



## Maternal And Fetal Outcome In Meconium-Stained Liquor

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### Abstract

**Background:** Meconium-stained amniotic fluid (MSAF), especially observed before term, is considered a sign of fetal jeopardy. Occurrence of meconium-stained amniotic fluid (MSAF) during labour may be considered as a measure for prediction of poor fetal outcomes such as meconium aspiration syndrome and perinatal asphyxia, resulting in perinatal as well as neonatal morbidity and mortality.

**Aims and Objectives:** To determine the prevalence of meconium-stained liquor during labour, associated risk factors and perinatal outcome at a tertiary hospital.

**Methods:** In this retrospective study, a total of 40 cases of meconium-stained liquor detected after spontaneous or artificial rupture of membranes during labour were observed over a period of 6 months (i.e. July 2021 to December 2021) and their outcomes in terms of mode of delivery (whether vaginal delivery or caesarean section) and fetal outcome and associated maternal high risks were studied.

**Result:** Anaemia was existent in around 20%, pregnancy induced hypertension (PIH) in 32.5% and premature rupture of membrane in 15%. Pregnancies complicated with Pregnancy induced hypertension had significant higher rate of meconium-stained liquor among all cases.

Caesarean section was commonly performed in meconium-stained amniotic fluid cases and accounted for about 49% of all cases.

**Conclusion:** Meconium-stained amniotic fluid increases the chance of caesarean delivery rates, birth asphyxia, Meconium Aspiration Syndrome, lower APGAR scoring and thereby increasing the chance of neonatal intensive unit admission.

**Keywords:** Meconium-stained amniotic fluid, Caesarean delivery, Neonate

### Introduction

Meconium, the gastrointestinal excreta of fetus is derived from Greek “meconium arion” resembling opium or poppy like substances, causing sleeping state like fetus in the uterus.<sup>1</sup>

Presence of meconium-stained amniotic fluid (MSAF) during labour is considered as the indicator in predicting adverse fetal outcomes like meconium aspiration syndrome and perinatal asphyxia, leading

to perinatal as well as neonatal morbidity and mortality.<sup>2,3</sup>

Meconium-stained amniotic fluid has a direct relation with fetal distress and increased chances of aspiration of meconium with harmful effect on the neonatal lungs.

Passage of meconium is rarely seen before 34weeks of gestation and its incidence increases after 37weeks

of gestation. It increases consistently with the increasing gestational age.

Meconium passage in mature fetus is increased by myelination of nerve fibers, its parasympathetic tone and with concentration motilin. Vagal stimulation from epithelial duct compression induces fetal hypoxic stress, leading to expanded peristalsis and relaxation of anatomical sphincter resulting in the intrauterine passage of faecal matter.<sup>4</sup>

### Three basic mechanisms required for meconium passage:

1. Physiological maturation event.
2. Acute hypoxia occurring in late pregnancy
3. Chronic intrauterine hypoxia.

Meconium is thick, black green in colour, germs and odour free material present in intestine of fetus till 12weeks of pregnancy.

The parts of meconium incorporate water (72%-80%), desquamated cells from the digestive system and skin, gastro-intestinal bodily fluid, lanugo hair, material from vernix caseosa, amniotic liquid, intestinal emission, blood bunch explicit glycoproteins, and bile and medication metabolite.<sup>5</sup>

Amniotic fluid contains carbohydrate, proteins, lipids, lactate, pyruvate, electrolytes, enzymes and hormones.

It protects fetus from external environment and help in fetal movement and growth.

Assessment of fetal lung maturity is done by determining lecithin/ sphingomyelin ratio and presence of phosphatidyl glycerol in the amniotic fluid.

Meconium aspiration is defined as presence of meconium below the level of vocal cord and contribute almost 20-30% of all new born which is associated with meconium-stained amniotic fluid.<sup>6</sup>

Occurs in uterus with gasping of fetus or after the birth Meconium Aspiration Syndrome (MAS) is defined as difficulty in breathing that develop after the birth, with X-ray finding of aspiration pneumonitis and presence of meconium-stained amniotic fluid.

As per RCOG intrapartum guideline, meconium-stained liquor is categorized as Significant MSL and Non-significant MSL.

Thin yellow or greenish tinged fluid, containing non particulate material is seen in Non-significant MSL.

Dark green or black liquor that is thick and tenacious and consists of lumps of meconium, seen in Significant MSL

### Aims And Objectives:

To determine perinatal outcome in cases with meconium-stained amniotic fluid, their mode of delivery and associated maternal risk factors.

### Material & Methods

The study is a retrospective observational study was conducted in Obstetrics and Gynaecology department at MGM Medical College, Kalamboli over a period of 6 months from July 2021 to December 2021. Total 40 cases with Meconium-stained amniotic fluid were observed from July 2021 to December 2021

The patients were carefully watched and strictly monitored for progression of labour and fetal heart rates.

Mode of delivery was decided, considering all obstetrical conditions. Fetal outcome was observed, APGAR Score was noted at 1 minute and 5 minutes, birth weight, neonatal intensive care admissions (NICU), birth asphyxia, and early neonatal death were noted.

All the babies of the study group were followed up for 4 to 7 days for perinatal morbidity & mortality. Incidence of NICU admission in the study group & the incidence of meconium aspiration & meconium aspiration syndrome were noted in babies born with meconium-stained liquor.

The results were then carefully tabulated statistically using SPSS version 28.

### Inclusion Criteria

1. Included all pregnant women who had completed more than 37 weeks of gestation
2. With singleton pregnancies with cephalic presentation with no congenital anomalies and with significant meconium.
3. Informed and written Consent was taken.

### Exclusion Criteria

1. Pregnancies who had completed less than 37 weeks of gestation
2. Pregnancies with presentation other than cephalic presentation
3. Pregnancies with known fetal congenital abnormalities.

**Results:**

**1a) Maternal Age**

Age	Number	Percentage
<20yrs	0	0
20-30yrs	26	65%
>30yrs	14	35%

**1b) Parity**

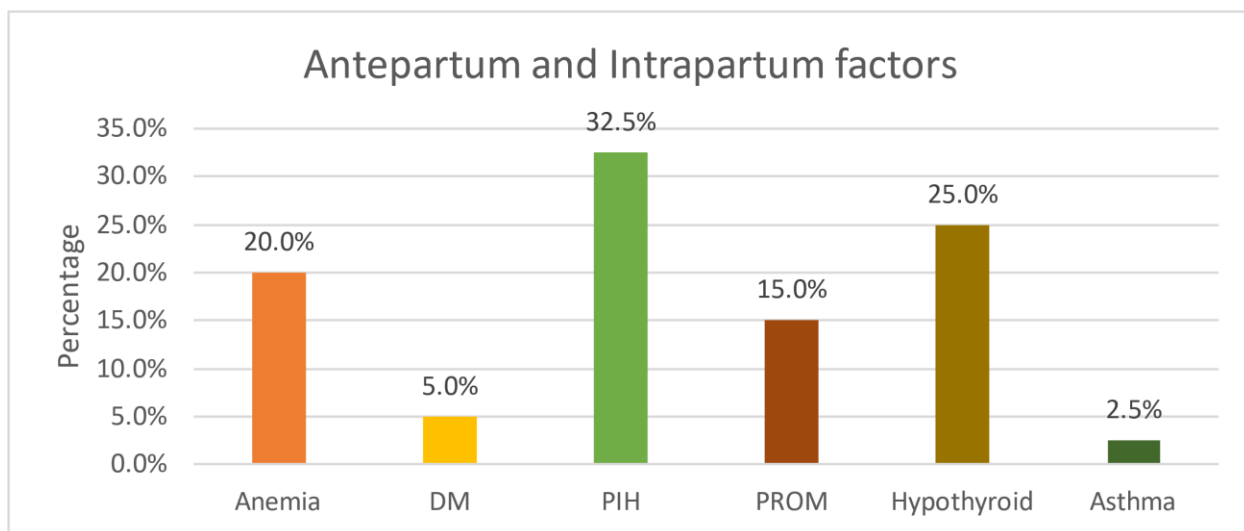
Parity	Number	Percentage
Primigravida	21	52.50%
Multigravida	19	47.50%

**1c) Gestational Age**

Parity	Number	Percentage
Primigravida	21	52.50%
Multigravida	19	47.50%

40 pregnant women with 37 completed weeks of gestation and with cephalic presentations were included in this study. 20-30 year of age was seen in 65% cases Approximately gestational age of more than 40 weeks seen in 50% cases.

**Relation of Antepartum and Intrapartum factors with meconium stained Fluid**



The above graph shows the association of maternal co-morbidities with meconium-stained liquor. Pregnancy with Pregnancy induced hypertension (PIH) had a higher rate of meconium-stained liquor accounting for 32.5% of cases as compared to the other associated maternal factors.

Mode of delivery	Cases	Percentage
Vaginal	14	35%
Instrumental	8	16%
LSCS	18	49%

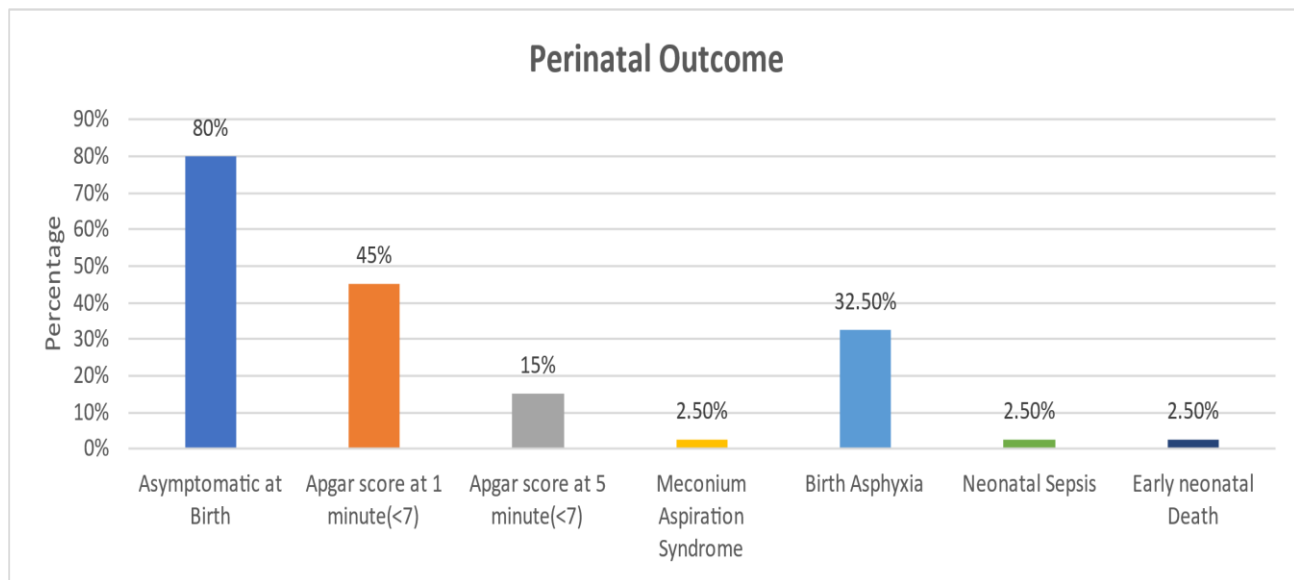
### Mode of Delivery

As shown in the above table, Meconium-stained liquor was found in majority of the patients who underwent cesarean section accounting to about 49% of the cases.

Weight	Number	Percentage
<2kg	10	25%
2-2.5kg	16	40%
>3kg	14	35%

### Fetal weight

### 5) Perinatal Outcome



The above graph shows the relationship between the meconium-stained liquor and associated neonatal outcomes. Neonates with MSAF had low Apgar scores at birth, thereby requiring admission to Neonatal Intensive Care Unit (NICU).

Meconium aspiration was seen in a single case (2.5%) and one baby had early neonatal death. (2.5%).

## Discussion

Assessment of the fetal wellbeing in labour is done by fetal heart rate monitoring and by knowing the presence of meconium in the amniotic fluid.<sup>7</sup> Meconium stained amniotic fluid has been implicated as a factor influencing fetal wellbeing during intrapartum and postpartum periods. Meconium staining of amniotic fluid calls for a close vigilance and proper monitoring of labour.<sup>8</sup>

In the present study the incidence of MSAF in primigravida was 52.5% (21) and in multigravida was 47.5% (19) respectively which was comparable to the studies done by Akhila S *et al*, in which the incidence of MSAF was more in primigravida i.e. 54.6% (190) and Tayade S having incidence of 71.66% in primigravida and 28% in multigravida.<sup>9</sup>

The present study showed maximum cases i.e. 50% with MSAF seen in gestational age more than 40 weeks which was comparable with the studies conducted by Mudhra R *et al* having 50% incidence; Desai DS *et al* giving an incidence of 63.96% and Fischer C *et al*, showing maximum cases seen in post-dated pregnancy respectively.<sup>10</sup>

In our study the antenatal complications associated with MSAF were pregnancy induced hypertension (PIH) accounting for the maximum number of cases i.e. (32.5)%. Other factors noted were maternal

Hypothyroidism (25%), Anaemia (20%), Premature rupture of membranes (15%). According to a study done by Neha *et al* anaemia was found in 15% of cases pregnancy induced hypertension found in 25% and premature rupture of membrane was found in 10% of cases.<sup>6</sup> Pregnancy with PIH had a higher rate of meconium staining among cases which was comparable to our study.

In the present study the incidence of caesarean sections performed in view of meconium-stained liquor was 49% while vaginal deliveries were conducted in 35% of the cases. Wong SF found in his study that 13.2% of the subjects with MSAF had undergone caesarean sections, Naveen S *et al* also reported a caesarean section rate of 49.1% in MSAF.<sup>11</sup> This higher rate of caesarean sections may be due to a lack of facilities such as fetal scalp pH monitoring and tracings of fetal electronic monitoring.

In our study 25% of cases with meconium-stained liquor (MSAF) had birth weight <2 kg whereas 35% of cases with MSAF had birth weight >3kg. On the other hand, Rekha K *et al* in her study observed birth weight <2kg in 40% of the neonates with MSAF.

Based on our study we can conclude that MSAF is associated with lower Apgar score, more NICU admissions, meconium aspiration syndrome (MAS),

birth asphyxia, neonatal sepsis, perinatal death. In our study Apgar score <7 at 1 minutes (45%) and at 5 minutes (15%) were more in meconium-stained group. Rokade et al<sup>13</sup> found that 71% of the newborns had Apgar <7 at birth. Similar results were observed by Rekha K et al. In present study early neonatal deaths were observed in 1 of the neonates with MSAF. In contrast to our study Supriya et al<sup>12</sup> found 20 early neonatal deaths. These differences may due early interventions and liberalisation in caesarean sections.

## Conclusion

Meconium-stained amniotic fluid is an alarming sign from both Obstetrician's and Paediatrician's points of view as it increases the caesarean rates, causes birth asphyxia, meconium aspiration syndrome and increases the number of neonatal intensive care admissions. Hence identification of pregnant women at risk of passage of meconium during labour would allow intensive fetal surveillance and early intervention which might lead to a reduction in neonatal and perinatal adverse outcomes.

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