

## ROLE OF ADMISSION TEST IN PREDICTING ADVERSE FOETAL OUTCOME

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### ABSTRACT

#### BACKGROUND

The aim of the evaluation of admission test in high-risk and low-risk groups. Evaluation of role of admission test in predicting adverse outcome of foetus in both low and high-risk groups'.

#### MATERIALS AND METHODS

This is a cross-sectional study done in Tirunelveli Medical College in a period of six months for 100 patients with equally divided low and high-risk groups.

#### RESULTS

With normal tracing, 96.9% of babies have no asphyxia. With suspicious trace, 65.2% had no asphyxia. With ominous trace, 58.3% had no asphyxia. In high-risk cases with normal tracings, 85% had no asphyxia. With suspicious tracing, 68.4% had no asphyxia. With ominous tracing, 54.5% had no asphyxia. In short, it is 78.6% sensitive in high-risk cases. In low-risk cases with normal tracing, 97.8% had no asphyxia. With suspicious tracing, 100% had no asphyxia. In short, AT is 91.8% specific in low-risk cases.

#### CONCLUSION

Admission test is a good intrapartum test both in high-risk and low-risk groups. It is simple, highly acceptable and also it can be repeated. It has 78.6% sensitivity in high-risk cases, 91.8% specificity in low-risk cases and over all negative predictive value is 91%.

#### KEYWORDS

Admission Test, CTG, Foetal Outcome, Maternal Outcome.

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#### BACKGROUND

The goal of antepartum foetal surveillance is to prevent foetal death. Each and every foetus has a potential risk of intrapartum hypoxia or birth injury and an optimal outcome can be concluded only at the end of labour. However, any definite insult due to the process of labour can only be identified on long-term follow-up.

#### AIM OF THE STUDY

Evaluation of admission test in high-risk and low-risk groups. Evaluation of role of admission test in predicting adverse outcome of foetus at risk in both low-risk and high-risk groups.

#### OBJECTIVE

In promoting safe motherhood as defined by the World Health Organization, our objectives must be to optimise the

1. Health of the mother.
2. Health of the offspring.
3. Emotional satisfaction of the mother and her family.

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#### Inclusion Criteria Low-Risk Cases

- Pregnant patients with gestational age of 37 weeks up to 40 weeks.
- With labour pains either spontaneous (or) accelerated.
- With cephalic presentation.

#### High-Risk Cases

Post-dated pregnancy, pregnancy-induced hypertension, IUGR, oligohydramnios, Rh negative pregnancy, long period of primary infertility, bad obstetric history, heart disease, anaemia, previous LSCS, face presentation.

#### Exclusion Criteria

Antepartum haemorrhage, multiple pregnancy, major anomalies of a foetus <30 wks.

#### MATERIALS AND METHODS

In this admissions, test was done for 100 patients in the labour ward at the time of admission.

The patients were followed up according to the AT results.

Patients with normal tracings were followed up by intermittent auscultation and electronic monitoring done once in 4 to 5 hours during monitoring. When we suspected foetal distress, emergency interventions was made according to the stage of labour.<sup>(1)</sup> In patients with suspicious ominous tracings, immediate ARM done and colour of the liquor was assessed.

In patients with thin meconium-stained amniotic fluid, amnioinfusion was given and the labour was allowed to progress. They were followed up carefully by intermittent auscultation and CTG monitoring. When there is a change of colour of liquor or when ominous pattern appears on CTG record according to the stage of labour, the labour was terminated by either forceps or caesarean section. The findings of the admission test are correlated with the outcome of the pregnancy. To evaluate the outcome of pregnancy, foetal distress was considered to be present when ominous FHR changes led to caesarean section or forceps delivery and the newborn had an APGAR score <7 at 5 minutes following spontaneous delivery<sup>(2)</sup> (Arul Kumaran-GIBB).

## RESULTS

| Sl. No.                                    | Cases                         | Total No.  | Percentage (%) |
|--------------------------------------------|-------------------------------|------------|----------------|
| 1.                                         | Low-risk cases                | 50         | 50             |
| 2.                                         | High-risk cases               | 50         | 50             |
| <b>Total</b>                               |                               | <b>100</b> | <b>100</b>     |
| Breakup of high-risk cases                 |                               |            |                |
|                                            | a) Post-dated Pregnancy       | 17         | 34             |
|                                            | b) IUGR/Oligohydramnios       | 2          | 4              |
|                                            | c) Long period of infertility | 4          | 8              |
|                                            | d) Pre-term labour            | 1          | 2              |
|                                            | e) Bad obstetric history      | 4          | 8              |
|                                            | f) Heart disease              | 3          | 6              |
|                                            | g) PIH                        | 7          | 14             |
|                                            | h) Rh-ve                      | 5          | 10             |
|                                            | i) Anaemia                    | 5          | 10             |
|                                            | j) Pr. LSCS                   | 1          | 2              |
|                                            | k) Face                       | 1          | 2              |
| <b>Table 1. Breakup of High-Risk Cases</b> |                               |            |                |

This table shows various types of cases on whom admission test were performed. Among these, low-risk cases form 50% and high-risk cases form 50%.

| Age Group                             | Total Number of Patients | Percentage (%) |
|---------------------------------------|--------------------------|----------------|
| 18-24                                 | 64                       | 64             |
| 25-29                                 | 30                       | 30             |
| 30-34                                 | 3                        | 3              |
| 35-39                                 | 3                        | 3              |
| <b>Total</b>                          | <b>100</b>               | <b>100</b>     |
| <b>Table 2. Age-Wise Distribution</b> |                          |                |

Majority of them, 64% fall under 18-24 yrs. Remaining 30% of it is formed by 25-29 yrs. age group persons. 3% is formed by 30-34 yrs. age group persons, 3% is formed by persons between 35-39 yrs. of age.

| Gravity                         | Total Number | Percentage (%) |
|---------------------------------|--------------|----------------|
| Primi                           | 52           | 52             |
| G2                              | 29           | 29             |
| G3                              | 16           | 16             |
| G4                              | 3            | 3              |
| <b>Table 3. Obstetric Index</b> |              |                |

Among 100 patients, 52 were primi, second gravida was 29%, third gravida was 16% and fourth gravida and above forms 3%.

| CTG Patterns                                     | Total Number of Women | Percentage (%) |
|--------------------------------------------------|-----------------------|----------------|
| Normal tracing                                   | 65                    | 65             |
| Suspicious tracing                               | 23                    | 23             |
| Ominous pattern                                  | 12                    | 12             |
| <b>Total</b>                                     | <b>100</b>            | <b>200</b>     |
| <b>Table 4. CTG Tracing Pattern in all Cases</b> |                       |                |

Among 100 cases, normal tracing was observed in 65% of cases, suspicious tracing in 23% of cases and ominous tracing in 12% of cases.

| High-Risk Cases                                 | Normal    | Suspicious | Ominous   |
|-------------------------------------------------|-----------|------------|-----------|
| Post-dated pregnancy                            | 7         | 6          | 2         |
| IUGR/Oligohydramnios                            | -         | -          | 2         |
| Long period of infertility                      | -         | 2          | 2         |
| Preterm labour                                  | -         | 2          | -         |
| Bad obstetric history                           | 2         | 2          | -         |
| Heart disease                                   | 4         | 1          | -         |
| Pregnancy-induced hypertension                  | 4         | 3          | 2         |
| Rh negative                                     | 3         | -          | 2         |
| Anaemia                                         | 2         | 2          | 1         |
| Previous LSCS                                   | -         | 1          | -         |
| Face presentation                               | -         | -          | -         |
| <b>Total</b>                                    | <b>20</b> | <b>19</b>  | <b>11</b> |
| <b>Table 5. CTG Tracings in High-Risk Cases</b> |           |            |           |

Among the high-risk cases, 20 cases had normal tracing, 19 cases had suspicious tracing, 11 cases had ominous tracing.

| Mode of Delivery                              | Number of Women | Percentage (%) |
|-----------------------------------------------|-----------------|----------------|
| Labour natural                                | 65              | 65             |
| Forceps delivery                              | 15              | 15             |
| Caesarean section                             | 20              | 20             |
| <b>Total</b>                                  | <b>100</b>      | <b>100</b>     |
| <b>Table 6. Mode of Delivery in all Cases</b> |                 |                |

Among 100 patients, 65% delivered by labour natural, 15 delivered by forceps, 20% delivered by caesarean section.

| CTG Tracing       | Labour Natural | Forceps Delivery | Caesarean Section |
|-------------------|----------------|------------------|-------------------|
| Normal (n=65)     | 60             | 5                | -                 |
| Suspicious (n=23) | 5              | 9                | 9                 |
| Ominous (n=12)    | -              | 1                | 11                |
| <b>Total</b>      | <b>65</b>      | <b>15</b>        | <b>20</b>         |

**Table 7. Mode of Delivery According to CTG Findings**

In normal tracings, out of 65 cases, 60 delivered by labour natural, 5 delivered by forceps. All the cases were delivered by forceps for non-foetal distress indication. Foetal distress may develop during the course of labour due to various reasons like hyperstimulation of uterus, short cord, cord around the neck and intrapartum abruption of placenta.<sup>2</sup>

| CTG Tracing       | Labour Natural | Forceps Delivery | Caesarean Section |
|-------------------|----------------|------------------|-------------------|
| Normal (n=20)     | 15 (75%)       | 5 (25%)          | -                 |
| Suspicious (n=19) | 3 (15.8%)      | 7 (36.8%)        | 9 (47.4%)         |
| Ominous (n=11)    | 0%             | 1 (9.1%)         | 10 (90.9%)        |

**Table 8. Mode of Delivery According to CTG Tracing in High-Risk Cases**

In those with normal tracing (20), 15 (75%) delivered by labour natural, 5 (25%) delivered by forceps. In those with suspicious tracing 3 (15.8%) delivered by labour natural, 7 (36.8%) delivered by forceps, 9 (47.4%) delivered by LSCS.

The patients were taken up for emergency LSCS in view of the high-risk factors such as long period of infertility in (2) case, PIH (3), Anaemia (1), Post dated pregnancy (1), Pr. LSCS (1), BOH (1). In those with ominous tracing, 1 (9.1%) delivered by forceps 10 (90.9%) were delivered by LSCS to avoid foetal distress.

| CTG Tracing       | Neonatal Outcome (Apgar) |                         |                      |
|-------------------|--------------------------|-------------------------|----------------------|
|                   | No Asphyxia (7-10)       | Moderate Asphyxia (6-4) | Severe Asphyxia (<4) |
| Normal (n=65)     | 63 (96.9%)               | 2 (3.1%)                | 0                    |
| Suspicious (n=23) | 15 (65.2%)               | 7 (30.4%)               | 1 (4.3%)             |
| Ominous (n=12)    | 5 (58.3%)                | 4 (33.3%)               | 1 (8.3%)             |

**Table 9. Apgar Score According to CTG (All)**

p = 0.0004

There is statistically significant relationship ( $p < 0.05$ ) between CTG findings and Apgar score. Cases with normal CTG findings have high Apgar score. Suspicious and ominous cases give birth to more children with moderate and severe asphyxia.

Out of 100 cases, in those with normal tracings, 63 (96.9%) developed asphyxia 2 (3.1%) developed moderate asphyxia. There were no cases of severe asphyxia. In those with suspicious tracings, 15 (65.2%) developed no asphyxia 7 (30.4%) developed moderate asphyxia 1 (4.3%) developed severe asphyxia. In these ominous tracings, 5 (58.3%) developed no asphyxia. 4 (33.3%) developed moderate asphyxia and 1 (8.3%) developed severe asphyxia.

| CTG Tracing       | Neonatal Outcome (APGAR) |                         |                      |
|-------------------|--------------------------|-------------------------|----------------------|
|                   | No Asphyxia (7-10)       | Moderate Asphyxia (6-4) | Severe Asphyxia (<4) |
| Normal (n=20)     | 17 (85%)                 | 3 (15%)                 | 0%                   |
| Suspicious (n=19) | 13 (68.4%)               | 5 (26.3%)               | 1 (5.3%)             |
| Ominous (n=11)    | 6 (54.5%)                | 4 (36.4%)               | 1 (9.1%)             |

**Table 10. Apgar Score According to CTG (in High-Risk Groups)**

The relationship between CTG pattern and Apgar scores is statistically significant ( $p < 0.05$ ) among high-risk cases.

In high-risk cases in those with normal tracing, 17 (85%) has no asphyxia 3 (15%) has asphyxia. This is attributable to be inherent risk factor in the high-risk groups.

In those with suspicious tracing, 13 (68.4%) has no asphyxia 6 (31.6%) had asphyxia.

In those with ominous tracing, 6 (54.5%) had no asphyxia 5 (45.5%) in asphyxia.

| CTG Tracing      | Neonatal Outcome (Apgar) |                         |                      |
|------------------|--------------------------|-------------------------|----------------------|
|                  | No Asphyxia (7-10)       | Moderate Asphyxia (6-4) | Severe Asphyxia (<4) |
| Normal (n=46)    | 45 (97.8%)               | 1 (2.2%)                | -                    |
| Suspicious (n=3) | 3 (100%)                 | -                       | -                    |
| Ominous (n=1)    | 1 (100%)                 | -                       | -                    |

**Table 11. Apgar Score According to CTG (in Low-Risk Groups)**

| CTG Pattern                                                                    | Admission Test (n) | Foetal Distress |
|--------------------------------------------------------------------------------|--------------------|-----------------|
| Normal tracing                                                                 | 65                 | 4<br>(6.15%)    |
| Suspicious tracing                                                             | 23                 | 6<br>(26.1%)    |
| Ominous tracing                                                                | 12                 | 5<br>(41.7%)    |
| <b>Table 12. Results of AT in Relation to the Incidence of Foetal Distress</b> |                    |                 |

p = 0.0001

There exists statistically significant relationship ( $p < 0.05$ ) between the results of AT and incidence of foetal distress among the total study cases.

In all cases, in those with normal tracing, 4 (6.15%) developed distress. In those with suspicious tracing 6 (26.1%) developed foetal distress. In those with ominous tracing, 5 (41.7%) developed foetal distress.

| CTG Pattern                                                                    | Admission Test (n) | Foetal Distress |
|--------------------------------------------------------------------------------|--------------------|-----------------|
| Normal tracing                                                                 | 20                 | 3 (15%)         |
| Suspicious tracing                                                             | 19                 | 6 (31.6%)       |
| Ominous tracing                                                                | 11                 | 5 (45.5%)       |
| <b>Total</b>                                                                   | <b>50</b>          | <b>14</b>       |
| <b>Table 13. Results of AT in Relation to the Incidence of Foetal Distress</b> |                    |                 |

p = 0.0116

There exists statistically significant relationship ( $p < 0.05$ ) between the results of AT and incidence of foetal distress among the high-risk cases.

In high-risk group, in those with normal tracing, 3 (15%) developed distress. In those with suspicious tracing, 6 (31.6%) developed foetal distress. In those with ominous tracing, 5 (45.5%) developed foetal distress.<sup>3</sup>

| CTG Pattern                                                                                      | Admission Test (n) | Foetal Distress |
|--------------------------------------------------------------------------------------------------|--------------------|-----------------|
| Normal tracing                                                                                   | 46                 | 1 (2.2%)        |
| Suspicious tracing                                                                               | 3                  | -               |
| Ominous tracing                                                                                  | 1                  | -               |
| <b>Total</b>                                                                                     | <b>50</b>          | <b>1</b>        |
| <b>Table 14. Results of AT in Relations to the Incidence of Total Distress in Low-Risk Group</b> |                    |                 |

p = 0.0002

There exists statistically significant relationship ( $p < 0.05$ ) between the results of AT and incidence of foetal distress among the low-risk cases. With normal tracings, 1 (2.2%) developed foetal distress with suspicious tracing (0%) developed foetal distress with ominous tracing (0%) developed foetal distress.

| CTG Pattern                             | Total No. of Cases | Admitted in ICU for Asphyxia | Percentage (%) |
|-----------------------------------------|--------------------|------------------------------|----------------|
| Normal tracing                          | 65                 | -                            | 0              |
| Suspicious tracing                      | 23                 | 3                            | 13             |
| Caesarean tracing                       | 12                 | 4                            | 33.3           |
| <b>Table 15. Neonatal ICU Admission</b> |                    |                              |                |

$p' = 0.0006$

The relationship between ICU admission and CTG patterns is significant among the total study cases. Normal tracings, admission is nil. With suspicious tracing, admission is 13%. With ominous tracing, admission is 33.3%.

| CTG Pattern                                                | Total No. of Cases | Admitted in ICU for Asphyxia | Percentage (%) |
|------------------------------------------------------------|--------------------|------------------------------|----------------|
| Normal tracing                                             | 20                 | -                            | 0%             |
| Suspicious tracing                                         | 19                 | 3                            | 15.8%          |
| Ominous tracing                                            | 11                 | 4                            | 36.4%          |
| <b>Table 16. Neonatal ICU Admission in High-Risk Group</b> |                    |                              |                |

p = 0.0251

The relationship between ICU admission and CTG patterns is statistically significant among the high-risk cases.

With normal tracing, admission is nil. With suspicious tracing, admission is 15.8%. With ominous tracing, admission is 36.4%.

| Screening Test Results                         | Foetal Distress Present | Foetal Distress Absent | Total |
|------------------------------------------------|-------------------------|------------------------|-------|
| Positive (abnormal CTG pattern)                | 11                      | 24                     | 35    |
| Negative (normal CTG)                          | 4                       | 61                     | 65    |
| <b>Table 17. Prediction of Foetal Distress</b> |                         |                        |       |

p = 0.00001

Foetal distress prediction results are significantly related to screening test findings ( $p < 0.05$ ) among total cases.<sup>1</sup>

Among total study cases, admission test in prediction of foetal distress of sensitivity of 73.3%, specificity 71.8%, positive predictive value of 31.5% and negative predictive value of 93.8%.

| Screening Test Results                                               | Foetal Distress Present | Foetal Distress Absent | Total |
|----------------------------------------------------------------------|-------------------------|------------------------|-------|
| Positive (abnormal CTG pattern)                                      | 1                       | 19                     | 30    |
| Negative (normal CTG)                                                | 3                       | 17                     | 20    |
| <b>Table 17. A: Prediction of Foetal Distress in High-Risk Group</b> |                         |                        |       |

p = 0.0232

Foetal distress prediction results are significantly related to screening test findings ( $p < 0.05$ ) among total cases.<sup>4</sup> Among total study cases, admission test in prediction of foetal distress of sensitivity of 78.6%, specificity 52.8%, positive predictive value of 36.7% and negative predictive value of 85%.

| Screening Test Results                                              | Foetal Distress Present | Foetal Distress Absent | Total |
|---------------------------------------------------------------------|-------------------------|------------------------|-------|
| Positive (abnormal CTG pattern)                                     | 0                       | 4                      | 4     |
| Negative (normal CTG)                                               | 1                       | 45                     | 46    |
| <b>Table 17. B: Prediction of Foetal Distress in Low-Risk Group</b> |                         |                        |       |

p = 0.0002

Foetal distress prediction results are significantly related to screening test findings ( $p < 0.05$ ) among total cases.

## DISCUSSION

AT is used to detect foetal wellbeing and foetal distress if present on admission. This helps us in identifying the group of women who will require continuous electronic monitoring or intermittent auscultation during the course of labour.<sup>5</sup>

Antepartum risk factors are not accurate as predictors of foetal outcome. As foetal heart changes and acidosis occur in same frequency in high-risk as well as low-risk group during the course of labour.<sup>6</sup>

Bearing the acute events during the course of labour, AT will be a good predictor of foetal wellbeing at the time of

admission and during the next few hours of labour in term foetus. It will not predict the development of foetal distress that develops several hours later. (Ingemarsson 1993) Therefore, it can be safely assumed that if the AT is normal, it is enough to perform intermittent auscultation and CTG monitoring once in 4-5 hours. But, abnormal tracings should have continuous monitoring throughout labour to diagnose foetal distress earlier. LLAVENO et al (1990) criticises that the policy of continuous foetal monitoring led to increase in caesarean section with no evidence of foetal benefits. To improve the sensitivity and positive predictive value, false positives and false negatives are to be reduced. This can be done by doing additional tests like Foetal Scalp Blood Sampling (FSBS), Foetal Acoustic Stimulation Test (FAST) to diagnose exactly the foetal distress.

## CONCLUSION

Admission test is a good intrapartum test both in high-risk and low-risk groups. It is simple, highly acceptable and also it can be repeated. It has 78.6% sensitivity in high-risk cases, 91.8% specificity in low-risk cases and overall negative predictive value is 91%. A short recording immediately after admission can detect foetal distress if present and predict wellbeing for next few hours.

## REFERENCES

1. FIGO Guidelines for the use of fetal monitoring. J Gynecology and Obstet 1987;25:159-167.
2. Crawford D, Chapman M, Allan L. The assessment of persistent bradycardia, in prenatal life. Br J Obstet Gynaecol 1985;92(9):941-944.
3. Harris JL, Krueger TR, Parer JT. Mechanism of late decelerations of the fetal heart rate during hypoxia. Am J Obstet Gynecol 1982;144(5):491-496.
4. Fleischer A, Schulman H, Jagani N, et al. The development of fetal acidosis in the presence of an abnormal fetal heart rate tracing. I. The average for gestational age fetus. Am J Obstet Gynecol 1982;144(1):55-60.
5. Ingemarsson I, Arulkumaran S, Ingemarsson E, et al. Admission test: a screening test for a fetal distress in labour. Obstet Gynecol 1986;68(6):800-806.
6. Leveno KJ, Cunningham FG, Nelson SRN, et al. A prospective comparison of selective and universal electronic fetal monitoring in 34,995 pregnancies. N Engl J Med 1986;315:615-619.