

Original Research Article

## Study of Risk Factors and Outcome in Neonates Born with Meconium Stained Liquor

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**Abstract:** A cross-sectional observational study to Evaluate neonatal outcome and antenatal, intrapartum and neonatal attributes of meconium stained amniotic fluid (MSAF) as well as there incidence in 200 Inborn neonates born with meconium stained amniotic fluid who were admitted in NICU and with mother in PNC ward in a period of one year (April 2015-March 2016) excluding those who born with congenital abnormalities. Detail history of babies and mother with MSAF noted with emphasis on antepartum and intrapartum risk factors and outcome in terms of morbidity and mortality taken. Incidence of MSAF in present study was 11.8%. Out of 1685 inborn neonates, 200 babies with MSAF admitted to NICU with most common indications being birth asphyxia (32.5%) and Meconium Aspiration Syndrome (27.5%). Majority babies were delivered through thin Meconium Stained Liquor (65%) followed by thick (35%). Total number of deaths were 35 and most of these babies (34) had thick meconium with severe HIE and MAS. Oligohydramnios, PIH, anemia and fetal distress were common antenatal and intranatal factors associated with MSAF. Major morbidity and indication for NICU admission was Birth asphyxia and MAS. Mortality rate was 17.5% which is commonly associated with thick meconium and severe HIE.

**Keywords:** Meconium stained amniotic fluid, meconium aspiration syndrome, Birth Asphyxia.

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**INTRODUCTION**

The presence of meconium stained amniotic fluid (MSAF) is a serious sign of foetal compromise, which is associated with an increase in neonatal morbidity [1, 2], clear amniotic fluid on the other hand is considered reassuring. Meconium stained amniotic fluid (MSAF), which occurs in about 10-15% of all pregnancies [3], is common in term births and especially in post-dated deliveries. The etiology and pathophysiology of MSAF is poorly understood [4]. MSAF is usually associated with a response from the baby to having a temporarily reduced oxygen supply at some point of time (usually during labour) or a slowly reducing level of oxygen over a period of time. Factors such as placental insufficiency, maternal hypertension, pre-eclampsia, oligohydroamnios or maternal drug abuse (tobacco or cocaine) result in, inutero passage of meconium. Caesarean sections were performed twice as frequently in women presenting with MSAF and failure to progress, which was the indication in more than half of the cases. The finding of MSAF is associated with multiple markers of fetal distress, as meconium-stained

infants have in general lower scalp pH and lower umbilical cord artery pH in comparison with infants born through clear amniotic fluid [5,6]. Additionally, infants born through MSAF have lower Apgar scores in the first and fifth minute after delivery [7,8]. However, in the vast majority of cases, no major problems occur in infants born through MSAF.

With facilities like continuous fetal heart monitoring, fetal Doppler, the degree of fetal compromise can be evaluated early [9]. But, in a developing country like ours, where most peripheral centers are devoid of facilities for managing high risk deliveries or giving essential newborn care, the role of anticipation and timely referral assumes great importance. It can not only reduce neonatal morbidity and mortality but also has maternal implications [10]. Hence, the present study was undertaken to detect the antenatal and intrapartum clinical variables in mother as well as outcome of MSAF.

**MATERIAL AND METHODS**

A cross-sectional observational study was carried out over a one year period from April 2015 to march 2016 in the Neonatal intensive care unit and Post natal Ward of Gajra Raja Medical College and Kamla Raja Hospital, Gwalior.

Out of One thousand six hundred eighty five inborn neonates, 200 neonates delivered through meconium stained amniotic fluid, admitted to NICU & those with mother in PNC ward were included in the study. Babies born with MSAF who were having significant life threatening congenital abnormalities were excluded from this study.

Detail history of babies delivered with MSAF were noted with special emphasis on factors like need of resuscitation, vigorous, non-vigorous babies, need for NICU admission, consistency of meconium etc. and detail history of mothers was taken with emphasis on antepartum and intrapartum risk factors like any medical disease to mother, obstetric complications, cord problems, fetal distress etc.

MSAF was further categorized on the basis of meconium consistency into thick (dark green in color, "pea soup" consistency with particulate matter) and thin (lightly stained yellow or greenish color) meconium and compared for incidence of birth asphyxia, MAS and mortality. MAS was defined as respiratory distress soon after birth, radiological evidence of aspiration

pneumonia in presence of MSAF in meconium staining of skin/nails/cord or presence of meconium in the oropharynx/ trachea [11].

Morbidity of neonates were noted with emphasis on Meconium Aspiration Syndrome (MAS), Respiratory distress, birth asphyxia, ventilatory requirement, sepsis, growth retardation, gestational age, weight, etc. Babies were followed up till the time of discharge and mortality was noted.

**RESULTS**

During the study period, a total of 1685 neonates admitted in NICU, of these 200 (11.8%) had meconium stained amniotic fluid. 65% percent had thin meconium stained liquor, while 35% had thick meconium stained liquor.

Incidence was found to be more in male neonates (65.2%). The male-female ratio was 1.3:1. MSAF was greater in term deliveries (90%) whereas in preterm deliveries, thick meconium found in majority cases (55.56%). A total of 53% babies born through MSAF had weight between 2.5 and 3.5 kg followed by 40% babies having low birth weight (1.5 -2.5 kg). Mothers having very low birth weight babies had thick meconium predominantly.

Common mode of delivery was Caesarean Section (85%).

**Table-1: Baseline Characteristics of Study cases**

CHARACTERISTICS	THIN MECONIUM (n=130)	THICK MECONIUM (n=70)
<b>SEX (%)</b>		
Male (115)	75 (65.2%)	40 (34.78%)
Female (85)	55 (64.7%)	30 (35.3%)
<b>GESTATION WEEKS (%)</b>		
<37 (18)	8 (44.45%)	10 (55.56%)
37-41 (180)	120 (66.67%)	60 (33.33%)
>42(2)	2(100%)	0
<b>BIRTH WEIGHT (GMS) (%)</b>		
<1500 (6)	0	6
1501-2500 (80)	46 (57.5%)	34 (42.5%)
2501-3500 (106)	76 (71.7%)	30 (28.3%)
>3500 (8)	8 (100%)	0

**Table-2: Mode of delivery and Meconium staining of liquor**

MODE OF DELIVERY (%)	THIN MECONIUM (n=130)	THICK MECONIUM (n=70)
CESAREAN SECTION (170)	104 (61.1%)	66 (38.9%)
VAGINAL (30)	26 (86.6%)	4 (13.34%)

MSAF was more common in pregnancies associated with antenatal complications like

Oligohydrannios (30%), pregnancy induced hypertension (26%), anemia (19%), antepartum

eclampsia (4%), antepartum hemorrhage (4%), and hepatitis (4%). During labour, MSAF was more frequent in pregnancies with fetal distress (30%).

Postdate pregnancy was found to be major risk factor with an incidence of 33% (Refer Table. 3)

**Table-3: ANTENATAL AND INTRAPARTUM FACTORS ASSOCIATED WITH MSAF**

VARIABLES ASSOCIATED WITH MSAF	THIN MECONIUM (n=130)	THICK MECONIUM (n=70)
<b>ANTEPARTUM FACTORS</b>		
APH (8)	4(50%)	4(50%)
PIH (52)	38(73.07%)	14(26.93%)
<b>APE (8)</b>	2(25%)	6(75%)
OLIGOHYDRAMNIOS (60)	28(46.6%)	32 (53.34%)
POLYHYDRAMNIOS (8)	6(75%)	2(25%)
ANEMIA (38)	26(68.45%)	12(31.57%)
HEPATITIS (4)	4	0
<b>INTRAPARTUM FACTORS</b>		
FETAL DISTRESS (FD) (60)	32 (53.34%)	28 (46. 6%)
(1) FD ALONE (40)	18 (45%)	22 (55%)
(2) FD WITH OL (6)	4 (66.7%)	2 (33. 3%)
(3) FD WITH NPL (2)	0	2
(4) FD WITH CORD PROBLEMS (12)	10(83. 3%)	2 (16. 6%)
OBSTRUCTED LABOR (14)	4 (28. 57%)	10(71. 43%)
CORD PROBLEMS (12)	12	0
PROM (16)	10 (62.5%)	6 (37. 5%)
POSTDATE PREGNANCY (66)	50 (75.75%)	16(24. 25%)

Out of two hundreds inborn neonates admitted with MSAF, 165 discharged successfully and 35 neonates were certified. Mortality rate was 17.5%. Most

of these (97.1%) death were in thick meconium stained amniotic fluid group.

**Table-4: Admission to NICU and Neonatal Mortality**

INBORN NEONATES WITH MSAF(n=200)	THIN MECONIUM (n=130)	THICK MECONIUM (n=70)
DEATH (35) 17.5%	1 (2.8%)	34 (97.2%)
DISCHARGES (165)	129(78.1%)	36(21.8%)

Analysis of neonatal outcome shows that birth asphyxia(mild BA, Apgar 7-8) was the main cause for NICU admission with frequency higher with thin

MSAF group followed by meconium aspiration syndrome(27.5%) and neonatal sepsis(22.5%).

**Table-5: Outcome of babies born through meconium stained liquor**

MORBIDITY (%)	THIN MECONIUM (n=130)	THICK MECONIUM (n=70)
BIRTHASPHYXIA (65)	60(92.3%)	5 (7.6%)
MAS (55)	25 (45.4%)	30 (54.5%)
HIE (23)	10(43.4%)	13 (56.5%)
PULMONARY HEMORHAGE (2)	0	2
RDS (10)	10	0
NNS (45)	25(55.5%)	20(44.5)

**DISCUSSION**

Meconium stained amniotic fluid (MSAF) is a frequent occurrence seen in obstetric and neonatal practice. In present study, the incidence of MSAF

among admitted inborn neonates was 11.8% which was higher than other Comparable studies as this study had been included admitted inborn only while in other

studies non admitted newborns were also included [9, 12-14].

High prevalence of MSAF seen in male neonates with an incidence of 65.2%. Similar results were noted by National Neonatal Perinatal Database 2002-2003 [14] and Vineetgupta *et al.* [15]. In the present study, 90% babies were term. Finding was comparable with other studies [13,16]. The hormone motilin is secreted in ever increasing quantities by the fetus as gestation advances and most meconium discharges are said to occur in postdate gestations, because the motilin levels are highest then [10]. A. Narang *et al.* concludes that majority babies were good weight with 76% weighing more than 2.5 Kg, 6.4% below 2.5 Kg and only 5.5% with MSAF were weighing less than 2 kg [13]. In our study, 53% babies had birth weight between 2.5 Kg and 3.5 Kg and 40% had low birth weight.

Mode of delivery is significantly affected by meconium staining of liquor and it is stated that Caesarean sections were performed twice as frequently in women presenting with MSAF [17]. Incidence of Cesarean section was 85% in our study. Similar result observed by Shaikh *et al.* in 2010 [17].

Of the various antenatal complications, Oligohydramnios, Pregnancy induced hypertension and Anemia had shown high prevalence in association with MSAF with an incidence of 30%, 26% and 19% respectively. In this study, incidence of oligohydramnios, PIH and anemia was higher than those reported by other authors [10,14,18]. As this study had been conducted in a tertiary center where a large number of complicated pregnancies including oligohydramnios, PIH and anemia are referred, their incidence was higher. During labour, fetal distress was high in pregnancies with MSAF with an incidence of 30%. Vineeta gupta et al also showed a high incidence of fetal distress [15].

Thick meconium is associated with more admissions to NICU as concluded by Nirmala Duhan *et al.* [9] in contradictory to the present study as in thin MSAF group most neonates admitted with mild birth asphyxia. Neke akhtar et al observed that birth asphyxia is main cause for NICU admission in neonates associated with meconium passage in utero [19]. Our study confirms this observation showing 32.5% incidence.

## CONCLUSION

In the end it is concluded that the knowledge of Antenatal and intranatal factors associated with MSAF provide a way of early identification of high risk cases in resource poor setup where facilities like electronic fetal monitoring are not available, who can

be managed by optimal timely intervention in order to avoid severe asphyxia and meconium aspiration and its complications.

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