Special Article

MANAGEMENT OF MECONIUM STAINED AMNIOTIC FLUID: A TEAM APPROACH

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ABSTRACT

Passage of meconium in utero is a serious neonatal disorder cairying high morbidity and mortality. Role of planned team approach with aggressive intrapaitum suctioning and intensive neonatal management was studied to evaluate its impact on neonatal morbidity and mortality. Meconium Stained Amniotic Fluid (MSAF) was found amongst 7.4% of all deliveries and among these 238 (10.5%) babies developed'meconium aspiration syndrome (MAS).

Ninety five per cent babies with MSAF were born at >36 weeks of gestation and 76% were more than 2.5 kg. Passage of thick and thin meconium was seen in 44 and 56% respectively. Passage of thick meconium was significantly associated with severe asphyxia and canied a bad prognosis with increased risk of development of meconium aspiration syndrome, hypoxic schiemic encephalopathy, seizures and pulmonary air leak syndrome. Aggressive team approach was responsible for lowering the mortality to 7.7%.

Key words: *Meconium stained amniotic fluid, Meconium aspiration syndrome, Team management, Neonatal morbidity, Neonatal mortality.*

Meconium staining of the amniotic fluid (MSAF) is a common problem occurring in 11-22% of all deliveries(l,2). Meconium aspiration syndrome (MAS) complicates approximately 2% of these deliveries, with a reported mortality rate of 28-40%(l-6). MAS usually occurs in good weight term or post term babies whose intact survival can be ensured with a planned team approach during the perinatal period.

We prospectively evaluated the magnitude of the problem, the importance of thin and thick meconium, the complications of Meconium Aspiration of the Obstetrician and Neonatologist for the prevention of MAS.

Material and Methods

Babies*born from July, 1990 to June, 1991 with history of meconium stained amniotic fluid were prospectively evaluated and managed as per predesigned set protocol. Maternal data regarding age, parity, booking status, antenatal and obstetric problems were recorded. The management protocol included the following:

(a) With the delivery of the head of the baby, a thorough intrapartum suctioning was done, first of the orpropharynx

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and then of the nasopharynx by the Obstetrician, using mechanical suction.

(b) If copious thick meconium was present, then the chest was splinted by the nurse and baby quickly transferred to the prewarmed resuscitation table.

(c) After drying the baby, the larynx was visualized and if meconium was seen at the level of vocal cords, the baby was intubated and meconium sucked out, while withdrawing the endotracheal tube. The suction was done using the mechanical suction, with the suction attached directly to the endotracheal tube through an adapter. This procedure was repeated 2 or 3 times, while observing the heart rate till clear aspiration.

(d) If there was only thin meconium, and baby delivered with good Apgar, then no attempt was made to visualize the vocal cords or to do endotracheal intubation.

(e) After the initial resuscitation, the stomach was aspirated in each case and irrigated with normal saline.

(f) All severely asphyxiated, neurologically depressed and symptomatic babies were transferred to the Neonatal Intensive Care Unit, for management while all others were observed in the nursery attached to Labor ward.

Definitions

The following definitions were utilized:

(1) *Thin meconium:* Very light green staining of the amniotic fluid only.

(2) *Thick meconium:* Thick greenish me conium with paniculate matter in am niotic fluid.

(3) *Meconium Aspiration Syndrome (MAS):* Development of respiratory distress soon after birth with radiologi cal evidence of aspiration pneumonitis (atelectasis or hyperinflation) in the presence of meconium staining of the liquor or staining of nails or umbilical cord or skin(7).

Statistical analysis was done using the Chi-square test.

Results

During the study period, 3205 babies were born of which 238 cases(7.48%) had meconium stained liquor. Twenty-seven per cent of these pregnancies were booked antenatally whereas 73% had no antenatal care at our hospital prior to delivery. One hundred and thirty six (57.14%) babies were born to primigravida and 54.2% (129)

Table – I – Incidence of MSAF in Relation to Birth Weight and Gestation

Weight	Total		33-36 wks		>37 weeks	
(g)	MSAF/Live births		MSAF/Live births		MSAF/Live births	
<1500	3	47 (6.4)	2	40 (50)	1	7 (14.3)
1500-1999	10	340 (2.9)	4	144 (2.9)	6	196 (3.1)
2000-2499	45	604 (7.5)	5	212 (2.6)	40	392 (10.2)
>2500	180	1957 (9.2)	–	– –	180	1957 (9.2)
Total	238	3205 (7.4)	11	592 (1.9)	227	2417 (5.4)

Figures in parantheses indicate percentages.

were delivered by emergency cesarean section. Twenty eight babies (11.8%) were delivered by forceps and only 73 babies (30.7%) were delivered by spontaneous vaginal route.

Table I shows the breakup by birth weight and gestational age amongst the babies with meconium stained amniotic fluid. A total of 1.9% babies of 33-36 weeks gestation had meconium stained amniotic fluid and none of the pregnancies under 33 weeks had meconium stained liquor. Similarly, 6.4% of babies with birth weight under 1500 g had passage of meconium *in utero.*

Table II shows the correlation of birth asphyxia and passage of meconium *in utero.* A total of 17.7% babies with one minute Apgar score of 0-3 and 15.5% babies with one minute Apgar score of 4-6 had passed meconium *in utero.* This was in contrast to 6.3% of babies who were born with 1 minute Apgar of 7-10. These difference amongst the asphyxiated *vs* non-asphyxiated babies were statistically significant ($p < 0.01$),

Table III gives the relationship of consistency of meconium with meconium aspiration syndrome amongst babies with various grades of asphyxia. Twenty two babies with thick meconium and 4 with thin meconium had developed meconium aspiration syndrome. The frequency of occurrence of meconium aspiration syndrome was higher with thick meconium as compared to thin meconium ($p<0.01$) and was unrelated to the severity of asphyxia.

Table IV shows the morbidity and

TABLE II --*Apgar Score and Meconium Stained Amniotic Fluid (MSAF)*

Apgar score	Total live births	No. of cases of MSAF	Percentage
0-3	151	27 **	17.7
4-6	207	32 ***	15.5
>7	2847	179 *	6.3
Total	3205	238	7.4

TABLE III-- *Correlation of Apgar Score, Consistency of Meconium and Meconium Aspiration Syndrome*

Apgar score	Thin Nos	Meconium MAS	Thick Nos	Meconium MAS
0- 3	3	1 (3.3)	24	13* (54.2)
4- 6	13	1 (7.7)	19	5 (26.5)
7-10	118	2 (1.7)	61	4 (6.5)
Total	134	4 (2.9)	104	22 (21.2)

* $p < 0.01$. Figures in parantheses indicate percentages.

mortality amongst 26 babies who developed Meconium Aspiration Syndrome. Fourteen babies were born severely asphyxiated whereas 11 babies (42.5%) had developed varying grades of hypoxic ischemic encephalopathy. Seven of them had developed seizures, four babies had air leak syndrome and one baby had persistent pulmonary hypertension. Four babies were ventilated with high pressures and three of them could be saved. There were two neonatal deaths amongst 26 babies due to air leak and persistent pulmonary hypertension.

TABLE IV - *Neonatal Morbidity and Mortality in Meconium Aspiration Syndrome (n = 26)*

Problems	No. of cases	Percentage
Birth asphyxia	14	53.8
Hypoxic ischemic encephalopathy (Stage I = 4; Stage II = 6; Stage 111 = 1)	11	42.5
Seizures	7	26.9
Air leak syndrome	4	15.4
Persistent pulmonary hypertension	1	3.8
Mortality	2	7.7

Discussion

The present study shows that with good intrapartum suctioning and aggressive neonatal management, the complications of MSAF can be reduced to a great extent. With planned aggressive intrapartum management of MSAF, only 10.5% had Meconium Aspiration Syndrome (MAS) which constituted 0.6% of all the deliveries.

Passage of meconium *in utero,* often considered a feature of stressed fetus, is not always associated with birth asphyxia. In the present study, 17.7 and 15.5 babies with severe and moderate asphyxia, respectively had passed meconium *in utero* whereas 6.3% babies with no asphyxia had passed meconium. *Listeria monocytogenes* infection has also been associated with passage of meconium *in utero* without any fetal distress.

Meconium Stained Amniotic Fluid (MSAF) predominantly occurs in term babies. In the present study, 95.4% babies were term and none of the babies was under 33 weeks of gestation. Similarly, majority of the babies were good weight and only 5.5% babies with MSAF were weighing less than 2 kg.

Consistency of meconium has a direct bearing on the neonatal outcome(l,2). Passage of thin meconium was not significantly associated with increased incidence of neonatal morbidity in our study, 56% babies had thin meconium, but meconium aspiration syndrome (MAS) was seen in only 2.9% of them whereas thick meconium was found in 44% of babies and 21% of them had developed symptoms. MAS occurrence was also directly related to the increasing severity of asphyxia. Similar observations have also been made by others(l,3). Presence of thick meconium has also been associated with fetal heart rate abnormalities and should alert the obstetrician and neonatologist for fetal compromise. Forty one per cent of the babies with thick meconium stained amniotic fluid had significant asphyxia and 42% of them developed hypoxic ischemic encephalopathy whereas 15% of the babies with MAS also developed pulmonary air leak. Gregory *et al.(2)* reported 8% incidence while Madaansky *et al*.(8) reported 41% incidence of pulmonary air leak with MAS.

MAS carries a high mortality and mor-

bidity and this can be minimized by aggressive intrapartum management(10-13). With this aggressive team approach, we could decrease the incidence of MAS to 10.98% of total MSAF(and 0.6% of all deliveries) and the neonatal mortality to 7.7%. Similar observations of lowered morbidity and mortality have also been reported by Carson *et al.* (3) and Linder *et al.(9)* with planned team approach.

It is concluded that good intrapartum suctioning and neonatal management can reduce the complications of MSAF to a great extent. Presence of thin meconium is as favourable as clear fluid and such babies do not require endotracheal intubation and suction, if active and crying. Presence of thick meconium with fetal heart rate abnormality is an ominous sign. Severer the asphyxia, higher are the chances of thick . meconium stained liquor and greater probability of MAS.

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