

Study of Early Perinatal outcome in Lower Segment Caesarean Section in Severe Foetal Distress

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Abstract

Introduction: Fetal distress contributes to increased caesarean section rate. Predicting adverse outcome in early perinatal period is important in severe fetal distress. *Aim of the Study:* To study the risk factors for foetal distress and evaluate the incidence of meconium stained liquor, respiratory distress, morbidity and mortality in foetal distress. *Material and Methods:* This was a prospective study done in in the department of Obstetrics and Gynaecology, Dr.V.M. Government Medical College, Solapur. A total of 150 newborns delivered via Caesarean section with a diagnosis of clinical foetal distress were compared with another group of 150 newborns delivered similarly, but without clinical foetal distress. The risk factors for foetal distress were noted. The meconium quality, postnatal NICU admission rate, morbidity and mortality were looked at. *Results and Observations:* Majority of the patients were 21-25 years in both study and control groups and majority were (53.33%) primigravida. Maximum patients in both groups (29.23%) were of 40 weeks gestational age. Incidence of post maturity (41 weeks and above) in study group was higher (25.38%) when compared to control group (7.33%). Anemia and post-maturity were the most common antenatal complications in study group. Most common indication for induction of labour in study group was post-date

pregnancy. Incidence of thick meconium (52.66%) was higher in study group followed by thin meconium (40.66%). Incidence of low 1 min and 5 min Apgar score was higher in thick meconium cases. Incidence of admission to NICU (30.66%), mortality (11.33%) was higher in the study group. *Conclusion:* Foetal distress is associated with many antenatal risk factors necessitating LSCS. It is commonly associated with thick meconium which can lead to increased incidence of low Apgar scores at 1 and 5 minutes. It also increases the rate of NICU admission in first 48 hours and has increased perinatal mortality.

Keywords: Fetal Distress; Perinatal Outcome; Apgar Score.

Introduction

Caesarean section is one of the commonly performed surgical procedures in obstetric practice and is one of the oldest operations in surgical field [1]. Fetal distress is alarming for the obstetrician and requires immediate action like caesarean section or instrument assisted vaginal delivery in order to prevent fetal death [2].

The foetus depends on the maternal vascular supply for exchange of oxygen and carbon dioxide. Disruption of the blood supply can lead to fetal hypoxia, which may progress to acidosis contributing to neonatal morbidity and mortality [3,4].

Uterine contractions produce a transient decrease in blood flow to the placenta and the fetus, which may lead to the disruption of gas exchange across the placental barrier. Initially the foetus adapts to these changes but prolonged reduction of blood flow may lead to fetal acidemia [3].

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The partial pressure of oxygen in the mother's circulation is higher than that in fetal circulation, which facilitates maternal-to-fetal transfer of oxygen across the placental interface [3]. Fetal distress is a widely used but poorly defined terminology. Fetal condition during labor is usually assessed by fetal heart rate (FHR) and checking the presence of meconium in the amniotic fluid, especially in the set-up where facilities of cardiotocography and fetal scalp blood pH estimation are not available [5].

Fetal distress in labor results in progressive hypoxia and acidosis [1].

As soon as hypoxia sets in there is redistribution of blood flow to vital centres to limit the deleterious effects of oxygen limitation in the brain, heart and adrenal glands. A further compensatory response is that overall fetal oxygen consumption declines to values as low as 50% of the control. This level can be maintained for periods up to 45 minutes and is completely reversible on cessation of hypoxia. There is accumulation of lactate in the vascular beds with limited oxygen supply due to anaerobic glycolysis leading to gradual development of metabolic acidosis [6,7].

The management of the compromised fetus is crucial and important and often prompts performance of an emergency caesarean delivery. Fetal distress is a poorly defined term and may result in unnecessary emergency caesarean deliveries under general anesthesia [6].

The goal of fetal intrapartum resuscitation (FIR) is to optimize the fetal condition in utero so that labor may continue safely, or to improve fetal wellbeing prior to emergency delivery. The specific measures employed aim to increase oxygen delivery to the placenta and fetus in order to reverse hypoxia and acidosis.

Intrauterine resuscitation encompasses maternal repositioning, reducing uterine activity, oxygen administration, Amnioinfusion, optimizing maternal fluid status and correction of hypotension, and modifying maternal expulsive efforts. It helps to "buy time" to optimize the fetal condition while preparing for an impending delivery, or an emergency caesarean section [5].

Aims and Objectives

To study the risk factors for foetal distress and evaluate the incidence of meconium stained liquor, respiratory distress, morbidity and mortality in foetal distress.

Materials and Methods

Ethical permission was taken from the institution. This was a prospective study done in the department of Obstetrics and Gynaecology, Dr. V.M. Government Medical College, Solapur for a period of two years from November 2010 to October 2012.

Complete details of antenatal history were noted in all the cases. Early perinatal outcome of newborns delivered through Caesarean section due to clinical foetal distress (on the bases of abnormal foetal heart rate and rhythm by intermittent auscultation, together with meconium staining of amniotic fluid) in labour was compared with a group of newborns similarly delivered via Caesarean section without a diagnosis of clinical foetal distress (The non - exposed group of mothers comprised of mothers who underwent Caesarean section for indications other than clinical diagnosis of foetal distress.). The 150 newborns delivered via Caesarean section with a diagnosis of clinical foetal distress (Study group) were compared with another group of 150 newborns delivered similarly, but without clinical foetal distress (Control group).

Data collected was analyzed using appropriate standard statistical methods i.e. Chi-square (X^2) test and 'Z' - test.

Inclusion Criteria

1. Term gestation (at 37 weeks or above)
2. Cephalic presentation
3. Singleton pregnancies

Observations and Results

The early perinatal outcome of 150 newborns delivered via caesarean section with diagnosis of foetal distress (Study group) was compared with control group (150 newborns delivered via caesarean section without clinical foetal distress).

Age-Wise Distribution of Patients

Majority of the patients were in the age group of 21-25 years in both study (54%) and control group (57.33%). In Study group, the second major age group was 18-20 years (30%) and in control group it was 26-30 years (21.33%). Third and fourth age group in study group was 26-30 years (11.33%), >30 years (4.6%) respectively and in control group was 18-20 years (18.66%), >30 years (2.66%) respectively.

Minimum age in both the groups was 18 years whereas, the maximum age in both the groups was 38 years.

The mean age in study group was 23.05±3.63 and in control group was 23.91±3.43.

Statistically there was no difference in Age distribution in study group and control group (p' value - p > 0.05, insignificant).

In study group majority of the women were primigravida (53.3%) followed by second gravida (28%), third gravida (15.3%), fourth gravida (2.6%) respectively. There was only one (0.6%) 6th gravida in study group and there was no 5th gravida in study group.

In control group majority of the women were second gravida (41.3%) followed by primigravida (28%), third gravida (22%) and fourth gravida (7.3%) respectively. There were two fifth gravida (1.3%) in control group and there was no sixth gravida in control group.

Association of primigravida in study group was statistically highly significant (p<0.001) when compared with control group.

Maximum patients in both study group (29.2%) and control group (26.6%) were of gestational age 40

weeks followed by 39 weeks in both the groups.

Incidence of post maturity (41 weeks and above) in study group was higher (25.3%) when compared with control group (7.3%).

Mean gestational age in study group was 39.05 ± 1.38 and control group was 38.8 ± 1.27. Statistically there was no difference in gestational age distribution in study group and control group (p' value - p > 0.05 (insignificant)).

Anemia (25.3%) and post-maturity (41 weeks and above) (25.3%) was most common antenatal complications in study group. 2nd common complication in study group was pregnancy induced hypertension (16.6%), followed by PROM (5.3%).

Association of antenatal complications was high in study group (80%) when compared to control group (54.6%). Antenatal complications were statistically more significant (p < 0.01) in study group than control group.

In study group (76%) and control group (92.6%) patients had spontaneous onset of labour. In study group 24% patients required induction for labour and in control group only 7.3% required induction. Association of induction of labour in study group was statistically highly significant (p < 0.001).

Table 1: Distribution of Gestational Age

Sr.No.	Gestational age (Weeks)	Study Group (150)	Control Group (150)
1.	37	16 (10.6%)	30 (20%)
2.	38	19 (12.6%)	34 (22.6%)
3.	39	33 (22%)	35 (23.3%)
4.	40	44 (29.3%)	40 (26.6%)
5.	41	30 (20%)	9 (6%)
6.	42	8 (5.3%)	2 (1.3%)
	Mean ± SD	39.05 ± 1.38	38.8 ± 1.27

'p' value - p > 0.05 (insignificant)

Table 2: Antenatal Complications (Risk factors)

Sr. No.	Complications	Study Group	Control Group
1.	Pregnancy induced hypertension	25 (16.6%)	25 (16.6%)
2.	Anemia	38 (25.3%)	25 (16.6%)
3.	Anemia with PIH	3 (2%)	2 (1.3%)
4.	Post-maturity (41 weeks and above)	38 (25.3%)	10 (6.6%)
5.	Oligohydramnios	3 (2%)	1 (0.6%)
6.	Abruptio placentae	2 (1.3%)	0 (0%)
7.	Central placenta previa	1 (0.6%)	2 (1.3%)
8.	Antepartum eclampsia	0 (0%)	2 (1.3%)
9.	PROM	8 (5.3%)	15 (10%)
10.	Mother on anti convulsant/ anti- psychotic drug	2 (1.3%)	0 (0%)
	Total	120 (80%)	82 (54.6%)

p < 0.01 (more significant)

Table 3: Indications for induction of labour in study group and control group

Sr. No.	Indication	Study group	Control group
1.	Postdate Pregnancy	24 (16%)	4 (2.6%)
2.	Pregnancy induced hypertension (PIH)	6 (4%)	7 (4.6%)
3.	PROM	1 (0.6%)	-
4.	PIH with postdate pregnancy	5 (3.3%)	-
	Total	36 (24%)	11 (7.3%)

Table 4: Liquor state in study group and control group

Sr. No.	Liquor State	Study group (150)	Control group (150)
1.	Meconium stained liquor	140 (93.3%)	3 (2%)
2.	Clear liquor	9 (6%)	147 (98%)
3.	Blood tinged liquor	1 (0.6%)	-

'p' value - $p < 0.001$ (highly significant)

Table 5: Distribution of liquor state, Apgar score and fetal outcome in study group

Sr. No.	Liquor state	No. of cases	Low Apgar score (0-6)		Admission to NICU in first 48 hours	Discharge rate	Mortality (Death)
			1 min	5 min			
1.	Thin Meconium	61 (40.6%)	39 (26%)	5 (3.3%)	6 (4%)	6 (4%)	0 (0%)
2.	Thick Meconium	79 (52.6%)	70 (46.6%)	29 (19.3%)	32 (21.3%)	19 (12.6%)	13+2 still birth=15 (10%)
3.	Clear	9 (6%)	7 (4.6%)	2 (1.3%)	2 (1.3%)	1 (0.6%)	1 (0.6%)
4.	Blood tinged	1 (0.6%)	1 (0.6%)	1 (0.6%)	1 (0.6%)	1 (0.6%)	0 (0%)
	Total	150	117	37	41	27	16

Table 6: Distribution of fetal outcome in study group

	No. of Admission to NICU	Reason for admission to NICU		Discharge	Mortality	Cause of death
0-24 hours	41 (27.3%)	MAS → MAS with PNA → Perinatal Asphyxia → Severe PNA with HIE-III → MAS with HIE-III → TTN → Meconium gastritis →	21(14%) 8(5.3%) 4(2.6%) 1(0.6%) 5(3.3%) 1(0.6%) 1(0.6%)		3+2 SB = 5 (3.3%)	1) MAS with pulmonary hemorrhage with RF with RD 2) MAS with severe PNA 3) MAS with severe PNA
25-48 hours	--	--	--	2 (1.3%)	3 (2%)	1) MAS with HIE-III severe PNA 2) MAS with HIE-III 3) Severe PNA with HIE-III
49-72 hours	2(1.3%)	Aspiration Pneumonitis with RD Hypoglycemic convulsion	1 1	2(1.3%)	2(1.3%)	1) MAS with HIE-III with severe PNA 2) MAS with HIE-III with severe PNA
73 hours to 7 days	3 (2%)	Jaundice (Hyperbilirubinemia) (on PND4) Hypoglycemic convulsion (on PND 4)	2 1	4 (2.6%) (PND4)	3(2%) (PND4)	1) MAS with HIE-III with severe PNA with RF with cardiorespiratory arrest (CRA) 2) MAS with HIE-III with RF with CRA 3) MAS with Pulmonary hemorrhage with severe perinatal asphyxia
				PND5-7 (4.6%)	2 (1.3%)	1) Aspiration pneumonitis with RD with RF with CRA 2) MAS with HIE stage III
				PND6-2 (1.3%)	1 (0.6%)	1) MAS with severe PNA
				PND7-2 (1.3%)	0	0
> 7 days				12 (8%)	1(0.6%) (on PND8)	1) MAS with RF with CRA

Most common indication for induction of labour in study group was post-date pregnancy (16%) followed by PIH (4%).

In control group most common indication for induction of labour was PIH (4.6%) followed by postdate pregnancy (2.6%).

Incidence of meconium stained liquor in study group was higher (93.3%) compared to control group incidence (2%).

Out of 9(6%) cases of clear liquor in study group in 2 (1.3%) cases 2 loops of cord around neck were found intra-operatively and in 1 (0.6%) case, single loop of cord around neck was found intraoperatively. In other 6 (4%) cases there were no significant intra-operative findings.

There was only one (0.6%) blood tinged liquor state in study group. There were 3 cases (2%) of meconium stained liquor in control group and it was an accidental finding intraoperatively. In these cases fetal heart rates were regular and none of the babies required any NICU admission. Association of meconium stained liquor state in study group was highly significant ($p < 0.001$).

Incidence of low 1 min Apgar score i.e. very poor (18%) and moderately poor (60%) was higher in study group when compared with control group in which incidence of low 1 min Apgar score was minimal in 2% cases and was moderate in 30.6%.

In control group incidence of good Apgar score at 1 min was higher when compared with study group (22%).

Association of low 1 min. Apgar score in study group was statistically highly significant ($p < 0.001$).

Incidence of low 1 min Apgar score was higher in study group (78%) when compared with control group (32.6%).

Incidence of thick meconium (52.6%) was higher in study group followed by thin meconium (40.6%) clear liquor (6%) and blood tinged liquor (0.6%) respectively.

In thick meconium incidence of low 1 min Apgar score was higher 46.6% and low 5 min Apgar score was higher 19.3% followed by in thin meconium; low 1min, 5 min Apgar score was 26%, 3.3% respectively. In cases with clear liquor, incidence of low 1 min, 5 min Apgar score was 1.3% each. Rate of NICU admission in first 48 hours was higher in thick meconium stained liquor group i.e. 21.3% followed by thin meconium (4%), clear liquor (1.3%), Blood tinged liquor (0.6%) respectively. Incidence of mortality (10%) was higher in thick meconium group when compared with thin meconium.

Fetal outcome in Study Group and Control Group

Incidence of admission to NICU in study group was seen in 46 cases (30.6%) and mortality was seen in 17 (11.3%) cases. Mortality included 2 still births and 15 deaths. In control group there were 7 (4.6%) NICU admissions and not a single case of perinatal mortality. Admission to NICU and mortality rate was statistically highly significant in study group when compared to control group ($p < 0.001$, Highly significant).

MAS: Meconium aspiration syndrome, RF: Respiratory failure, RD: Respiratory distress, PNA: Perinatal asphyxia, HIE: hypoxix ischemic encephalopathy, CRA: Cardiorespiratory arrest, PND: Perinatal death

Incidence of NICU admission rate (27.3%), and mortality (5.3%) was higher in study group in first 48 hours when compared to control group which had NICU admission rate of 4% and mortality. In control group incidence of baby with mother was higher (96%) when compared with study group (72.6%). Admission to NICU, mortality rate was statistically highly significant in study group when compared to control group ($p < 0.001$) in first 48hours.

Incidence of NICU admission (27.7%), and mortality (12.2%) was more when lower segment caesarean section was done after 30 min of detection of fetal distress. Incidence of NICU admission (26.6%) and mortality (8.3%) found when detection of fetal distress to delivery interval was ≤ 30 min.

Discussion

In the present study majority were in the age group of 21-25 years in both study (54%) and control groups (57.3%) and least common age group was more than 30 years, in both the groups. Geidam et al [8] also observed majority of their cases in the 21-35 years age group in both study (85%) and control group (83.3%). In their study also the least common age group was more than 35 years, in both study (5.8%) and control group (7.5%).

In the present study, in control group, pregnancy induced hypertension (16.6%) was the most common antenatal complication. This finding was similar to that of Geidam et al [8] where pregnancy induced hypertension was the most common antenatal complication and was seen in 5.8% cases.

Incidence of thick and thin meconium in present study was 52.6% and 40.6% respectively. This compares well with the findings of Bhindeet al [9] who also observed 59.5% and 40.6% cases having thick and thin meconium in their study.

In the present study most common associated complication was anemia (24.6%) and post maturity (22.6%) followed by PIH (16%). Results of the present study compare well with the observations of Bhide et al [9].

Association of low 1 min Apgar score in the study group was high and also significant, when compared to control group. Clinical diagnosis of fetal distress was found to be associated with low 1 min Apgar score in present study and is comparable with the report of Kenyatta hospital study [10].

Clinical diagnosis of fetal distress was found to be significantly associated with increased rate of NICU admissions and high mortality in present study and was comparable with Kenyatta Hospital study.

In Roy et al [11] study CTG monitoring was used and the rate of NICU admission was less than present

study and that of Rotich et al [10] study.

Comparison of incidence of still birth in study group

In present study the incidence of still birth in Study group was 2 (1.3%) which is similar to the observations of Giedam et al [8] and Roy et al [11] who reported it as 2.5% and 0.4% respectively.

Incidence of NICU admission rate (27.3%) and mortality (5.3%) was higher in study group in first 46 hours, when compared to control group.

In the control group incidence of baby with mother was higher (96%) when compared with study group (72.6%). Admission to NICU and mortality rate was statistically highly significant in the study group when compared to the control group ($p < 0.001$) in first 48 hours.

Table 7: Comparison of incidence of low 5 min Apgar score (0-6)

	Study Group	Control Group
Rotich et al [10]	14(24.1%)	2(3.4%)
Geidam et al [8]	17(14.6%)	5(4.1%)
Roy et al [9]	15.2 %	-
Present study	37(24.6%)	3(2%)

Table 8: Relation of detection of fetal distress to delivery interval

Study	Detection of fetal distress to delivery interval	NICU admission
Roy et al [11]	≤ 30 mins (n-121)	26(21.4%)
	>30 mins (n-96)	7(7.2%)
Present study	≤ 30 mins (n-60)	16(26.6%)
	>30 mins (n-90)	25(27.7%)

Conclusion

Foetal post-maturity, anemia, pregnancy induced hypertension, premature rupture of membranes are some of the common risk factors for foetal distress necessitating LSCS.

Post-date pregnancy is a common indication for induction of labour. Foetal distress is commonly associated with thick meconium which can lead to increased incidence of low Apgar scores at 1 and 5 minutes. It also increases the rate of NICU admission in first 48 hours and is associated with increased perinatal mortality.

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