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Original article

Evaluation of Pre-disposing factors of Foetal Distress and its Outcome: A Retrospective Observational Study

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Abstract:

Background: Foetal distress is characterized by foetal tachycardia, bradycardia, variable decelerations, and late decelerations often leading to emergency caesarean section. The primary purpose of the study was to study the predisposing factors of foetal distress and to assess foetal outcome.

Method: A total of 200 women with foetal distress were enrolled in this retrospective observational study conducted at Tertiary care teaching hospital. Data was collected from patient's indoor hospital records, the labour room record, operative records, laboratory reports, neonatal intensive care unit (NICU) admission records, and nonstress test (NST) machine records. Analysis was done to assess the predisposing factors of foetal distress and to predict the foetal outcome.

Result: Among all cases of foetal distress, 29.7% women had meconium- stained amniotic fluid, 20% had IUGR, 14% had oligohydramnios, 15% had pre-eclampsia, 2% had cord prolapse. Out of all only 14.5 % babies were admitted to NICU, 3% babies had umbilical cord pH <7, 5% babies had depression at one minute of APGAR, 2 % had depression at 5 min of APGAR.

Conclusion: It could be possible to reduce the rate of NICU admission and improve APGAR score of babies by strict intra-partum monitoring by NST and also vigorously monitoring those patients with high risk factors. Early identification of risk factors and prompt intervention for the same can prevent further morbidities due to intra-partum foetal distress.

Keywords: Foetal distress, APGAR, NST, IUGR, LSCS, EFM, MSAF.

Introduction:

Foetal distress is often an indication for emergency caesarean section or operative vaginal delivery (1). Intra-partum findings such as foetal tachycardia, bradycardia, variable decelerations, and late decelerations are signs of foetal distress which require immediate intervention (2). The foetal distress definition should be changed to non-reassuring foetal status with further description of finding like foetal tachycardia, bradycardia, variable decelerations, late decelerations and low biophysical profile (3). The indication leads to decide mode of delivery, emergency of delivery, and type of anaesthesia (4). Severe preeclampsia, growth restricted foetus, post-term. and oligohydramnios have also been observed associated with abnormal foetal heart tracing and caesarean section (5). Foetal distress in most of the hospitals is detected by electronic foetal monitoring only but which leads to a high

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rate of caesarean deliveries and hence there was very less number of babies which had adverse outcome at birth (6,7). So, this study was undertaken to analyse the pre-disposing factors of foetal distress and its perinatal outcome.

Methodology:

This observational, non-interventional, and cross-sectional study is part of a large research project performed at the Department of Obstetrics and Gynaecology of a tertiary care hospital from January 2018 to December 2019 after approval from the Institutional Ethical Committee with reference number EC/24/2018. The patients were enrolled after diagnosis of fetal distress in the intrapartum period for the data collection. The inclusion criteria involved singleton pregnancy, gestational age at term (≥ 30 weeks), cephalic presentation, presence of MSAF during labor, mode of the delivery by cesarean section, abnormal fetal heart rate monitoring findings suggestive of fetal distress, and women who were willing to participate. The exclusion criteria included multiple gestations, breech presentation, known fetal anomalies, gestational age less than 30 weeks, intrauterine foetal demise, antepartum haemorrhage, and women who did not want to participate in the present study. The patients were counselled, and those willing to participate in the study were recruited after obtaining their informed consent after the patient delivered the neonate and was shifted to the ward. There were on an average 20 cases per month leading to 240 cases in a year. However, following the OPENEPI formula with confidence level of 95%, the sample size was derived to be 214.2 cases.

The retrospective data was collected and entered in an Excel sheet. SPSS Version 17 was used for statistical analysis. The qualitative data was represented in form of frequency and percentage.

Results:

A total of 200 retrospective cases were chosen to analyse the intra-partum foetal distress and its foetal outcome. The sociodemographic details are mentioned in table 1.

Table 1: Sociodemographic details of the cases

Sociodemographic details (N=200)		Frequency (n)	Percentage (%)
Age	<20 years	15	7.5
	21-25 years	84	42.0
	26-30 years	74	37.0
	31-35 years	22	11.0
	36-40 years	5	2.5
Gravida	Primigravida	107	53.7
	Multigravida	93	46.5
Gestational Age (in weeks)	30-32	1	0.5
	32-36	16	8.0
	36.1-38	55	27.5
	38.1-40	65	32.5
	> 40 weeks	63	31.5
Birth weight (kg)	1.5-1.99	11	5.5
	2.0-2.499	60	30.0
	2.5-2.999	89	44.5
	3.0-3.499	32	16.0
	3.5-3.999	7	3.5
	>4.0	1	0.5

Table 2. Distribution according to obstetrics and maternal high risk factors

Pre-disposing factors (N=200)		Frequency(n)	Percentage(%)
Obstetric factors	Moderate MSAF	52	26%
	Post term	34	17%
	Preterm labour	30	15%
	Oligohydramnios	24	12%
	IUGR	20	10%
	PROM	16	8%
	Cord around neck	14	7%
	Thick meconium	6	3%
	Cord prolapses	1	0.5%
	Preterm labour	1	0.5%
	Abruptio placenta	1	0.5%
	Placenta previa	1	0.5%
Maternal factors	Preeclampsia	15	41.7
	GDM	9	25
	Maternal fever	5	13.9
	Deranged LFT	4	11.1
	PIH	4	11.1
	Anaemia	4	11.1

The distribution of cases on the basis of outcome is illustrated in table 3.NICU

Table 3. Distribution of cases based on the foetal outcome

Foetal Outcome (N=200)		Frequency(n)	Percentage(%)
NICU Admission	YES	29	14.5
	NO	171	85.5
Umbilical cord analysis	<7	10	5.0
	≥7	190	95.0
APGAR at 1 minute	Depression	10	5.0
	No Depression	190	95.0
APGAR at 5 minute	Depression	4	2.0
	No Depression	196	98

Discussion:

In present study, a total 200 women were enrolled for study after signing the consent. All of them counselled regarding the participation in the study.

The present study reported a maximum number of women enrolled belonged to 21 to 25 years of age group. Gangwar et al. (1) reported more women belonging to 24.5 years of age and in Ajah et al. (8) reported more frequency of women in 25 to 29 years age group. So, the results for mean age of fetal distress in our study are consistent with other studies.

The present study reported fetal distress was more common during 38- 40 weeks of gestation. Ajah et al.(8) reported the mean gestational age for fetal distress was 39± 2 weeks. Ugwa (9) concluded that the mean

gestational age for fetal distress at 37.6 weeks + 2.4 weeks. Hence, result of gestational age are consistent with other studies. In the current study, the obstetrical causes contributed more for foetal distress than maternal causes of foetal distress. Similarly, Sabol et al. (10) concluded that increased rates of neonatal acidaemia were associated with obstetric events only.

In present study, there were 14.5% cases were transferred to NICU due to foetal distress. Similarly, Gangwar et al. (1) also reported 14.5 % and 14.6 % of cases with foetal distress which were transferred to NICU respectively. So, it is concluded that early decision of LSCS leads to less admission to NICU.

Umbilical cord blood pH less than 7 (acidosis) is an indicator of birth asphyxia in newborn babies. In present study, there were 97%(194 cases) had cord blood pH above 7 and only 6 cases (3%) had acidaemia at birth and all 6 babies of acidaemia was transferred to NICU. Out of 6 babies only one case had cord prolapse and had very poor APGAR score 4/10,5/10,6/10. In current study, cord prolapse affects 0.5% patients. Similarly, Gebreheat et al (11) reported that the cord prolapse affected in 4.26 %. In contrast other studies had more cases of foetal distress due to cord prolapse. Aslam et al. (12) reported cord prolapse affecting 8.1% patients and Tasew et al. (13) reported cord prolapse affected in 8% patients. Similarly, a correlation between cord pH less than 7 and its neonatal outcome also has been found in another study conducted by Perveen et al (14). However, Kumar et al. (15), showed that no statistically association between non-reassuring fetal heart rate and adverse neonatal outcomes. So, it is concluded that early decision of performing LSCS for foetal distress helped further in preventing birth asphyxia in new-born and further complications.

Amongst 200 cases enrolled in present study, there were196 (98%) cases with no depression at 5 minutes. 5% cases which were previously diagnosed with depression at 1 minute, only 2% patients had depression at 5 minute and the cause for the depression at 5 minutes were cord prolapse, intra-uterine foetal restriction, bleeding placenta previa. All of them [4 cases (2%)] had Apgar score of 4/10 at 5 minutes. Other six cases having depression at 1 minute were improved clinically at 5 minute without any depression (Apgar score of 6/10, 7/10, 8/10).So, in our study ,there was a statistically significant association between low APGAR score and neonatal acidaemia. Syed et al. (16) also showed same association between low APGAR score and neonatal acidaemia.

However, the limitation of the study states that the foetal monitoring was done only by NST machine. There were no other methods available for foetal monitoring in the institution. Duration of study was only for 2 years. Sample size was small when compared to previous similar studies.

Conclusion

The study concluded that the abnormal foetal heart rate patterns detected by CTG do not correlate well with early neonatal outcome resulting in a high rate of unnecessary caesarean deliveries. However, the correlation was better in women with associated complicating factors as there was significantly higher NICU admission rate in babies born to them. Preterm and low birth new-born having pH less than 7 admitted in NICU, had close association with foetal distress.

The complete assessment of the patient's clinical parameters may help to differentiate between foetuses that require prompt delivery and those who are not actually in acute distress. Antepartum and Intra-partum risk factors have shown to significantly increase the risk of emergency caesarean section due to non-reassuring foetal status. Because of early diagnosis of foetal distress and early decision for LSCS, there were less numbers of cases having depression and were transferred to NICU. So, there were no cases with still birth and neonatal death in our study. Early detection of the risk factors is required for timely institution of appropriate intervention in order to result in improved neonatal outcome. In order to reduce this high trends of caesarean sections due to clinical diagnosis of foetal distress, antepartum foetal assessment with non stress test or biophysical profile and intrapartum use of continuous electronic foetal monitoring should be used to confirm foetal distress before any surgical intervention. Foetal blood sampling and foetal pulse oximetry should be performed in events of non reassuring or abnormal tomography.

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