

Study of Meconium Aspiration Syndrome in Babies Born to Mothers with Meconium Stained Amniotic Fluid

Suneetha PCGS¹, Nanaji Rao P²

ABSTRACT

Introduction: Babies born to mothers with Meconium Stained Amniotic Fluid (MSAF) are highly likely to develop respiratory distress compared to their counterparts born through clear amniotic fluid. Meconium Aspiration Syndrome (MAS) is a potentially preventable condition occurring usually in term and post-term babies. This study was conducted in Mother and Baby Unit, Government General Hospital, Guntur between September 2017 and February 2018.

Material and methods: All consecutive live births in the Unit during the study period were evaluated and analysed for incidence of MAS, risk factors associated with it and the final outcome of babies with MAS.

Results: Of the 3460 consecutive live births, 293 (8.4%) babies were born with MSAF. Out of the 293 babies with MSAF 39 (13.31%) babies developed MAS. Of the 39 babies with MAS 30(76.93%) babies were discharged and 9(23.09%) babies died. Risk factors significantly associated with occurrence of MAS were oligohydramnios, post term pregnancy, small for gestational age (SGA) and APGAR score less than 7.

Conclusion: The management of babies born to mothers with MSAF is a combined approach by both the Obstetrician and Paediatrician and includes timely intervention and management.

Keywords: Meconium Stained Amniotic Fluid, Meconium Aspiration Syndrome, Meconium Staining, APGAR Score.

INTRODUCTION

Meconium is a sterile, black green, odorless tar like substance that is passed with the baby's first bowel motion after birth. At times this can be passed before the baby is born, discoloring the amniotic fluid¹. Meconium is passed following an asphyxia episode in utero. If the asphyxia episode is accompanied by prolonged gasping, meconium will be drawn deeply in to the lungs².

Meconium stained amniotic fluid (MSAF) is associated with several maternal and neonatal risk factors³. Passage of fresh meconium into the amniotic fluid during labour is one of the recognised indicators of fetal distress, and is associated with increased perinatal morbidity and mortality⁴. Presence of meconium in the amniotic fluid has for a long time been considered to be a bad predictor of fetal outcome and meconium aspiration syndrome (MAS)⁵. Babies born through MSAF are 100 times more likely to develop respiratory distress compared to their counterparts born through clear amniotic fluid⁶.

Meconium aspiration syndrome (MAS) is a serious and potentially preventable condition which usually occurs in

term and post-term babies⁷. Meconium may be aspirated before or during labour and delivery resulting in neonatal respiratory distress. Prevention of MAS remains a major objective for obstetricians and neonatologists⁸.

This study was conducted to find out the incidence of MAS, analyze associated maternal and neonatal risk factors, and determine the final outcome in babies born to mothers with Meconium Stained Amniotic Fluid, in a tertiary setting in Government General Hospital, Guntur, Andhra Pradesh.

MATERIAL AND METHODS

This cross sectional study was conducted in a tertiary care setting in the Mother and Baby Unit, Government General Hospital, Guntur, Andhra Pradesh between September 2017 and February 2018. All babies born with meconium stained amniotic fluid and/or with meconium staining of nails/cord/skin were included in the study. Preterm babies and babies with congenital anomalies were excluded from the study.

Ethical approval and consent: The study has been approved by the Ethics Committee of the Institute. A written consent was taken from either of the parents of the baby.

Data collection procedure: This is a cross sectional study of term and post term babies born in the Mother and Child Unit of Government General Hospital, with meconium stained amniotic fluid and/or meconium staining of nails/cord/skin. A structured proforma was used for data collection, which included detailed history and clinical examination.

Neonatal resuscitation was done following Neonatal Resuscitation Programme guidelines and babies with respiratory distress were admitted to the NICU and managed according to the NICU protocol. All the babies underwent routine septic screen, chest x-ray and later blood culture. Observations were noted regarding the final outcome.

Diagnosis of Meconium Aspiration Syndrome was done as per defined criteria:

- History of Meconium Stained Amniotic Fluid.
- Evidence of respiratory distress like tachypnoea, sub

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How to cite this article: Suneetha PCGS, Nanaji Rao P. Study of meconium aspiration syndrome in babies born to mothers with meconium stained amniotic fluid. International Journal of Contemporary Medical Research 2021;8(6):F1-F3.

DOI: <http://dx.doi.org/10.21276/ijcmr.2021.8.6.14>



costal and intercostal retractions, grunting and cyanosis.

- Chest x-ray showing bilateral asymmetric patchy infiltrates.

Data analysis: The data was analyzed by SPSS software. Categorical data was represented as frequencies and percentages. Odds ratio with 95% CI was measured to find association between maternal and neonatal risk factors with MAS. P value <0.05 was considered as statistically significant. Pie charts were used to represent the data.

RESULTS

Out of a total number of 3460 consecutive live births from September 2017 to February 2018, 293 (8.4%) babies were born with Meconium Stained Amniotic Fluid (MSAF).

Out of 293 cases with MSAF, 165(56.32%) babies were male and 128(43.68%) babies were female. Babies born at term were 282 (96.25%) and post term were 11 (3.75%). Babies who are Small for Gestational Age (SGA) were 181 (61.88%) and Appropriate for Gestational Age (AGA) were 112(38.22%).

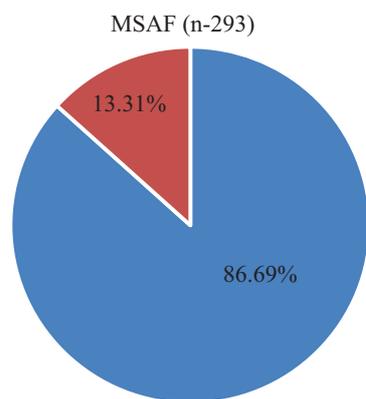
Figure No 01 shows development of meconium aspiration syndrome (MAS) in babies with MSAF. Out of 293 babies born with MSAF, 39(13.31%) developed MAS.

Table No 01 shows maternal risk factor – Oligohydramnios. Babies born with history of oligohydramnios with MSAF had 2.35 times more risk of developing MAS than babies with no history of oligohydramnios.

Table No 02. shows neonatal risk factor – APGAR score less than 7. Babies born with APGAR score less than 7 with MSAF had 15.23 times more risk of developing MAS than with babies with APGAR score more than 7.

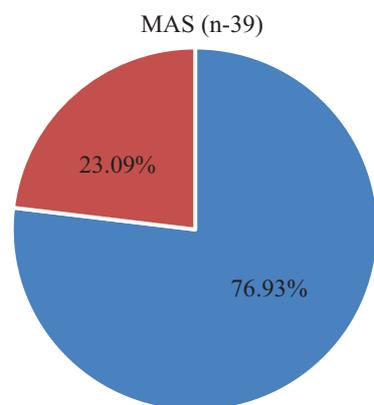
Of the 39 babies with MAS, 26 (66.67%) babies developed respiratory distress within four hours (<4) after birth & 13(33.33%) babies developed distress between four and eight hours (4-8) of birth. 21(53.84%) of the babies had mild MAS, 8(20.52%) had moderate MAS & 10(25.64%) had severe MAS.

Figure No 02 shows final outcome of babies with meconium



■ Without MAS (n=254) ■ MAS (n=39)

Figure-1: Development of meconium aspiration syndrome (MAS) in MSAF babies



■ Discharged (n=30) ■ Death (n=9)

Figure-2: Final outcome of babies with meconium aspiration syndrome

aspiration syndrome. Of the 39 babies with MAS 30(76.93%) babies were discharged & 9(23.09%) babies died.

DISCUSSION

When exposed to stress such as hypoxia, fetus passes meconium and starts reflex gasping, a combination which allows meconium to reach the respiratory airways. Meconium aspiration can present a diverse clinical spectrum ranging from mild self-resolving respiratory distress to severe respiratory failure resulting in severe morbidity and mortality.

Meconium passage is most likely to occur in post term baby, the term baby after asphyxia or the baby with IUGR. Most babies with MSAF are 37 weeks or older and most meconium stained infants are post mature and small for gestational age⁹. The incidence of MSAF varied greatly in different studies varying from 7 to 22%^{10,11,12}. In our current study the incidence of MSAF is 8.46% which is comparable to other studies (Patil et al 8.3% & Fischer et al 7.93%)^{13,14}. Risk factors that increase the likelihood of passage of meconium in utero include – hypoxia, placental insufficiency, preeclampsia, maternal hypertension, maternal diabetes mellitus, maternal smoking, post term pregnancy, oligohydramnios and intrauterine growth restriction

Oligohydramnios	Meconium aspiration syndrome		Total n(%)
	Yes n(%)	No n(%)	
Yes	12(30%)	39(15.5%)	51(17.5%)
No	28(70%)	214(84.5%)	242 (82.5%)
Total	40(100%)	253(100%)	293(100%)

*Odd ratio (95%CI): 2.35 (1.10 – 5.01). p<0.05 – Statistically significant

Table-1: Maternal risk factor – oligohydramnios

APGAR less than 7	Meconium aspiration syndrome		Total n(%)
	Yes n(%)	No n(%)	
Yes	18(39.1%)	10(4.1%)	28(9.5%)
No	28(60.9%)	237(95.9%)	265(90.5%)
Total	46(100%)	247(100%)	293(100%)

*Odds ratio (95%CI): 15.23 (6.40 – 36.24). p<0.05 – Statistically significant

Table-2: Neonatal risk factor – APGAR less than 7

(IUGR)³. The risk of developing MAS in an infant born through MSAF increases with heavy MSAF, nulliparity, fetal heart rate abnormalities, caesarean section and low Apgar scores. Three risk factors were identified for thick MSAF by Naveen S et al⁹. They are maternal age of more than 30, postdated pregnancy and fetal distress.

The incidence of meconium aspiration syndrome (MAS) in babies born to mothers with MSAF varied from 5% to 22% in different studies^{13,15}. In our current study the incidence of MAS among babies with MSAF is 13.31% which is comparable with other studies (Patil et al)¹³. In this current study the maternal and neonatal risk factors significantly associated with risk of MAS were primigravida, oligohydramnios, post term pregnancy, small for gestational age (SGA) and APGAR score less than 7.

Approximately one third of infants with MAS require respiratory support in the form of intubation and mechanical ventilation, and newer neonatal therapies such as high-frequency ventilation (HFV), inhaled nitric oxide (iNO) and surfactant administration^{16,17}. In our study out of 39 babies with MAS 30(76.93%) babies were discharged and 9(23.07%) babies died. From the literature, the mortality of babies with MAS ranged from 0 to 30%^{3,16}. The higher mortality in our study may be attributed to the high number of high risk pregnant mothers that get referred to our tertiary care centre.

CONCLUSION

Meconium Stained Amniotic Fluid (MSAF) alone is not associated with an adverse neonatal outcome, majority of the babies remain asymptomatic in spite of MSAF and require only routine care. Increasing grade of MSAF is associated with increased adverse outcome. The incidence of meconium aspiration syndrome (MAS) and mortality is higher in the babies born with thick meconium.

The mortality of babies born with MSAF and subsequent MAS can be reduced by timely intervention and management. The management of babies born to mothers with MSAF is a combined approach by both the Obstetrician and Paediatrician, right from proper monitoring of maternal risk factors to meticulous newborn resuscitation and further management.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 17-05-2021; **Accepted:** 31-05-2021; **Published:** 28-06-2021