



A one year cross sectional study of management practices of meconium stained amniotic fluid and perinatal outcome

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OBJECTIVE(S): To evaluate different management practices in meconium stained amniotic fluid and their effect on perinatal outcome.

METHOD(S): This was a cross sectional study of 249 women in labor with meconium stained amniotic fluid admitted from August 1999 to July 2000. The effect of amnioinfusion on the perinatal outcome was studied and the results were analyzed by chi square test and Z test.

RESULTS: Total number of live births in the institute during this period was 3002 and the incidence of meconium stained amniotic fluid was 8.3% (249/3002). 12.9% of the babies developed meconium aspiration syndrome. Thick meconium stained liquor had higher incidence of meconium aspiration syndrome (19% vs 2%) than that in thin meconium stained group. In the amnioinfusion group the perinatal mortality was 1.2%, compared to 9.5% in the group which did not receive amnioinfusion and this was statistically significant (RR 0.13, 95% CI-0.03 – 0.59). Neonatal morbidity was 25% and mortality 31.25% in cases of meconium aspiration syndrome.

CONCLUSION(S) : Amnioinfusion plays an important role in reducing meconium aspiration syndrome and perinatal mortality.

Key words : meconium stained amniotic fluid, meconium aspiration syndrome, perinatal morbidity, perinatal mortality

Introduction

Meconium staining of amniotic fluid (MSAF) is considered a harbinger of fetal compromise because of its direct correlation with fetal distress and increased likelihood of inhalation of meconium with resultant deleterious effects on the neonatal lungs. The present study was undertaken to evaluate different management practices in cases of meconium stained amniotic fluid and their effect on perinatal outcome. Intrapartum amnioinfusion dilutes meconium stained amniotic fluid significantly and has been studied as an additional tool to prevent meconium aspiration syndrome (MAS).

Methods

This was a cross sectional study of 249 women admitted to the labor ward with MSAF between August 1999 and July 2000. During this period, 3002 live births took place at our tertiary care center.

The inclusion criteria were meconium stained amniotic fluid diagnosed by spontaneous / artificial / intraoperative rupture of membranes, singleton pregnancy, and cephalic presentation. The exclusion criteria were antepartum hemorrhage, multifetal gestation and congenital fetal anomalies.

After a detailed history taking including complications during the present pregnancy, general physical examination and obstetric examination were performed. Gestational age by virtue of history, fundal examination and ultrasound was recorded. Routine hematological and urine examinations were done.

Further cervical dilatation, character of the meconium stained

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amniotic fluid, and fetal heart variability were noted. Partogram was maintained. Thin meconium was defined as very light green staining of amniotic fluid, and thick meconium as thick greenish meconium with particulate matter in amniotic fluid. Intrapartum resuscitative management practices like oxygen inhalation, left lateral position, intravenous fluids, and use of amnioinfusion were noted. Amnioinfusion was carried out by using 500 mL of normal saline over a period of 30 minutes followed by 180 mL per hour with gravity. On an average, 800 mL of normal saline was used for amnioinfusion. In addition mode of delivery, duration between detection of MSAF and delivery of the fetus, and mechanical oronasopharyngeal suction before and at infant's first breath were recorded. Neonatal details considered were mode of delivery, apgar score of the baby at 1 and 5 minutes, birth weight, presence or absence of meconium aspiration confirmed by the presence of meconium below the vocal cords on laryngoscopic examination and endotracheal suction, neonatal respiratory distress and radiological evidence of patchy densities of MAS in the lungs. In addition, mother and neonate were followed up during their stay in the postnatal ward. The data were analyzed by using chi square test and Z test.

Results

Two hundred and forty-nine infants were delivered with MSAF while there were 3002 live births during the study period giving an incidence of 8.3% (249/3002). MAS was present in 32 cases (12.9%) of meconium stained liquor. The incidence of MAS was 1.06% of total live births. The age of the women in the study ranged from 18 to 30 years with a mean of 24 years. Fifty-seven percent of the women were primigravidas. Thin meconium was present in 89 (35.7%) and thick meconium in 160 (64.3%) women.

One hundred and thirty (52.20%) of the women in the study had associated risk factors such as pregnancy induced hypertension, postdatism, intrauterine growth retardation, anemia, cephalopelvic disproportion, prolonged labor, eclampsia, and cord round the neck.

Incidence of fetal heart abnormalities (tachycardia, bradycardia, late and variable decelerations) was significantly higher in thick meconium stained liquor (75%; 120/160) as compared to that in the thin meconium group (22.47%; 20/89). This was statistically significant (P value <0.001, 95% CI 37.64 - 63.36, χ^2 - 64.11, Df-1).

The average time from detection of MSAF to delivery was 1 hour 15 minutes. Labor was terminated by cesarean section in 56.2% of thick meconium cases as compared to 18.0% of thin meconium cases (P <0.001). The indication for

cesarean section was primarily fetal distress, while other associated indications were cephalopelvic disproportion, prolonged labor etc. In contrast, instrumental delivery was more with thick meconium group (26.9% vs 24.4%) but not significantly so.

Table 1 shows the effect of amnioinfusion. The incidence of meconium aspiration was significantly high when amnioinfusion was not given (19.04% vs 9.70% , R R 0.51, 95%, CI 0.27 - 0.97). The perinatal mortality was also significantly high (9.52% vs 1.21%) in the group not subjected to amnioinfusion (R R 0.13, 95% CI 0.03 - 0.5).

At apgar score of 0-3 at 1 minute, there were 2 (2%) severely asphyxiated neonates in thin meconium stained liquor group and 21 (13%) in thick meconium stained liquor group (P=0.0052). While in the thin MSAF group 4 (4%) and in thick MSAF group 21 (13%) had apgar score between 4-6 at 1 minute (P=0.022). (Table 1).

Table 1. Amnioinfusion and meconium aspiration syndrome.

Outcome	Amnioinfusion given (n=165)	Amnioinfusion not given (n=84)	RR (95% CI)
MAS	16 (9.70%)	16 (19.04%)	0.51(0.27-0.97)
Mortality	2 (1.21%)	8 (9.52%)	0.13(0.03-0.59)
Morbidity	4 (2.42%)	4 (4.76%)	0.51(0.16-1.65)

Figures in brackets represent percentages. MAS-meconium aspiration syndrome.

Table 2. Co-relation of apgar score, consistency of meconium and meconium aspiration syndrome.

Apgar score at 1 minute	Thin meconium (n=89)	MAS	Thick Meconium (n=160)	MAS
0 - 3	2 (2%)	2	21 (13%)	21
4 - 6	4 (4%)	0	21 (13%)	9
7 - 10	83 (94%)	0	118 (74%)	0

Figures in brackets represent percentages. MAS-Meconium aspiration syndrome.

Out of 249 cases of meconium stained liquor, 229 infants (92.0%) underwent immediate oropharyngeal suction, and of them 20.1% (46/229) did not respond to it and needed endotracheal suction. Meconium aspiration subsequently developed in 32 neonates out of the 249 (12.85%). Neonatal morbidity due to meconium aspiration was seen in 8 out of the 32 neonates (25%) out of whom four developed seizures, two developed gastro-intestinal bleeding and two had hypoxic ischemic encephalopathy stage I. All the eight babies recovered. Out of the 10 (31.25%) neonatal deaths, six were

due to hypoxic ischemic encephalopathy, two due to pulmonary hypertension and two due to air leak syndrome. Mortality due to meconium aspiration constituted 4% of total perinatal deaths. Fourteen babies had no ill effects from MSAF.

Discussion

In our study the incidence of MSAF is 8.3%. Similar observations are made by other workers¹⁻³. However Rossi et al⁴ report a high incidence of 22% due to more number of no-care mothers attending their hospital.

We found that 12.8% of meconium stained amniotic fluid group has meconium aspiration. This is consistent with 10.5% reported by Narang et al⁷, while Bhide et al² have reported an incidence of 22% and Gregory et al³ of 20%.

Our study shows a high cesarean section rate of 42.57% (106/249). Similar observation is made by Narang et al¹. Rathore et al⁵ show a significant decrease in cesarean section rate by amnioinfusion (21% vs 36%, $P < 0.005$)⁵. In our series, cesarean section rate was 58.2% (90/160) with thick meconium staining and 17.18% (16/89) with thin meconium staining ($P < 0.0001$).

In our study there were 9.70% meconium aspiration syndrome cases in spite of administering amnioinfusion though this is significantly less than 19.04% in no amnioinfusion group. Other authors had no meconium aspiration in amnioinfusion group^{6,7}. Our study is an observational study and no strict criteria were laid in MSAF cases for amnioinfusion and cases of MSAF detected for the first time intraoperatively were also included in the study group.

Yoder et al⁸ studied changing obstetric practices associated with incidence of MAS and identified a four fold decrease in the rate of MAS over a period of nine years⁸. They attributed this to amnioinfusion, higher cesarean section rate, early ultrasound evaluation, significant decrease in postdate births, and frequent diagnosis of nonreassuring fetal heart rate pattern.

Pierce et al⁹ in their meta-analysis found that most trials used aggressive combined obstetric and pediatric suctioning at birth. Their pooled data showed 2.5% incidence of MAS in the amnioinfusion group versus 8.5% in the control group. Our neonatal mortality due to meconium aspiration is 31.25% while Rossi et al⁴ report a one of 18% and Davis et al¹⁰ 40%. Our perinatal mortality was 1.27% in the amnioinfusion group and 9.52% in the nonamnioinfusion group. Mahomed et al¹¹ reported 1.2% perinatal deaths in the amnioinfusion

group and 3.6% in the nonamnioinfusion group. Hofmeyr et al¹² report that the incidence of meconium aspiration syndrome was lower than expected and there were no perinatal deaths in their study.

Conclusion

Meconium staining of liquor is a commonly observed phenomenon. Since the presence of thick meconium is associated with increased incidence of perinatal morbidity and mortality, it cannot be overlooked. Presence of meconium is more significant when it is associated with fetal heart rate abnormalities. Meconium aspiration syndrome is a significant cause of perinatal mortality which can be reduced by amnioinfusion. This is important in developing countries with limited intrapartum facilities. Amnioinfusion for MSAF improves perinatal outcome.

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