

Meconium Aspiration Syndrome in Meconium Stained Amniotic Fluid

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Abstract: To know the incidence and risk factors of meconium aspiration syndrome (MAS) at various gestational ages in babies born through meconium stained amniotic fluid using guidelines 2000 for neonatal resuscitation. From all deliveries conducted during November 2000 to July 2001, babies born through meconium stained amniotic fluid (MSAF) were taken up for study. Detailed maternal data especially parity, period of gestation, any history of eclampsia, pre-eclampsia or hypertension were recorded. Mode of delivery and presentation were recorded. Detailed data of infant like apgar score, gestational assessment, development of respiratory distress within 72 hours of birth were recorded. Roentgenographic examination of chest on day 3 of life was done in all infants born through MSAF. One hundred (100) babies out of 792 deliveries were born through MSAF. In 16% cases both respiratory distress and radiological opacities were present bringing the incidence of MAS to 2.02% of all live births. Anaemia and pregnancy induced hypertension were commonest risk factor. No baby was below 34 weeks of gestation. 75% babies with MAS were term and 25% preterm. Birth weight was >2000gm in 93% of babies. 43.75% of babies with MAS had severe birth asphyxia. MSAF and MAS did not develop in babies below 34 weeks of gestation. Moderate to severe birth asphyxia is a significant risk factor of MAS.

Introduction

Meconium staining of amniotic fluid (MSAF) occurs in 10.3%-22% of the live births with rising frequency along with the increase in gestational age of the fetus¹. Passage of meconium in utero is a serious neonatal disorder carrying high mortality and morbidity. MSAF is considered to be a bad predictor of fetal outcome because of its direct correlation to fetal distress and increased likelihood of inhalation of meconium with resultant deleterious effects on the neonatal lungs¹. Meconium aspiration syndrome (MAS) is defined as development of respiratory distress along with radiological evidence in a baby born with MSAF².

Previously the approach to prevent MAS was oropharyngeal suctioning on delivery of the head followed by immediate postnatal endotracheal suctioning³. Whether all babies born through thin meconium should undergo immediate postnatal suctioning is controversial. According to latest guidelines vigorous tracheal suctioning of the infant with MSAF does not improve outcome and may cause complications⁴. This study was planned to know the incidence and risk factors of MAS at various gestational ages in babies born through MSAF using guidelines 2000 for neonatal resuscitation.^{4,5}

Material and Methods

This prospective study was carried out during period from November 2000 to July 2001. In Neonatology section of department of Pediatrics of our hospital; 792 deliveries were conducted during the study period. 100 babies were born with meconium stained amniotic fluid. Detailed maternal data was recorded on a predesigned proforma. Mother's age, parity, period of gestation, any complications of pregnancy like preeclampsia, eclampsia, hypertension were recorded. The mode of delivery, presentation and indications for any interference were recorded. Mothers having meconium stained amniotic fluid detected during labour were included in the study. Intrapartum suctioning after delivery of head from mouth, pharynx and nose was performed in all deliveries born through MSAF. Direct laryngoscopy was performed for suctioning of meconium from the hypopharynx and intubation/suction of trachea done, if the infant had depressed or absent respiration, decreased muscle tone or heart rate <100bpm; none was subjected to vigorous infant tracheal suctioning.

Details of resuscitation method used, Apgar score at 1, 5min. and if needed at 10min. and subsequently were recorded. Assessment

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of gestation was done by Ballard's scoring system⁶. All infants were observed for development of any respiratory distress for 72 hrs. after birth. The infant was said to have respiratory distress if the respiratory rate was more than 60 per minute and/or chest indrawing if the infant had and/or expiratory grunt or moaning. All infants underwent roentgenographic examination of chest on day 3 of life. The cases having septicemia on clinical or on investigative basis were excluded from the study group. The meconium aspiration syndrome was labelled on the basis of development of respiratory distress along with radiological evidence of meconium aspiration developing in babies born through MSAF. The data obtained was analysed statistically.

Results

There were 792 live births during the study period. 100 babies out of 792 were born through meconium stained amniotic fluid bringing the incidence of MSAF to 12.62% of all live births. Respiratory distress was present in 27% of the babies born through MSAF. Radiological opacities were present in 73% of babies born through MSAF. However in 16% of cases both respiratory distress and radiological opacities were present which brings the incidence of MAS to 2.02% of all live births. Chest indrawing and expiratory grunt were the commonest features of respiratory distress in these babies (Table 1).

Table 1. Babies with MAS with 2 or > 2 signs of respiratory distress

Signs of Respiratory Distress	Number (n=16)	Percentage
Tachypnoea + Expiratory Grunt	11	68.75
Tachpnoea + Chest Indrawing	12	75
Chest indrawing + Expiratory Grunt	14	87.5
Chest indrawing + Expiratory Grunt + Tachypnoea	11	68.75

Out of 16 cases of MAS, 31.25%, 37.5% and 6.25% were having parity 1, 2 and 3 respectively while 25% babies were born to >para 3 mothers (p>0.05). Anaemia and pregnancy induced hypertension were the commonest risk factor in 68.75% and 31.25% of patients with MAS. In 62% cases of MSAF and MAS mode of delivery was LSCS while in 38% mode of delivery was by normal vaginal route (p<0.01). 69% of MSAF babies were males and 31% of females. No baby born through MSAF or having MAS was below 34 weeks of gestational age (Table 2). 75% of babies with

Table 2. Distribution of babbies according to period of gestation.

Period of Gestation (Completed weeks)	Babies born through MSAF (n=100)	Babies who developed MAS (n=16)
<37	14	4 (25)
37-41	82	12(75)
>42	4	0

* Figures in parentheses indicate percentages

Table 3. Distribution of babbies according to birth weight.

Birth Weight (Grams)	Babies born through MSAF (n=100)	Babies who developed MAS (n=16)
<1500	-	-
1501-1999	7	1(6.25)
2000-2499	23	6(37.5)
2500-2999	32	3(18.75)
>3000	38	6(37.5)

* Figures in parentheses indicate percentages

Table 4. Distribution of babbies according to grade of birth asphyxia by APGAR score

Apgar Score	Babies born through MSAF (n=100)	Babies who developed MAS (n=16)
No Asphyxia (8-10)	63	4(25)
Mild (5-7)	19	2(12.5)
Moderate (3-4)	4	3(18.75)
Severe (0-2)	14	7(43.75)

* Figures in parentheses indicate percentages

MAS were term babies and 25% preterm ($p<0.05$). Weight distribution of babies is shown in Table 3. It was seen that 63% babies born through MSAF had no asphyxia and 37% had asphyxia at birth (Table 4).

Discussion

Meconium staining of amniotic fluid is found in 7-21% of births^{2,7-11}. The incidence in our study was 12.6%. It usually occurs in term or post term infants. 82% babies born through MSAF were term, 14% preterm and 4% were post term. Usually but not invariably, fetal distress and hypoxia occur with passage of meconium into the amniotic fluid. These infants are meconium stained and may be depressed and require resuscitation at birth.

Meconium aspiration syndrome is defined as presence of respiratory distress and radiological opacities developing in a baby born through meconium stained amniotic fluid. MAS was present in 16% of our babies while Narang et al² have found the incidence of MAS in 10.5% babies. In thick meconium, incidence of 18.7% to 42.7% have been reported^{2,8,12}.

Anemia and pregnancy induced hypertension were the predominant risk factors in 45% and 28% babies which is consistent with earlier reports^{13,14}. Toxemia as the predominant causative factor of MSAF was observed by Miller and Nayak & Dalal^{15,16}. In 62% cases of MSAF and MAS mode of delivery was LSCS while in 38% it was normal vaginal route.

Either in utero or more often with the first breath, meconium is aspirated into the lungs. The resulting small airway obstruction

may produce respiratory distress within the first hours, with tachypnoea, retraction, grunting and cyanosis. In the present study retraction and grunting were the commonest signs of respiratory distress seen in 87.5% of babies while tachypnoea was present in 75% babbies.

Of the babies who developed MAS, 75% were term and 25% preterm; none of 4 post term babies developed MAS. The birth weight of 93% of MSAF born babies was >2000 grams and 38% babies had birth weight ≥ 3000 grams. Miller recorded mean birth weight 3400 ± 516 gm in babies born with MSAF¹⁶.

Of the babies born with MSAF 63% had no asphyxia at birth (Apgar score >7 at 1 minute) and did not require treatment. Depressed infants should undergo endotracheal intubation and suction should be applied directly to endotracheal tube to remove meconium from the airway. The risks of endotracheal intubation are less than the risks of meconium aspiration syndrome; 43.75% babies who developed MAS had severe asphyxia at birth which is almost similar to the earlier reports².

It can be concluded that MSAF and MAS did not occur below 34 weeks of gestation. Moderate to severe birth asphyxia is a significant risk factor for development of MAS in neonates, born through MSAF.

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