

## EVALUATION OF TWO MOST WIDELY USED CLINICAL METHODS OF DIAGNOSING INTRA PARTUM FETAL DISTRESS

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### SUMMARY

Fetal heart sound (FHS) abnormalities and thick meconium stained liquor amnii singly or in combination are the most widely used clinical methods for predicting fetal distress in labour. In the present study these methods have been evaluated for their sensitivity, specificity and predictive value in diagnosing distress in cases where caesarean sections were done on basis of their presence. APGAR score at 1 minute was used to find out whether the baby was actually distressed and if so to what extent. Both these methods had a good and reliable predictive value. However thick meconium staining of liquor was most sensitive and when combined with FHS abnormality, the combination was most specific in judging fetal distress. None of these methods could predict the degree of distress.

### INTRODUCTION

Periodic auscultation of fetal heart sounds (FHS) and noting the presence or absence of thick meconium staining of liquor amnii have been, used by most obstetricians as two most important clinical methods for judging intrapartum

fetal distress. Though advanced systems like cardiotocography are available, for varied reasons, most obstetricians especially in our country do not use them. As a result, clinical methods still remain the most popular and widely used. Some of the limitations of these methods have been identified. Bosco (1992) puts an incidence range of meconium staining of amniotic fluid between 8% to 22% of

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deliveries. Of these, all do not have distressed babies. Similarly FHS monitoring has known limitations (Dutta - 1993).

In the present study, an attempt has been made on basis of statistical methods to quantify the sensitivity, specificity and predictive values of these two most popular methods of judging intrapartum fetal distress. The results so obtained could help a clinician to choose a method and also decide the extent to which he can rely on these methods.

#### **MATERIALS AND METHODS**

The present study was carried out in the dept. of obst. & Gynecology, Medical College and SSG Hospital, Baroda for the period of four years from January 1989 to December 1992. An analysis of all caesarean sections done in this institution for the indication of intrapartum fetal distress was done. The methods used at our institution for fetal distress include:

##### **For FHS**

- An increase in FHS rate to over 160/mt. or a decrease in rate to 120/mt. or less.
- Irregularity in rhythm.
- FHS taking a long time to recover back its normal rate after the contractions has passed off.

##### **For Liquor**

Thick meconium staining of liquor amnii on rupture of membranes occurring spontaneously or otherwise.

Both these criteria singly or in combination are taken as evidence of distress.

Caesarean sections done for fetal distress were analysed and Apgar Score of

the newborn at 1 minute was noted. The degree of distress was judged thus (Singh - 1993) :

- APGAR less than 3 : Severe distress
- APGAR of 3 to 5 : Moderate distress
- APGAR of 6 and 7 : Mild distress
- APGAR more than 7 : No distress

Results were considered for FHS abnormality or thick meconium stained liquor or both, whichever was used by the clinician performing the C.S. to indicate fetal distress. By using the standard methods of statistical analysis the sensitivity, specificity and predictive value of each of these methods was evaluated. Actual APGAR score at 1 minute of birth as recorded by the neonatologist attending C.S. was correlated and conclusions drawn from the results so obtained.

#### **RESULTS**

In all 415 caesarean sections were done at the institution during the study period for the indication of intrapartum fetal distress based on the criteria specified above.

As shown in Table I thick meconium staining of liquor amnii had the highest sensitivity and positive predictive value amongst all the three to indicate fetal distress. However its specificity was lowest. It was the combination of FHS abnormality and thick meconium staining of liquor which proved to be the most specific in indicating fetal distress. FHS abnormality singly though has a poor sensitivity and specificity, interestingly it has a satisfactory predictive value. Analysing the predictive values then, all the three methods were good.

In Tables II, III and IV attempts have

**Table I**  
**Overall Figures**

	Actually distressed at birth	Total LSCS done for fetal distress	Sensitivity	Specificity	Predictive value
FHS Abnormal Liquor : Clear	71	114	0.37	0.42	0.63
Thick Meco. staining of liq. FHS : normal	190	237	0.77	0.38	0.08
FHS : Abnormal + Liquor stained	42	64	0.13	0.8	0.65

**Table II**  
**Mild Asphyxia (Apgar 6-7)**

	Actually distressed at birth	Total LSCS done for fetal distress	Sensitivity	Specificity	Predictive value
FHS Abnormal Liquor : Clear	34	114	0.04	0.56	0.26
Thick Meco. staining FHS : normal	72	237	0.71	0.27	0.26
FHS : Abnormal + Liquor stained	13	64	0.11	0.83	0.02

been made for finding the efficacy of the methods for predicting the degree of distress. As is obvious from these Tables, FHS abnormality and thick meconium staining of liquor in combination are having the highest specificity irrespective of the degree of fetal distress. However

the sensitivity was highest for thick meconium staining singly for all degrees of distress as well. However none of the criteria can indicate the degree of fetal distress as could be judged from the poor predictive value of all.

**Table III**  
**Moderate Asphyxia (Apgar 3 to 5)**

	Actually distressed at birth	Total LSCS done for fetal distress	Sensitivity	Specificity	Predictive value
FHS Abnormal Liquor : Clear	22	114	0.41	0.56	0.19
Liquor stained FHS : normal	48	237	0.73	0.27	0.20
FHS : Abnormal + Liquor stained	12	64	0.14	0.84	0.19

**Table IV**  
**Severe Asphyxia (Apgar less than 3)**

	Actually distressed at birth	Total LSCS done for fetal distress	Sensitivity	Specificity	Predictive value
FHS Abnormal Liquor : Clear	15	114	0.31	0.53	0.18
FHS : Normal but Liquor stained	70	237	0.85	0.31	0.28
FHS : Abnormal + Liquor stained	17	64	0.16	0.85	0.27

#### **DISCUSSION**

Many interesting and thought provoking results emerge from this study. On the actual scene of action, when the clinician has to decide on the basis of clinical methods as to whether an unborn child is having a fetal distress or not these

results are going to be of some help. On the face of it when the results of the two most widely used clinical parameters : FHS abnormality and thick meconium staining of liquor amnii are used to judge fetal distress singly or in combination, both of them prove to be of a very limited

value. This emerges when we try to calculate the percentage of babies having actual fetal distress to those who were delivered by caesran section due to FHS abnormality. The figure comes to 38.37%. The same for thick meconium liquor was 44.49% and for the combination of two 39.62%. Thus on the face of it less than 50% of babies are likely to be distressed when these methods are used to predict intrapartum fetal distress. However, this gloomy picture gets dispelled when statistical indices are used and thereby the efficacy of these methods judged.

Positive predictive value or in simplified words the capacity of a particular method to predict fetal distress is 0.8 for thick meconium staining of liquor, showing the extent to which a clinician can safely rely on this method to predict fetal distress. Also, the other two methods - FHS abnormality and FHS abnormality in combination with thick meconium staining of liquor; are also quite good predictors of fetal distress.

Also, when one tries to judge how sensitive a method was and of these which one was most sensitive - thick meconium staining of liquor amnii was the most sensitive and the combination having a poorest sensitivity of all - 0.13. Also, when one tries to judge how specific these methods were in judging fetal distress one finds that the combination of FHS abnormality and staining of liquor was the most specific in picking up distress.

Understandably, the capacity to predict the degree of distress was poor by all the methods. Thus, they can predict

a distress reasonably well but to what extent is the child in utero distressed is very poorly predicted by the two methods or their combination in the study. Thus, all that a clinician can judge if he finds these parameters appearing is that the child has a reasonable chance of being distressed but whether this distress is mild, moderate or severe can not be conjectured.

In literature multifocal views emerge regarding these parameters to judge distress (Smith et al - 1987, Krebs et al - 1979). FIGO recommendations on guidelines for the use of fetal monitoring puts rate between 110-150 as baseline and not indicative of distress. However to what extent rates below and above these can be called indicative of distress requires to be studied. (Gibb D. - 1993). Meconium staining of liquor on the other hand may be present in 8% to 32% of all deliveries and could just be a physiological event or may indicate a distress (Bosco P. - 1992). When such confusing literature is read, obviously the clinician who is actually practising obstetrics and does not have an access to CTG monitoring (as is the case with most of us in India) feels at a loss. The cynic will go up to the extent of putting on a wry smile and asking "How really distressing was the fetal "distress" ?" when judged on these two clinical methods.

But with the results of this study showing a good predictive value of these methods a clinician can be rest assured of the fact that his decision to caesar out babies on these criteria is more likely to be right than wrong.

CONCLUSIONS

FHS abnormality and thick meconium staining of liquor amnii singly as well as in combination are good predictors of intrapartum fetal distress. Also amongst these, thick meconium staining of liquor singly is most sensitive in picking up distress and the combination most specific in such a prediction.

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Summary: This study is a useful non-invasive method of study of the human fetal circulation. It is a useful and reliable tool for prediction of the foetal oxygen status. We conducted a study to correlate abnormal Doppler values to the severity of gestational morbidity and mortality in high risk pregnancies. In our study, 90% of patients with abnormal Doppler findings had adverse perinatal outcome.

Introduction: The introduction of Doppler ultrasonography in Obstetrics has made possible for the detection of non-invasive evaluation of fetal-placental circulation. It is a useful and reliable tool for prediction of the foetal oxygen status. We conducted a study to correlate abnormal Doppler values to the severity of gestational morbidity and mortality in high risk pregnancies. In our study, 90% of patients with abnormal Doppler findings had adverse perinatal outcome.