

MECONIUM STAINED AMNIOTIC FLUID AND ITS NEONATAL OUTCOME IN A RURAL TERTIARY CARE CENTER NEAR MATHURA

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Abstract

The presence of meconium stained amniotic fluid (MSAF) is a sign of fetal compromise. It is associated with significant neonatal morbidity and mortality. MSAF is frequently associated with high cesarean rate, prolonged labour, low APGAR scores, increased rate of birth asphyxia; increased NICU admission, meconium aspiration syndrome and neonatal death. The aim of this prospective study is to correlate the effect of meconium stained amniotic fluid on neonatal outcome.

Keywords: Meconium stained amniotic fluid, Neonatal morbidity and mortality, NICU.

Introduction

The fetus and the newborn cannot be considered as two distinct entities. Any situation that compromises the fetus' well-being e.g alterations in the amniotic fluid quantities and properties, could influence the clinical status of the neonate at birth, and in severe cases, compromise its future.¹ Meconium is found in fetal gut from 10 weeks of gestation but passage of meconium in amniotic fluid is rare before 34 weeks. Incidence of meconium passage increases with gestational age^{2,3}. Passage of meconium into amniotic fluid might be a physiologic phenomenon of GIT maturation, or as a sign of acute or chronic hypoxic event, thus making it a indicator of fetal distress⁴.

Traditionally, meconium has been viewed as a harbinger of impending or ongoing fetal compromise and is associated with fetal hypoxia, acidosis or fetal distress⁵. The predictive value of meconium was better when it occurred in high risk patients and was thick, dark and tenacious. Thinly stained meconium had a poor correlation with fetal hypoxia⁶.

The objective of this prospective study was to determine the neonatal outcome in meconium stained liquor and its correlation between thin and thick MSL.

Material and Methods:

This prospective case control study was carried out at KD Medical College, Hospital and Research Centre, Mathura (U.P.) in the Pediatric Department after taking informed and written consent. This study was conducted from August 2019 to January 2020. The study included neonates born with meconium stained amniotic fluid with gestational age > 37 weeks.

Discussion:

MAS is more frequently seen in post-term pregnancy. Factors such as placental insufficiency, maternal hypertension, pre-eclampsia, oligo-hydroamnios result in, in utero passage of meconium⁷. The moderate and thick meconium group has a significantly greater risk of an abnormal fetal heart rate, low 1 and 5 minute Apgar scores, a cord blood pH of less than 7.2, birth asphyxia, need for O₂ support and NICU admission of babies⁵. Aspiration of the meconium into fetal or neonatal lungs is associated with clinical disease ranging from mild respiratory distress to severe respiratory compromise and causes significant increase in perinatal morbidity and mortality⁸. Early identification of high risk cases with improved neonatal and perinatal care can decrease perinatal mortality⁹.

1. Frequency and nature (consistency) of amniotic fluid:

The incidence of thin MSL and thick MSL is 87.91% (131 cases) and 12.1% (18 cases) which is comparable with other studies.

Table 1:

Authors	Thin MSL	Thick MSL
Debdas ¹⁰	78.75%	21.25%
Arun ¹¹	51.15%	48.85%
Erum majid Shaikh ¹²	78%	22%
Present Study	87.9%	12.1%

The mean difference between two groups is statistically significant (p value= .000). Wiswell TE, Hernandez C¹³ have reported incidence of thick MSL between 7-22% of live births which are consistent with our study (12.1%).

2: Respiratory distress: Total number of cases with respiratory distress is 33(22.15%),out of which 16(12.21%) cases are of thin MSL and 17(94.4%) cases are of thick MSL.The mean difference between two groups is stastically significant (p value= .000).Schaffer¹⁴ (1971) concluded aspiration of meconium was one of the major cause of dyspnea and respiratory distress in the newborn.

3: Delayed crying: Total number of newborns with delayed crying is 23 (15.44%),out of which thin MSL are 10(7.6%) cases and 13(72.2%) are thick MSL cases.

4: APGAR score at 1 minute and 5 minute: Majority of the workers observed that meconium stained AF was associated with low APGAR score at birth.Our findings are consistent with that of Miller¹⁵, Hari Bhaskar¹⁶ studied that one minute APGAR score of less than 3 was due to antepartum and intrapartum asphyxia in thick MSL.Sedaghatian¹⁷ found that both MSAF and MAS are associated negatively with one and five minute APGAR score.

5: Respiratory rate: Average respiratory rate is 60 in total 149 newborns; in thin MSL it is 58/min and it is 74/min in thick MSL.

6. Saturation of oxygen in blood: Average Spo2 in 149 cases is 92%; it is 93.13 % in thin MSL and 83.94% in thick MSL. The mean difference between two groups is stastically significant (p value= .000)

7: Mode of Delivery: There is increased incidence of caesarean section in MSAF deliveries, especially thick MSL group. The mean difference between two groups is stastically significant (p value= .000). Khatree¹⁸ recorded higher incidence of CS because of higher incidence of CPD and fetal distress. Goud and Krishna¹⁹ observed that thick meconium staining has higher CS rate than thin group. It is comparable with our studies. Arun Nayak²⁰ observed that incidence of operative delivery was more in thick MSL group with CS rate 16.9% and 8% in thin MSL.Abramovici²¹ and Walker²² advised for early termination by LSCS if MSAF was associated with abnormality of FHR and with low fetal scalp blood pH.

8.Resuscitation Required: Total number of cases which required resuscitation is 33 (22.14%) of which thin MSL is 17 (12.88%) cases and 16 (88.9%) cases belong to thick MSL. The mean difference between two groups is stastically significant (p value=.000). Swain et al²³ in their study performed oropharyngeal suction in all cases, similar to findings of Khatun et al.Mundra et al, Shazia Qadir et al²⁴.

9. Maternal Risk Factors: Average number of maternal risk factors is 18 (12%).It comprises PIH, oligohydrminos, GDM. The p value is .000 which is stastically significant.Desmond²⁵, Fuzikura²⁶ concluded that actual

causes of which control meconium passage are due to diminished oxygen transfer, toxemia, hypertension, anemia, obesity, type of labour, maternal age,prolonged gestation.Meis²⁷ observed that meconium staining increases two fold in prolonged labour.

10: Mechanical ventilation: Total number of cases which require mechanical ventilation is 7 (4.69%).Total number of cases which require mechanical ventilation is 7 (4.69%) out of which 2/131cases belong to thin MSL and 5/18 cases (27.78%) belong to thick MSL. Overall, requirement of mechanical ventilation in MSAF newborns is increased.

Table 2:

Requirement of Mechanical Ventilation	Priyadarshini V. et al ²⁸	Espinheira MC et al ²⁹	Present study
Percentage	48.57 %	43.1 %	27.78%

11: Meconium Aspiration Syndrome: Total number of cases with MAS is 16 (10.67%); of which 4/131 cases (2.67%) belong to thin MSL and 12/18 cases (66.67%) belong to thick MSL. The mean difference between two groups is stastically significant (p value= .000). The overall incidence of meconium aspiration in live born infants is 1 to 3%. 10% to 30% of meconium stained babies develop varying degrees of respiratory difficulties.Brown³⁰In 2 different studies in India, Gupta³¹ showed 6% of meconium stained babies develop MAS, whereas Bhaskar³² found 23.7% MAS in meconium stained babies with mortality of 18.1%.Wiswell¹³ found 9% MAS cases in his study. Our findings are consistent with findings of Wiswell¹³ and Brown³⁰.

12: Other Complications: Other complications associated with MSL are: VAP, Sepsis, HIE, BPD. Most of the workers demonstrated increased incidence of pulmonary complications in babies born with thick MSAF.

Schaffer¹⁴ (1971) concluded aspiration of meconium was one of the major cause of dyspnea and respiratory distress in the newborn.

Fujikura²⁶ (1975) observed a less incidence of respiratory distress syndrome in stained babies.Our findings are not consistent with his study.

Brown³⁰ (1981) found, among autopsy of 200 still births, 12.5% demonstrated evidence of aspiration of AF in alveolar system.

Steven (2004)³³ concluded that meconium seems to be toxic to the lungs.

13: Number of deaths (Mortality):Total number of deaths is 7 out of 149 total cases (4.70%); of which 2 cases(1.53%) belong to thin MSL and 5 cases(27.78%) belong to thick MSL. The mean difference between two groups is stastically significant (p value= .000).

Table 3:

Death reported by different authors	Hellman ³⁴	Debdas ³⁵	Goud and Krishna ¹⁹	Narang ³⁶	Present study
Percentage	7%	3%	7.7%	7.7%	4.70%

Percentage of death reported by different authors is **Hellman**³⁴ (7%), **Debdas**¹⁰ (3%), **Goud and Krishna**¹⁹ (7.7%) which is comparable with our study.

14: Correlation of nature of amniotic fluid with NICU stay for >7 days: Total number of cases with NICU stay >7 days is 27 out of 149(18.12%);of which 14 cases(10.68%) belong to thin MSL and 13 cases (72.2%) belong to thick MSL. Our findings are consistent with findings of **Pravin Goud**¹⁹ and non-consistent with that of **Narli N et al**³⁷ and **Priyadarshini et al**²⁸.

Table 4: Study on NICU stay by different authors:

Nature of amniotic fluid	Narli N et al ³⁷	Priyadarshini et al ²⁸	Pravin Goud ¹⁹	Present study
Thin Meconium	8.4 %	9.2 %	10.8 %	10.68 %
Thick Meconium	11.2 %	14.1 %	54.9 %	72.2 %

Results:

Total 149 cases were enrolled. In our study, it was found that there is higher incidence of delayed crying (72.2%),respiratory distress (22.15%),low APGAR scoring, low oxygen saturation in blood (average sPO₂=83.94%), more number of cesarean sections(88.9%);increased requirement of resuscitation (88.9%), mechanical ventilation (27.78%),long duration of NICU stay (72.2%), more MAS cases (66.67%),increased rate of birth asphyxia (16%), increased perinatal mortality (27.78%) in thick MSL group compared to thin MSL group.

Conclusion:

Meconium stained amniotic fluid is associated with higher rate of cesarean delivery, increased need for neonatal resuscitation, fetal distress, increased rate of birth asphyxia with hypoxic ischemic encephalopathy, meconium aspiration syndrome, increased rate of NICU admission, increased mortality. The morbidity is more with thick MSL than thin MSL. the knowledge of antenatal and peri-natal factors associated with MSAF provide a way of early identification of high risk cases. It can be managed by optimal timely intervention in order to avoid severe asphyxia and meconium aspiration and its complications.

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