Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(10A):3553-3556 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2016.v04i10.001

Original Research Article

A Study of Clinico -Epidemiological Profile of Meconium Aspiration Syndrome in Newborn Admitted in NICU of Gauhati Medical College & Hospital

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Abstract: The objective is to determine the clinical & epidemiological profile of Meconium Aspiration Syndrome (MAS) in neonates admitted in NICU, Gauhati Medical College & Hospital. A prospective study was designed in a Tertiary care Hospital using 119 newborn babies who met the inclusion criteria were studied over a period of 12 months. The incidence of MAS was 4.03/1000 live births. Males are (63%) affected more. Primigravida, vaginal deliveries, term newborns were important risk factors. Fetal distress (94.29% mortality) prolonged labour (54.29% mortality) was associated with poor outcome.43.96% had severe MAS needed mechanical ventilation. Overall mortality was 38.46%. Mortality was very high despite interventions in severe MAS. Some simple but important measures which will help to bring down this are: Early detection of high risk pregnancy and early referral to higher Centre with proper facility, early detection of fetal distress, management of fetal distress, vigorous resuscitation at birth.
Keywords: Meconium Aspiration Syndrome (MAS) Incidence, Risk Factors, outcome.

INTRODUCTION

Meconium is a sterile, black-green, odorless material. Meconium is formed from the accumulation of debris in gut of the fetus. It stars forming since the 3rd month of gestation. Meconium is composed of water (72%-80%), desquamated cells from intestine, gastrointestinal mucin, lanugo hair, amniotic fluid, bile, fatty material from vernix caseosa, glycoproteins. Hypoxia and/or infection can lead to passage of meconium in utero. Hypoxia can stimulate gasping respiration in the fetus which can lead to aspiration of meconium containing amniotic fluid. Aspiration can occur in newborn just after the delivery [1]. Meconium aspiration leads to five major effects namely, obstruction of airway, dysfunction of surfactant, chemical pneumonitis, sepsis and persistent pulmonary hypertension. Mothers who have pregnancy induced hypertension, chronic respiratory or cardiovascular disease, heavy smokers, post term pregnancy are at increased risk of meconium stained liquor and hence meconium aspiration in their newborn babies. The incidence of meconium stained liquor is 10-25% of deliveries; out of which 5% develop MAS. 30% of this requires mechanical ventilation. Under this backdrop, this study is undertaken with following aims & objectives.

i. To determine the clinical & epidemiological profile of Meconium Aspiration Syndrome (MAS) in neonates admitted in NICU, Gauhati Medical College & Hospital.
ii. To determine the outcome of Meconium Aspiration Syndrome (MAS) & risk factors associated with mortalities in neonates admitted in NICU, Gauhati Medical College & Hospital

MATERIALS & METHODS

The present study was conducted during a period of one year from 1stjuly 2015 to 30th June 2016 in Neonatal Intensive Care Unit (Level IIB accredited by National Neonatology Forum) of Department of Pediatrics, of Gauhati Medical College & Hospital (GMCH). The study was a prospective study and approved by Institutional Ethical Committee.

Selection of Sample:

Inclusion Criteria: All the babies both inborn and out born who develop Meconium Aspiration Syndrome (MAS) were included in this study. The diagnosis of

MAS is made on the basis of presence of any two of the following features:

i. Meconium staining of liquor or staining of nails/ umbilical cord/ skin, presence of meconium in oro-pharynx or trachea or both.
ii. Respiratory distress having onset soon after birth.
iii. Radiological evidences of aspiration pneumonia with areas of atelectasis and hyperinflation.

Exclusion Criteria: Babies; who develop respiratory distress due to other causes were not included in the study and presence of major congenital anomalies was also excluded.

PLAN OF STUDY:

In predesigned proforma under epidemiological profile, sex of the baby, maternal age, gestational age, complications of pregnancy, place of delivery, mode of delivery were noted. In clinical features age of onset of respiratory distress, severity of distress in terms of Silverman score, FiO_2 requirement, need for CPAP or Mechanical Ventilation were noted.

Outcome was noted and on the basis of outcome, two groups were formed, a group who survived and a second group of babies who expired. Factors (maternal age, antenatal check-up, parity, mode of delivery, gestational age, birth weight, sex, anemia, fetal distress, PIH, prolonged labour, affecting both groups were compared. Group of survivors included babies who were discharged successfully, were taking feeds and had stable vital signs.

DATA ANALYSIS:

The data thus collected was subsequently scrutinized individually and analyzed manually. Proportions were compared by Chi square test and Fischer Exact test if needed and ‘‘p’’ value was obtained by software INSTAT. ‘‘p’’ value was considered as significant when it is less than 0.05.

RESULTS & OBSERVATIONS

During the study period there were 66 inborn babies and 53 out born babies (total 119) who develop MAS. There were 16348livebirths in the GMCH during the present study, so the incidence of MAS amongst the live birth in GMCH was 4.03/1000 live births. Overall mortality was 38.46%. In the current study it observed that (Table No. 1), 75 cases were of male babies (63%) and 44 cases were females (37%).

Table-1: Distribution of cases

Sex	Number of cases	Percentage
Male	75	63%
Female	44	37%

Out of 119 babies who developed MAS, 28 babies were taken away against medical advice. Rest 91 babies are studied in different aspects as discussed below. Out of these 35 babies expired and rest 56 improved and was discharged.

Table 2: Baseline data of the study patients

		Discharged % (n=56)	**Expired% (n=35)**	**P Value**
Maternal Age (years)	20-35	52 (92.86%)	32(91.42%)	>0.9999
	>35	4(7.14%)	3(8.56%)	
Antenatal check up	No	7(12.5%)	4(11.43%)	>0.9999
	Yes	49(87.5%)	31(88.57%)	
Parity	Primi	35(62.5%)	24(68.57%)	0.6538
	Multi	21(37.5%)	11 (31.43%)	
Mode of delivery	SVD	28 (50%)	17(48.57%)	0.4249
	LSCS	26(46.43%)	14(40%)	
	Ventouse	0	1(2.86%)	
	Forceps	2(3.57%)	3(8.57%)	
Gestational Age of Baby	Term	48(85.71%)	33(94.29%)	0.2034
	Post term	8(14.29%)	2(5.71%)	
Birth Weight	SGA	14(25%)	6(17.14%)	0.6537
	LGA	2(3.57%)	1(2.86%)	
	AGA	40(71.42%)	28(80%)	
Sex	Male	35(62.5%)	23 (65.72%)	0.7563
	Female	21(37.5%)	12(34.28%)	

From above table-2 it was seen that most of the mothers (92.86%) in the discharged group and in the expired group (91.42%) belongs to the age group of 20-35 yrs. Most of the neonates were term 85.71% vs 94.29% in the discharged and expired group and percentage of Spontaneous Vaginal Delivery was higher in both the groups (50% v/s 48.57%). It was also seen that, most of the babies developed MAS were born from primi mothers. (62.5% in discharged and 68.57%) in expired group. However, these findings were statistically not significant.

Table 3: Intrapartum Risk Factors

Risk factors	Parameters	Discharged(%)(n=56)	Expired (%) n=35)	p Value
PROM	No	48 (85.71%)	31(88.57%)	0.761
	Yes	8(14.29%)	4 (11.43%)	
PIH	Yes	21 (37.5%)	11(31.43%)	0.241
	No	35(62.5%)	24 (68.57%)	
Fetal Distress	Yes	48(85.71)	33(94.29%)	**0.306**
	No	8(14.29%)	2 (5.71%)	
Prolonged Labour	No	33 ((58.93%)	19 (54.29%)	**0.670**
	Yes	23 (41.07%)	16 (45.71%)	

From above table-3 it was seen that 14.29% cases in the discharged group & 11.43% in the expired group had history of PROM. Fetal distress was found in 85.71% in discharged group & 94.29% and in the expired group. Prolonged labour & PIH were not statistically significant risk factors.

Out of 94 babies, 9 (9.8%) cases had mild MAS, requiring no oxygen therapy and improved in 48 hours of admission. 42 (46.15%) cases had moderate MAS having Silverman score of respiratory distress 3 to 6, requiring O_2 hood or CPAP. 40 (43.96%) cases had severe MAS needed mechanical ventilation. Out of 40 babies who needed mechanical ventilation 35 babies (87.5%) expired. Overall mortality was 38.46%.

Out of 53 out born cases 12 babies were taken away against medical advice (LAMA) .Out of the rest 41 cases we studied the effect of distance travelled and outcome of the cases as per following table-4.

Table-4: Outcome of the cases as per distance travelled to reach GMCH

Distance travelled to reach GMCH(in km)	Discharged (%) (n=23)	Expired (%) n=18)	P – value
<30 km	8	3	0.233
30- 80 km	9	6	
>80km	6	9	

From above table it was seen that outcome was more favorable in the cases that travelled less to reach GMCH, however this finding is not statistically significant.

DISCUSSION

This study was undertaken to know the incidence, risk factors and outcome of babies with MAS in Neonatal Unit of GMCH. 119 babies with MAS who met the inclusion criteria in the period of 1 year were included in the study. The incidence of MAS in inborn babies was 4.03/1000 live births. Incidence of MAS was more in male babies. A similar observation was also found in studies of Vora *et al.;* In the present study it was seen that incidence of MAS is more in term babies then post term babies which resembled earlier studies done by Louis *et al.;* [12], Gupta *et al.;* [9]. Babies delivered by spontaneous or assisted developed MAS more often. Mortality was more in vaginally delivered cases showing the importance of LSCS. Incidence was maximum in mothers of 20-35 yrs. Primiparity, evidence of fetal distress and prolonged labour were associated with higher mortalities however these associations were not statistically significant. No statistically significant correlations were found in between antenatal check-ups, PIH, Pre-eclampsia, eclampsia, PROM and the occurrence of MAS. In our study the overall mortality rate was 38.46. In our study 43.96% of cases had severe MAS who needed ventilator support. As this study was done in a tertiary centre where maximum number of sick cases was referred from periphery, this might be the reason for this higher incidence of severe MAS and high mortality. This reflects the high need for early diagnosis and prompt referral of High risk pregnancies. We have also seen that cases which were referred from far away from

GMCH had poor outcome relative to cases that were referred nearby places. It shows the importance of distance between referral centre and tertiary care centre. Limitations of the study were lack of control population, so proper matching cannot be done.

CONCLUSION

Research in low-resource settings is difficult because of lack of infrastructure, but with the available resources we can reduce mortality in MAS if we can create awareness for early diagnosis and prompt referral of high risk pregnancies.

What is already known?

MAS are a significant cause of mortality in newborn babies.

What this study adds?

Incidence of MAS is very high in developing countries and it has not reduced despite various measures.

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