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Maternal and neonatal factors associated with meconium stained amniotic fluid.

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Abstract

The study was conducted to study the clinical profile of babies and their mothers with meconium stained amniotic fluid at birth. All babies born with meconium stained amniotic fluid (MSAF) at Jawaharlal Nehru Medical College Hospital, Aligarh Muslim University Aligarh from July2010 to December 2010 were included in the study. Out of 172 babies with MSAF, 31 developed Meconium Aspiration Syndrome (MAS)while 141 did not. For both the groups, the case records of the babies and their mothers were retrospectively studied and compared using univariate analysis and multiple regression analysis. The incidence of MSAF was 9.8% and of MAS was around 1.8%.The characteristics of the babies associated with increased risk of MAS were low Apgar score at 5 minutes and presence of respiratory distress soon after birth. No significant maternal risk factor was identified. Practising standard delivery guidelines, meticulous resuscitation at birth and vigilant monitoring of distressed babies immediately following birth may bring down the incidence of MAS.

KEYWORDS- Meconium Stained Amniotic fluid, (MSAF), Meconium Aspiration Syndrome (MAS)

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Introduction

The passage of meconium in utero is a potentially threatening perinatal problem. The detection of meconium stained amniotic fluid is a cause of concern both for the obstetrician and the attending pediatrician. The meconium may be aspirated by the fetus if he makes gasping efforts in utero or during and after the birth of the newborn. This in turn may lead to meconium aspiration syndrome (MAS) by obstruction of airways by meconium, loss of lung surfactant and chemical pneumonitis. The vicious cycle of hypoxemia, shunting, acidosis and pulmonary hypertension is frequently associated with MAS and may be difficult or impossible to treat successfully. Therefore the aim of intervention in the delivery room should be directed to reduce the incidence and severity of meconium aspiration.

MAS is an important cause of respiratory distress in the newborn. Optimal care for an infant born through MSAF involves cooperation between the obstetrician and pediatrician, each with separate but significant role.[1]

Meconium stained amniotic fluid occurs in 7- 22% of pregnancies especially term and post term [1,2]. Out of these 5% of babies born through meconium stained amniotic fluid land up in MAS. The risk factors for passage of meconium in utero, and the progression of meconium stained babies to cases with MAS have been extensively studied in the past[3,4,5] The present study aims at evaluating the clinical profile of the babies and mothers with meconium stained amniotic fluid.

Method

Type of Study	Retrospective study
Place of study	NICU of a tertiary care hospital

Material

All babies born with meconium stained amniotic fluid over a six month period were included in the study. The details of the baby at birth and the clinical course in the hospital were included in the predesigned proforma. The details of the mother regarding her particulars and various clinicosocial factors were also entered in the proforma. Neonates with consistent CXR findings whose respiratory distress could not otherwise be explained were defined as MAS.

Inclusion criteria: All babies born through meconium stained amniotic fluid

Results

During the period of study from July 10 to December 10 there were 1748 deliveries. Out of these, 172 were born through meconium stained amniotic fluid (9.8%). Among meconium stained babies 31 developed MAS (1.8% of total deliveries)

The clinical attributes of the babies and the mothers are as shown in Table 1 and Table 2. The male to female ratio was close to 1:1 for babies with meconium stained amniotic fluid as well as MAS (90/82; 17/14 respectively). Majority of the babies were weighing above 2.5 kg (102/172, 59%). Out of 31 babies with MAS, 30 developed respiratory distress soon after birth and one developed after a few hours. 12 babies without MAS had respiratory distress soon after birth which later settled and was attributed to delayed physiological adaptation following birth. Almost all babies with MAS had low Apgar score at 1 minute. There was no difference in the mode of delivery or in the period of gestation between babies with MAS and MSAF alone. The study of clinical profile of babies with MAS (as shown in table 3 and Figure 2) found the presence of peripheral circulatory failure (PCF), hypoglycemia and sepsis as important co morbid conditions.

Table 1. *Table showing clinical profile of babies with MAS and MSAF alone*

		MSAF with MAS(31)	MSAF alone (141)
Sex	Male/ female	17/ 14	73/ 68
Weight	< = 2.5 kg	18	52
	> 2.5 kg	13	89
Respiratory distress at 0 hr	Present	30	12
	Absent	1	129
MOD	ND	16	74
	LSCS	15	67
AS 1”	<= 5	30	30
	>5	1	111
AS 5”	<= 5	15	3
	>5	16	138
Gestation	< = 37 weeks	13	39
	> 37 weeks	18	102

Table 2. *Table showing clinical profile of mothers with MAS and MSAF alone*

		MSAF with MAS	MSAF alone
Maternal age	< = 30	24	128
	> 30	7	13
Parity	< = 2	16	99
	> 2	15	42
Hypertension	Present	11	25
	Absent	20	116
Anemia	Present	21	87
	Absent	10	54
ANCvisits	Present	16	104
	Absent	15	37
Risk for sepsis	Present	27	67
	Absent	4	74

The maternal data of babies with MAS and MSAF alone was also compared. The results are as shown in Table 2. The effect of maternal age, parity, presence of hypertension, anemia, risk for sepsis and ANC visits was studied. On doing univariate analysis, presence of hypertension and other risk factors for sepsis in the mother were found to be significant. However on doing the multiple logistic regression analysis, only low apgar score at 5 minute and respiratory distress at zero hr came as significant factors for MAS.

Table 3. *Logistic regression*

S. No.	Variable	SE	P
1	Sex	1.2	0.10
2	Anemia	1.2	0.15
3	RFS	1.8	0.12
4	HTN	1.3	0.81
5	MOD	1.4	0.22
6	ANC	1.3	0.24
7	Resp distress	2.5	0.001
8	Parity	1.2	0.55
9	Maternal age	1.9	0.29
10	Apgar's score(1')	1.8	0.97
11	Apgar's score(5')	1.8	0.03
12	B wt	1.4	0.48
13	Gestation	1.3	0.44
14	Social class	1.4	0.14

Table 4. *Showing the presence of co morbid conditions in babies with MAS*

	MSAF with MAS	MSAF alone
Risk for sepsis	30 (97%)	1 (0.7%)
Sepsis	11 (35%)	20 (14%)
Increased respiratory rate*	10 (32%)	16 (12%)
Hypoxia	19 (61%)	12 (8.5%)
Grunting*	23 (74%)	3 (2%)
Hypoglycemia	15 (48%)	16 (11%)
Hypocalcemia	5 (16%)	26 (18%)
Acute renal failure (ARF)	8 (25%)	23 (16%)
Sclerema	1 (3%)	30 (21%)
Peripheral circulatory failure (PCF)	21 (68%)	10 (7%)
Polycythemia	5 (16%)	26 (18%)
Hyperbilirubinemia	6 (19%)	25 (17.7%)
Gastrointestinal hemorrhage (GI hge)	1 (3%)	30 (21%)
Pulmonary bleeding (pulm hge)	5 (16%)	26 (18%)

- *5 babies were in secondary apnea*

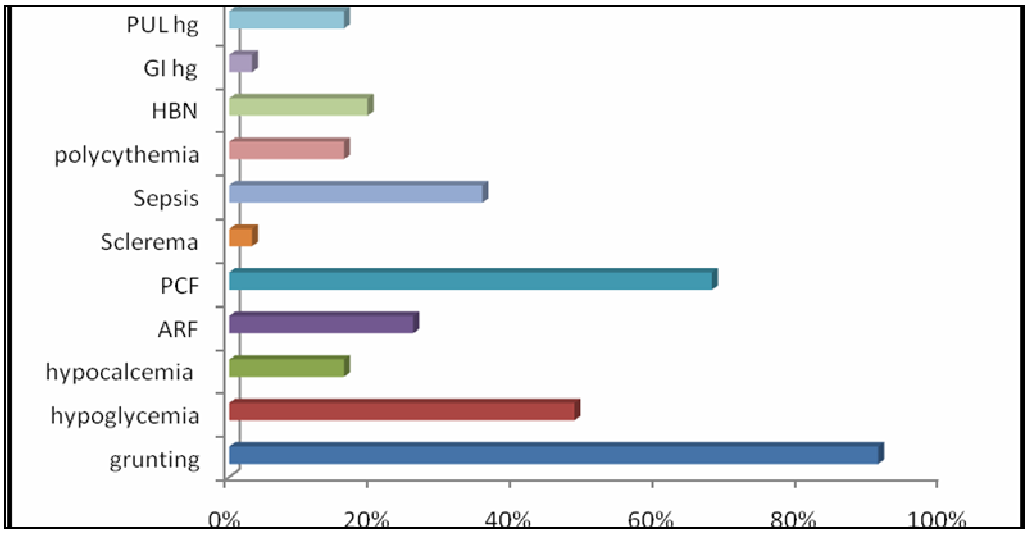

Figure 2. *Shows relative proportions of various comorbid conditions in neonates with MAS*

Discussion

Optimal care for an infant born through MSAF involves cooperation between the obstetrician and pediatrician, each with separate but imperative roles [1,3,6,7]
The incidence of meconium stained amniotic fluid and its progression to MAS has been extensively studied in the past. We found the incidence of meconium stained amniotic fluid and MAS as 9.8%. out of these around 18% progressed to MAS. In the study by swain et al, the incidence of MSAF was 13.97% and that of MAS was 8.57% [8] The increased incidence of MAS cases found in our study could be due to high incidence of co morbid sepsis(35%) in our study group.

Many of the studies done in the past have identified maternal and neonatal characteristics associated with MSAF. In the study by Manganaro et al no significant difference in maternal age, parity, gestational age, sex, low 1 and 5 minute Apgar scores, metabolic acidemia, or need for endotracheal intubation was found between MSAF and non-MSAF infants [6]

In the present study we studied various clinical and physiological parameters of the babies with MSAF and of their mothers. On univariate analysis various parameters came out to be significant. However on multiple logistic regression analysis only low Apgar score at 5 minutes and respiratory distress soon after birth came out to be significant factors for causing progression to MAS. Low Apgar scores at 1 and 5 minute, fetal distress/ respiratory distress in the newborn and presence of thick meconium were found to be significant risk factors for MAS by previous authors also [9,10].

Swain and associates found advanced gestational age, increased caesarean section & low Apgar scores at 1 minute and 5 minute to be the most common & significant risk factors associated with MAS. Yong and Ho [11] found significant risk of progression to MAS in males, small for gestational age babies or babies born after distress. We however did not find the significant effect of gestational age, size or mode of delivery on the development of MAS.

Another work by Usta and coworkers identified six variables MAS: nonreassuring fetal heart tracing , need for endotracheal intubation and suctioning below the vocal cords, 1-minute Apgar score of 4 or less, present cesarean delivery, and previous cesarean delivery.

Bhat RY et al [2] however found thick meconium as the only significant factor contributing to MAS. Another work by Khazardoost et al [13] did not find the role any maternal factors in predicting the progression to MAS. We also noted similar findings with no maternal factor found to be significantly associated with MAS.

Conclusion

Increased incidence of MAS was found in babies who had either low Apgar score at 5 min or developed respiratory distress immediately after birth. The progression to MAS in babies with MSAF was not associated with any maternal clinicosocial factors studied**.** Standard delivery guidelines, meticulous resuscitation at birth and vigilant monitoring of distressed babies immediately following birth may bring down the incidence of MAS.

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