

Correlation of Admission NST in Low Risk Pregnancy with Neonatal Outcome

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ABSTRACT

Objective: NST is an effective tool frequently used in surveillance of High risk pregnancy group. The aim of this study is to evaluate the role of NST for routine surveillance of low risk pregnant patients admitted in labor room so that we can detect high risk fetus in low risk pregnant woman as early as possible to decrease perinatal morbidity and mortality.

Method: This is a prospective longitudinal study at GMERS Medical College Sola, Ahmedabad, Gujarat, India, Department of obstetrics and gynecology from April 2014 to September 2014. This study included 350 low risk pregnant mothers with labor pain after 37 completed weeks who were subjected to NST for 20 minutes.

Result: Fetal distress, meconium stained liquor and caesarean section rates were higher in non-reactive (NR) and equivocal (E) NST than in the reactive (R) NST group. Perinatal morbidity in Reactive, Equivocal and Non-Reactive was 2.4%, 18.36% & 44.44% respectively.

Conclusion: This study suggest that NST is good screening procedure for detecting high risk fetus in obvious low risk mothers. The probability of adverse outcome like meconium stained liquor and poor APGAR score increases with E and NR results.

Keywords- Non stress test (NST), Low risk pregnancy, Perinatal morbidity.

INTRODUCTION

In developing countries, maternal mortality has been significantly decreased so now modern obstetricians are focusing more on fetal health. Initially fetus was considered only as an outcome of pregnancy but now-a-days the fetus is considered as second patient. So it also requires as much

surveillance as the health of mother. Intra partum assessment of fetal wellbeing is one of the primary task of modern obstetric practice.

About 50% of fetal death occurs in low risk mothers without apparent cause¹. Although many technologies have been developed for monitoring fetus in high risk mothers, we should not under-estimate the

fetuses of low risk mothers as they are equally precious. Continuous electronic monitoring is not possible throughout labor in developing countries due to lack of manpower and resources. Hence, admission NST will detect high risk fetus in low risk mothers and further monitoring will be decided on basis of that. NST is easy to perform and normal value will predict good fetal wellbeing for next few hours in labor.

AIMS AND OBJECTIVES

1. To evaluate the role of NST as a screening method in management of low risk pregnancies admitted in labor room.
2. To study the correlation of NST with fetal outcome.
3. To assess the positive and negative predictive values of NST.

MATERIAL AND METHODS

A Prospective longitudinal study in GMERS MEDICAL COLLEGE, SOLA, AHMEDABAD, department of Obstetrics and Gynecology during April 2014 to September 2014. Total 350 women with low risk pregnancies with established labor admitted in labor room were included in study. Women with IUGR, mal-presentation's, multiple pregnancy, preterm labor, ante-partum hemorrhage, PIH, Diabetes, Cardiac Disease and women for elective cesarean section were excluded from the study.

Procedure

All the patients admitted with established 1st stage of labor were subjected to admission NST. The test was done for 20 minutes with patient in supine position. If NST result was reactive, those foetuses were considered as low risk and intermittent auscultation was carried out to monitor the labor. If NST result were E or NR then NST was extended for 40 minutes, with corrective measures like oxygen, left lateral

position and i.v. fluids. If NST persisted to remain E or NR at the end of 40 minutes then USG was done to measure AFI. All the patients with AFI < 5 c.m were subjected to artificial rupture of membrane at 4-5 c.m dilatation with more intensive monitoring. The admission test was interpreted as;

Reactive admission test (Negative)

- Normal baseline foetal heart rate (120-160 bpm).
- Variability in the absence of deceleration (6-25 bpm).
- Presence of two accelerations of 15 bpm above baseline lasting for 15 seconds.
- Suspicious Admission rest (Equivocal).
- Absence of acceleration for > 40 minutes.
- Baseline foetal heart rate of 150-170 bpm or 100-110 bpm.
- Absent variability (<5 beats) for > 40 minutes with normal baseline and no acceleration.

Non-reactive admission rest (Positive)

- Baseline foetal heart rate >160 bpm or <100 bpm with absent variability and/or repetitive late/variable deceleration.
- Absent baseline variability (<5bpm) for >90 min.
- Repetitive late decelerations.
- Sinusoidal pattern with no accelerations (bpm- beats per minute).

RESULTS

For this study, 350 pregnant women admitted in labor room in 1st stage of labor, were subjected to NST & result recorded.

NST was Reactive (R) in 283, Equivocal (E) in 49 & Non-Reactive (NR) in 18 women. (See table 1-6.)

DISCUSSION

The aim of our study was to identify those fetuses that are at risk so that timely

measures can be taken before damage. False negative rate of NST is defined as fetal death within 1 week of reactive NST which is $<1\%$ ². In present study, false negative rate was very low 3.5%, thus reactive NST is considered as a good predictor of fetal health³. Rate of intervention for presumed distress was very low 6.36% in Reactive NST as compared to 38.8% in E and 55.6% in NR. Study of Anjana Verma⁴ shows R NST had 10 times less intervention for presumed distress than having NR NST. In our study LSCS rate was 14.84 % in R and 66.66% in NR group which is comparable to the rate in study by Eden *et al*⁵ with 23.2% LSCS rate in R NST and 37.7% in NR NST.

In our study, 7.7% of R NST had meconium stained liquor compared to 44.4% of NR NST in the present study. In study of lohana *et al*⁶, 8.24% of R NST & 33.33% of NR NST had meconium stained liquor comparable to our study. Patients with R NST having APGAR score > 7 was found in 96.5% & < 7 at 1 min was 3.5%, where as in NR group, it was 38.9% with APGAR > 7 & 61.1 % with APGAR < 7 . In study of Eden *et al*⁵ APGAR SCORE > 7 was found in 98% in R NST & only 1.9% had APGAR < 7 . In study by Lawrence D Devoe⁷, these findings were similar. NPV of NST for meconium stained liquor in our study was 85.29% which is comparable to 90.9% in study by Bano I *et al*⁸. In our study, NPV for low 1 min APGAR score was 86.39 % whereas specificity was 96.46% in comparison to 92.85% and 84.78% in study by Bhide AA *et al*⁹. In our study, NPV for low APGAR at 5 min was 84.2% and specificity was 97.87% which is comparable to 95.23% and 83.33% of study by Bhide *et al*⁹. In our study, PPV of NST for low 1 min APGAR score was 70.58% with sensitivity of 35.8% as compared to 66.6% and 30.9 % by Jophy R *et al*¹⁰.

CONCLUSION

The main goal of intrapartum fetal surveillance in low risk pregnancy without any obvious risk factor is timely detection of fetus who are at risk of morbidity and mortality so that intervention can be done at appropriate time, thus unnecessary delay and perinatal morbidities can be avoided.

To avoid needless intervention in a not so compromised fetus is also an equally important goal. In our study, we concluded that if NST is reactive with early labor contractions, then chances of hypoxia are less during delivery except in patients due to acute events. Good specificity and NPV of NST gives us assurance of good perinatal outcome. NST is simple and non-invasive method with high NPV so admission NST can be used as a primary screening test to pick up high risk fetus in low risk mothers. But because of poor sensitivity and low PPV of NST, non-reactive NST does not indicate fetal status and subsequent perinatal outcome accurately, so additional back up test is highly desirable in non-reactive group prior to obstetric intervention.

REFERENCES

1. Yucel A, Yilmazer M, Acar M. Comparison of Doppler indices and non-stress test values according to foetal sex in normal term pregnancies. *The Medical Journal of Kocatepe*. 2005; 6(1):19-24.
2. Cunningham FG, Wenstrom K, Hauth J, Leveno K, Gilstrap L (2001). Williams Obstetrics 21st edition, The McGraw-Hill Companies. 2001; 1096-1103.
3. Freeman RK .Problems with intra partum foetal heart rate monitoring interpretation and patient management. *Obstet Gynecol*. 2002 Oct; 100(4):813-26.
4. Anjana Verma, Lalit Shrimali. Impact of admission Non Stress Test as a screening procedure on perinatal outcome. *International Journal of science and research*, 2012; 3 (5); 6-10.

5. Eden RD, Seifert LS, Kodack LD, Trofater KF, Killam AP, Gall SA. A modified biophysical profile for antenatal foetal surveillance. *Obstet Gynecol.* 1988 mar; 71(3 pt 1):365-69.
6. Richa U. Lohana, Meena Khatri, Chella Hariharan Correlation of non-stress test with foetal outcome in term pregnancy (37-42 weeks). *Int J Reprod Contracept Obstet Gynecol.* 2013; 2(4): 639-645.
7. Lawrence DD, Morrison J, Meartin J Jr., Palmer S, Martin R, Searle N *et al.* Non stress testing and contraindication stress testing. *OGCNA.* 1999; 535-556.
8. Imam Bano, Nasreen Noor, Lata Motwani, Zakia Arshad. Comparative study of Non stress Test and Foetal Acoustic Stimulation of Assessment of Foetal Well-being. 10.5005/jp-journals-10006-1112.
9. Bhide AA, Bhattacharya MS. Predictive value of non-stress test in evaluating neonatal outcome. *J Postgrad Med.* 1990; 36(2):104-5.
10. Jophy R, Annamma T, Jairaj P. Admission test as a screening procedure for perinatal outcome. *J Obstet Gynecol India.* 2002; 52(5):26-29.

Table 1. Correlation of mode of delivery with admission NST

Result of NST	Total no. of cases	Full term ND	Instrumental D	LSCS
R	283	237(83.7%)	4(1.4%)	42 (14.84%)
E	49	19(38.8%)	2(4.08%)	28(57.14%)
NR	18	6(33.3%)	0(0%)	12 (66.66%)

Table 1: Shows result of NST in relation to mode of delivery. In R group 83.7% had normal delivery while 66.7% & 57.14% had LSCS in NR & E group respectively.

Table 2. Correlation of E & NR NST with AFI

Result of NST	AFI Normal	AFI Reduced
E	31(63.26%)	18 (36.73%)
NR	8(44.44%)	10 (55.55%)

Table 2: In our study patients with E & NR NST had Ultrasonography for AFI in which 55.5% of NR group had reduced liquor.

Table 3. Indication of LSCS in all types of NST result

Indication of LSCS	R	E	NR
Fetal Distress	18(6.4%)	19 (38.8%)	10 (55.6%)
Non Progress of Labor	15 (5.3%)	6(12.2%)	2
CPD	9(3.2%)	3(6.1%)	0

Table 3: Shows distribution of study group according to indication of LSCS. IN NR & E group 55.6% & 38.8% patients had fetal distress as indication of LSCS while in R group only 6.4% of patients underwent LSCS for same indication. Thus, the rate of LSCS for fetal distress was 6 to 9 time higher in NR & E group.

Table 4. Correlation of NST with meconium stained liquor

Results of NST	Liquor clear	Meconium stained liquor
R	2.61 (92.2%)	22 (7.7%)
E	35 (71.4%)	14 (28.5%)
NR	10 (55.6%)	8 (44.4%)

Table 4: Shows correlation of meconium stained liquor with NST. Only 7.7% of R group had meconium during delivery whole 28.5% & 44.4% had meconium in E & NR group respectively.

Table 5. Correlation of NST with fetal outcome

Result of NST	APGAR >7 at 1 min	APGAR <7 at 1 min	APGAR <7 at 5 min	Admission to NICU	Neonatal death
R	273 (96.5%)	10(3.5%)	6 (2.1%)	8(2.4%)	0 (0%)
E	35 (71.4%)	14(28.6%)	8 (16.3%)	9 (18.36%)	0(0 %)
NR	7 (38.9%)	11(61.1%)	7 (38.9%)	8 (44.4%)	1 (5.55%)

Table 5: Shows correlation of fetal outcome with NST. Out of 283 women in R group only 10 neonates had low APGAR score at 1 min, thus giving false negative rate of 3.5% which is very low. Therefore R NST is considered as a good predictor of fetal outcome. Perinatal morbidity in R, E, and NR group was 2.4%, 18.36% & 44.4% respectively. Thus R NST ensures good perinatal outcome. While perinatal morbidity was 9–22 times higher in E & NR group.

Table 6. Performance of NST with foetal outcome in percentage

	Positive Predictive Value	Negative Predictive Value	Sensitivity	Specificity
LSCS for fetal distress	61.7%	87.45%	43.28%	93.63%
Meconium stained liquor	50.0%	85.29%	32.83%	92.22%
1 min APGAR <7	70.58%	86.39%	35.82%	96.46%
5 min APGAR <7	71.42%	84.1`9%	22.38%	97.87%

Table 6: The specificity of NST for 1 min and 5 min APGAR <7 is 96.46 and 97.87% respectively correlated reactivity of NST with good perinatal outcome.