test to detect and timely refer the high risk patient to a higher centre, where facilities for emergency Obstetric care and NICU facilities are available.

Although caesarean rate increases with use of NST, goal of healthy mother and healthy baby can be achieved with it.

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