

A Study of Perinatal Outcome of Non Reactive Non Stress Test

Rekha Jakhar, Ankita Sharma

Abstract: *Objective:* To understand the perinatal outcomes in pregnant woman with non-reactive Non stress test and the role of NST in management of high risk pregnancies. *Design:* observational study. *Setting:* unaid hospital jodhpur(Rajasthan, India). *Method:* The study will be a cross sectional population based study and will focus on high risk pregnant women above 34 weeks of gestation with non reactive non stress test and their perinatal outcomes.

Keywords: non reactive non stress test outcome

1. Introduction

With recent advances in medical technology and much widespread access to healthcare there has been a significant decrease in maternal mortality rates in developing countries and the focus has now shifted towards foetal health. The motto of modern obstetrics, "healthy mother with healthy child", underscores this shift in outlook. Ante partumevaluation of fetus at risk for damage and death in utero remains a major challenge in modern obstetrics.

However, in India alone, about 8,90,000 perinatal deaths occur annually(1). Previously, the foetus was considered only as an outcome of pregnancy and since it cannot be practically "seen" or "examined", foetal wellbeing was generally thought to be a direct consequence of maternal health and welfare. However, the foetus is now treated as a second patient in the pregnancy and the one that faces a greater risk of serious morbidity and mortality. No longer is it likened to a transient maternal organ. A better understanding of the foetal physiology and advancement in technology have changed this attitude towards the fetus. Therefore, the need for fetal surveillance requires emphasis(2).

According to American college of obstetrician and gynecologists and American academy of Pediatrics (2012) the objective of antepartum fetal surveillance is to prevent fetal death and avoidance of unnecessary interventions(3).

Today, a modern obstetrician's practice primarily includes intrapartum assessment of foetal wellbeing (2). In clinical practice, it is not only critical but also very difficult to arrive at an "ideal" time after which medical intervention (induction of labour) is more beneficial than risky in terms of pregnancy outcomes. Both pre-term delivery, that is, within 37 weeks of gestation and post-term delivery, at or beyond 42 weeks of gestation, births are associated with increased neonatal morbidity and mortality (1).

The main purpose of the various antepartum surveillance techniques is to detect fetal distress so as to prevent fetal death(4). It is the obstetrician's reassurance that the fetal heart rate patterns are normal and with nearly 100% certainty that the fetus is in a good position, which has made cardiotocography so attractive and has induced its widespread use. If the NST shows the baby is happy in its cozy little shell, there is no reason for labour induction(5).

In the aforementioned context, it is clear that there are gaps in understanding the perinatal outcome when the NST is Non-reactive. The current study is being planned to study the perinatal outcome of women having Non-reactive NST (Non-stress test) and also to understand the factors that can influence the results of NST.

2. Material and Method

Source of Data

The study will be a cross sectional population based study and will focus on high risk pregnant women above 34 weeks of gestation admitted & delivered in Unaid Hospital.

Methods of data collection

Data will be collected on a pre-structured proforma

- Patients meeting the inclusion criteria will be subjected to NST
- NST will be performed by a Cardiotocograph with external transducers for duration of 20 min
- In case of non-reactive NST, the test will be continued for 40 min.
- Pre structured proforma will include patient's particulars which will include name of the patient, age, occupation, literacy status (whether she is illiterate, graduate, post graduate), address and her presenting complaints. Patient will be admitted if she fulfills inclusion criteria. Patient's antenatal history will include whether the patient was booked or unbooked and the trimester in which she got booked, no. of antenatal visits, period of gestation, immunization status, any past history, drug history. Her ultrasonography findings will be noted down. Her obstetric history which will include number of children she is having, any history of abortion and menstrual history which will consist of Last Menstrual Period and Past Menstrual History will be taken. All routine investigations will be conducted. Her detailed history will be taken and detailed clinical examination will be conducted which will include her systemic, per abdominal and per vaginal examination will be performed. Non stress test of the patient will be conducted. Mode of delivery will be noted and particulars of the baby delivered will be noted down which will include APGAR score, weight, Gestational age and the sex of the baby.
- Based on the 40 minute extended NST trace, perinatal outcome will be studied, with special reference to:
 - Mode of delivery
 - Presence of meconium

Volume 8 Issue 12, December 2019

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

- APGAR at 1 min
- NICU admission
- Perinatal asphyxia
- Gestational age

Table 1: Distribution of cases based on maternal age

Age in yrs	No. Of subjects (%)
<20	18
21-25	36
26-30	30
31-35	14
>35	02
Total	100

Table 2: Number of booked & un-booked cases

Booked/ Unbooked	Frequency	Percent
Booked	48	48.0
Un booked	52	52.0
Total	100	100.0

Table 3: Distribution of cases according to gestational age

Gestation age (Weeks)	Number
34-36	35
37-39	53
40-42	12
Total	100

Table 4: Distribution of Cases Based on Mode of Delivery

Labor	Normal Vaginal	LSCS		Totsl
		Emergency	Elective	
Spontaneous	11 (64.7%)	6 (35.3%)	0	17(100%)
Induced	25 (43.1%)	33 (56.9%)	-	58 (100%)
No labor	0	0	25 (100%)	25(100%)
Total	36 (36.0%)	39 (39.0%)	25 (25.0%)	100 (100%)

Table 5: Perinatal outcome based on APGAR Score

Perinatal Outcome	Apgar at 1 minute		Apgar at 5 minutes	
	<6	≥6	<8	≥8
Observation	4 (28.57)	31 (36.04)	2 (16.66)	33 (37.5)
Incubator	2 (14.28)	6(6.97)	2 (16.66)	6 (6.81)
Ventilator	4 (28.57)	8 (9.30)	4 (33.33)	8 (9.09)
Phototherapy	2 (14.28)	4 (4.65)	0 (0)	6 (6.81)
No admission	2 (14.28)	37 (43.02)	4 (33.33)	35 (39.77)
Total	14	86	12	88

Table 6: Mode of delivery and perinatal outcome based on presence of meconium stained liquor

Parameter	Meconium Stained Liquor (n=30)	
Mode Of Delivery	NVD	10 (33.33)
	LSCS	20 (66.66)
	Total	30 (100)
Perinatal Outcome	Observation	16 (53.33)
	Incubator	0
	Ventilator	8 (26.66)
	No admission	6 (20)
	Total	30 (100)

Results: in our study we found that 64 patients out of 100 delivered by LSCS out of which 39 were emergency LSCS. Out of 100 babies with Non Reactive NST traces, 96(96%) babies survived and were discharged. Totally 26(26%) babies suffered significant morbidity requiring NICU care, of which 4(4%) babies expired. It was also noted that apgar score, cord factor and meconium stained liquor did not have

any significant effect on perinatal outcome.

3. Conclusion

The Non Reactive NST does not indicate the fetal status and subsequent perinatal outcome accurately, thus Non Reactive NST should be supported by other antenatal fetal surveillance techniques prior to Obstetric intervention. Non reactive NST influence the mode of delivery.

4. Review of Literature

The antepartum assessment of fetal well-being has become an integral part of management of both high risk and low risk pregnancies. The goal of various antepartum fetal surveillance techniques is to detect fetal distress so as to prevent fetal morbidity and mortality. Hence these techniques aim to identify those babies that are at risk of preventable morbidity or mortality from utero-placental insufficiency due to maternal risk factors, placental disorders or fetal disease.

With the advent of electronic fetal monitoring, a relationship between fetal movement and fetal heart rate was observed and that relationship formed the basis for non-stress test (NST). Most antepartum testing protocols use the NST as their principal test of fetal well-being. NST utilizes the observation that the occurrence of fetal heart rate accelerations in response to fetal movements is a reliable indicator of immediate fetal well-being.

The popularity of NST stems from its ease of application in ambulatory settings, non-invasiveness, modest technical requirements, relatively standard interpretation criteria and lack of contraindications.

The fetal monitoring workshop conducted by the National Institute of Child Health and Development has defined accelerations based on gestational age. The acme of acceleration is 15 bpm or more above the baseline heart rate and the accelerations last 15 seconds or longer for under two minutes in fetuses at or beyond 32 weeks. Before 32 weeks, accelerations are defined as having 10 bpm or more for 10 seconds or longer. Fetal reactivity appears between 28 and 30 weeks and it is a function of posterior hypothalamus and nucleus in the upper medulla. Fetal breathing movements begin at 20 to 21 weeks while the fetal tone and the movements appear between 7 and 9 weeks of intrauterine life. The percentage of body movements accompanied by acceleration and the amplitude of these accelerations increased with the gestational age.

One of the most widely accepted NSTs at this time is described as follows. A reactive strip is defined as a strip that demonstrates two accelerations of at least 15 beats per minute above baseline and lasting at least 15 seconds within a 20-minute period. The patient with a reactive NST may go home after scheduling her next encounter, which may either be a follow-up NST or an obstetrician visit. The patient with a nonreactive NST will need to be evaluated to determine the appropriate further evaluation. A high risk pregnancy is one in which some conditions put the mother, the

developing fetus, or both at higher than normal risk for complications during or after the pregnancy and birth.

In a study conducted by Shiva Raouf, it was observed that the descent arrest occurred in 2.7% of the subjects (non-reactive NST) in the study group, whereas it occurred in 4.7% of the participants in the control group (reactive NST) ($p=0.44$). Bradycardia found in 28% of the participants in study group and 3.3% of the control group ($p<0.001$). The low APGAR score was found in 2.7% of case group however; no lowering of APGAR score detected in the control group. Meconium defecation observed in 11.3% of the subjects in the study group and 9.7% of the participants in control group ($p=0.62$). The amount of stillbirth was 2.7% in the study group and no stillbirths were found in the control group. There was a significant difference between the results of both groups in terms of bradycardia, low APGAR score and caesarean section. The aim of their study was to assess diagnostic value of NST, but their study design was wrong as one cannot assess diagnostic value without comparing NST with gold standard test(6).

In a pioneer study conducted by Richa U. Lohana, it was reported that the incidence of reactive test was 85% and that of Non-reactive NST was 15%. As the gestational age advances the occurrences of NR NST increase. Postdatism (gestation >40 weeks) is found to be an important factor for NR NST. Mode of delivery was related to results of Non stress Test in terms of maximum vaginal delivery in Reactive groups, Operative deliveries which occurred in the Reactive groups were also due to indications other than fetal distress. Caesarean section rate is slightly higher in non-reactive NST. This study suggests that the NST was found to be a good predictor of the healthy foetus even in normal pregnancies between 37-42 weeks of gestation and the probability of an adverse outcome such as meconium-staining of liquor and poor APGAR score increases with a non-reactive strip. However large randomized controlled trials are necessary to assess normal pregnancies to incorporate NST to monitor normal pregnancies.

In a study conducted on 90 singleton pregnancies beyond 30 weeks of gestation, it was concluded that an abnormal NST following an abnormal Doppler is associated with worst perinatal outcome in patients with severe preeclampsia and fetal growth restriction. In cases of abnormal Doppler if the prospects of neonatal survival are good it is better to deliver the foetus before NST becomes abnormal. Colour Doppler is useful in recognizing fetal compromise earlier than NST, giving a lead time which is important in the management of preterm high risk pregnancies such as severe preeclampsia and fetal growth restriction. Even though both tests are complementary to each other in fetal surveillance of high risk pregnancies, the clinical condition dictates the most appropriate step. In present study we consider only pregnant females with more than 34 weeks' gestation.

In another study by Hafizur Rahman observed that the admission CTG were 'reactive' in 77%, 'equivocal' in 14.4% and 'ominous' in 8.7% women. Incidence of fetal distress, moderate-thick meconium stained liquor and neonatal intensive care unit (NICU) admission was significantly more frequent among patients with ominous

test results as compared to those with equivocal or reactive test results on admission. Incidence of vaginal delivery was more common when the test was reactive. Objective of their study was to evaluate the predictive value of the admission cardiotocogram (CTG) in detecting foetal hypoxia at the time of admission in labour and to correlate the results of the admission CTG with the perinatal outcome in high-risk obstetric cases (7).

In a study observing the correlation between maternal BMI and NST parameters as well as the pregnancy outcomes in nulliparous women. Results indicated that the frequency of NST reactive and non-reactive parameters was 41%, 59% in the case group (BMI>26) respectively and 55%, 45% in the control group (BMI<26), respectively. Significant increases were found in the case group regarding the mean of post-delivery weight ($P = 0.02$), BMI after delivery ($P = 0.005$), neonatal birth weight ($P = 0.001$), gestational age ($P = 0.001$), and caesarean section (CS) delivery ($P = 0.01$). This study revealed that the increase in maternal BMI was accompanied by an increase in non-reactive NST. Also a significant increase was observed regarding maternal BMI one month after delivery, neonatal birth weight, gestational age and CS delivery (8).

References

- [1] Dr. Himabindu P, Dr.M.Tripura Sundari, DSP. Evaluation of Non Stress Test in Monitoring High Risk Pregnancies. IOSR J Dent Med Sci [Internet]. 2015;14(4):2279–861. Available from: www.iosrjournals.org
- [2] Patel S, Gupta S, Modi K, Desai A, Shah S. Correlation of Admission NST in Low Risk Pregnancy with Neonatal Outcome. 2015;2(2):1–5.
- [3] Guidelines for Perinatal Care, 7th Edition [Internet]. American Academy of Pediatrics; 2012. 598 p. Available from: <https://ebooks.aappublications.org/content/9781581107715/9781581107715>
- [4] Practice Bulletin No. 145. Obstet Gynecol [Internet]. 2014;124(1):182–92. Available from: <http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00006250-201407000-00035>
- [5] Lohana R, Khatri M, Hariharan C. Correlation of non stress test with fetal outcome in term pregnancy (37-42 Weeks). Int J Reprod Contraception, Obstet Gynecol. 2014;2(4):639.
- [6] Raouf S, Sheikhan F, Hassanpour S, Bani S, Torabi R, Shamsalizadeh N. Diagnostic Value of Non Stress Test in Latent Phase of Labor and Maternal and Fetal Outcomes. Glob J Health Sci. 2014;7(2):177–82.
- [7] Rahman H, Renjhen P, Dutta S, Kar S. Admission cardiotocography: Its role in predicting foetal outcome in high-risk obstetric patients. Australas Med J. 2012;5(10):522–7.
- [8] Akbarzade M, Rafiee B, Asadi N, Zare N. Correlation Between Maternal Body Mass Index, Non-stress Test Parameters and Pregnancy Outcomes in Nulliparous Women. Women's Heal Bull. 2015;1(3):12–6.