

# A retrospective review of tracheal suction at birth in neonates with meconium aspiration syndrome

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## Summary

A retrospective study of 54 neonates with Meconium Aspiration Syndrome (MAS) admitted to the Paediatric ICU Penang General Hospital from January 1989 – December 1990 was carried out to determine if suction of the trachea at birth was performed in this group of patients. 63% were inborn and 27% outborn. The mean birth weight was 3.2 kg, 83% were ventilated, mean duration of ventilation was five days and the mortality was 24%. 63% had an Apgar Score of < 5 at 1 min and 65% had thick meconium-stained liquor. Only 48% were intubated and suctioned at birth. Overall tracheal suction rate was low.

*Key words:* Meconium Aspiration Syndrome, tracheal suction at birth.

## Introduction

Meconium Aspiration Syndrome (MAS) is an important cause of morbidity and mortality. The incidence of meconium-stained liquor in the West is 12.5%, and that of meconium aspiration syndrome 5.41%.<sup>1</sup> Prompt obstetric and paediatric suctioning of the oropharynx has significantly decreased the mortality and morbidity.<sup>2,3,4</sup> The purpose of this study was to determine whether adequate resuscitation was carried out at birth to infants with meconium aspiration syndrome admitted to the Paediatric ICU from January 1989 – December 1990.

## Methods and Materials

Patients with MAS who were admitted to the Paediatric ICU were selected for the study. The patients with the following criteria were included in the study (a) evidence of meconium aspirated from the trachea at birth (b) tachypnoea from birth with hyperinflated chest (c) radiological features consistent with MAS and (d) Negative blood cultures and tracheal cultures before ventilation. From January 1989 – December 1990, 62 neonates with MAS were admitted to the Paediatric ICU at Penang General Hospital. This represented 12% of all the admissions to the Paediatric ICU during the study period. Eight cases records were missing and were not included into the study. Of the 54 neonates included in the study, 34 were born at Penang General Hospital and 20 neonates were referred from the District Hospitals. Each case record was carefully reviewed and analysed for the following:

1. Biodata (gestation, race, birth weight and sex)
2. Characteristics (mode of delivery, consistency of meconium at birth, Apgar score at 1 minute, duration of ventilation, complications and deaths)
3. Details of resuscitation at birth (suction before first breath, direct laryngoscope, and suction and intubation and suction)

## Results

Table I represents the Biodata of the study population. Table II represents the characteristics and Table III the methods of tracheal suction.

Table I  
Biodata of the 54 neonates with MAS

Biodata	Total (%)	Range	Mean
1. Inborn	34 (63%)		
Outborn	20 (27%)		
2. Gestation			
Term	30 (55%)		
Post Term	24 (45%)		
3. Race			
Malays	32 (60%)		
Indians	13 (22%)		
Chinese	9 (18%)		
4. Birth Weight		2.3 – 4.14 Kg	3.2 Kg
5. Sex			
Males	29 (54%)		
Females	25 (46%)		

Adequate resuscitation is defined as intrapartum oropharyngeal suctioning, as well as immediate postnatal intubation and direct tracheal suctioning.<sup>2,3,4</sup> Term is defined, from 37 to less than 42 completed weeks and post-term from forty two completed weeks or more.<sup>5</sup> The degree of meconium stained liquor at birth was determined by the midwife or doctor present at delivery, as assessed by the colour and consistency of the liquor. The gestational age was assessed by Dubowitz Scoring.

Vaginally delivered neonates were resuscitated by the nursing staff initially and doctors were called in problem cases. Resuscitation was carried out by doctors in vaginally assisted deliveries and emergency LSCS. Paediatrics medical officers were present at emergency LSCS during office hours, after office hours the resuscitation was carried out by the obstetric and anaesthetic medical officers and the paediatric medical officers were called in the event of problems.

Of the twenty outborn deliveries, seventeen were from Bukit Mertajam District Hospital, two from Butterworth District Hospital and one from Kulim District Hospital. Persistent fetal circulation and pneumothoraces were important predictors of mortality. Ten (91%) of the eleven patients with persistent fetal circulation and three (75%) of the four patients with pneumothoraces died. All four patients had unilateral pneumothoraces. In all the seven (13%) patients with fits, lumbar puncture had been done to exclude meningitis and appropriate biochemical tests to exclude a metabolic cause for the fits.

**Table II**  
**Characteristics of 54 neonates with MAS**

Characteristics	Total (%)	Range	Mean
<b>1. Method of Delivery</b>			
Vaginal delivery	26 (48%)		
Assisted vaginal delivery	5 (9%)		
Emergency LSCS	23 (43%)		
<b>2. Degree of Meconium-Stained liquor at birth</b>			
Thin	1 (2%)		
Moderate	8 (15%)		
Thick	35 (65%)		
Not Mentioned	10 (18%)		
<b>3. Apgar Score at 1 minute</b>		0 - 9	4.5
Apgar Score < 5 at 1 minute	34 (63%)		
<b>4. Ventilated</b>			
	45 (83%)		
<b>5. Duration of ventilation (days)</b>		1 - 21	5
<b>6. Deaths</b>			
	13 (24%)		
<b>7. Complications</b>			
Nosocomial pneumonia	17 (31%)		
Persistent fetal circulation	11 (20%)		
Fits	7 (13%)		
Pneumothorax	4 (7%)		

**Table III**  
**Methods of Tracheal Suction**

	Suction before first breath	Direct Laryngoscopy and Suction	Intubation and Suction
Inborn (34)	3	3	21 (62%)
Outborn (20)	0	1	5 (25%)
Total	3 (5%)	4 (7%)	26 (48%)

### Discussion

Only three (5%) had pharyngeal suction before the first breath. The influential article by Gregory et al and the recommendations of American Academy of Paediatrics<sup>6</sup> has resulted in suctioning secretions from the mouth and nasopharynx before delivery of the shoulders, in combination with laryngoscopy and tracheal intubation a routine procedure in the presence of meconium-stained liquor. Recently there have been reports in the literature that have questioned the validity of routine endotracheal intubation in infants born with meconium-stained liquor.<sup>7</sup> In a study Linder et al showed that tracheal intubation and suction actually increased morbidity in about 2% of vigorous infants who had already undergone careful pharyngeal suction with a Dee Lee catheter.<sup>8</sup> However the importance of pharyngeal suctioning before the first breath is well established and this may obviate the need for tracheal suction.<sup>4,8,9</sup>

A limitation of this study is that it does not include patients with meconium-stained liquor during the study period who were not admitted to the Paediatric ICU. Among the patients admitted to the Paediatric ICU, suction and intubation had been carried out in 26 (48%) patients. Despite this, all these patients were ventilated. This is partly explained by the fact that in many cases suctioning of meconium had not been commenced before the onset of the first breath. However, in some patients despite adequate resuscitation, MAS is not completely prevented. This is because meconium can be aspirated before labour and during labour.<sup>10</sup>

Meconium Aspiration Syndrome is associated with increased perinatal morbidity.<sup>2,9</sup> Children surviving MAS have long term pulmonary sequelae, including airway obstruction, hyperinflation and airway hyperreactivity.<sup>11</sup> The most important preventive measure at the time of delivery is thorough catheter suctioning of secretions from the oropharynx before the first breath.<sup>1,2,3,4,6,7</sup> Laryngoscopy and tracheal intubation and suctioning can be reserved for asphyxiated infants.<sup>1,7</sup> Thick meconium-stained liquor should be regarded as a paediatric emergency. Continued cooperation between obstetric and paediatric staff and continued awareness and emphasis on training of medical and nursing staff is needed to prevent this disorder.

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