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ORIGINAL RESEARCH

The study of maternal factors and perinatal outcome in meconium stained liquor in full term pregnancies

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ABSTRACT

Introduction- Meconium-stained amniotic fluid (MSAF) is considered a reliable indicator of foetal distress in the womb caused by inadequate oxygen supply to the foetus. The aim of present study was to assess the maternal factors and perinatal outcome in meconium stained liquor in full term pregnancies. **Material and methods-** The present hospital based prospective observational study was conducted at department of obstetrics and gynecology of a tertiary care hospital among 100 pregnant women admitted for delivery with meconium stained liquor during the duration period of one year. The study patients were categorised into 2 groups based on the clinical grading of meconium- Group A (thin) and Group B (thick) . Clinical and demographic history was taken. Results were analyzed using SPSS version 25.0. **Results –** 60 patients had thin meconium stain and 40 had thick meconium stain.(Figure 1) Maximum patients belong to age group of 21 to 25 years (55) and least were in the age group of above 30 years (5). Postdatism in 28 cases was the prevailing maternal factor linked to MSAF, 25 patients does not have any risk factor. The most common cause of still birth was meconium aspiration syndrome (15). The results of our investigation confirm these conclusions, as the infant mortality rate in our study was 7%. **Conclusion-** The presence of meconium in the amniotic fluid greatly elevated the risk of health problems and death in newborns. The viscosity of meconium directly influenced the outcome of the neonate.

Keywords- Meconium, morbidity, mortality, outcome, perinatal, pregnancy

INTRODUCTION

Meconium refers to the first faeces or excrement of a baby. It is composed of shed cells, intestinal mucus, vernix caseosa, adipose tissue, and digestive waste [1, 2]. Meconium formation initiates in the foetal gastrointestinal tract at approximately week 12 of conception and then accumulates in the foetal intestines during the entire length of the pregnancy [3, 4]. The onset of this condition is often recognised in the labour ward for many reasons, which can be confusing for health workers. Physiologically, it may arise due to the development of the gastrointestinal system, whereas pathologically, it may emerge as a consequence of acute conditions.[5,6]

Meconium typically evacuates within the initial 24 to 48 hours after childbirth. Meconium, on the other hand, might be expelled during the process of childbirth due to many factors. Obstructed labour, advanced maternal age, tobacco smoking, oligohydramnios, anaemia, prolonged duration of labour, use of a uterotonic agent during labour, and hypertensive disorders of pregnancy are some of the factors that contribute to the passage of meconium [7, 8].The prevalence of intrapartum MSAF in term pregnancy varies across regions and ranges from 7% to 22%. The rate could increase to 40% in postterm pregnancies [9, 10]

Meconium can elevate the risk of complications, illness, and potentially death for the foetus during childbirth, depending on many conditions. The main objective of obstetric treatment is to mitigate the occurrence of maternal and foetal morbidity and mortality. Early detection of indicators of foetal distress is crucial in order to decrease foetal morbidity and mortality. [11]

Meconium-stained amniotic fluid (MSAF) is considered one of the first and most reliable indicators of foetal distress in the womb caused by a lack of oxygen to the foetus. Meconium serves as a favourable environment for the growth of microorganisms, leading to an inflammatory reaction when inhaled by the foetus and occasionally resulting in lung blockage. When meconium is found in the amniotic fluid together with an irregular foetal heart

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rate, it suggests that the foetus is experiencing discomfort. This can result in stillbirth or the birth of a baby who is deprived of oxygen, leading to brain damage, neurological issues, and other symptoms. The occurrence of meconium-stained amniotic fluid (MSAF) varies significantly depending on the maternal risk factors. [12]

This study aims to investigate the potential association between meconium staining of amniotic fluid (AF) and high-risk factors that increase the likelihood of foetal stress during birth. Additionally, the study seeks to accurately assess the condition and outcome of the foetus in all cases of meconium-stained amniotic fluid (MSAF) using the data collected in this research.

MATERIAL AND METHODS

The present hospital based prospective observational study was conducted at department of obstetrics and gynecology, GMC, Jammu among pregnant women admitted for delivery during the duration period of one year. Ethical permission was taken from institutional ethics committee before commencement of study. Patients were asked to sign an informed consent form after explaining them the complete procedure of study.

Through convenience sampling method a total of 100 patients with labour pain and MSAF were selected on the basis of inclusion and exclusion criteria. The study included women who had reached full term in their pregnancy, had a baby in the head-down position, and had either a complex presentation or a transverse lying. These women also had meconium-stained amniotic fluid when their water broke naturally or was artificially broken during birth. Exclusion criteria included women with preterm pregnancy or breech presentation.

The study patients were categorised into 2 groups based on the clinical grading of meconium. Group A (thin) refers to the presence of thin meconium staining either at the time of membrane rupture or later during labour. Group B (thick) refers to the presence of meconium that is stained with amniotic fluid at the time of membrane rupture or at a later stage during labour. The obstetric management of the cases was carried out according to the protocols established for the labour room.

All newborn infants were placed under surveillance for a duration of 24 hours. Infants who exhibited no abnormalities and experienced no difficulties within the first 24 hours following delivery were reunited with their mother. Infants exhibiting any indication of difficulties during a 24-hour period were admitted to the neonatal intensive care unit (NICU). If any complications arose, babies that were placed with their mother were transported to the Neonatal Intensive Care Unit (NICU). Infants were monitored until the 14th day and their clinical status was evaluated, with any anomalies being documented. The occurrence of death and the specific reasons for it during the hospital stay in the second week of a newborn's life were also documented.

The data analysis was conducted using SPSS software version 25, which is a statistical suite specifically designed for the social sciences.

RESULTS

Out of 100 patients 60 patients had thin meconium stain and 40 had thick meconium stain.(Figure 1) Maximum patients belong to age group of 21 to 25 years (55) and least were in the age group of above 30 years (5) (Figure 2).

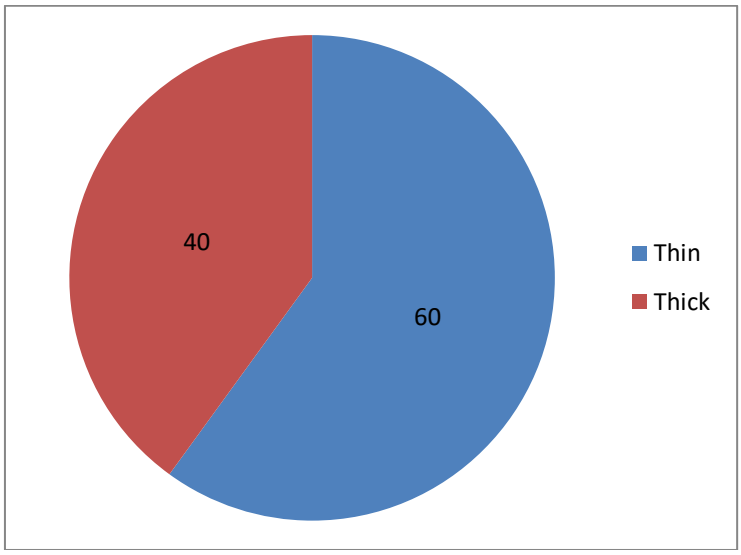

Figure: 1. division of patients according to type of meconium consistency

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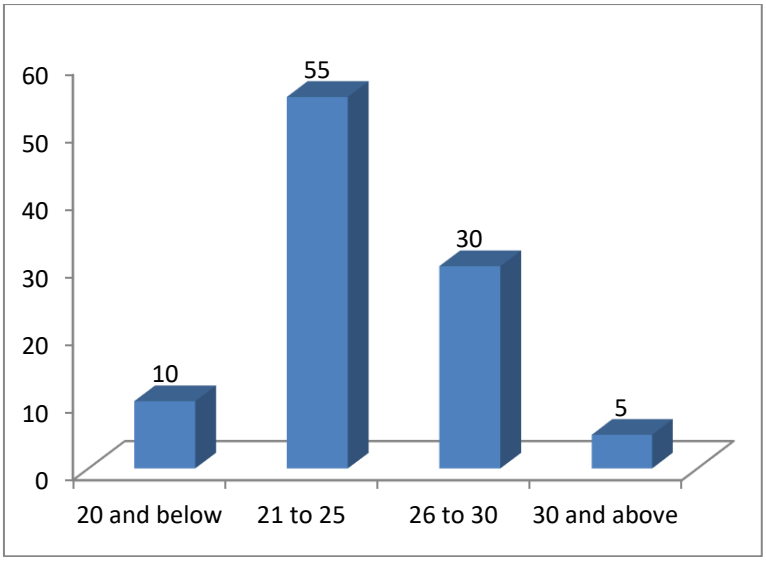

Figure: 2. Distribution of patients according to gender

The antepartum and intrapartum risk factors linked with meconium-stained amniotic fluid (MSAF) included prolonged labour in 6 cases, oligohydramnios in 8 cases, hypertension in 8 cases, IUGR in 7 cases and anaemia in 8 cases. Prolonged labour, low amniotic fluid levels (oligohydramnios), and high blood pressure (hypertension) were more prevalent than other covariates and showed a significant correlation with the presence of meconium-stained amniotic fluid, with a p-value of less than 0.05. Postdatism in 28 cases was the prevailing maternal factor linked to MSAF, 25 patients does not have any risk factor as shown in table 1.

Table: 1 Maternal risk factors related to Meconium stained liquor

Maternal risk factor	Frequency	P value
Hypertension	8	<0.05
IUGR	7	
Oligohydramnios	8	
Prolonged labour	6	
Postdatism	28	
PROM	10	
Anemia	8	
No risk factor	25	

In the thin meconium group, 45 cases experienced spontaneous labour, while in the thick meconium group there was only 15 cases. Mothers who experienced spontaneous commencement of labour were more likely to have an increased occurrence of meconium staining, possibly due to the presence of other related risk factors. The current investigation found a noteworthy correlation between the firmness of meconium and the method of delivery. The prevalence of caesarean section was significantly higher in the thick group, compared to the thin group as shown in table 2.

Table: 2 Correlation and the mode of delivery in MSAF

Meconium consistency	Normal delivery	Caesarean delivery	P value
Thick	15	25	0.01
Thin	45	15	
Total	60	40	

Out of all the infant born 60 were male and 40 were female. The mean birth weight was 2.9kgs . NICU care requirement of thick meconium group was about twice than that of thin meconium group. The most common cause of still birth was meconium aspiration syndrome as shown in table 3.

Table: 3 Cause and incidence of neonatal morbidity and mortality

Cause	No. of cases	Neonatal morbidity	Number of deaths
Asphyxia	10	8	2

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MAS	15	14	1
Pneumonia	9	7	2
Septicemia	1	0	1
HIE	3	2	1

Thick meconium-stained group had poorer perinatal outcome than that of the thin meconium-stained group with cases of still birth as shown in table 4

Table: 4. Perinatal outcome in meconium-stained liquor.

Fetal outcome	Thick	Thin	Total
Neonatal death	5	2	7
Still birth	6	2	8
Cured	55	30	85
Total	66	34	100

DISCUSSION

Meconium stained amniotic fluid (MSAF) is a concerning indication of foetal distress and is linked to a negative result for the baby during childbirth. The occurrence of meconium stained amniotic fluid varies from 7-22% while meconium aspiration syndrome (MAS) is present in around 5% of all cases of meconium stained amniotic fluid (MSAF).[3] MAS, or meconium aspiration syndrome, is responsible for infant mortality in around 0.05% of all pregnancies, which translates to 1 in 2000 pregnancies.[13]

Umbilical cord compression leads to vagal activation, which causes foetal hypoxic stress. This stress results in increased peristalsis and relaxation of the anal sphincter, leading to the passage of meconium into the uterus.[14] Neonates with meconium-stained fluid are more susceptible to developing respiratory distress compared to neonates born with clear fluid. Maternal systemic autoimmune disease (MSAF) increases the likelihood of perinatal mortality, even in women who have a very low probability of experiencing difficulties during childbirth.[15]

The present prospective hospital based observational study was conducted among 100 women having labour pain and had meconium stained amniotic fluid to investigate the potential association between meconium staining of amniotic fluid (AF) and high-risk factors that increase the likelihood of foetal stress during birth. Additionally, the study seeks to accurately assess the condition and outcome of the foetus in all cases of meconium-stained amniotic fluid (MSAF) using the data collected in this research.

In our study 60% of cases had thin consistency of meconium stain while 40% had thick consistency results were similar to study done by Majid et al and Sandu et al. [16,17] Results were in contrast to study done by Mohammed N et al where 76.5% of cases had thin meconium stained fluid and 23.5% with thick meconium. [18]

Postdatism and PROM were the leading maternal risk factors for MSAF in our study which is similar to the findings by Pendse et al and Kamala et al.[19,20] It is not uncommon for obstetricians to be more aggressive in labour with MSAF. It has led to high caesarean section rates in MSAF cases, and is almost justified due to associated high perinatal morbidity and mortality in these cases. When thick meconium in early stage of labour is diagnosed with anticipated longer vaginal delivery time, caesarean section is strongly indicated. High rate of caesarean section in thick MSAF group is our study is similar to the studies by Goud et al and most of the studies reviewed.[21]

The most common cause of still birth was meconium aspiration syndrome in our study. In a study done by it was found that most common cause of death was perinatal asphyxia, another study from Nepal also support this study.[22,23] Nayek categorised the MSAF into two categories based on their thickness, namely "thin" and "thick". It was observed that perinatal mortality was greater in the thick group compared to the thin group.[24] The results of our investigation confirm these conclusions, as the infant mortality rate in our study was 7%.

Limitation- Our study lacked a control group that had visibly discoloured amniotic fluid, which would have enhanced the robustness of the study findings.

CONCLUSION

The occurrence of meconium-stained amniotic fluid (MSAF) varies significantly depending on maternal risk factors, both during pregnancy and during labour. Efficient and constant monitoring of foetal health throughout birth is crucial for cases involving PROM, prolonged labour, postdate, and hypertension. Timely management of cases with meconium-stained amniotic fluid (MSAF) is of highest importance. Thick meconium, in comparison to thin meconium, was found to be associated with considerably increased need for intensive care unit. Given that not all foetuses with meconium passage during labour have maternal risk factors or experience adverse outcomes, it is crucial to promptly identify those who are likely to develop foetal distress and intervene accordingly. This is done to prevent the occurrence of meconium aspiration syndrome and its subsequent complications.

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