INCIDENCE AND RISK FACTORS OF MECONIUM STAINED AMNIOTIC FLUID IN NEWBORN AT A TERTIARY CARE CENTRE OF NEPAL: A RETROSPECTIVE STUDY

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ABSTRACT

Meconium stained amniotic fluid (MSAF) is a common cause of perinatal morbidity and mortality in neonates. Meconium has been considered as a sign of fetal distress occurring due to hypoxia which remains a major concern for obstetricians and Neonatologists. Good intrapartum care, timely interventions of all babies and selective approach of endotracheal intubation can reduce its complications to a greater extent. This was a hospital based retrospective cross-sectional study of neonates admitted at Nepal Medical College Teaching Hospital (NMCTH) during the period of January 2021 to Dec 2022. A total of 4171 deliveries was conducted during the study period. Only 265 (6.35%) cases were with meconium stained amniotic fluid. Among them, 74 (27.9 %) cases were vaginal deliveries and 191 (72.1 %) cases born via caesarian section. Out of 265 babies with MSAF, 165 (62.3%) and 100 (37.7%) were male and female respectively. Baby's weight range was 2.5 to 3.5 kg. Among 265 neonates, two hundred and thirty-five newborns (88.7%) were vigorous and thirty neonates (11.3%) were non -vigorous and required resuscitation. Maternal risk factors for MSAF in increasing frequency were thick meconium, oligohydramnios, intrauterine growth restriction, diabetes mellitus, premature rupture of membrane (PROM) and post term pregnancy. Babies with APGAR scoring less than 7 had Odds ratio (95% Cl): 9.31 (3.54- 24.43) that is babies had 9.31 times more risk of developing meconium aspiration syndrome than with babies of APGAR score more than 7. Out of 265 cases, 88.3% required resuscitation in the form of orogastric suction at birth followed by bag and mask ventilation in 9.8 % cases. 117 (44.1%) babies were put on respiratory support. Out of 265 cases, 261 (98.5%) babies were discharged, 2 (0.8%) cases died and 2 (0.8 %) babies were left against medical advice.

KEYWORDS

APGAR score, meconium aspiration syndrome, meconium-stained amniotic fluid

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INTRODUCTION

Meconium is the first intestinal discharge of the newborn. The complex chemical composition of meconium may be responsible for pulmonary inflammation, termed chemical pneumonitis, and a risk of surfactant inactivation. Meconium-stained amniotic fluid (MSAF) is an indicator of foetal distress which develops in about 7-22 % of live birth.[1] Meconium aspiration syndrome (MAS) occurs in about 5% of neonates born with MSAF. MSAF increases the incidence of perinatal morbidity (3-5%) and mortality.[2] Care during intrapartum period is important to reduce the burden.

Intrauterine distress may occur following an asphyxia episode. Risk factors that may cause in -utero passage of meconium include the post-dated pregnancy, placental insufficiency, maternal hypertension, pre-eclampsia, oligohydramnios, and maternal drug abuse, especially of tobacco and cocaine. MAS is declining in developed countries with advances in obstetric practices and perinatal care.[3] However, MAS remains a significant respiratory problem and cause of neonatal mortality in developing countries. Studies conducted in Nepal have revealed the incidence of MAS to be 6.6–8.6% and neonatal mortality as high as 11.3%.[4]

MAS babies are 10 times more likely to have NICU admission and sepsis is a significant co-morbidity. Thick meconium stained amniotic fluid is worrisome. There is increased chance of operative delivery and neonatal complications if associated with thick meconium stained amniotic fluid.[5] MAS is one of the most common causes of respiratory distress in term and post -term infants, which remains a major goal for obstetricians and neonatologists.

The aim of this study was to identify the incidence, risk factors and outcome associated with MSAF so that adverse outcome could be prevented as well as minimized especially at the regional level II/III perinatal Centre by-good intrapartum monitoring, timely interventions, by immediate oropharyngeal suctioning of all babies and selective approach of endotracheal intubation could reduce complications of MSAF to a greater extent.

MATERIALS AND METHODS

This was a hospital record- based, retrospective study of neonates admitted at NMCTH from January 2021 to Dec 2022. Ethical approval for the study was taken from the Institutional review committee of NMCTH. All the neonates born with MSAF were included in the study. Demographic characteristics of the mother and baby, antenatal risk factors like postdated pregnancy, diabetes, intrauterine growth restriction, antepartum hemorrhage and oligohydramnios, gestational age of baby, mode of delivery, birth weight, was recorded. The need of resuscitation like orogastric suction, bag & mask ventilation or endo-tracheal intubation were noted along with NICU management like respiratory support. Data was collected and analyzed using SPSS-18.

RESULTS

A total of 4,171 deliveries was conducted during the period of January 2021 to Dec 2022. Only 265 (6.35%) cases were with meconium stained

Table 1: Baseline characteristics of the study neonates with MSAF (n=265)

Parameters	N	%
Sex		
Male	165	62.3
Female	100	37.7
Birth weight in Kg		
< 2.5	20	7.5
2.5 – 3.5	192	72.5
>3.5	53	20
Mode of delivery		
NVD	74	27.9
LSCS	191	72.1
At birth		
Vigorous	235	88.7
Non-vigorous	30	11.3

Table 2: Maternal and obstetric related factors among neonates with MSAF

Parameters	N	%
Diabetes mellitus		
Yes	7	2.6
No	258	97.4
Intrauterine growth restriction		
Yes	7	2.6
No	258	97.4
Post – term pregnancy		
Yes	1	0.4
No	264	99.6
PROM >18 hours		
Yes	2	0.8
No	263	99.2
Oligohydramnios		
Yes	19	7.2
No	246	92.8
Type of meconium		
Thick	140	52.8
Thin	125	47.2

Table 3: Distribution of MASF babies with and without MAS according to APGAR score < 7				
Parameters	**Meconium aspiration syndrome**		**Total (%)**	**OR (95% CI)**
APGAR <7	Yes n (%)	No n(%)		
Yes	12 (4.52%)	8 (3.02%)	20 (7.55%)	9.31 (3.54-24.43)
No	34 (12.8%)	211 (79.62%)	245 (92.45%)	
Total	46 (17.35%)	219 (82.64%))	265 (100%)	

amniotic fluid. Among them, 74 (27.9 %) babies with MSAF had vaginal deliveries and 191 (72.1 %) cases born via caesarian section. Out of 265 babies with MSAF, 165 (62.3%) and 100 (37.7%) were male and female respectively. Majority of newborn with MSAF had birth weight between 2.5 to 3.5 kg. Among 265 cases, 235 (88.7%) newborns were vigorous and 30 (11.3%) were non -vigorous and required resuscitation (Table 1).

Maternal risk factors for MSAF in increasing frequency were thick meconium stained liquor, oligohydramnios, intrauterine growth restriction, diabetes mellitus, PROM and post term pregnancy (Table 2).

Odds ratio 9.31 (95% CI: 3.54- 24.43) that is babies with APGAR less than 7 had 9.31 times higher odds of meconium aspiration syndrome than babies with APGAR score more than 7 Table 3.

Table 4: Need of Resuscitation and Respiratory support at birth		
Parameters	**N**	**%**
Resuscitation		
Orogastric suction	234	88.3
Endotracheal suction	5	1.9
Bag and mask ventilation	26	9.8
Respiratory Support		
Oxygen via nasal prongs	78	29.4
CPAP	34	12.8
Mechanical ventilation	5	1.9
Respiratory support not Required	148	55.8

Table 5: Outcome of babies diagnosed with MSAF		
Outcome	**n**	**%**
Discharged	261	98.5
Death	2	0.8
Left against medical advice	2	0.8

Out of 265 cases, 88.3% required resuscitation in the form of orogastric suction at birth followed by bag and mask ventilation in 9.8 % cases.117 (44.1%) babies were put on respiratory support (Table 4).

Out of 265 cases, 261 (98.5%) babies were discharged, 2 (0.8%) cases died and 2 (0.8 %) babies were left against medical advice.

DISCUSSIONS

Meconium stained amniotic fluid is a frequent finding during deliveries which increases the rate of perinatal morbidity and mortality. MAS is a preventable condition by regular antenatal follow up, careful intrapartum monitoring and timely interventions to reduce the complications of MSAF.

This study was done to find out the incidence and risk factors of meconium stained amniotic fluid in newborn. In this study, the incidence of meconium stained amniotic fluid is 6.35% which is similar to other studies like Avula *et al*,[1] Shrestha *et al*[5] (6.5%), Mohammad *et al*[9] (7.85%).

Prevalence of meconium aspiration syndrome in this study was 46 (17.35%) which is comparable with other studies like Moeed *et al*,[14] (14.9%), Avula *et al*,[1] (13.12%), Chhetri and Aryal[2] (14.8%).

In the present study, frequency of lower segment cesarean section was 72.1% cases. Similar rate has been mentioned in other study like Sori *et al*.[19] Meconium stained amniotic fluid is the risk for neonatal morbidities so could be the reason of increased rate of cesarean section is justifiable.

Post term pregnancy was seen in 0.4% cases in this study. This could be due to women visited to hospital in time and were more aware of pregnancy related complications.

In this study, meconium stained liquor grading was thick in 52.8% of newborns and was thin in 47.2% newborns. These findings consistent

with the study of Shrestha *et al.*[5] But in contrast with study by Mohammad *et al.*[9]

The common maternal risk factors were thick meconium (52.8%), oligohydramnios (7.2%) and intrauterine growth restricted baby (2.6%) respectively in present study. Out of 265 cases, 44.15% of studied neonates required respiratory support in the form of oxygen via nasal prongs (29.4%), Bubble CPAP (12.8%), mechanical ventilation (1.9%).Similar incidence has been reported in Chhetri and Aryal.[2]

In this study, mortality rate was two (0.8 % cases) which was similar to study done by Chhetri and Aryal[2] (1.5%) and 0.86% in the study by Akhila *et al.*[21] The mortality reported in other studies[21-25] varied from 0.86% to 33%. This difference could be due to the difference in sample size. This study has a few limitations as it was small size and retrospective study.

In conclusion, meconium stained amniotic fluid increases the incidence of perinatal morbidity (3-5%) and mortality. In this study, the incidence of meconium stained amniotic fluid is 6.35%. The common maternal risk factors were thick meconium (52.8%), oligohydramnios (7.2%) and intrauterine growth restricted baby (2.6%) respectively.

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