

MECONIUM-STAINED AMNIOTIC FLUID - A NEONATAL OUTCOME ANALYSIS IN PATIENTS UNDERGOING CAESAREAN SECTION

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Abstract

Background: Meconium-stained amniotic fluid (MSAF) is often identified as the most disconcerting sign of foetal distress, leading to an adverse foetal outcome. **Aims:** To investigate the neonatal outcome in women undergoing caesarean section who have meconium-stained amniotic fluid. **Cardiotocography's** role in women with meconium-stained amniotic fluid. **Materials and Methods:** This is a prospective observational cross-sectional study conducted on 206 patients undergoing caesarean section due to meconium stained amniotic fluid in the department of obstetrics and gynaecology, Shivpuri government medical college associated district hospital, Madhya Pradesh, India during the period of October 2019 to October 2021. **Results:** The majority (56%) of MSAF is seen in patents with > 40 weeks of gestation. 65% of patients had non-reassuring foetal status on cardiotocography. 65% of neonates had an APGAR score of < 7 at 1 minute. 59% of new-borns had an APGAR <7 at 5 minutes. SNCU stays are 24 to 48 hours in 56% of cases. The majority of babies recover without any complications; 3.2% mortality was noted in our study. **Conclusions:** In our study, we have seen that meconium staining is common in term and prolonged pregnancies. Cardiotocography is found useful in monitoring foetal status in patient with meconium stained liquor, and we can do early intervention in non-reassuring foetal status and improve the neonatal outcome.

INTRODUCTION

Meconium-stained amniotic fluid (MSAF) is often identified as the most disconcerting sign of fetal distress, leading to an adverse fetal outcome.^[1] Meconium is a sterile viscous greenish substance present in the gastrointestinal tract of the fetus from 12 weeks of gestational age. The expulsion of meconium is usually expected after birth, and hence the presence of meconium-stained amniotic fluid (MSAF) before delivery is considered to be a sign of fetal distress. This is due to the vagal stimulation and subsequent intestinal peristalsis due to fetal distress associated with hypoxia, leading to meconium expulsion into the amniotic cavity, staining the amniotic fluid.^[2] MSAF is associated with both maternal and neonatal complications. The maternal complications include chorioamnionitis and postpartum endometritis.^[3] The major neonatal complications include meconium aspiration syndrome (MAS), respiratory distress, and neonatal

sepsis.^[1] MAS is a clinical condition characterized by failure of the respiratory system, which can at times be fatal, even leading to neonatal death. The incidence of MSAF increases > 34 weeks of gestation because of the immature gastrointestinal tract development of preterm fetuses.^[2] The MSAF also increases the rate of operative interference (4). This study aims to analyze the neonatal outcomes of patients undergoing caesarean section due to MSAF.

MATERIALS AND METHODS

This is a prospective observational cross-sectional study conducted on 206 patients undergoing caesarean section due to meconium-stained amniotic fluid in the department of obstetrics and gynecology during the period of October 2019 to October 2021. The pregnant women with term gestation undergoing caesarean section due to MSAF and associated indications were included in the study, and the women undergoing caesarian section due to

obstetric indications other than MSAF were excluded from the study. The patients' detailed history-taking and examination were done. Meconium staining of the amniotic fluid was identified during examination. Continuous fetal monitoring was done using cardiotocography. The fetal heart rate (FHR) tracings were classified as normal, suspicious or abnormal according to the guidelines of National Institute of Clinical Excellence (NICE) (15). Women with a non-reassuring fetal status were subjected to a caesarean section. The neonatal outcome was then analyzed by the APGAR score (A- appearance of skin, P- pulse, G- grimace, A-activity, R- respiratory function), general condition, admission into the NICU (Neonatal Intensive Care Unit) and its duration, and the development of complications of meconium aspiration syndrome.

RESULTS

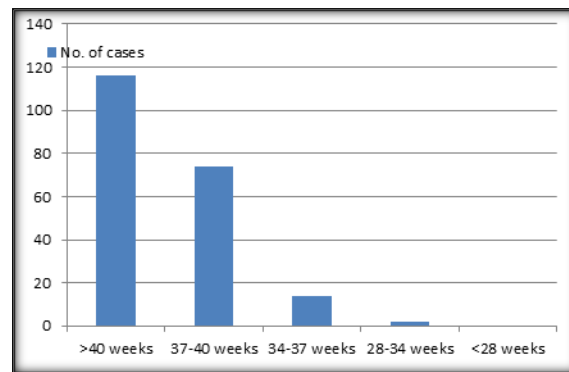


Fig 1: Detection of MSAF according to gestational age

Table 1: Detection of MSAF according to gestational age

Gestational age	Number	Percentage
>40 weeks	116	56
37-40 weeks	74	36
34-37 weeks	14	7
28-34 weeks	2	0.9
<28 weeks	0	0
TOTAL	206	100

Meconium-stained amniotic fluid is detected among women presenting at more than 40 weeks of gestation, with the majority of 56%.

Table 2: Evaluation of fetal status by cardiotocography

NST(Non Stress Test)	Number	Percentage
Reassuring	72	35%
Non- reassuring	134	65%
Total	206	100%

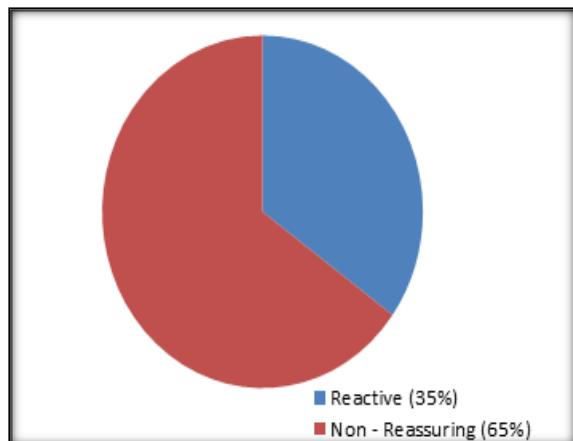


Fig 2: Fetal status

Among the 206 patients who presented in labour with MSAF, on evaluation with cardiotocography, the majority of women (65%) presented with a non-reassuring fetal status at some point of labour, leading to operative interference. The remaining women (35%) had a reassuring fetal status but had to have a caesarean section for other obstetric reasons.

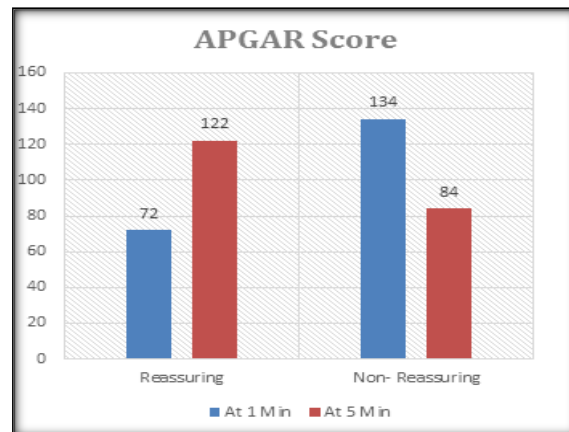


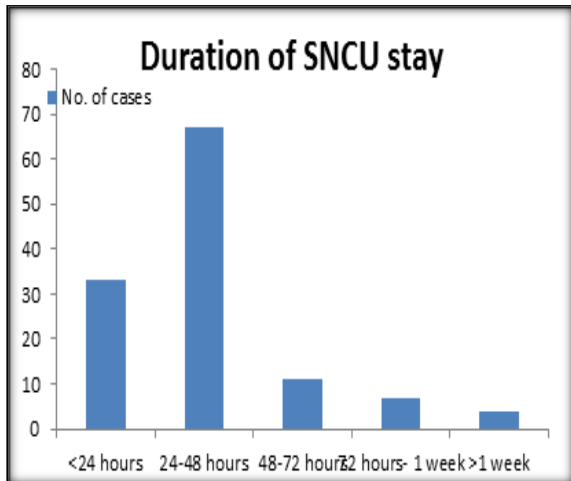
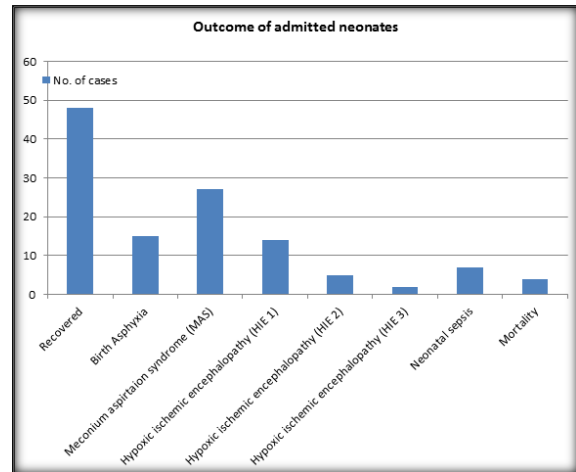
Fig 3: APGAR Score

On assessment of the APGAR score at 5 minutes after birth, majority (59.2%) of the newborn presented with an APGAR score of <7 and required SNCU admission. However, there was an APGAR score improvement in 7.3% neonates at 5 minutes in comparison with the APGAR score at 1 minute of birth. Rest of the 40.8% newborn had a good APGAR score of >7 and were handover mother-side.

Table 3: APGAR score at 1 minute

APGAR	Number (%)	
	At 1 Min.	At 5 Min.
Reassuring	72 (35)	122 (59.2)
Non- reassuring	134 (65)	84 (40.8)
Total	206 (100)	206 (100)

On assessment of the APGAR score at 1 minute after birth, majority (66.5%) of the newborn presented with an APGAR score of <7.

**Fig 4: Duration of SNCU stay****Fig 5: Outcome of the admitted neonates****Table 4: Duration of SNCU stay**

Duration	Number	Percentage
<24 hours	33	27
24-48 hours	67	55
48-72 hours	11	9
72 hours- 1 week	7	6
>1 week	4	3.2
Total	206	100

On analysis, the duration of SNCU stay was 24-48 hours in majority of the neonates (55%) and 3.2% of neonates required >1-week admission.

Table 5: Outcome of the admitted neonates

Duration	Number	Percentage
<24 hours	33	27
24-48 hours	67	55
48-72 hours	11	9
72 hours- 1 week	7	6
>1 week	4	3.2
Total	206	100

On the basis of neonatal outcome, the majority (39.3%) of the babies recovered without any complication and 3.2% resulted in mortality which was equivalent to > 1 week stay in SNCU.

DISCUSSION

Meconium passage is a normal physiological event of a mature foetus occurring within 24-48 hours post-birth. However, the premature passage of meconium intrauterine is most often associated with fetomaternal stress, leading to foetal distress. Intrauterine aspiration of this meconium-stained fluid by the foetus is linked to a number of neonatal complications, including meconium aspiration syndrome (MAS), hypoxic ischemic encephalopathy, and chemical pneumonitis.^[4]

Meconium aspiration syndrome (MAS) is a common cause of respiratory distress in term and post-mature neonates. Aspirated meconium causes respiratory distress and hypoxemia through the combined effects of obstruction of airways, chemical pneumonitis, and surfactant dysfunction.^[5] In the present study, the majority of the patients with MSAF belonged to the > 40-week gestational age group (56%), followed by the 37-40-week gestational age group (36%). The present study, in comparison to a similar study by Gavhane et al., showed a similar incidence of higher MSAF in

women with the mean gestational age of 39.31 ± 0.89 weeks.^[6] The study by Paudel et al., identified that post-term gestation was another significant factor with high risk for developing MAS. Babies born at a gestational age of ≥ 42 weeks had a twofold risk associated with MAS in this study.^[7] However, another study by Smeets Patel et al., showed that 29.5% of patients belonged to > 40 weeks of gestational age and the majority (65%) belonged to the 37–40-week gestational age group, which is in contrast to our study where MSAF is common among the prolonged pregnancies of > 40 weeks of gestation.^[8] However, it could be interpreted that MSAF is common among labouring patients with a full-term pregnancy of > 37 weeks gestational age. The reason is attributed to poor gastrointestinal peristalsis in preterm foetuses. However, if MSAF is found in preterm gestation, it should alert the clinician to suspect other causes like biliary obstruction or infectious causes like listeria infection.^[2]

On cardiotocographic monitoring, the majority of the patients presented with a non-reactive non stress test (65%). In a similar study by Mundhra et al., 21.8% of the patients showed foetal heart rate abnormalities in continuous electronic foetal heart rate monitoring, which was quite a higher number than in their study on the aspect of analysis of abnormal antepartum and intrapartum factors associated with MSAF.^[9]

On assessment of the APGAR score at 1 minute after birth, the majority (66.5%) of the new-borns presented with an APGAR score of < 7 . In comparison with a similar study by Qadir et al., low APGAR scores were more prevalent in the MSAF group compared to the control group. At 1 minute, a low APGAR score was found in 38.9% of cases and at 5 minutes, the cases were reduced to 20.4%, which, however, was a higher value in comparison to the control group.^[10] This was a similar pattern in our study where the majority (59.2%) presented with a low APGAR score of < 7 at 5 minutes after birth and required SNCU admission. However, after resuscitation, there was an APGAR score improvement in 7.3% of neonates at 5 minutes in comparison with the APGAR score at 1 minute of birth. 40.8% of new-borns had a good APGAR score of > 7 and were handed over mother-side. They require only post-delivery care.

It is also found that low APGAR scores are associated with a thick MSAF according to the study by Thobbi et al., where 52.1% of neonates with thick meconium presented with a low APGAR score of < 5 . But it has also been found that if resuscitation is done well, the APGAR score is better at 5 minutes after birth than it was at 1 minute.^[11]

In our study, the mean duration of SNCU stay was 24–48 hours in the majority of the neonates (55%). However, on the basis of neonatal outcome, 39.3% of the babies recovered completely without any complications, and 3.2% resulted in mortality,

which was equivalent to a > 1 week stay in SNCU. Among the developed complications, meconium aspiration syndrome (MAS) was the major complication, accounting for 22.1% of the neonates. In a similar study by Singh G et al, MAS was the major complication developed, in 34% of the neonates. It was also found that there was a statistically significant association between MSAF and the development of other complications like hypoxic ischemic encephalopathy (HIE) and neonatal sepsis. The mean NICU stay was found to be 6.48 ± 0.54 days, similar to our study where the majority of neonates had a mean stay of < 7 days. The neonatal mortality in intramural neonates with MSAF was 10.5%, which is a little higher than in our study. However, the neonatal mortality in intramural neonates (10.5%) was found to be less than that in extramural neonates (27.5%). The reasons attributed are transportation delays, poor aseptic measures, and the absence of trained personnel.^[11] Hence, it could be interpreted that strict monitoring by trained personnel of the affected neonates is required to prevent neonatal morbidity and mortality.

According to the study by Mohammed et al, MAS was the commonest complication, accounting for 8.7% in thin MSAF and 22.8% in thick MSAF, similar to our study where the total incidence of MAS was 22.1%. It could be learnt that assessment of the consistency of meconium at the time of diagnosis is also an important factor for prediction of neonatal complications.^[13]

According to the study by Mundhra et al. ^[9] it is found that MSAF is an indication for caesarean section in an effort to prevent neonatal morbidity. In a study by Saunders et al., it was found that caesarean section was performed twice more often than the control group, and the obstetric indication was found to be non-progress of labour and foetal distress.^[14] Hence, it could be elucidated that MSAF is one of the factors causing foetal distress. Hence, vigilant monitoring is warranted in cases with MSAF planned for spontaneous labour progression.

CONCLUSION

It could be interpreted that meconium staining is more common in term and prolonged pregnancies. Hence, the utmost care should be taken in the monitoring of these patients by the use of feasible contrivances like cardiotocography. The non-reassuring changes indicate foetal distress and intervention should be done promptly to prevent an adverse neonatal outcome. A thorough education of health personnel working in the field of obstetrics regarding watchful monitoring of women with MSAF would contribute to the prevention of perinatal morbidity and mortality.

Conflicts of interest None

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