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### Original article

## The Management Practices and outcome of meconium stained amniotic fluid

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#### ABSTRACT

One of the major problems an obstetrician faces while conducting labour is the Meconium stained amniotic fluid. Meconium stained amniotic fluid present in 10%-20% of all deliveries. Meconium Aspiration Syndrome occurs in about 2-4% of all deliveries (or 20-25% of MSAF cases) leading to a high mortality of nearly 8-48% and 20 % morbidity at various stages of growth. Passage of meconium in utero is generally considered as a sign of fetal distress. The stress can be acute as in the case of cord compression or chronic as in the case of placental insufficiency. Cases of full term singleton pregnancy with vertex presentation in labour and in whom meconium stained amniotic fluid (MSAF) was detected after spontaneous or artificial rupture of membranes were enrolled to study the management practices of MSAF and its outcome. Of the total 6000 deliveries, 795 cases were complicated by meconium stained amniotic fluid. Out of 795 MSAF cases, of which 28.4% of babies were less than 2500 gms weight, 64.65% were between 2501-3500 gms and 5.6% were more than 3500 gms. Based on our study we conclude that meconium stained amniotic fluid is associated with increased incidence of caesarean section, lower Apgar score, neonatal nursery admission and meconium aspiration syndrome.

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#### 1.Introduction:

One of the major problems an obstetrician faces while conducting labour is the Meconium stained amniotic fluid. Meconium stained amniotic fluid present in 10%-20% of all deliveries<sup>1,2</sup>. Meconium Aspiration Syndrome occurs in about 2-4% of all deliveries (or 20-25% of MSAF cases) leading to a high mortality of nearly 8-48%<sup>3</sup> and 20 % morbidity at various stages of growth<sup>4</sup>. Various studies have been carried out to determine the relation of MSAF with the perinatal outcome. It was seen that perinatal outcome was similar in thin meconium stained and clear amniotic fluid. While the moderate and thick MSAF are associated with Meconium Aspiration Syndrome.

Passage of meconium in utero is generally considered as a sign of fetal distress. The stress can be acute as in the case of cord compression or chronic as in the case of placental insufficiency

The significance of meconium staining as a more significant marker of fetal distress occurs in 10-20% of all the deliveries as stated above and is most common in the post mature babies. There also appears to be a maturational aspects to the ability to pass meconium, since it is rarely observed in fetus less than 36 weeks of gestation<sup>4</sup>.

Meconium stained amniotic fluid is not only a sign of antenatal distress but can itself cause subsequent difficulties in the neonate. The contaminants of the amniotic fluid in utero or during the delivery may lead to subsequent respiratory distress. Meconium is a lipid and a protein rich substance that is highly irritating to the mucus membrane of the distal airways resulting in a chemical pneumonitis. More particulate meconium will remain trapped in small airways leading to a ball valve type of gas trapping. Dissolved meconium may travel to the respiratory tract and inactivate the pulmonary system greatly leading to functional deficiency of surfactant

In most cases, the meconium is gradually removed from the respiratory tracts by phagocytosis and pulmonary function return to normal after 5 to 7 days. In more severe cases meconium aspiration syndrome may lead to respiratory failure and even the death despite aggressive intervention.

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## 2. Materials and Methods

Cases of full term singleton pregnancy with vertex presentation in labour and in whom meconium stained amniotic fluid (MSAF) was detected after spontaneous or artificial rupture of membranes were enrolled to study the management practices of MSAF and its outcome.

For all cases of MSAF detailed obstetric history including the complications during previous as well as present pregnancy were obtained. This was followed by general physical, systemic and per abdominal examination were carried out to assess gestational age, presentation, position and fetal heart rate, per vaginal examination was done to determine cervical effacement, dilatation, station, type of meconium stained amniotic fluid colour (fresh or old) as well as its characteristics (thin, moderate and thick).

All cases enrolled were managed as per current our hospital practices, All patients were monitored and managed in 1st, 2nd and 3rd stage of labour. Complications during labour and their management was recorded on a proforma. Common practices that followed in the first stage after the detection of meconium were left lateral position, oxygen inhalation, oxytocin drip, to augment the uterine contractions depending on the character of the meconium and the parity of the patients

In case of second stage of labour the delivery was conducted by normal, vacuum, outlet forceps or caesarean section. Amnioinfusion was not practiced in our hospital.

## 3. Results:

Of the total 6000 deliveries, 795 cases were complicated by meconium stained amniotic fluid.

The meconium was described as thick in 198 (25%) cases, moderate in 178 (22%) cases, light in 386 (50%) and unknown in 33 (4%).

The rate of MSAF increased with gestational age. MSAF was seen in 40% of post dated deliveries, followed by 40-42 weeks (prolonged pregnancy) of 36.4% and least at 34-36 weeks (preterm) of 0.1%

Out of 795 MSAF cases, 28.4% of babies were less than 2500 gms weight, 64.65% were between 2501-3500 gms and 5.6% were more than 3500 gms (Table 1)

Among the intrapartum complications, cord problems (loop around the neck and cord prolapse) with fetal distress was associated with maximum number of MSAF cases (70%), followed by failed progress with fetal distress (63%) of cases and least was seen in PROM (premature rupture of membrane) cases i.e 14% of cases (Table 2)

**Table 1: Prevalence of MSAF in relation to Gestation and Birth Weight**

Parameters	No. of Cases	MSAF (%)
<b>Gestation (weeks)</b>		
34 - 36	1	0.1
37 - 39	186	23.39
40 - 42	290	36.4
>42	318	40
<b>Birth Weight (gm)</b>		
<1500	9	1.13
1501 -2500	226	28.40
2501 3500	514	64.65
>3500	46	5.6

**Table 2. Antenatal And Intrapartum Factors Associated With MSAF**

Maternal Complications	No. of MSAF Cases	Total	%
Severe Anaemia	6	18	33
Eclampsia	9	31	29
Gestational hypertension	33	243	13
Antepartum haemorrhage	6	23	26
Hepatitis	2	3	66
Heart Diseases	2	37	5.4
<b>Intrapartum</b>			
PROM >24 hrs	5	35	14
Failed Progress of Labour	13	43	30
Obstructed Labour	4	7	57
Fetal Distress	63	123	51
Fetal Distress with Cord Problems	14	20	70
Fetal Distress with Failed progress of labour	7	11	63
Fetal Distress with Obstructed Labour	2	6	33

Among the antepartum cases MSAF was seen in highest in liver disorders (66%) cases followed by Pre-eclampsia and APH (Antepartum haemorrhage) of 39% cases and least in Heart diseases in pregnancy i.e. 5.4 cases.

Out of 795 MSAF cases, 394 (49.5%) had vaginal delivery, 52 (6.5%) had Forceps, 10 (1.25%) had Vacuum delivery and 339 (42.6%) had Caesarean section. Primigravida had more Caesarean sections 220 (28%) rate, compared to the multigravida

119 (15%). Normal vaginal deliveries were more in multigravida 248 (31%) compared to primigravida 146 (18%) and instrumental deliveries were more in primigravida (Table 3 & 4). MAS was more commonly seen after normal delivery (63.73%) as compared to Caesarean section (31.3%) and instrumental delivery (Vacuum 1.25%, Forceps 3.75%) ( Table 5)

On comparing mean Apgar score at five minutes, it was found that significant lower Apgar score were seen in subjects of MSAF. The five minutes Apgar score was low in 80 cases. All of them developed MAS, remaining 715 cases had good 5 minutes Apgar score (7.6+0.8). Decision regarding the Neonatal Intensive Care admissions was made by a Pediatrician, babies admitted in Intensive Care were followed till discharge or mortality (Table no 6,7). Out of eighty cases of meconium aspiration syndrome, eight babies expired due to asphyxia, septicemia, pulmonary hypertension and aspiration pneumonia (Table no 8)

**Table 4: Mode of Delivery with respect to Parity in MSAF**

Delivery	Primi	Multi	Total
SVD	146	248	18.36% / 31.19%
Vacuum	9	1	1.13% / 0.12%
Forceps	36	16	4.52% / 2.01%
Caesarean	220	119	27.67% / 14.96%

**Table 5: MAS in relation to Mode of Delivery**

Mode of Delivery	Cases	%
SVD	51	63.73
Vacuum	1	1.25
Forceps	3	3.75
Caesarean	25	31.3

**Table 6: Outcome**

Mode of Delivery	%
Apgar score	0-3/13 3-6/35 >7/32
Convulsions	06
Intubation needed	40
Ventilator needed	20
MAS	80
NICU admission	80
Sepsis	03
Duration NICU stay(days)	9±5
Mortality	08

**Table no 7: Correlation between cord blood and Apgar score**

UaPH	APGAR			TOTAL
	0-3	3-6	>7	
≤7.0	5	3	0	08
7-7.2	3	22	16	41
>7.2	5	10	16	31

UaPH; Umbilical artery PH

**Table no 8: Causes of mortality in 8 MAS cases**

Causes of Death	No of Neonates
MAS with Asphyxia	5
Septicemia	2
MAS,PPHN with Aspiration pneumonia	1

**5. Discussion**

Meconium stained amniotic fluid (MSAF) is a commonly observed phenomenon. The presence of thick meconium is associated with increased incidence of perinatal morbidity and mortality.

In present study there were 6000 deliveries 795 MSAF case and 80 infants developed MAS, out of which 8 babies expired and 10 % had various illnesses in the follow up period.

The data collected from more than 30 reports showed the frequency of MSAF is approximately 12.5% of all deliveries, of these MSAF infants 17% developed MAS of which more than 12% died and 20% had morbidity at various stages of growth.

Antenatal diagnosis of MSAF is difficult as ultrasonography or amnioscopy have limited role. Amniocentesis is the only sensitive method of detecting MSAF before membrane rupture. But, carries procedure related loss rate of 1 in 200. In our study we have not attempted amniocentesis.

In present study MSAF was found in 40% of post dated pregnancy, 28.4% in IUGR and 11.95% in term pregnancy with complications.

According to the literature available meconium release was twice as common and combination of fetal distress three times for deliveries at or above 42 weeks.

MSAF is seen in 6-11% of IUGR cases, in our study it was 15% which is probably due to increased fetal distress during intrapartum period. PET and Fetal distress were the most common complication for MSAF in our study.

No cases of MSAF were found below 36wks of gestation, 0.01% MSAF found at 36wks. In our observation maximum cases of MSAF were found when birth weight was between 2501-3500gm and least cases when birth wt was less than 1500gm.

Twenty patients underwent amnioscopy (10 IUGR and 10 postdated cases) 16 cases had clear liquor, Subsequently early ARM (Artificial rupture of membrane) showed MSAF in 8 cases and 2 babies developed MAS. In this study amnioscopy showed a limited role in diagnosing MSAF.

Amnioinfusion can be used to relieve umbilical cord compression during labour, hence is useful in decreasing caesarean section rate.

As per the mode of delivery concerned majority of MSAF mothers delivered by normal vaginal delivery or by LSCS and few by instruments. Many Indian studies shows similar rate of instrumental and LSCS rate, but many western studies shows less instrumental and more LSCS. This is due to many western authors suggest immediate surgery for thick meconium stained fluid irrespective of parity if vaginal delivery is not imminent. LSCS rate is less in multigravida compared to primigravida this is due to favourable vaginal delivery outcome in multigravidas<sup>8,9</sup>.

Its seems that the incidence of MAS is less with LSCS and forceps deliveries compared to vacuum extraction and vaginal delivery.

In Present Study, we tried to correlate the degree of Asphyxia and Acidosis to Meconium Aspiration. Almost 48 babies had severe birth asphyxia whose 5 minute Apgar was less than 5. Out of which 8 babies had severe acidosis, PH less than 7; 41 babies had moderate acidosis, PH 7 to 7.2; and 31 babies had normal PH. Remaining babies who had either mild asphyxia or no asphyxia, all had normal arterial PH i.e 7.2. As meconium should always be considered a marker of fetal distress. Therefore, there was a significant effect on the Apgar score of neonates<sup>10,11,12,13</sup>.

All babies who had severe birth asphyxia and severe acidosis had meconium aspiration syndrome and expired within 1 week after delivery, rest all babies with moderate to mild birth asphyxia with moderate acidosis to normal PH developed meconium aspiration syndrome but survived<sup>14</sup>.

In our study, more than 48 babies had severe birth asphyxia and varying degree of acidosis and more than 26 babies had moderate birth asphyxia with varying degree of acidosis, in relation to the other various literature. We conclude meconium staining is associated with fetal distress.

Out of 80 babies of MAS; 8 babies died in spite of aggressive management. Causes of death were severe birth asphyxia, severe birth asphyxia with PPHN and severe birth asphyxia with aspiration pneumonia and septicemia. In all cases severe birth asphyxia contributed major problem as a cause of death.

Prevention of MAS can be achieved by avoiding post maturity, as decreased term gestation reduces the prenatal morbidity and mortality due to meconium aspiration syndrome.

Babies delivered through meconium stained amniotic fluid had higher rate of birth asphyxia. Complications due to birth asphyxia like seizures were higher. S Arulkumaran et al found that birth asphyxia was significantly high in meconium stained amniotic fluid<sup>15</sup>. Requirement of oropharyngeal suction was significantly high. Need for intubations was also high as non vigorous babies needed direct tracheal suctioning and birth asphyxia cases were high. Meconium aspiration syndrome was developed in 80 cases.

Admission in NICU were higher as more babies had respiratory distress due to aspiration of meconium stained amniotic fluid. Some babies were also admitted in NICU for post resuscitation care. Neonatal mortality was also high. Mortality rate was 10%. Higher mortality was due to severe birth asphyxia. 18 babies developed sepsis (22.5%). Gram negative organisms were isolated.

## 6. Conclusion And Summary

Meconium Aspiration Syndrome is a perinatal problem which requires a full co-operation and coordination of Obstetrician and Pediatrician if it is to be avoided. Prompt and efficient delivery room management can minimize the sequelae of aspirated meconium.

However, more infants who develop severe meconium aspiration syndrome are been managed in neonatal intensive care units where they can be closely monitored and vigorously treated.

Based on our study we conclude that meconium stained amniotic fluid is associated with increased incidence of caesarean section, lower Apgar score, neonatal nursery admission and meconium aspiration syndrome.

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