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"ROLE OF NON STRESS TEST ON ADMISSION (ADMISSION TEST) AT TERM AND ITS FETAL OUTCOME"

Gynaecology

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ABSTRACT

Background: The non-stress test (NST) and the ultrasound biophysical profile (BPP) are the primary antenatal fetal surveillance methods now used.

Aim: To evaluate the role of admission test in normal and high risk pregnancies and to correlate the result of admission test with mode of delivery and fetal outcome.

Methods: A prospective observational cohort study was conducted over a period of one year. All the cases were evaluated by Non Stress Test at admission (Admission Test) and the reliability of NST test was evaluated.

Results: Out of 200 patients, 149 patients were reactive, 19 were suspicious and 32 were non – reactive. Fetal distress was seen in 5% of reactive cases while 67% of non-reactive and suspicious cases. Admission test had 90% specificity and 79.8% sensitivity.

Conclusion: The intrapartum surveillance of high risk pregnancies with NST can effectively screen for identification of high risk fetuses and segregate the population that is at risk for perinatal mortality and morbidity.

KEYWORDS

NST, high risk pregnancies, fetal distress.

INTRODUCTION

One of the greatest challenges that obstetricians face on a daily basis is the task of delivering, for each patient, a vigorous and neurologically intact infant.[1] Increasingly sophisticated non-invasive equipments have made the intrauterine environment more accessible to the obstetrician. . The NST is based on the principle that the fetal heart will accelerate with movement in a fetus with normal autonomic function. Accelerations of 15 beats per minute above baseline and for 15 seconds from the baseline in a 20- to 40-minute period are considered reactive and are a measure that has stood the test of time as a predictor of fetal well-being at that point in time. Evidence from randomized trials shows that routine electronic fetal monitoring throughout labour results in increased, probably unnecessary, intervention for apparent fetal distress[2].

In this study, the effectiveness and the role of NST has been evaluated for assessing the perinatal outcome of fetuses in high risk pregnancies.

MATERIALS AND METHODS

A prospective observational cohort study was conducted at Government General Hospital, Anantapuram (A.P.) over a period of one year i.e, from October 2016 to September 2017. Two hundred antenatal cases with term gestation and vertex presentation admitted in the antenatal ward were randomly selected. Of these 200 cases, 100 high risk (study group) pregnancies and 100 low risk (control group) pregnancies were enrolled into study. Informed consent was taken from all the cases. A detailed history was taken regarding the last menstrual period, parity, previous obstetric history; number of previous antenatal check-ups was noted in pre-structured proforma. A thorough clinical examination including general examination, vital data and obstetric examination was done. All preliminary and relevant investigations were made and the treatment schedule noted down. All the cases were evaluated by Non Stress Test as and when required. The NSTs were classified into 3 groups[3]:1. Reactive or normal test. 2. Non-reactive or ominous test and 3. Suspicious or Equivocal test. Mode of delivery and Apgar score at 1minute & 5 minutes were recorded.

Inclusion criteria for the study were:

Patients with following risk factors were included in high risk pregnancy study group.

- Pregnancy induced hypertension, Eclampsia
- Anemia {Hb - < 8gm%} complicating pregnancy
- Premature rupture of membranes
- Heart disease complicating pregnancy
- Intrauterine growth retardation
- Post term pregnancy
- Elderly primi
- Bad Obstetric History
- Gestational Diabetes Mellitus

Control group did not have any of the above risk factors.

The exclusion criteria for the study were:-

1. Sedative usage in the mother 24 hours before testing
2. Malpresentations and preterm
3. Major congenital anomaly of the fetus detected by routine antenatal ultrasound scanning.

Statistical Analysis:

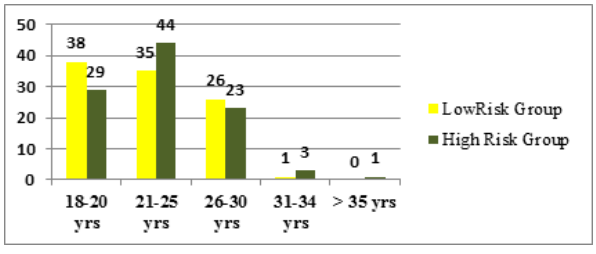
Data was collected on a pre- designed structured proforma and entered into Excel sheet. SPSS version 21 was used for statistical analysis .To study the association of outcome with other variables chi square test was used and p value < 0.01 was considered significant. Sensitivity, specificity, positive and negative predicted values were calculated for the reliability of NST test.

RESULTS

318 NST tracings that were recorded in 100 high risk and 100 low risk pregnancies were studied.

The age distribution of patients in high risk and low risk groups is shown in Chart 1. More than fifty per cent of study cases were between 18 years to 25 years.

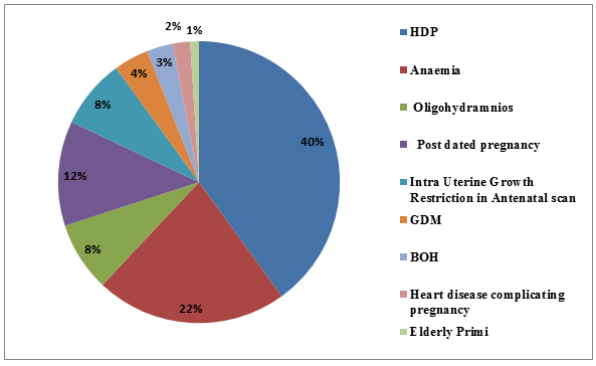
Chart 1: Age distribution of high risk and low risk pregnancy



The mean age for high risk and low risk were 23.58 years and 22.88 years respectively. There was no statistical difference in the mean age between the two groups as p > 0.185. Majority of cases in both the groups were primigravida (52%).

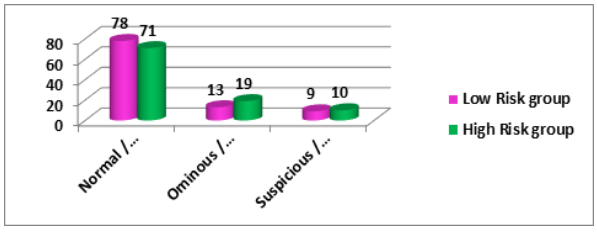
Distribution of risk factors in high risk cases is depicted in Chart 2. In the study group the commonest indication was hypertensive disorders of pregnancy (40%) of which 10% had pre- eclampsia and 4% had eclampsia. Next common indication was anemia complicating pregnancy which accounted for 22% of total high risk cases. The reason for Hypertensive disorders of pregnancy being commonest could be due to large group constituted by primigravida and teenage patients (18 – 20years).

Chart 2: Distribution of High risk cases



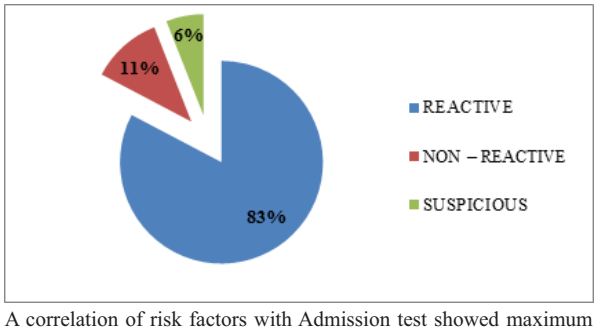
At admission, the CTG results in the study showed 21% of abnormal NST's in low risk group and 29% in high risk group as shown in chart 3.

Chart 3: Distribution of patients based on Admission Tests (AT)



Out of total 318 NST's taken in total 200 cases, 263 (83%) were Reactive, 36 (11%) were Non – Reactive and 19 (6%) Suspicious.

Chart 4: Distribution of NST's in the Study



A correlation of risk factors with Admission test showed maximum number of Non- reactive cases occurred in HDP (47%) followed by anemia (26%). Out of 4 cases of eclampsia, 3 had Non-reactive and 1 had Suspicious Admission Test. Correlation between mode of delivery and Admission test is depicted in Table 1.

Table 1: Correlation between Mode of delivery and Admission test

Mode of Delivery	Low Risk Group (n1 = 100)			High Risk Group (n2= 100)		
	Reactive (n = 78)	Non-Reactive (n = 13)	Suspicious (n = 9)	Reactive (n = 71)	Non-Reactive (n = 19)	Suspicious (n = 10)
SVD	63(81%)	1(7.5%)	1(11%)	53(75%)	1(5%)	2(20%)
LSCS	6(8%)	9(70%)	4(44.5%)	10(14%)	16(85%)	6(60%)
Outlet forceps	5(6%)	2(15%)	3(33.5%)	6(8%)	1(5%)	1(10%)
Ventouse	4(5%)	1(7.5%)	1(11%)	2(3%)	1(5%)	1(10%)

Normal vaginal delivery occurred in 81% and 75% of reactive cases in low risk & high risk cases respectively. In 70% of low risk and 85% of high risk non-reactive cases LSCS was done. When AT was abnormal the incidence of operative deliveries increased.

Out of 200 cases, in 158 (80%) cases babies had no birth asphyxia and there was only 1 stillborn in high risk case. In the study, out of total 149 reactive cases 8 (5%) of them delivered babies with birth asphyxia. Whereas out of 51 cases with abnormal admission test 34 (67%) of them delivered babies with birth asphyxia. In low risk cases, 97.5% of reactive cases had no birth asphyxia while 61.5% of non-reactive cases had birth asphyxia. In high risk cases, 91.5% of reactive cases had no birth asphyxia while 90% of non-reactive cases had birth asphyxia.

Table 2 indicates that admission test is a reliable screening test for the predicting the fetal outcome

Table 2: Fetal outcome in relation to AT results

Fetal Outcome	Normal cases(n=100)			High Risk cases (n=100)		
	Reactive (n=78)	Non –reactive (n=13)	Suspicious (n=9)	Reactive (n=71)	Non –reactive (n=19)	Suspicious (n=10)
1" & 5" Apgar Score > 6/10	76 (97.5%)	5(38.5%)	6(67%)	65 (91.5%)	1(5%)	5(50%)
1" & 5" Apgar Score ≤ 6/10	2(2.5%)	8(61.5%)	3(33%)	6(8.5%)	17(90%)	5(50%)
IUD	0	0	0	0	1(5%)	0

Reliability of Admission test is calculated and tabulated in table 3.

Table 3: Reliability of Admission Test

Sensitivity	79.8%
Specificity	90%
Positive predictive value	66.66%
Negative predictive value	94.63%
Percentage of false negatives	19.05%
Percentage of false positives	10.7%

Admssion test had 90% specificity and 94% negative predictive value and hence it is an excellent tool for intrapartum surveillance and in predicting fetal outcome.

DISCUSSION

As compared to Jophy et a[14] and Buckshee et al 5 our study also showed a higher percentage of abnormal AT results probably be due to the fact that our hospital is a tertiary referral center where most of the complicated deliveries were referred.

Table 4: Comparison of Admission test results:

AT result	Jophy et al[4]	Buckshee et al [5]	Present study
Reactive	68%	85%	74.5%
Suspicious	29%	11%	9.5%
Non-reactive	3%	4%	16%

In the present study, 81.25% of Non- reactive cases had fetal distress which is comparable with studies done by Aparne Hegde et al (75%). While in Ingermarsson et al study 40% of the non- reactive cases developed fetal distress as shown in table 5.

Table 5: Comparison of fetal distress in relation to Admission test

Study	Admission Test	No.Of Patients	No.of patients with fetal distress
Aparna Hegde[6] et al	Reactive	169	6(3.6%)
	Suspicious	19	3(15%)
	Ominous	12	9(75%)
Ingemarsson[7] et al	Reactive	982	32(1.3%)
	Suspicious	49	5(10.2%)
	Ominous	10	4(40%)
Present study	Reactive	149	8(5.36%)
	Suspicious	19	8(42.1%)
	Ominous	32	26(81.25%)

The sensitivity of the present study is 79.8% when compared with Aparna Hegde et al and Ingermarsson et al where the sensitivity is 66.7% and 61% respectively .The specificity of the study is 90% which is comparable to all the other studies

Table 6: Comparison of Studies with Outcome for Admission Test

Study	Sensitivity (%)	Specificity (%)	NPV (%)	PPV (%)
Ingermarsson[7] et al (1986)	61	95.4	98.7	40
Aparna Hegde[6] et al 2001)	66.7	90	96.94	38.70
Buckshee[5] et al (1999)	21.43	87.50	74.12	40
Desai[8] et al (2003)	44	93.12	90.6	52.2
Present study	79.8	90	94.63	66.66

CONCLUSION

Admission test is a simple, non-invasive method, which can be performed with minimal training. It is an effective screening test for fetal heart rate monitoring in high-risk pregnancy. It is less time consuming and has no contraindications and has no ill effects on fetus or mother. Non-reactive tests are associated with statistically significant increase in caesarean section rate for fetal distress.AT has high degree of negative predictive value, which suggests that it is better at ruling out fetal compromise. Therefore, a normal admission test is an excellent predictor of a healthy fetus. Thus to deliver quality care to all the pregnant women in high flow hospitals we recommend NST at admission i.e., Admission test must be considered as a screening tool for intrapartum surveillance.

Conflict of interest - Nil

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