OBSTETRIC AND PERINATAL OUTCOME OF LOW-RISK PREGNANCIES WITH TERM LABOUR AND MECONIUM-STAINED AMNIOTIC FLUID AT ST. PHILOMENA'S HOSPITAL

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ABSTRACT

BACKGROUND

Meconium-stained amniotic fluid has been considered as sign of foetal distress in presentations other than breech and is associated with poor foetal outcome, but others consider meconium passage by foetus as physiological phenomenon and procedures of environmental hazards to foetus before birth.

MATERIALS AND METHODS

200 women with meconium-stained amniotic fluid in labour, all low-risk pregnancies were included in our study from September 2010 to August 2012 admitted in our department. For uniformity of results, cases with obstetric and medical complications were excluded. The cases were divided into three groups depending upon grades of meconium staining as thin, moderate and thick. Foetal monitoring, uterine contractions and Apgar score, birth weight, resuscitation of baby noted. All babies were followed up to first week of neonatal life.

RESULTS

Of 200 cases, 147 had caesarean delivery 73.5% and 53 had vaginal delivery 26.5%. The incidence of LSCS was found to be maximum in the thick MSAF group 54.5%, 14% in moderate and 5% in this MSAF group. In moderate MSAF group, 2.17% had <7, 1 minute Apgar. In thick MSAF group, 3.33% had <7 Apgar; in thin MSAF group, 11.76% had <7 Apgar at 1 minute. The p value was 0.094 in all grades of MSAF, the 5 min. Apgar's were more than 7. The occurrence of complications in the baby did not depend on the mode of delivery. The p value was 0.58, which was insignificant. The 'p value of association of CTG abnormality and foetal morbidity was significant <0.001. The association of grades of meconium and foetal morbidity, the p value was 0.337, which was insignificant. There was no perinatal mortality in our study.

CONCLUSION

The incidence of low-risk pregnancies with MSAF in our study was 4.5%. There was increased tendency for LSCS in the MSAF. The foetal morbidity depends on the reactivity to CTG not on grades of MSAF. Therefore, close intrapartum monitoring has to be done in such cases and LSCS done in those instances where CTG is abnormal.

KEYWORDS

Meconium-Stained Amniotic Fluid (MSAF), Foetal Distress, Birth Asphyxia, Nonstress Test (NST), Cardiotocography (CTG) and Foetal Scalp Blood Sampling (FBS).

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BACKGROUND

Meconium, the gastrointestinal excreta of the foetus was named by Aristotle. The word meconium is derived from Greek word 'meconium-arion', which means like opium poppy like substances caused sleeping state of the foetus in mother's womb. Meconium begins to appear in the human intestine from 16th week of gestation (Windle 1940).[1] The passage of meconium in utero has been described by various authors to different mechanisms as follows. The pathological explanation proposes that foetuses pass meconium in response to foetal hypoxia; in utero passage of meconium represents normal gastrointestinal tract maturation, which is under neural control; commonly, meconium passage occurs following relaxation of anal sphincter and increased peristalsis from vagal stimulation; by the end of the sixteenth week of gestation, the gastrointestinal functions of the foetus is sufficiently developed to absorb much of water from it, propel unabsorbed matter as far as the lower colon.

During intrauterine life, foetus normally does not pass meconium as the peristaltic movement of foetal intestine remain quiescent. But, if foetal hypoxia occurs intestinal peristalsis increases sufficient to cause the unabsorbed matter excreted per anus. These foetal excreta are called the meconium. But, quite a good number of cases, no definite cause could be found. Meconium consists not only of undigested debris from swallowed amniotic fluid, but to a

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lesser degree of various products of secretion, excretion and desquamation by the gastrointestinal tract. Meconium is a viscous, semisolid material, rich in polysaccharides and also contain lipid, digestive secretion, cellular debris, lanugo hair, vernix caseosa, steroid and sometimes occult blood (Fox 1945).[2] The classical sign or markers of foetal hypoxia are loss of or decreased foetal movements, variations in foetal heart rate pattern, presence of meconium in amniotic fluid, presence of foetal molding and decrease in foetal scalp blood pH. The significance of meconium-stained amniotic fluid is believed to be one of the oldest and surest sign of foetal distress in utero due to foetal hypoxia (McCall and Fulsher, 1953).[3]

At the other end of spectrum, meconium passage is a normal physiological event in a term foetus and is not a sign of foetal distress in the absence of foetal heart rate abnormalities, but can become an environmental hazard when foetal acidemia supervenes. Combination of meconium and abnormal foetal heart rate enhances a poor neonatal outcome than meconium passage alone.

Most of the workers observed that meconium staining of amniotic fluid was associated with increased foetal morbidity and mortality that was found more in thick meconium staining and less in thin meconium staining. Meconium acts as a good culture medium for pathogens, sometimes cause obstruction in the lung and sets foreign body inflammatory reaction in lungs when aspiration occurs, which was the main cause of perinatal morbidity (Bryan 1967)[4], (Gooding 1971).[5] Presence of meconium in the amniotic fluid or detection of foetal heart rate abnormality is said to indicate foetal distress, which may result in stillbirth or in the birth of asphyxiated baby with the consequences such as brain damage, neurological problem and other manifestation (Abramovici 1974).[6]

Since all foetuses with meconium passage in labour do not have adverse outcome, it is important to distinguish those who are destined to develop foetal distress promptly and intervene accordingly to prevent meconium aspiration syndrome and sequelae. Hence, the present study of "effect of meconium-stained amniotic fluid on foetal morbidity and mortality" has been undertaken to know whether all meconium-stained cases result in asphyxiated birth to know whether the amount of meconium discharge into the amniotic fluid has any relation with foetal outcome. As found by some authors, a large proportion of women with meconium-stained amniotic fluid have risk factors simultaneously like pre-eclampsia, diabetes, post maturity. Therefore, this study is an effort to ascertain whether meconium staining of amniotic fluid has any correlation with high-risk factors predisposes to foetal distress in labour and to assess exactly the foetal condition and outcome in all cases of meconium-stained amniotic fluid with the help of data obtained in the present series. We have excluded all such high-risk pregnancies.

Total Number of Deliveries During the Period of Study	Number of Meconium-Stained Cases	Percentage of Meconium-Stained Cases
4350	522	12%

Table 1. Percentage of Cases with Meconium-Stained Amniotic Fluid

Total number of deliveries during the study period was 4350 of which 522 cases had meconium staining of amniotic fluid, which constituted to 12% of total number of deliveries.

Grade	Number of Cases	Percentage
Thin	34	17%
Moderate	46	23%
Thick	120	60%
Total	**200**	**100**

Table 2. Frequency and Type of Meconium Staining in Our Study Group

Out of 200 cases studied, 17% were thin meconium stained, 23% were moderately stained, 60% were thick meconium stained.

Mode of Delivery	Thin	%	Moderate	%	Thick	%
Normal	15	7.5%	12	6%	8	4%
Forceps	5	2.5%	2	1%	3	1.5%
Vacuum	4	2%	4	2%	0	
LSCS	10	5%	28	14%	109	54.5%

Table 3. Showing Mode of Delivery with Respect to Grade of Meconium Staining

The incidence of LSCS was found to be maximum in the thick MSAF group 54.5%, 14% in moderate and 5% in thin MSAF group.

Normal vaginal delivery was 7.5% in the thin, 6% in moderate and 4% in thick MSAF group.

Forceps delivery was 2.5% in thin, 1% in moderate and 1.5% in thick MSAF group. Vacuum-assisted delivery was 2% in thin and 2% moderate MSAF group.

Apgar 1 Min.	Moderate	Thick	Thin	Total	p-value
<7	1 (2.17%)	4 (3.33%)	4 (11.76%)	5	0.094
7 and above	45 (97.83%)	116 (96.67%)	30 (88.24%)	195	
Total	**46**	**120**	**34**	**200**	

Table 4. Distribution of Grades of Meconium in Apgar at 1 Min. Group

In moderate MSAF group, 2.17% had <7 1 min. Apgars; in thick group, 3.33% had <7 Apgars; in thin MSAF group, 11.76% had <7 Apgars at 1 min. The p value was 0.094.

Apgar 5 Min.	Moderate	Thick	Thin	Total
<7	0 (0.00)	0 (0.00)	0 (0.00)	0
7 and above	46 (100.00)	120 (100.00)	34 (100.00)	200
Total	**46**	**120**	**34**	**200**

Table 5. Distribution of Grades of Meconium in Apgars at 5 Min. Group

In all the grades of MSAF, the 5 min. Apgars were more than 7.

Complications	LSCS Number (%)	FTVD Number (%)	p value
Meconium Aspiration Syndrome	3 (13.04%)	4 (25.00%)	0.58
Respiratory Distress Syndrome	2 (8.70%)	1 (6.25%)	
Transient Tachypnoea of Newborn	8 (34.78%)	7 (43.75%)	
Grunting	10 (43.48%)	4 (25.00%)	
Total	**23**	**16**	

Table 6. Complications in the Baby Associated with Caesarean Delivery and Vaginal Birth

In the LSCS group, 43.48% had grunting, 34.78% had transient tachypnoea of newborn, 13.04% had respiratory distress syndrome, 8.7% had meconium aspiration syndrome.

In the FTND group, 43.75% had transient tachypnoea of newborn, 25% had grunting, 25% had meconium aspiration syndrome and 6.25% had respiratory distress syndrome.

The p value was found to be 0.58, which is insignificant. The occurrence of complications did not depend on the mode of delivery. Totally, 12 babies went to NICU. 7 of them in LSCS and 5 of them were delivered vaginally.

	CTG			p-value
	Abnormal	Non-Reassuring	Reassuring	
Complications				
Present	12 (85.71%)	15 (10.95%)	12 (24.49%)	<0.001
Absent	2 (14.29%)	122 (89.05%)	37 (75.51%)	
Mother side	6 (42.86%)	136 (99.27%)	46 (93.88%)	<0.001
NICU	8 (57.14%)	1 (0.73%)	3 (6.12%)	

Table 7. Comparison of CTG with Perinatal Outcome with Respect to Presence of Complications and NICU Admission

In the group where the CTG was abnormal, 12 (85.71%) of them had complications and 2 (14.29%) of them did not have complications, 6 (42.86%) were mother side and 8 (57.14%) of them needed admission in NICU.

In the group where the CTG was nonreactive, 15 (10.95%) of them had complications and 122 (89.05%) of them did not have complications, 136 (99.27%) were mother side and 1 (0.73%) of them needed admission in NICU.

In the group where the CTG was reactive, 12 (24.49%) of them had complications and 37 (75.51%) of them did not have complications, 46 (93.88%) were mother side and 3 (6.12%) of them needed admission in NICU. The p value of this association was statistically significant. The foetal morbidity and the requirement of NICU admission depended on the reactivity, abnormality of the CTG.

	Grade			p-value
	Thin	Moderate	Thick	
Complications				
Present	12 (26.09%)	20 (16.67%)	7 (20.59%)	0.337
Absent	34 (73.91%)	100 (83.33%)	27 (79.4%)	
MS/NICU				
MS	44 (95.65%)	112 (93.33%)	32 (94.1%)	0.917
NICU	2 (4.35%)	8 (6.67%)	2 (5.88%)	

Table 8. Grade with Complications and NICU

The thin MSAF group, 12 (26.09%) babies had complications and 34 (73.91%) did not have any complications. 44 (95.65%) of the babies were mother side and 2 (4.35%) required admission in NICU.

In the moderate MSAF group, 20 (16.67%) babies had complications and 100 (83.33%) did not have any complications. 112 (93.33%) of the babies were mother side and 8 (6.67%) required admission in NICU.

In the thick MSAF group, 7 (20.59%) babies had complications and 27 (79.4%) did not have any complications. 32 (94.1%) of the babies were mother side and 2 (5.88%) required admission in NICU.

The p value is not significant here. The foetal morbidity and need for NICU care do not depend on the grades of meconium in the amniotic fluid.

AIMS AND OBJECTIVES

- Study of perinatal mortality and morbidity of neonate born with meconium-stained amniotic fluid.
- Obstetric outcome in low-risk pregnancies.

MATERIALS AND METHODS

Study included the departments of OBG and paediatrics at St. Philomena's Hospital, Bangalore. This is a prospective study done over a period of 2 years from September 2010 to August 2012. Two hundred antenatal patients diagnosed to have meconium-stained amniotic fluid in labour attending department of OBG as inpatients were included in the study. The grade of meconium at diagnosis, obstetric outcome and neonatal morbidity and mortality was studied. The gestational age of the study population ranged from 37 completed weeks and 42 completed weeks with no associated risk factors. Mothers in labour were included for study with the following.

Inclusion Criteria

Term labour (>37 completed weeks to 42 completed weeks), cephalic presentation, live singleton pregnancy, pregnancy without any congenital malformation. Mothers in labour were excluded from study with the following.

Exclusion Criteria

Preterm labour (<37 completed weeks), antepartum haemorrhage, breech presentation, transverse lie, multiple pregnancy, pregnancy with congenital malformations and intrauterine death.

Following selection of cases, a detailed history regarding age, gravida and parity, past obstetrical history, menstrual history, socioeconomic status and history of present pregnancy, history of medical and surgical disorders were noted from the patients' antenatal records and recorded in a printed proforma.

DISCUSSION

MSAF has been implicated as a factor influencing foetal wellbeing during the intrapartum and postpartum periods. Presence of meconium in AF in cephalic presentation was of great concern even to the midwives and obstetricians of old age (Mittler and Mittler 1947). Passage of meconium, once thought to be a sure sign of foetal death in utero (Schultz 1925), but later it was realised to be a sign of foetal hypoxia, not actually foetal death (James Walker, 1954).[7]

The present study was undertaken to evaluate the significance of MSAF and its foetal outcome in parturients admitted to St. Philomena's Hospital. 200 cases were included in our study, which fulfilled the inclusion criteria.

There was increased incidence of operative delivery in our study (Table 6). The percentage of LSCS was 73.5% and vaginal delivery was 26.5%. The incidence of LSCS was found to be maximum in the thick MSAF group 54.5%, 14% in moderate and 5% in thin MSAF group.

In our study, 68.5% of the babies had non-reassuring NST. 24.5% of them had reactive NST and 7% had abnormal NST. The p value of the association was statistically significant with poor perinatal outcome in the form of foetal complications with abnormal CTG.

Majority of the authors observed that incidence of birth asphyxia among the babies born with MSAF was more compared to the control cases with clear AF. Workers like James Walker (1954), Desmond (1957) concluded that this high rate of depressed babies in stained group was the result of intrauterine hypoxia.

In our study, neonatal morbidity was found to be 19.5% of 200 deliveries. Morbidity in the form of neonatal complications was 26.09% in thin MSAF, 16.67% in moderate MSAF group and 20.37% in thick MSAF group and the p value being 0.337, which is insignificant.

The neonatal morbidity does not depend on the presence of grades of meconium in the amniotic fluid. In our study group, 6% of the babies born with MSAF required NICU admission. There was no significant difference in NICU admission among the thin, moderate and thick MSAF groups. The p value was 0.917, which is magnificent, that is the requirement of the NICU care does not depend on the grades of meconium staining in the amniotic fluid.

Incidence

Incidence of MSAF in labour widely varies as reported from time to time by different workers. Its incidence by some workers like Goud and Krishna (1989)[8] was 9.8%, Arun (1991) was 14%, Hari Bhaskar (1997)[9] was 11.2%.

From the above list, it is evident that the incidence varies from 9.8 to 14%. These authors included high-risk pregnancies and even post-dated pregnancies. According to Ziadeh SM, Sunna (2000),[10] the incidence was 10.13%. In our study, the incidence of low-risk pregnancies with MSAF was 4.5%. In present study, among the MSAF cases, the highest incidence was thick MSAF. Of the total deliveries of our study period, 17% cases had thin MSAF and 23% of cases had moderate MSAF and 60% had thick MSAF. There was increased incidence of operative delivery in our study, LSCS being 73.5% and vaginal delivery was 26.5%.

The p value of the association of CTG with MSAF was statistically significant with poor outcome in the form of foetal complications with abnormal CTG. Workers like James Walker (1954) and Desmond (1957)[11] concluded that high

rate of depressed babies in stained group was the result of intrauterine hypoxia.

CONCLUSION

The incidence of low-risk pregnancies with MSAF in our study during a span of 2 years from September 2010 to August 2012 was found to be 4.5%.

Thick MSAF was most frequently found as compared to moderate or thin MSAF. The incidence of MSAF was not related to birth weight in the low-risk term pregnancies in labour. MSAF was more frequently associated with induction of labour than in the labour that was spontaneous in onset.

There was increased tendency for LSCS in the MSAF group than for vaginal delivery. The foetal morbidity depended on the reactivity of CTG, but not on the grades of MSAF in the low-risk pregnancies that were studied.

The neonatal outcome in terms of NICU admission and occurrence of complications like meconium aspiration syndrome, respiratory distress syndrome, transient tachypnoea of newborn, etc. didn't seem to differ if mode of delivery was vaginal or caesarean, but depended on the Apgars; therefore, LSCS should be limited to only those cases where the CTG is abnormal or non-reassuring. If CTG is reassuring, close monitoring of labour and close foetal monitoring should be done.

The above observations of our study was being made in low-risk pregnancies with MSAF and does not hold good in high-risk pregnancies.

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