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A prospective observational study on correlation of non stress test in latent phase of labor with the fetal outcome in singleton term pregnancies (37-42 completed weeks) with vertex presenting part

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Abstract

Introduction: The fetus is a second patient with a high risk of morbidity and mortality. Non Stress test (NST) is one of the antepartum surveillance techniques that is used to evaluate the fetal wellbeing and to rule out fetal distress. The non stress test is most widely used and accepted method of antenatal surveillance. It is usually performed on outpatient basis.

Aim and Objective: To achieve an outcome of a healthy mother with a healthy baby at the end of labour and to help the obstetrician in making early decision regarding management of labor.

Material and Methods: This was prospective case study conducted during March 2020 to July 2021or till sample size is reached, whichever is earlier at Department of Obstetrics and Gynaecology, Mahila Chikitsalya, SMS Medical College Jaipur. The study included Sample size of 250 patients. in clean labor room and postnatal ward from all antenatal patients were monitored in clean labor room there after patients were sent to postnatal wards after delivery. In postnatal wards patients were given education about nutrition, episiotomy care, general hygiene, breast feeding, cord care of the newborn, vaccination and family planning.

Result: Out of 250 patient majority of the patients that is 61.6% were from 20-24 years of age. We found that 72.4% were booked and 27.6% were un booked there is no significant correlation between booking status and NST outcome. Most common indication of LSCS in patients who had indeterminate NST is MSL that is 70% and most common indication in patients who had abnormal NST is MSL that is 58.8%. We found that 9.2% neonates were with birth asphyxia, 2.8% patients with HIE, 4% with neonatal jaundice and 8.8% neonates with MAS. We found that out of patients who had normal NST only 1% neonate needed ventilator support.

Conclusion: The major goal of antepartum surveillance in normal pregnancies without any risk factor is an appropriate and timely identification and intervention of fetus at risk of morbidity and mortality and thus unnecessary delay in intervention can be avoided and hence a better perinatal outcome could be achieved, other

important goal is to avoid unnecessary intervention. Non stress test is a simple, non-invasive test which can be a good predictor of healthy fetus in normal pregnancies between 37 -42 weeks of gestation. NST is useful tool to avoid obstetric litigation with expectation of good outcome.

Keywords: Singleton Term Pregnancies, Fetal Outcome, Non Stress Test

Introduction

The maternal mortality rate has significantly reduced in developing countries. Thus, the focus has shifted toward fetal health. The fetus is a second patient with a high risk of morbidity and mortality. Non Stress test (NST) is one of the antepartum surveillance techniques that is used to evaluate the fetal wellbeing and to rule out fetal distress[1]. The basis of NST is increase of fetal heart rate in response to fetal movements. NST result is one of the determinant factors for health providers to decide between waiting, performing further assessment or starting labor induction. NST is a valuable diagnostic test and is used as diagnostic test during third trimester of the pregnancy, currently it is not performed routinely during labor. This test involves use of Doppler detected fetal heart rate acceleration coincident with fetal movement perceived by mother. Non stress test is test of fetal condition and it differs from contraction stress test which is a test of uteroplacental function.[2]

The non stress test works on the hypothesis of intact neurological coupling between fetal CNS and fetal heart. In late gestation on an average fetus exhibit 34 acceleration above baseline fetal heart rate, every hour. These acceleration average 20-25bpm in amplitude and approximately 40 sec in duration.[3] the presence of fetal hypoxia disrupts this pattern. The absence of fetal heart rate acceleration is attributable to quite fetal sleep state. CNS depressants like narcotics phenobarbital and beta blockers like propanalol can reduce heart activity[5]. In smokers, due to increase in fetal carboxyhemoglobin and a decrease in uterine blood flow, there is decrease fetal heart acceleration.

CTC machine consist of transducer that emits ultrasound and a sensor to detect a shift in frequency of reflected sound. Ultrasound Doppler signals are edited electronically before fetal heart rate data are printed onto monitor. Reflected ultrasound signals from moving fetal heart valves analysed through a microprocessor that compare incoming signals with the most recent previous signal. This process is called autocorrelation, is based on the fact that fetal heart rate has regularity whereas “noise”is random and without regularity[6]. Several fetal heart rate motions must be deemed electronically acceptable by microprocessor before fetal heart rate is printed. Such electronic editing has greatly improved the tracing quality of externally recorded fetal heart rate.

Material and Method

This was prospective case study conducted during March 2020 to July 2021or till sample size is reached, whichever is earlier at Department of Obstetrics and Gynaecology, Mahila Chikitsalya, SMS Medical College Jaipur. The study included Sample size of 250 patients, who went through inclusion and exclusion criteria are included in this study.

Inclusion criteria

1. Subjects who are willing to participate in the study
2. Gestational ages between 37-42 completed weeks
3. Cervical dilatation upto 4 cm.

Exclusion criteria

1. Subjects not willing to participate in study
2. Pregnancy less than 37 weeks of gestation
3. Cervical dilation more than 4cm

4. Previous caesarean section and previous scar on uterus.

Results

In this study we observed 250 patients admitted at Department of Obstetrics and Gynaecology, Mahila Chikitsalya, SMS Medical College Jaipur. Out of 250 patients majority of the patients that is 61.6% were from 20-24 years of age. We found that 72.4% were booked and 27.6% were un booked there is no significant correlation between booking status and NST outcome.

Out of 250 patient majority of patients that is 59.6% are primigravida rest are multigravida. Majority of patients that is 64% were nullipara, 23.2% were para 1 and 8.4% were para 2, 4.4% were para 3 and above. In present study 91.2 % patients had no previous abortion whereas 8.8% patients had earlier abortions.

Table 1: Distribution of study subjects according to period of gestation

POG (weeks)	Normal NST		Indeterminate NST		Abnormal NST		Total	
	N	%	N	%	N	%	N	%
37 – 376d wk	83	40.7	9	34.6	7	35	99	39.6
38 – 38+6	71	34.8	11	42.3	6	30	88	35.2
39-39 6d wk	44	21.6	5	19.2	2	10	51	20.4
40-42 wk	6	2.9	1	3.8	5	25	12	4.8
Total	204	100	26	100	20	100	250	100

In table 1, Out of 250 patients 39.6% patients have gestation age 37 to 376d weeks, 35.2% patients have gestation age from 38wk to 38wk6d, 20.4% from 39 to 39wk6d, 4.8% from 40 to 42 wk. We found that 81.6% had normal NST test, 10.4% had indeterminate NST, 8% had abnormal NST.

We found that out of the patients who had normal NST test 94.6% patients had normal delivery, 5.4% patients had LSCS. In patients who had indeterminate NST 53.8% had normal delivery, 7.7% had assisted vaginal delivery, 38.5% had LSCS. In patients who had abnormal NST 53.8% had FTND, 7.7% had assisted vaginal delivery, 38.5% had LSCS.

Table 2: Distribution of study subjects according to indications of LSCS

Indications of LSCS	Normal NST		Indeterminate NST		Abnormal NST		Total	
	N	%	N	%	N	%	N	%
APH	0	0	0	0	2	11.8	2	5.3
FD	2	18.2	0	0	4	23.5	6	15.8
FI	4	36.4	0	0	0	0	4	10.5
MSL	4	36.4	7	70	10	58.8	21	55.3
NPOL	1	9.1	0	0	1	5.9	2	5.3
NR NST	0	0	3	30	0	0	3	7.9
Total	11	100	10	100	17	100	38	100
Chi-square = 24.940 with 10 degrees of freedom; P = 0.005 (S)								

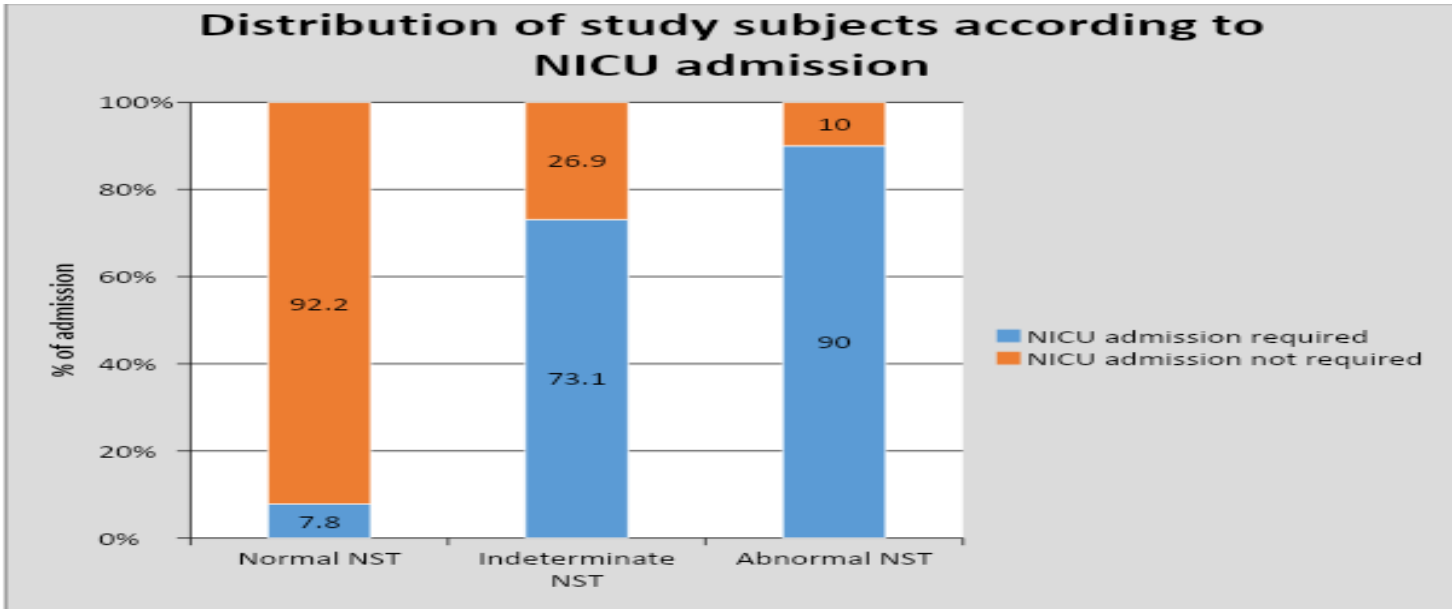
In table 2, Most common indication of LSCS in patient with normal NST is failed induction and meconium aspiration syndrome that is 36.4%. Most common indication of LSCS in patients who had indeterminate NST is MSL that is 70% and most common indication in patients who had abnormal NST is MSL that is 58.8%.

Table 3: Distribution of study subjects according to APGAR score at 1 min

APGAR score at 1 min	Normal NST		Indeterminate NST		Abnormal NST		Total	
	N	%	N	%	N	%	N	%
<7	4	2	6	23.1	12	60	22	8.8
>7	200	98	20	76.9	8	40	228	91.2
Total	204	100	26	100	20	100	250	100
Chi-square = 83.820 with 2 degrees of freedom; P < 0.001 (S)								

In table 3, Out of 250 neonates 91.2% had APGAR>7 at 1 min of birth. 8.8% had APGAR<7 at 1 min of birth. Out of 22 neonates who had who had APGAR<7, 54.4% had abnormal NST, 27.2% had indeterminate NST, 18.1% had normal. NST. Out of the patients who had APGAR>7 at 1 min. 3.5% had abnormal NST, 8.7% had indeterminate NST, 87.7% had normal NST. There is significant statistical correlation between NST outcome and APGAR score.

In this present study we found that Out of 250 neonates 10% were <2.5kg, 90% were >2.5 kg. There is no correlation between birth weight and NST outcomes.



Graph 1: Distribution of study subjects according to

NICU admission

In graph 1, we found that patients who had normal NST only 7.8% neonates required admission, In patients who had indeterminate NST 26.9% neonates needed admission, In patients who had abnormal NST 90% neonates needed admission. There is significant

correlation between NST outcome and neonatal admissions.

In our study we found that 9.2% neonates were with birth asphyxia, 2.8% patients with HIE, 4% with neonatal jaundice and 8.8% neonates with MAS. We found that Out of patients who had normal NST only 1% neonate needed ventilator support, and patients who had indeterminate NST 11.5% neonate needed ventilatory support, patients who had abnormal NST 30 % neonate needed ventilator support.

Discussion

The present study is done with the aim to find out incidence of various fetal outcomes by interpreting the fetal heart rate tracing using NICHD (National Institute of Child and Human Development) three tier systems.

In present study patients were selected from all age group, maternal age group between 20-24 year was most common that is 61.6%, these findings were similar to Lohana RU et al[6] study who found that 21 to 30 years was most common age group and Bhide et al[7] study who found that 26 to 30 years was most common, there is no significant correlation between age and NST outcome. In our study 15.2% had lSCS that is similar with Bhide et al[7] study in which lSCS rate was 18%. There is significant correlation between LSCS rate and NST outcome. LSCS rate was higher in indeterminate NST and abnormal NST.

In present study there are 1.2% instrumental delivery that is comparable with Sharma P et al[8] study in which there are 6.38% instrumental delivery. Out of 204 neonates who had normal NST only 4 that is 1.9% had APGAR at 1 min <7, out of 26 neonates who had indeterminate NST 6 had APGAR <7 that is 23%, out of 20 neonates who had abnormal NST 8 had APGAR <7 that is 40 %.this is similar with Lohana RU et al[6] study in which 53.3% had non-reactive NST preceding to <7 APGAR.

Out of 53 neonates admitted in NICU 7 neonates admitted due to hypoxic ischemic encephalopathy 85.7% had indeterminate or abnormal NST, 22 neonates had meconium aspiration syndrome of which 77.2% had indeterminate and abnormal NST, 10 neonates had neonatal jaundice of which only 30% had indeterminate or abnormal NST, 23 neonates had birth asphyxia of which 73% had indeterminate or abnormal NST. In our study 2.8% had HIE out of which 85.7% had indeterminate or abnormal NST. These results were similar to Sharma P et al[8] study.

In our study out of 250 neonates 99.2% survived, while perinatal mortality rate was 0.8%.it is similar with Rouf s et al[9] study in which neonatal mortality rate in study group was 2.7%.

Conclusion

The major goal of antepartum surveillance in normal pregnancies without any risk factor is an appropriate and timely identification and intervention of fetus at risk of morbidity and mortality and thus unnecessary delay in intervention can be avoided and hence a better perinatal outcome could be achieved, other important goal is to avoid unnecessary intervention. Non stress test is a simple, non-invasive test which can be a good predictor of healthy fetus in normal pregnancies between 37 -42 weeks of gestation. NST is useful tool to avoid obstetric litigation with expectation of good outcome.

References

1. 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 Oct 28;7(2):177-82.

2. Freeman RK. The use of the oxytocin challenge test for antepartum clinical evaluation of uteroplacental respiratory function. Am J Obstet Gynecol. 1975 Feb 15;121(4):481-9. doi: 10.1016/0002-9378(75) 90079-4. PMID: 1146875
3. Lee CY, Di Loreto PC, O'Lane JM. A study of fetal heart rate acceleration patterns. Obstetrics and Gynecology. 1975 Feb;45(2):142-146. PMID: 1118084.
4. Margulis E, Binder D, Cohen AW. The effect of propranolol on the nonstress test. Am J Obstet Gynecol. 1984 Feb 1;148(3):340-1. doi: 10.1016/s0002-9378(84)80083-6. PMID: 6695981.
5. Neilson DR Jr, Freeman RK, Mangan S. Signal ambiguity resulting in unexpected outcome with external fetal heart rate monitoring. Am J Obstet Gynecol. 2008 Jun;198(6):717-24. doi: 10.1016/j.ajog. 2008.02.030. Epub 2008 Apr 2. PMID: 18377859.
6. Lohana R U, Nurani R, Chandraharan E, Lowe V, Ugwumadu A, Arulkumaran S. Misidentification of maternal heart rate as fetal on cardiotocography during the second stage of labor: the role of the fetal electrocardiograph. Acta Obstet Gynecol Scand. 2012 Dec; 91(12):1428-32. doi: 10.1111/j.1600-0412.2012.01511.x. Epub 2012 Sep 18. PMID: 22881463.
7. Bhide A, Bhattacharya M S. Predictive value of the nonreactive nonstress test in evaluating neonatal outcome. J Postgrad Med 1990;36(2):104-5
8. Preeti Sharma, Nikita Gandotra, Deepti Rana, Sabiya Rasheed, Anil Kumar. Correlation of admission labour test in low risk pregnancies with pregnancy outcome. Int J 2008 obstet Gynecol.2019 May ;8(5);1880-83
9. Raouf 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;8(2):172-79.