VALIDITY OF ADMISSION TEST AS A SCREENING TEST IN DIFFERENTIATING HIGH AND LOW OBSERVATIONAL ANTENATAL WOMEN- A PROSPECTIVE STUDY IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND

Non-stress test is a non-invasive test, most commonly used for the antepartum evaluation of foetal well-being. Admission cardiotocogram is usually a 20 mins. recording of foetal heart rate immediately after admission to labour ward. Abnormal tracing might indicate and identify potential foetal compromise at an early stage and allow early intervention. Admission test enable the obstetrician to concentrate more on those foetuses having abnormal tracings than those with reactive tracings.

MATERIALS AND METHODS

It is a prospective study of assessing the validity of admission test as a screening test to differentiate high and low observational antenatal women. The study was conducted at Institute of Social Obstetrics and Govt. Kasturba Gandhi Hospital, Triplicane, Chennai during the period of April 2007 to April 2008; 800 number of antenatal women who were admitted through casualty were taken for the study based on the inclusion and exclusion criteria. After eliciting the history and complete clinical examination of the patient, the admission test is performed on each patient for 20 minutes. The admission test tracings were typed into- (i) Reactive, (ii) Suspicious, (iii) Ominous. Depending on the type of tracings, the mode of management varies. Patient can be divided into low and high observational status depending upon the tracings.

RESULTS

In this study, the number of patients in the age group between 18 to 20 years were 80 (10%), 21 to 29 years were 600 patients (75%) and the patients in 30 to 35 years were 120 (15%). In this study, the patients in primi were 496 (62%) and second gravida were 304 patients (38%). Highest number of patients were primi. Among them 784 patients were booked ones and 16 were unbooked. The admission test tracing pattern was such as reassuring pattern in 481 patients, suspicious in 267 patients and ominous in 52 patients. CTG observational status was low in 481 (60.13%) patients and it was high in 319 patients (39.87%). Spontaneous labour occurs in 624 patients (78%) and induced labour in 176 patients (22%). Since "p" value is less than 0.05, there is a significant correlation between type of tracings and mode of delivery. Among the total of 800 patients in this study, 380 (47.5%) number of the patients had the spontaneous labour in the primi gravida and 116 (14.5%) patients had the induced labour. In second gravida, it was about 244 patients (30.5%) in spontaneous labour and 304 (38%) were in induced labour; P value- 0.226; statistically no significant relationship exists between Gravida and type of Labour. In this study, APGAR score more than 7 patients were 561 number (70.1%) and foetal outcome was good in 561 patients and it is poor in 239 patients. In this study the highest number of patients, 361 had the babies with birth weight of 2.4 to 2.7 Kgs.

CONCLUSION

The study shows that there is a good correlation between reactive tracings and good foetal outcome even with less frequent monitoring. Hence, the admission test can be used as a useful tool to differentiate between these two categories of women in early labour to maximally utilize the available limited man power.

KEYWORDS

Admission Test, Tracing Pattern, Antenatal.

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BACKGROUND

Non-stress test is a non-invasive test, most commonly used for the antepartum evaluation of foetal well-being.^{1,2} The rationale underlying this test is that the presence of spontaneous foetal health rate accelerations with foetal movements is an indicator of foetal well-being.

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Admission cardiotocogram is usually a 20 mins. recording of foetal heart rate immediately after admission to labour ward. Abnormal tracing might indicate and identify potential foetal compromise at an early stage and allow early intervention.^{3,4}

Admission test enable the obstetrician to concentrate more on those foetuses having abnormal tracings than those with reactive tracings.

Need for Admission Test

In low resource setting, there is a need to segregate those antenatal women who require constant monitoring and those who can be monitored as usual. One of the low cost, easily available methods with long-term benefit is admission test. Though, the initial cost could be high, the recurring cost

effectiveness of this test makes it an ideal tool to improve perinatal outcome.

MATERIALS AND METHODS

Material/Foetal Monitor BT- 300 Consists of-

1. BT 300 main body.
2. Ultrasound transducer (Doppler Probe).
3. The Co-Transducer (Uterine contraction probe).
4. Event marker.
5. Thermal print paper.
6. Power adapter.
7. Ultrasound gel.
8. Transducer belt.

Type of Study

It is a prospective study of assessing the validity of admission test as a screening test to differentiate high and low observational antenatal women.

Place of Study

The study was conducted at Institute of Social Obstetrics and Govt. Kasturba Gandhi Hospital, Triplicane, Chennai during the period of April 2007 to April 2008.

Study Population

800 antenatal women were selected based on inclusion and exclusion criteria.

Inclusion Criteria

1. Primi and Second gravida.
2. Singleton pregnancy.
3. Cephalic presentation.
4. No contraindications for vaginal delivery.
5. No Medical, Surgical, Obstetrical complications.

Exclusion Criteria

1. Multigravida.
2. Preeclampsia.
3. Gestational Diabetes Mellitus, Multiple pregnancies.
4. Abruptio placentae.
5. Heart disease complicating pregnancy.
6. Malpositions and Malpresentations.
7. Anaemia.
8. FGR- Foetal growth restriction.
9. Post Term.

Non-Stress Test

The pregnant mother was asked to empty her bladder and all the procedure, what to expect during the procedure and what is expected of her were explained to her. She is placed in the semi-Fowler's position. The ultrasound transducer is applied to the maternal abdomen with a gel interface and the foetal heart rate is observed for 20 mins. The patient was asked to press the event marker every time she perceives foetal movement. Presence of spontaneous foetal heart rate accelerations with foetal movement is an indicator of foetal well-being.

Method of Study

Antenatal women who are admitted through casualty were taken for the study based on the inclusion and exclusion criteria. After eliciting the history and complete clinical examination of the patient (both general and obstetrical) consent was obtained from each patient for admission test.

Before getting consent from the patients, the entire procedure is explained to her.

The admission test is performed on each patient for 20 minutes. The admission test tracings were typed into- (i) Reactive, (ii) Suspicious, (iii) Ominous. Depending on the type of tracings, the mode of management varies.

Patient can be divided into low and high observational status depending upon the tracings.

Low observational status- Reactive tracing.

High observational status- Suspicious + Ominous Tracings.

If the admission test tracings are reactive and not in immediate labour, she is transferred to antenatal ward. If the tracings are ominous, she is transferred to labour ward and further management is decided based on individual condition.

In suspicious tracings, the patient is transferred to I stage labour room. After giving intravenous hydration and nasal oxygen, the admission test is repeated after 30 minutes. If the repeat admission test is reactive, she is observed in the low observational unit.

When the repeat admission test is still suspicious, she is shifted to high observational unit and additional measures to monitor foetus are initiated. Necessary interventions are effective depending on individual outcome.

NST Variables to be Evaluated are-

- Baseline foetal heart rate.
- Variability of foetal heart rate.
- Presence or absence of accelerations.
- Presence or absence of decelerations.

Normal, Reassuring or Reactive

- Two or more accelerations (> 15 beats/min.) lasting for more than 15 secs.) in 20 minutes.
- Baseline foetal heart rate 110 - 150 beats/min.
- Baseline variability 5 - 25 beats/min.
- Absence of decelerations.
- Moderate tachycardia/bradycardia and accelerations.

**Figure 1. Reactive Trace with Acceleration
Suspicious, Equivocal or Non-Reactive**

- Absence of accelerations.
- Reduced baseline variability (5 - 10 beats/min) for more than 40.
- Baseline bradycardia (FHR less than 100 beats/min or tachycardia (FHR more than 150 beats/min).
- Presence of decelerations.
- Variable decelerations depth < 60 beats per min, duration < 60 sec.

Figure 2. Suspicious: i) Baseline Heart Rate > 150 bpm; ii) No Accelerations

Figure 3. Suspicious: i) Baseline FHR > 150 bpm; ii) No Accelerations

Pathologic/Ominous

- Silent pattern (5 beats/min) and baseline foetal heart rate > 150 beats per min (or) < 110 beats/min.
- No acceleration.
- Repeated late decelerations and/or complicated variable decelerations.
- Prolonged bradycardia (FHR < 100 beats/min for more than 10 mins.).

Figure 4. Ominous: i) Prolonged Bradycardia; ii) No Accelerations

Statistical Analysis

The observed data was analysed by SPSS version 21.0 software. The collected data were tabulated and expressed as mean, standard deviation, numbers and percentages. Continuous variables were compared with sensitivity and specificity tests. The comparison was done using Chi-Square, as appropriate value reported at the 95% confidence interval. P value < 0.05 was considered as statistically significant.

RESULTS

In this study, the number of patients in the age group between 18 and 20 years were 80 (10%), 21 to 29 years were 600 patients (75%) and the patients in 30 to 35 years were 120 (15%). Shown in Figure 5.

Figure 5

In this study, the patients in primi were 496 (62%) and second gravida were 304 patients (38%). Highest number of patient were primi as shown in Fig. 6. Among them 784 patients were booked ones and 16 were un-booked as shown in Table 1.

Figure 6

Booking Status	No. of Patients	% of Patients
Booked	784	98
Unbooked	16	2

Table 1. Booking Status

Admission Test Trace Pattern

Table number 4 shows the pattern such as reassuring pattern in 481 patients, suspicious in 267 patients and ominous in 52 patients, which is shown in Table 2. CTG observational status was low in 481 (60.13%) patients and it was high in 319 patients (39.87%), which is shown in Table 3.

Tracings	No. of Patients	% of Patients
Reassuring	481	60.1
Suspicious	267	33.4
Ominous	52	6.5

Table 2. Admission Test Trace Pattern

Observational Status	No. of Patients	% of Patients
Low	481	60.13
High	319	39.87

Table 3. CTG Observational Status

Spontaneous labour occurs in 624 patients (78%) and induced labour in 176 patients (22%) shown in Table 4 and mode of delivery was shown in Table 5.

Type of Labour	No. of Patients	% of Patients
Spontaneous	624	78
Induced	176	22

Table 4. Type of Labour

Mode of Delivery	No. of Patients	% of Patients
SVD	545	68.1
IVD	80	10
CS	175	21.9

Table 5. Mode of Delivery

Figure 7

Tracings	Mode of Delivery			Total
	SVD	IVD	CS	
Reactive n = 481	347 (43.4%)	40 (5.0%)	94 (11.8%)	481 (60.1%)
Suspicious 11 - 267	178 (22.3%)	27 (3.4%)	62 (7.8%)	267 (33.4%)
Ominous n - 52	20 (2.5%)	13 (1.6%)	19 (2.4%)	52 (6.5%)
Total	545 (68.12%)	80 (10%)	175 (21.88%)	800 (100%)

Table 6. Relation between Admission Test Tracings and Mode of Delivery

Mode of Delivery	No. of Patients	% of Patients
SVD	545	68.1
IVD	80	10
CS	175	21.9

Table 7. Mode of Delivery

Relation between admission test tracing and the mode of delivery was shown in Table 6, Figure 7. As per reason, Chi-Square test P value= 0.000 since "p" value is less than 0.05 there is a significant correlation between type of tracings and mode of delivery.

Gravida	Type of Labour		Total
	Spontaneous	Induced	
Primi	380 (47.5%)	116 (14.5%)	496 (62%)
Second	244 (30.5%)	60 (7.5%)	304 (38%)
Total	624 (78.0%)	176 (22.0%)	800 (100.0%)

Table 8. Between Gravida and Type of Labour

Among the total of 800 patients in this study, 380 (47.5%) number of the patients had the spontaneous labour in the primi gravida and 116 (14.5%) patients had the induced labour.

In second gravida, it was about 244 patients (30.5%) in spontaneous labour and 304 (38%) were in induced labour, which was shown in Table 8.

As per chi square test, p value- 0.226 statistically no significant relationship exists between Gravida and type of Labour.

Type of Labour	Mode of Delivery		
	SVD	IVD	CS
Spontaneous	425 (53.1%)	60 (7.5%)	139 (17.4%)
Induced	120 (15.0%)	20 (2.5%)	36 (4.5%)

Table 9. Type of Labour vs. Mode of Delivery

Labour vs. mode of delivery was shown in Table 9. In this study among the spontaneous on set of labour, spontaneous vaginal delivery were 425 patients (53.1%), induced vaginal delivery were 60 patients and caesarean sections were in 139 (17.7%) number of cases. In induced labour, the spontaneous vaginal deliveries were 120 (15.0%) number of cases, induced deliveries were 20 (2.5%) numbers and caesarean was in 36 (4.5%) cases.

P value= 0.731, since p value > 0.05 there is no significant relationship between type of labour and mode of delivery.

Gravida	Mode of Delivery			Total
	SVD	IVD	CS	
Primi	361 (45.1%)	54	81 (10.17%)	496 (62.0%)
Second	184 (23.0%)	26 (3.3%)	94 (11.8%)	304 (38.0%)
Total	545 (68.1%)	80 (10.0%)	175 (21.9%)	800 (100.0%)

Table 10. Gravida vs. Mode of Delivery

Gravida vs. mode of delivery was shown in Table 10. As per Chi Square test p value= 0.000, so the association between these two variables is statistically significant.

The APGAR score and its percentage, the foetal outcome were shown in Table 11 and 12.

APGAR Score	No.	Percent
Less than 4	67	8.4%
4 - 6	172	21.5%
More than 7	561	70.1%

Table 11. APGAR Score

Foetal Outcome	No	Percent
Good	561	70.1%
Poor	239	29.9%

Table 12. Foetal Outcome

Admission test tracing correlation with APGAR score and admission test tracing with foetal outcome were shown in Table 13 and Table 14, respectively. In this study, APGAR score more than 7 patients were 561 in number (70.1%) and foetal outcome was good in 561 patients and it is poor in 239 patients.

Admission Test Tracings	APGAR			TOTAL
	< 4	4 - 6	> 7	
Reactive	12 (1.5%)	59 (7.4%)	410 (51.3%)	481 (60.1%)
Suspicious	30 (3.8%)	98 (12.3%)	139 (17.4%)	267 (33.4%)
Ominous	25 (3.1%)	15 (1.9%)	12 (1.5%)	52 (6.5%)
Total	67 (8.4%)	172 (21.5%)	561 (70.1%)	800 (100.0%)

Table 13. Admission Test Tracings vs. APGAR Score

P value = 0.002.

Since p value is < 0.05, there is a statistically significant correlation between admission test tracings and APGAR.

Admission Test Tracing	Foetal Outcome		Total
	Good	Poor	
Reactive	410 (51.3%)	71 (8.9%)	48 (60.1%)
Suspicious	139 (17.4%)	128 (16.0%)	267 (33.4%)
Ominous	12	40	52 (65.0%)
Total	561 (70.1%)	239 (29.9%)	800 (100.0%)

Table 14. Admission Test Tracings vs. Foetal Outcome

As per Pearson Chi-square test, p value= 0.002. Abnormal CTG tracings are associated with poor foetal outcome than reactive tracings.

Mode of Delivery	APGAR			Total
	< 4	4 - 6	> 7	
SVD	37 (4.6%)	119 (14.9%)	389 (48.6%)	545 (68.1%)
	11 (1.4 ⁰ /0)	14 (1.8%)	55 (6.9%)	80 (10.0%)
CS	19 (2.4%)	39 (4.9%)	117 (14.6%)	175 (21.9%)
Total	67 (8.4%)	172 (21.5%)	561 (70.1%)	800 (100.0%)

Table 15. Mode of Delivery and APGAR Score

As per chi-square test P value = 0.149.

Mode of Delivery	Foetal Outcome		Total
	Good	Poor	
SVD	389 (48.6%)	156 (19.5%)	545 (68.1%)
IVD	55 (6.9%)	25 (3.1%)	80 (10.0%)
CS	117 (14.60/0)	58 (7.3%)	175 (21.9%)
Total	561 (70.1%)	239 (29.9%)	800 (100.0%)

Table 16. Mode of Delivery and Foetal Outcome

As per chi-square test, P value= 0.054.

Birth Weight	Frequency	Percent
2.4 - 2.7	349	43.62
2.8 - 3.1	245	30.63
3.2 - 3.4	206	25.75

Table 17. Birth Weight

Birth Weight (kg)	Mode of Delivery			TOTAL
	SVD	IVD	CS	
2.4 - 2.7	239 (29.8%)	36 (4.5%)	74 (9.25%)	349 (43.62%)
2.8 - 3.1	172 (21.5%)	23 (2.87%)	50 (6.25%)	245 (30.63%)
3.2 - 3.4	134 (16.75%)	21 (2.62%)	51 (6.38%)	206 (25.75%)
Total	545 (68.13%)	80 (10%)	175 (21.87%)	800 (100.0%)

Table 18. Birth Weight and Mode of Delivery

As per chi-square test, P value= 0.996.

Birth Weight	APGAR			TOTAL
	< 4	4 - 6	> 7	
2.4 - 2.7	36 (4.5%)	70 (8.75%)	243 (30.38%)	349 (43.62%)
2.8 - 3.1	15 (1.88%)	59 (7.38%)	171 (21.38%)	245 (30.63%)
3.2 - 3.4	16 (2%)	43 (5.38%)	147 (18.38%)	206 (25.75%)
Total	67 (8.38%)	172 (21.5%)	561 (70.12%)	800 (100.0%)

Table 19. Birth Weight and APGAR Score

As per chi-square test, P value = 0.074.

Birth Weight (kg)	Foetal Outcome		Total
	Good	Poor	
2.4 - 2.7	243 (30.38%)	106 (13.25%)	349 (43.63%)
2.8 - 3.1	171 (21.38%)	74 (9.25%)	245 (30.62%)
3.2 - 3.4	(18.38%)	59 (7.38%)	206 (25.75%)
Total	561 (70.13%)	239 (29.87%)	800 (100.0%)

Table 20. Birth Weight and Foetal Outcome

As per chi-square test, P value= 0.871.

Sensitivity **	70.29%
Specificity **	73.08%
Positive Predictive Value **	52.66%
Negative Predictive Value **	85.24%
Diagnostic Accuracy **	7225

Table 21. Admission Test Evaluation

DISCUSSION

In this study, 800 antenatal women were included. Majority of the antenatal women were primi, belonging to the age group 21 - 29 years.

This is in accordance with more pregnancies in particular age group.

Regarding booking status of the patients (Table 3) in this study, 98% (11 - 784) of women were booked. Only 2% (n - 16) were unbooked. Most of the unbooked patients were second gravida. Booking status has no significance in this study.

Discussion on Table 4

In this study, out of 800 AN women 481 (60.1%) of patients had reactive admission test tracings; 33.4% (11 - 267) belonged to suspicious tracings group and 6.5% (n- 52) belonged to ominous group.

In 2002, Kasthugai P and Narogoni S conducted a study on Admission test- an effective risk screening tool with 500 patients. The tracings were: 86.6% (n- 433) had reactive 7.4% (n- 37) belonged to suspicious group and 0.6% (n- 30) belonged to ominous.^{5,6,7}

In Kandan Karibu Hospital, Singapore (1998), a study was conducted in 1000 Antenatal women for admission test in high and low-risk pregnancy.^{8,9} The tracings were reactive 982 (4.3%), suspicious 49 (4.7%) and ominous 10 (1%).

The CTG Observational Status of Antenatal Women (Table 5)

In this study, 481 (60.13%) patients belonged to low observational status and 319 (39.81%) belonged to high observational status. The continuation of change over status patients will be discussed later.

Type of Labour (Table 6)

In the present study, 78% of labourers were spontaneous on set (n- 624). Only 22% were induced type (11 - 176).

Discussion on Table 8

MacDonald et al conducted a randomised trial on admission cardiotocography in 1000 antenatal women (1985).^{10,11} Mode of delivery among them: SVD- 31%, IVD- 9%, CS- 60%. Most

of the caesarean deliveries occurred in abnormal CTG group. They found a statistically significant relation between non-reactive tests and increased incidence of IVD and CS (P < 0.05).

Ingemarsson et al (1986) carried out a study in 1000 AN women on efficacy of admission test in predicting neonatal outcome, their mode of delivery.^{12,13} SVD- 45%, IVD- 6% and CS- 49%. They also found that abnormal admission test tracings were associated with increased caesarean delivery than reactive tracings group (p < 0.04).

In a study conducted by Vinitha Das, GK Malik in 170 AN women on efficacy of admission test in predicting foetal jeopardy in labour, 60.97% of the abnormal tracings group had caesarean delivery.¹⁴ In reactive tracings group, only 45.7% of patients had caesarean delivery. They observed a significant relation between admission test tracings and mode of delivery (p value- 0.04).

In this study, mode of delivery among 800 AN women- 68.1% -SVD, 10% -IVD, 21.9% -CS. On comparing admission test tracings with mode of delivery, only 19.5% (n - 94) of the reactive group had caesarean delivery, but 23.22% (n - 62) of suspicious and 36.53% (n - 19) of the ominous group had caesarean delivery. This showed that abnormal tracings were associated with increased incidence of caesarean delivery than reactive tracings (p < 0.05).

Kidd LC, Patel NB, Smith R did a randomised clinical trial on non-stress antenatal cardiology in 396 AN women in 1985.^{15,16,17} They found that caesarean delivery rates were almost same in both reactive and non-reactive tracings; hence, they concluded that availability of non-stress cardiotocography was not associated with increased labour induction (or) caesarean section.

Discussion on Table 9

In this study when gravida and type of labour were analysed, there was no significant association between them,¹⁸ (p 0.245). In a study by Mires G, Williams et al (2000) on admission test in low risk obstetric population, most of the second gravida were delivered by labour natural of spontaneous onset when they were analysed. There occurred significant association (p < 0.01).

Discussion on Table 10

In this study primi: out of 496 AN women, 361 were delivered by normal vaginal delivery, 54 by Instrumental vaginal delivery and 81 by caesarean section. Among second gravida (11 - 304), 184 patients delivered naturally, 26 patients delivered by Instrumental vaginal delivery and 94 were delivery by Caesarean section. Since p value= 0.000, the relation between these two is statistically significant.

In a study conducted by Nidhikaty (2000) in 1000 AN women, no association existed between parity and mode of delivery (p = 0.226).

Discussion on Table 14

Atul K Sood did a study in 500 AN women on evaluation of non-stress test in low risk pregnancy.^{19,20} They found that 5 mins. APGAR score < 7 and neonatal admissions were more commonly associated with non-reactive tracings than reactive tracings (p < 0.005).

Sandal J et al and Gourounti did a study on effect of admission test on rate of CS, instrumental vaginal delivery

and neonatal APGAR score.^{21,22} The relative risk for having a caesarean delivery (RR 1.2, CI 1.00 - 1.41) and instrumental delivery (RR 1%, CI 1.00 - 1.18) were both high in abnormal tracings group. Similarly, the relative risk for low APGAR (< 7 at 5 mins.) was also high in abnormal tracings group (RR 1.35, CI 0.85 - 2.13). They concluded that abnormal (Suspicious and Ominous) admission test tracings were associated with increased risk of instrumental vaginal delivery and caesarean section and low 5 mins. Apgar score.

Fawole AO, Sotiloye OS did a study on antenatal cardiotocography in 300 AN women in Nigeria.^{23,24} They analysed that low APGAR < 7 occurred most commonly in non-reactive tracings (p= 0.04). Reactive test was associated with 3-fold reduction in the incidence of low APGARs compared with non-reactive.

In 1989 Manterola Alvarez D, Angeles Weintraub conducted a study on admission test and perinatal outcome.^{25,26} They found a statistical significant correlation between suspicious and ominous tracings and foetal condition at birth (APGAR < 7) p= 0.01.

Pattison N, McCowan L did a study to assess the effects of antenatal cardiotocography on perinatal morbidity and mortality in 2000.^{27,28} No significant correlation existed between type of tracings and perinatal morbidity and mortality (p= 0.18).

In 1984, a randomised controlled trial was conducted on admission test by Kidd LC and Smith R. In their study, they observed that frequency of intrapartum foetal distress and low APGAR score were similar in both reactive and abnormal tracings group.

In this study 40 babies of ominous tracings group 128 babies of suspicious group had APGAR score < 7, but only 71 babies of the reactive tracings group had low APGAR score of < 7. So abnormal tracings had 2-fold increased risk of having low APGAR score, then reactive tracings. (p value- 0.002) as discussion on Table 15.

Fawole AO and Sotiloye OS did a study on antenatal cardiotocography (2007) on 150 AN women. They found that non-reactive test was strongly associated with poor foetal outcome (p= 0.04). They concluded that antenatal cardiotocography can be used in low resource settings for improving perinatal care.

Manterola Alvarez and Angeles Weintraub did a study on admission test and foetal outcome (1989).²⁹ They took 600 Antenatal patients, observed that non-reactive tracings were significantly associated with increased risk of instrumental vaginal delivery, caesarean section and poor foetal outcome than reactive tracings group (p= 0.03).

Pattison N and McCowan L did a study to assess the effects of cardiotocography on perinatal morbidity and mortality. They noted no significant effect of antenatal cardiotocography on perinatal outcome (p= 0.14).

In the study conducted by Kidd LC and Smith R on antenatal cardiotocography in 396 antenatal patients (1985) there was no difference in foetal outcome of reactive and non-reactive group.

Murphy J and Sheilo did a randomised controlled trial on admission cardiotocography in 8000 antenatal women (2002). They observed no difference in foetal outcome between usual care group and admission cardiotocography (RR 1.01, 95%, CI > 0.70 - 1.47). They concluded that routine

use of cardiotocography for 20 mins. on admission to delivery does not improve foetal outcome.

In this study when admission test tracings and foetal outcome were analysed, the results showed that abnormal tracings associated with poor foetal outcome than reactive tracings (p= 0.002) and 4% (n= 21) antenatal women, who were initially in low observational status switch over to high observational status later.

In this Study, Diagnostic (or) Screening Test Evaluation shows (Table 22)

- Sensitivity- 70.29%.
- Specificity- 73.08%.
- Positive predictive value- 52.66.
- Negative predictive value- 85.24.
- Diagnostic accuracy- 72.25%.

In a Study conducted by Atul K Sood in 2002 on Admission Test showed

- Sensitivity- 41%
- Specificity- 94%
- PPV- 83%
- NPV- 72%
- Diagnostic accuracy- 74%

In 2001, Vinitha Das conducted a prospective randomised study on efficacy of admission test in predicting foetal distress. She observed-

- Sensitivity- 38%
- Specificity- 79%
- PPV- 48%
- NPV- 72%

In a study conducted by Kushtagi P (2002) on labour admission test showed-

- Sensitivity- 53%
- Specificity- 93%
- NPV- 91%

The values obtained in the present study compares favourably with the values of other studies, indicating that reactive admission test correlates well with foetal well-being.

CONCLUSION

The present study was carried out at Institute of Social Obstetrics and Govt. Kasturba Gandhi Hospital, Chennai from April 2007 to April 2008, to analyse the efficacy of admission test as a predictor of observational status for women in early labour.

In settings with restricted manpower and qualified staff, there is always a need to differentiate the patients who require constant monitoring and those who could be monitored less frequently. However, this differentiation could be arrived at only after an initial screening and such bifurcation.

In this study, 800 AN women who were admitted to the labour ward of this tertiary care centre were selected based on the inclusion and exclusion criteria and after obtaining informed consent all of them were subjected to a 20-minute admission test. Based on the findings of the admission test, they were divided into low observational status (reactive tracing) and high observational status (suspicious and/or

ominous tracings). The onset, duration and mode of delivery along with the maternal and foetal outcome were analysed.

The study shows that there is a good correlation between reactive tracings and good foetal outcome even with less frequent monitoring. Hence, the admission test can be used as an useful tool to differentiate between these two categories of women in early labour to maximally utilise the available limited man power.

REFERENCES

- [1] Weintraub ACD, Alonso A. To evaluate effectiveness of NST in identification of foetus under risk. *Gynaecol Obstet Max* 1989;57:3-7.
- [2] Arul Kumaran ASI, Ingemarsson S. Montar Traces of you: Clinician's guide to foetal trace interpretation. Boblingen; Hewlett Packard GMBH 1995:5965-6246.
- [3] Sood AK. Evaluation of non stress test in high risk pregnancy. *J Obstet Gynecol Ind* 2002;52:71-5.
- [4] Blix E, Oian P. Labour admission test: an assessment test: an assessment of test's value as screening for fetal distress in labour. *Acta Obstet Gynecol Scand* 2001;80(8):738-43.
- [5] Brown VA, Sawers RS, Parsons RJ, et al. Value of antenatal cardiotocography in management of high risk pregnancy: a randomized controlled trial. *Br J Obstet Gynaecol* 1982;89(9):716-22.
- [6] Breuker KH, Kusche M, Muller U, et al. The importance of antepartum cardiotocography. *J Perinat Med* 1986;14(3):171-9.
- [7] Oats JN, Chew FT, Ratten VJ. Antepartum cardiotocography - an audit. *Aust Obstet Gynaecol* 1987;27(2):82-6.
- [8] Emmen L, Huisjes HJ, Aarnoudse JG, et al. Antepartum diagnosis of the terminal fetal state by cardiotocography. *Br J Obstet Gynaecol* 1975;82(5):353-9.
- [9] Fawole AO, Sotiloye OS, Oladimeji AO, et al. Antenatal cardiotocography: experience in a Nigerian tertiary hospital. *Niger Postgrad Med J* 2008;15(1):19-23.
- [10] Gourounti K, Sandall J. Admission cardiotocography versus intermittent auscultation of fetal heart rate; Effects on neonatal apgar score, on rate of caesarean sections and on rate of instrumental delivery: a systematic review. *Int J Nurs Stud* 2007;44(6):1029-35.
- [11] Impey L, Reynolds M, MacQuillan K, et al. Admission cardiotocography: a randomized controlled trial. *Lancet* 2003;361(9356):465-70.
- [12] Ingemarsson I. Efficacy of admission test in predicting neonatal outcome. *Obstet Gyn* 1986;68:800.
- [13] Ingemarsson I, Arulkumaran S, Ingemarsson E, et al. Admission test: a screening test for fetal distress in labour. *Obstet Gynecol* 1986;68(6):800-6.
- [14] Ingemarsson I, Arulkumaran S. The FHR Admission test. In fetal monitoring: Physiology and technique of antenatal and intrapartum fetal assessment. ed JAD spencer. Tunbridge wells: Castle House Publications 1989.
- [15] Kelly J, Mansfield, Needham. Randomised controlled study of antepartum CTG. *Br J Obstet Gynaecol* 1982;89(6):427-33.
- [16] Keane MW, Merger EO, Vice L. Effectiveness of non-stress test and perinatal outcome. *Obstet* 1981;57:320.
- [17] Kidd LC, Patel NB, Smith R. Non-stress antenatal cardiotocography - a prospective randomized clinical trial. *Br J Obstet Gynaecol* 1985;92(11):1156-9.
- [18] Kushtagi P, Naragoni S. Labour admission test – an effective risk screening tool. *J Indian Med Asso* 2002;100(4):234-6.
- [19] McCune GS, Doig J, Ridley W. Antepartum non-stress cardiotocography in high risk pregnancies. *Br J Obstet Gynaecol* 1983;90(8):697-704.
- [20] Mirghani HM, Khair H. Comparison between visual and computerized cardiotocography in low risk pregnancy. *Saudi Med J* 2005;26(8):1228-30.
- [21] Mires G, Williams F, Howie P. Randomised controlled trial of cardiotocography versus Doppler auscultation of fetal heart at admission in labour in low risk obstetric population. *BMJ* 2001;322(7300):1457-62.
- [22] Murphy J, Sheil O. Randomised controlled trial on Admission cardiotocography *Lancet* 2003;361(356):465-70.
- [23] Penning S, Garite TJ. Management of fetal distress. Management of fetal distress. *Obstet Gynaecol Clin North Am* 1999;26(2):259-74.
- [24] Rooth G, Huch A, Huch R. FIGO News: guidelines for the use of fetal monitoring. *Int J Gynaecol Obstet* 1987;25:159-67.
- [25] Sherer DM, Onyeije CI, Binder D, et al. Uncomplicated baseline fetal tachycardia or bradycardia in postterm pregnancies and perinatal outcome. *Am J Perinatol* 1998;15(5):335-8.
- [26] Solum T, Ingemarsson I, Sjöberg NO. Selection criteria for antenatal cardiotocography. *Z Geburtshilfe Perinatol* 1979;183(3):212-7.
- [27] Das V, Katiyar N, Malik GK. Role of admission test. *J Obstet Gynecol Ind* 2001;51(1):48-50.
- [28] Visser GH, Huisjes HJ. Diagnostic value of unstressed antepartum cardiotocogram. *Br J Obstet Gynaecol* 1977;84(5):321-6.
- [29] Zuspan FP, Quilligan EJ, Iams JD, et al. Predictors of intrapartum fetal distress: the role of electronic fetal monitoring. Report of the National Institute of Child Health and Human Development Consensus Development Task Force. *Am J Obstet Gynecol* 1979;135(3):287-91.