

## EVALUATION OF DIFFERENT MODES OF DIAGNOSIS OF FOETAL DISTRESS AND EARLY PERINATAL OUTCOME IN A TERTIARY CARE CENTRE, SOUTH KERALA

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### ABSTRACT

#### BACKGROUND

The most common indication of caesarean section has been foetal distress for the past few decades. Foetal distress indicates foetal hypoxia and acidosis during intrauterine life.

The objective of this study was to correlate the diagnosis of foetal distress by different modes with perinatal outcome.

#### MATERIALS AND METHODS

Retrospective analysis of case records was carried out between January 2014 to March 2016 in the Department of Obstetrics and Gynaecology and Neonatal Intensive Care Unit, Travancore Medical College Hospital, a tertiary health care facility in South Kerala, of 112 antenatal cases who were diagnosed to have Foetal distress and undergone Caesarean section.

#### RESULTS

In our study, 88 (78.6%) were nulliparous and 64 (57.1%) were between the age group 18-25 years. The mode of diagnosis of foetal distress was 74.1% with one parameter and the method most commonly employed to diagnose was the external cardiotocography (45 cases). Predictivity value of the parameters used to identify the foetuses at jeopardy was found to be more sensitive when used in combination. 19 babies (17.0%) had a 5-minute Apgar score <7 and required immediate resuscitation. 5 Babies had a 1-minute Apgar score <4, while there were 3 cases of severe birth asphyxia (Apgar score <4 at 5 minutes) who died. The neonatal outcome was poorer in cases with associated complicating factors.

#### CONCLUSION

The clinical diagnosis of foetal distress is accurate in about a third of the cases and it has led to an unnecessary caesarean section in the remaining two thirds and do not correlate well with early perinatal outcome. The correlation was however better in cases with two parameters used together, mainly meconium stained liquor and abnormal foetal heart rate pattern. On the contrary, lack of adverse outcome could reflect that our unit makes decisions at a time before clinically significant foetal compromise occurs. The use of other modalities like foetal ECG as an adjunct to cardiotocography may help in improving the predictive value of foetal monitoring. Antepartum and Intrapartum risk factors have shown to significantly increase the risk of emergency caesarean section due to non-reassuring foetal status.

#### KEYWORDS

Foetal Distress, Cardiotocography, Caesarean Section, Perinatal Outcome, APGAR Score.

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#### BACKGROUND

Foetal distress may be defined as a physiological state in which there is a metabolic acidosis secondary to hypoxia. It is brought about by factors that causes umbilical cord compression or impaired gaseous exchange between placenta and maternal circulation or foetal sepsis, which could be alone or in combination.

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Clinically, usually it is characterized by Abnormal Foetal heart rate and rhythm or passage of meconium into the amniotic fluid or decreased foetal movements. The most common indicator of intrapartum caesarean section is Foetal distress for the past few decades.<sup>1,2</sup> The diagnosis of Foetal distress made on the basis of these modes has led to a high rate of caesarean deliveries without the foetuses being adversely affected. Hence there is a need to assess the efficacy of different modes of diagnosis of foetal distress especially electronic foetal monitoring. Keeping this issue into consideration, this study was undertaken to analyse the correlation between caesarean section for foetal distress and early perinatal outcome.

#### Aims and Objectives

1. The primary outcome measures assessed were the different modes of diagnosis of foetal distress such as Abnormal foetal heart rate pattern in cardiotocography, Meconium stained liquor, Decreased

foetal movements perception and Abnormal Doppler indices in USG. And the best mode of diagnosis among these, in predicting early perinatal outcome.

- The secondary outcome measures evaluated the associated obstetric risk factors contributing to foetal distress.

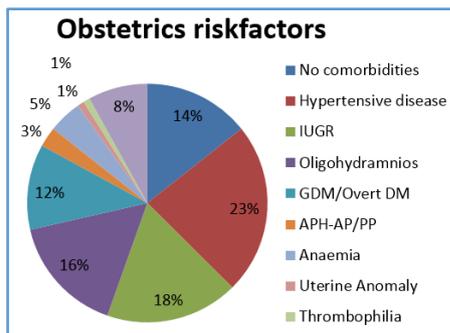
**MATERIALS AND METHODS**

We conducted a retrospective case review of 112 women who underwent caesarean section for foetal distress in the department of obstetrics and gynaecology and neonatal intensive care unit in a Tertiary care centre. The study was approved by the institutional ethics committee. As it was a retrospective study, consent from the participants was waived, but confidentiality was maintained. Details of antenatal cases were collected from the medical records department and also from the maternal register maintained in labour room and neonatal register maintained in neonatal intensive care unit and was entered in a pre-structured Performa. Data was then entered in MS excel and analysed by SPSS version 20. Women who underwent vaginal delivery, or instrumental delivery and Twins and Triplet pregnancies were excluded from the study.

**RESULTS**

Variables	n = 112	Percentage
<b>Age</b>		
18-25	64	57.1
26-30	38	33.9
>30	10	8.9
Total	112	100
<b>Social Status</b>		
Rural	64	57.1
Urban	48	42.9
Total	112	100
<b>Parity</b>		
Primigravida	88	78.6
Gravida 2	20	17.9
Multigravida	4	3.6
Total	112	100
<b>Period of Gestation</b>		
26-30 wks.	29	25.9
31-35 wks.	33	29.4
36-40 wks.	50	44.7
Total	112	100

**Table 1. Sociodemographic Profile of Patient**



**Figure 1. Obstetric Risk Factors Causing Foetal Distress**

Comorbidities	n = 112	Percentage
No Comorbidities	16	14.3
Hypertensive Disease	26	23.2
IUGR	20	17.9
Oligohydramnios	18	16.0
GDM/Overt DM	13	11.6
APH-AP/PP	3	2.7
Anaemia	5	4.5
Uterine Anomaly	1	0.9
Thrombophilia	1	0.9
PROM	9	8.0
Total	112	100

**Table 2. Comorbidities**

Modes	(n=112)	Percentage
<b>I. Using 1 Parameters</b>	<b>83</b>	<b>74.1</b>
1. Meconium stained liquor(MSL)	27	
2. FHR Abnormality in cardiotocogram	45	
3. USG Doppler Abnormality	11	
<b>II. Using 2 Parameters</b>	<b>29</b>	<b>25.9</b>
1. ↓ Fetal Movements (FM) + MSL	2	
2. ↓ FM + FHR Abnormal Pattern	5	
3. MSL + FHR Abnormal Pattern	18	
4. ↓ FM + USG Doppler abnormality	1	
5. USG Doppler abnormality + MSL	1	
6. USG Doppler abnormality + FHR Abnormal	2	
<b>Total</b>	<b>112</b>	<b>100</b>

**Table 3. Modes of Diagnosis of Fetal Distress**

Variables	(n=112)	Percentage
<b>Apgar Score at 1 Minute</b>		
0-4	5	4.5
4-7	24	21.4
>7	83	74.1
Total	112	100
<b>Apgar Score at 5 Minutes</b>		
0-4	3	2.7
4-7	16	14.3
>7	93	83.0
Total	112	100
<b>Birth Weight</b>		
<1 Kg.	4	3.6
1-2 Kg	17	15.2
2-3 Kg.	54	48.2
3-4 Kg.	37	33.0
Total	112	100
<b>Admission In NICU</b>		
Yes	112	100.0
No	0	0
Total	112	100
<b>Ventilator Use</b>		
Yes	8	7.1
No	104	92.9
Total	112	100
<b>CPAP Use</b>		
Yes	16	14.3
No	96	85.7
Total	112	100

Neonatal Deaths		
Yes	3	2.7
No	109	97.3
Total	112	100

**Table 4. Perinatal Outcome of the Study Group**

## DISCUSSION

Continuous electronic foetal monitoring is probably the most common form of intrapartum foetal assessment used currently.<sup>3,4</sup> It is widely accepted method of foetal monitoring during labour. When electronic foetal monitoring by cardiotocography was introduced 30 years ago, the aim was to identify foetuses affected by hypoxia better. It is presumed to be superior method for foetal hypoxia as it detects the subtle changes in foetal heart rate which can be missed on intermittent auscultation by stethoscope. However, the main risk of wide spread application of continuous monitoring has been the observed risk of caesarean delivery noted in retrospective and prospective studies.<sup>5,6</sup> Various studies<sup>7,8,9</sup> implicate that abnormal foetal heart rate in cardiotocography is inconsistent, is at times inaccurate and may fail to predict early perinatal outcome.

Impey et al<sup>10</sup> found 32 % traces as abnormal. In our study 54.2% cases had abnormal foetal heart rate. Despite significant number of neonatal admissions with non-reassuring foetal heart rate, there was no significant rise in perinatal mortality (2.7%). The majority (74.1%) of the babies who were delivered with Apgar score at 1 minute of more than 7 despite the diagnosis of foetal distress in this study is higher. This implies that the clinical diagnosis of foetal distress, using only the foetal heart rate measurement, as reported in our study, is causing a lot of unnecessary caesarean sections.

But in this Medico legal era 'play safe' attitude was also adopted by us and resulted in high incidence of caesarean sections for non-reassuring foetal heart rate. To improve this situation, the concept of detecting foetal acidosis using foetal scalp blood sampling appeared attractive, but practical difficulties in carrying it out have restricted its use. These limitations of foetal heart monitoring and foetal blood sampling have led to the introduction of electrocardiogram (ECG) recently. Various randomized controlled trials<sup>11,12,13,14</sup> showed that addition of ST analysis to conventional cardiotocography improved the specificity of intrapartum monitoring and thereby reducing the rate of operative deliveries for foetal distress. Vayssiere et al<sup>15</sup> in 2007 reported that, in a population with abnormal foetal heart rate, ST segment analysis sensitivity is moderate (almost 40 %) for predicting PH – 7.15 and better (almost 60%) for severe acidosis, PH <7.05. Therefore, we strongly feel that Foetal ECG system needs to be introduced in addition to conventional cardiotocography wherever possible to reduce the rate of unnecessary caesarean sections.

Similarly, lack of significant association between fresh meconium stained liquor and foetal distress in this study is supported by the previous report by Wong and his co-authors.<sup>16,17,18</sup> However, this is contrary to the report from the case-control study by Desai et al in which there was a

strong association between meconium stained liquor and foetal distress. In view of this controversy, the diagnosis of foetal distress using history of passage of meconium is not yet conclusive.

The present study also showed that in 29 cases (25.9%), foetal distress was detected using 2 parameters, among which meconium stained liquor along with foetal heart rate abnormality was detected in 18 cases. The results obtained in this study agreed with those who consider intrapartum passage of meconium and abnormal foetal heart rate pattern, to signify clinical foetal distress that carries bad prognostic outcome. These two parameters should still be used to indicate foetal distress which requires immediate institution of supportive therapy and immediate delivery. Hence diagnosis of foetal distress should be made with great care and should not be based on a single parameter thus eliminating the risk of overdoing caesarean for jeopardized foetus.

A number of Obstetrical and Medical problems during pregnancy may subject the foetus to chronic distress, unless monitored carefully, these cases are more likely to develop hypoxia during labour, as labour itself is considered a process of repetitive hypoxic events. Very strict intrapartum foetal monitoring of such cases is required to decrease the risk of further foetal compromise. Chaudhari et al<sup>19</sup> reported majority of cases belonged to PIH (12%), and in our study also majority (23.2%) belonged to PIH, followed by IUGR (17.9%) and Oligohydramnios (16.0%). These antepartum and intrapartum risk factors have been associated with incidence of meconium stained liquor, foetal distress, low Apgar score, admission to NICU, birth asphyxia and caesarean section for foetal distress.

In the present study, after birth, at 1 minute, the Apgar score was <7 in 29 (25.9%) cases which improved at 5 minutes and at 5 minutes the resulting Apgar score of <7 was found only in 19 (17%). Overall 112 neonates were admitted to NICU for foetal distress (Respiratory distress, Neonatal depression, Meconium aspiration, Observation), out of which 8(7.1%) required Ventilatory support and 16(14.3%) were on CPAP.

## CONCLUSION

The clinical diagnosis of foetal distress is accurate in about a third of the cases. However, it has led to unnecessary caesarean sections in the remaining two thirds of the parturients and does not correlate well with early perinatal outcome. The correlation was however better in cases with two parameters used together to indicate foetal distress, mainly meconium stained liquor and abnormal foetal heart rate pattern which requires immediate institution of supportive therapy and immediate delivery. On the contrary, lack of adverse outcome could reflect that our unit makes decisions at a time before clinically significant foetal compromise occurs. The use of other modalities like foetal ECG as an adjunct to cardiotocography may help in improving the predictive value of foetal monitoring.

Antepartum and intrapartum risk factors have shown to significantly increase the risk of emergency caesarean

section due to non-reassuring foetal status. Early detection of the above risk factors is required for timely institution of appropriate intervention in order to result in improved maternal and neonatal outcome.

## REFERENCES

- [1] Mackenzie IZ, Cooke I. Prospective 12 month study of 30 minute decision to delivery intervals for emergency caesarean section. *BMJ* 2001;322(7298):1334-1335.
- [2] American College of Obstetrics and Gynecology. Fetal heart rate patterns: monitoring, interpretation and management. *American College of Obstetrics and Gynecology Technical Bulletin* 1995;207:182-189.
- [3] Gangwar R, Chaudhary S. Caesarean section for foetal distress and correlation with perinatal outcome. *J Obstet Gynaecol India* 2016;66(Suppl 1):177-180.
- [4] Chauhan SP, Magann EF, Scott JR, et al. Caesarean delivery for fetal distress: rate and risk factors. *Obstet Gynecol Surv* 2003;58(5):337-350.
- [5] Thacker SB, Stroup DF. Continuous electronic heart rate monitoring for assessment during labor. *Cochrane Database Syst Rev* 2001;2:CD000063.
- [6] Neilson JP. Fetal electrocardiogram (ECG) for fetal monitoring during labour. *Cochrane Database Syst Rev* 2003;2:CD000116.
- [7] Rizvi JH, Chaudri SR. Changing patterns of caesarean. *Aust N Z Obstet Gynaecol* 1988;28:263-266.
- [8] Dellinger EH, Boehm FH, Crane MM. Electronic fetal heart rate monitoring: early neonatal outcomes associated with normal rate, fetal stress and fetal distress. *Am J Obstet Gynecol* 2000;182(1 Pt 1):214-220.
- [9] Dunphy BC, Robinson JN, Shell OM, et al. Caesarean section for fetal distress, the interval from decision to delivery and the relative risk of poor neonatal condition. *J Obstet Gynecol* 1991;11(4):241-244.
- [10] Impey L, Reynolds M, MacQuillan K, et al. Admission cardiotocography: a randomized controlled trial. *Lancet* 2003;361(9356):465-470.
- [11] Amer-Wahlin I, Hellstem C, Noren H, et al. Cardiotocography only versus cardiotocography plus ST analysis of fetal electrocardiogram for intrapartum fetal monitoring: a Swedish randomized controlled trial. *Lancet* 2001;358(9281):534-538.
- [12] Reed NN, Mohajer MP, Sahota DS, et al. The potential impact of PR interval analysis of the fetal electrocardiogram (FECG) on intrapartum fetal monitoring. *Eur J Obstet Gynecol Reprod Biol* 1996;68(1-2):87-92.
- [13] van Wijngaarden WJ, Strachan BK, Sahota DS, et al. Improving intrapartum surveillance: an individualized T/QRS ratio? *Eur J Obstet Gynecol Reprod Biol* 2000;88(1):43-48.
- [14] Goodwin TM, Milner-Masterson L, Paul RH. Elimination of fetal scalp blood sampling on a large clinical service. *Obstet Gynecol* 1999;83(6):971-974.
- [15] Vayssiere C, Haberstick R, Sebahoun V, et al. Fetal electrocardiogram ST segment analysis and prediction of neonatal acidosis. *International Journal of Gynecology and Obstetrics* 2007;97(2):110-114.
- [16] Wong SF, Chow KM, Ho LC. The relative risk of fetal distress in pregnancy associated with meconium stained liquor at different gestation. *J Obstet Gynaecol* 2002;22(6):594-599.
- [17] Shy KK, Luthy DA, Bennett FC, et al. Effects of electronic fetal-heart-rate monitoring, as compared with periodic auscultation, on the neurologic development of premature infants. *N Engl J Med* 1990;322(9):588-593.
- [18] Desai D, Chauhan K, Chaudhary S. A study of meconium stained amniotic fluid, its significance and early maternal and neonatal outcome. *Int J Reprod Contracept Obstet Gynaecol* 2013;2(2):190-193.
- [19] Chaudhari KR, Pai SS. Admission test for screening labor. Hyderabad in: a comparative study by Dr. Reddy's Laboratories 2009.