

# Clinical study of meconium aspiration syndrome in relation to birth weight and gestational maturity at general hospital Sangli

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## Abstract

**Objective:** 1) To know the clinical profile of meconium aspiration syndrome in neonate. 2) To know the maternal risk factors for meconium aspiration syndrome. 3) To know outcome of meconium aspiration syndrome in neonate. **Material and Methods: Study Design:** A retrospective study. **Setting:** Neonatal Intensive Care Unit (NICU) of General Hospital Sangli. **Sample Size:** 52 newborn babies admitted during the year 2013 in NICU of pediatric ward. **Data Collection:** From the case sheet of the study subjects, with the help of prestructured proforma. **Study Period:** January 2013 to December 2013. **Statistical Analysis:** Data analyzed with percentages. **Results:** Out of total 1245 deliveries, MSAF (22.8%) and MAS 52 (4.1%) were seen. Out of 52 MAS, males were (55.7%) and female were (44.2%). Birth asphyxia (42%), Septicemia (23.2%), Pneumonia (3.8%) and Jaundice (23.2%) were commonest morbidities among MAS babies. Commonest causes of mortality were Birth asphyxia (37.5%), Pneumonia (12.5%) and Sepsis (25%). Almost 70.7 % MAS babies had birth weight between 2.5 – 3.5 Kg, 13.33% had > 3.5 Kg and 3.21 %  $\leq$  2.5 Kg. Antenatal risk factors among MAS babies were Fetal distress (42.3%), PIH (19.3%), Anemia (9.6%), Oligohydroamnios (9.6 %) and PROM (9.6%). **Conclusion:** Meconium Aspiration Syndrome was the common cause of respiratory distress in neonate. Increased incidence of MAS was associated with increase gestational age (term, postdatism, birth weight >2.5 kg. Birth asphyxia, Sepsis was common morbidity and mortality.

**Keywords:** Meconium aspiration syndrome, Gestational age, Birth weight.

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## INTRODUCTION

Meconium Aspiration Syndrome remains one of the most common causes of neonatal respiratory distress<sup>1</sup>. It is a life threatening respiratory emergency. The overall

frequency of meconium stained amniotic fluid varies between 5 to 25%<sup>2</sup>. Meconium Aspiration Syndrome (MAS) occurs in 10% of infants born through meconium stained amniotic fluid. The first intestinal discharge from neonates is Meconium, which is a viscous, dark green substance composed of intestinal epithelial cells, lanugos, mucus, intestinal secretions such as bile. Intestinal secretion, mucosal cells and solid constitutes making of 85-95% of meconium. Intrauterine distress can cause passage into the amniotic fluid. Factors that promote the passage in utero include placental insufficiency, maternal hypertension, pre-eclampsia, oligohydroamnios and maternal drug abuse like tobacco and cocaine<sup>3</sup>. Meconium stained amniotic fluid may be aspirated during labour and delivery, causing neonatal respiratory distress.

Meconium aspiration syndrome is a disease with the complex Pathophysiology and a potential for mortality and considerable morbidity. In the last decades, the incidence of MAS has been decreasing, which has been attributed to improved obstetric practices, including the avoidance of post-term pregnancy and caesarean deliveries prior to evidence of fetal distress. However MAS is still a major cause of morbidity and mortality. In neonatal period (The mortality rate of newborns with MAS was close to 50% in the 1970s but currently ranges between 5 to 37%). In the context, it remains a concern to both obstetrician and neonatologist<sup>4</sup>. According to many studies conducted in India and abroad, various maternal risk factors have been identified for the meconium aspiration syndromes as well as outcome of meconium aspiration syndrome babies have been studied. In this study, we tried to find out maternal risk factors and the neonatal outcome among MAS babies in our hospital

### OBJECTIVE

1. To know the clinical profile of meconium aspiration syndrome in neonate.
2. To know the maternal risk factors for meconium aspiration syndrome.
3. To know outcome of meconium aspiration syndrome in neonate.

### MATERIAL AND METHODS

A retrospective study was conducted on 52 neonates admitted in Neonatal Intensive Care Unit of General Hospital Sangli, during the year 2013. Data in relation to demographic profile, antenatal risk factors, neonatal complications, treatment profile and outcome was collected with the help of case sheets of newborn babies obtained from Medical Record Section and analyzed with percentages and proportions.

#### Inclusion Criteria

All the neonates delivered with meconium stained liquor, along with following criteria

1. Presence of retraction or grunting;
2. Babies requiring supplemental oxygen or ventilation;
3. Radiological evidence suggestive of meconium aspiration syndrome

All babies admitted in General Hospital, Sangli were taken in study.

#### Exclusion Criteria

1. Newborn babies with meconium stained liquor without respiratory distress and X ray chest within normal limit.
2. Transient Tachypnea of Newborn.
3. Respiratory Distress Syndrome.
4. Congenital Pneumonia.

All the babies born through MSAF, oropharyngeal suctioning was done as soon as head was delivered, immediate intratracheal intubation and suctioning was done to suck out thin/thick meconium in depressed infant at birth. In vigorous crying neonates, no intubation was done and neonate was carefully observed for development of respiratory distress subsequently. A detailed antenatal history was elicited to find out the etiology of passage of meconium into amniotic fluid. Detailed natal history and presenting complaints were taken. In all meconium stained infants APGAR score at 1 min and 5 min were assessed and birth weight, gestational age (by Ballard scoring)<sup>5</sup> and respiratory distress (by Downey's score) was seen. In MAS, routine investigation done were CBC (Haemogram), Peripheral Smear, Total Count, Differential Count, X Ray Chest were done. Other investigations like ABG, 2D-Echo, Blood Culture, Cranial USG were done as when required.

### OBSERVATION

Total numbers of deliveries (during Jan 2013-14) were 1245, out of which 280 (22.4%) deliveries were with meconium stained amniotic fluid (MSAF). Out of which 52, (18.57%) babies were with meconium aspiration syndrome (MAS) Out of 52 MAS babies, 29 (55.7%) were males and 31 (44.2%) were females. 31 (59.9%) babies were delivered per vaginally, 5 (9.6%) were by instrumental delivery, 16 (30.7%) were by caesarean section. Among 52 MAS babies 32 (61.5%) were small for gestational age, 10 (19.2%) were large for gestational age and 10 (19.2%) were appropriate for gestational age Out of total MAS babies, primigravida were 35 (67%), multigravida were 27 (33).

**Table 1:** Morbidities among Meconium Aspiration Syndrome (MAS) babies

Disease	Number	Percent %
Birth asphyxia	22	42%
Septicemia	12	23.2%
Jaundice	12	23.2%
Pneumonia	2	3.8%
Others	4	7.8%

# Others includes Necrotising Enterocolitis, Seizures, Persistent pulmonary hypertension (PPHN), Intraventricular Hemorrhage (IVH) and Pneumothorax

**Table 2:** Antenatal Risk Factors among Meconium Aspiration Syndrome (MAS) babies

Disease	Number	Percent %
Fetal distress	22	42.3
PIH/PET	10	19.3
Anemia	5	9.6
Oligohydroamnios	5	9.6
PROM	5	9.6
Others	5	9.6

# Others include BOH, DTA, and Cord compression.

**Table 3:** Relationship of birth weight with Meconium Aspiration Syndrome (MAS)

Birth Weight	No. of all delivery	Babies with MAS	Percent
2.5 Kg	280	9	3.21
2.5-3.5 Kg	890	33	70.30
>3.5 Kg	75	10	13.33

**Table 4:** Distribution of Meconium Aspiration Syndrome babies as per gestational maturity

Maturity	Number of MAS babies	Percent
34-36 wks	2	3.8
36-38 wks	3	5.7
38-40 wks	27	51.9
40-42 wks	17	32.6
>42 wks	3	5.7

**Table 5:** APGAR Score at 1 Minute of Meconium Aspiration Syndrome babies

APGAR Score	Number	Percent %
0-3	16	30.7
4-6	32	61.5
>6	4	7.6

In this study, out of 52 MAS babies, 42 (80.7%) had Downey's score < 4, and 9 (17.3%) had score of 4-6, and 1 (1.9%) at time of admission. Out of 52 MAS babies, 40 (76.9%) were treated conservatively with oxygen, IV antibiotics, phototherapy. 12 (23.07%) babies required mechanical ventilation, out of which 8 (15.3%) died during treatment. Details of cause of death is given as per given in table 6.

**Table 6:** Causes of Mortality in Meconium Aspiration Syndrome babies

Cause of Death	Number	Percent %
Birth asphyxia	3	37.5
Septicemia	2	25
Pneumonia	1	12.5
Others	2	25

# Others include Intraventricular Hemorrhage, Necrotising Enterocolitis

## DISCUSSION

In this study, Meconium stained amniotic fluid cases were 22.4% out of which Meconium Aspiration Syndrome babies were 18.57 % which were similar to findings observed by various authors, who found incidence of meconium staining of amniotic fluid were 9 to 22%. In a study conducted by Bhushan P K *et al*<sup>5</sup> MAS occurred in 25 % of all cases of MSAF. In a study by Rao B. *et al*<sup>6</sup> the incidence of MSAF was observed to be 8.54 % of which MAS was found in 16.1 % cases. Narang *et al*<sup>7</sup> found that 10.55% was the incidence of MAS. In this study, antenatal risk factors were fetal distress (42.2%), PIH

(19.3%), anemia (9.6%), oligohydramnios (9.6%) and PROM (9.6%).

1. Pregnancy induced hypertension (PIH) was found in 8.20 % to 23.58 % cases in Miller *et al*<sup>8</sup> and it was 15.75 % cases in Pravin and Usha Krishna's series<sup>9</sup>. 11.20 % in study by Fujikura<sup>10</sup>
2. Anemia - Incidence of cases in anemia was 22.12% in Praveen Goud and Usha Krishna's series<sup>9</sup>.
3. Premature rupture of membranes (PROM) - incidence was 3.10% cases in a study by Meis *et al*<sup>11</sup> and 6.60% cases in Miller *et al*<sup>8</sup>.
4. Oligohydramnios -In the study by Devang desai *et al*<sup>12</sup> 4% of oligohydramnios were associated with MSAF. In the present study, it was 10.1%.

In the present study majority of MAS babies had gestational age of 38–40 weeks (51.9%) and 40–42 weeks (32.6%). Errkola *et al*<sup>13</sup> found 95% cases more than 36 weeks. In the study by Eiden *et al*<sup>14</sup>, the frequency of meconium stained amniotic fluid increased with increasing gestational age of fetus i.e. 7% before 38 weeks, 78% between 38-42 weeks and 35% or more in pregnancies lasting longer than 42 weeks. In present study, birth weight of MAS babies was found to be < / = 2.5 Kg (3.21%), 2.5-3.5 Kg (70.7%) and > 3.5 Kg (13.5%). According to study by Pravin Goud and Usha Krishna<sup>9</sup> majority of babies in their study were 2.5-3 Kg and 4.2% weighed >3.5 Kg. In study by Bharati Rao *et al*<sup>6</sup> the birth weight of babies with MSAF were in range 1.6-3.8 Kg. In our study, APGAR Score was >7 (7.6%), 4-6 (61.5%) and < 3 (30.7%), which is comparable with Gregory *et al*<sup>15</sup>. They found > 7 (4.5%), 4-7 (49%) and < 3 (36.5%). It shows an important relation between APGAR Score and MAS babies In present study, Birth asphyxia (42%), Sepsis (23.2%), and Jaundice (23.2%) and others (7.8%). In National Neonatal Perinatal Database of India 2002-2003, perinatal asphyxia was single most common cause of death (40.5%) in babies born through MSAF with overall mortality of (11.6%). In a study by W is well TE *et al*<sup>1</sup>, it was found that 11.53% babies develop pneumothorax. In this study, 76.9% were treated conservatively, 23.07% were ventilated. In a study by Wiswell TE *et al*<sup>1</sup> who found, that of neonates with MAS, 29.7% require mechanical ventilation. In a study by Rossi EM *et al*<sup>16</sup> out of 16 infants with MAS, 7 (44%) required mechanical ventilation. In our study main cause of death is Birth asphyxia (37.5%) followed by Sepsis (25%), Pneumonia (12.5%) and Other (25%) includes NEC, IVH, Pneumothorax, PPHN. Narang *et al*<sup>7</sup> (1993) found that 53.8% cases MAS had birth asphyxia, 15.8% had air leak and 3.8% had PPHN. Wiswell TE *et al*<sup>1</sup> (1990) found that majority of babies died with MAS from acute respiratory failure, PPHN and air leaks, but some

may die from associated neurological or renal sequelae of birth asphyxia.

## CONCLUSION

Meconium Aspiration Syndrome was the common cause of respiratory distress in neonate. Increased incidence of MAS was associated with increase gestational age (term, postdatism) and birth weight >2.5 kg. Birth asphyxia, Sepsis was common morbidity and mortality.

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