

Comparison of Outcome of Nonvigorous Neonates with Meconium Stained Liquor Resuscitated With or Without Endotracheal Suction of Meconium-A Prospective Observational Cohort Study

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Abstract

89 nonvigorous neonates with meconium stained liquor were followed in the immediate neonatal period. 41 neonates received endotracheal tube (ET) suctioning at birth and 48 neonates did not receive ET suctioning at birth. Of the 41 ET neonates 16 had meconium related morbidity /mortality at NICU stay and 25 was normal. Of the 48 non ET neonates 9 had meconium related mortality /morbidity, 39 were normal. Odds ratio of mortality/ morbidity is significantly high (2.77) in ET group with narrow confidence interval (1.063,7.234), P value 0.03. Relative risk of ET group of having nonfavorable outcome is 1.7. Tracheal suctioning of meconium in nonvigorous neonates at birth did not decrease the meconium related morbidity /mortality during NICU stay.

Keywords: Meconium aspiration syndrome (MAS), Meconium stained amniotic fluid (MSAF), Nonvigorous, neonates, tracheal suctioning.

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INTRODUCTION

Depressed neonates born to mothers with meconium stained amniotic fluid are at increased risk of development of meconium aspiration syndrome [1,2]. Elective and routine endotracheal intubation and direct suctioning of trachea were initially recommended to all meconium stained newborns until randomized controlled trials demonstrated it is of no value in babies who were vigorous at birth [3]. As a nonvigorous neonate is born the standard recommendation is to suck the meconium from trachea [4]. Tracheal suctioning at birth before breathing needs expertise and not always possible. In the present study, single attempt of intubation and tracheal suctioning of nonvigorous neonates were taken in delivery room and if failed, bag and mask ventilation was done without tracheal suctioning. We have compared statistically the outcome of these two groups of nonvigorous neonates during NICU stay.

METHODS

The study was conducted in Calcutta National Medical College from June 2017-June 2018. Resuscitation of neonates born by normal delivery and Caesarean Section was done by postgraduate trainees in

Pediatric Medicine and Gynae Obstetrics trained in neonatal resuscitation protocol 2010 [4]. If a nonvigorous neonate is born with meconium stained liquor, suctioning of meconium was attempted by immediate endotracheal intubation. Wall mounted suction apparatus was used. Immediately after intubation suction catheter was attached to endotracheal tube and gradually withdrawn slowly. Suction pressure used was -100mmHg [5]. Single attempt of intubation was taken. If the single attempt of intubation was failed then resuscitation was continued as intermittent positive pressure ventilation. The neonatal resuscitation protocol was followed as NRP 2010 [4]. The immediate neonatal outcome of intubated vs nonintubated nonvigorous neonates during NICU stay was compared as incidence of meconium aspiration syndrome, tachypnea, increased oxygen requirement, respiratory failure requiring mechanical ventilation, air leak, death. Fetal distress was diagnosed by late deceleration in cardiotocograph. Gestational age was calculated by dating scan and was corroborated clinically by New Ballard's scoring. The collected data was analysed using SPSS version 16 software. Informed consent was taken from parents.

RESULTS

Total 171 neonates born with meconium stained liquor were enrolled of which 82 were vigorous and 89 neonates were nonvigorous. Of the total 89 nonvigorous cases -mean birth weight was 2.8kg, mean gestational age was 38wks. 49 neonates were born by normal delivery and 40 neonates were born by Caesarean section. 41 neonates received ET suctioning at birth and 48 neonates not received ET suctioning at birth. Of the 41 ET group neonates 16 had meconium related morbidity and mortality at NICU stay and 25 was normal. Of the 48 non ET neonates 9 had

meconium related mortality morbidity, 39 were normal. There was tachypnea with increased oxygen requirement with radiological changes of meconium aspiration syndrome in 16 neonates in ET group of which 5 neonates required mechanical ventilation. In the non ET group one baby was ventilated. Odds ratio of mortality morbidity is significantly high (2.77) in ET group, narrow confidence interval (1.063,7.234), P value 0.03. Relative risk of ET group of having nonfavorable outcome is 1.7. The incidence of fetal distress was more (53.6%) in ET group than non ET group.

Table-1: Distribution of nonvigorous neonates by sex, gestation, type of delivery

Total nonvigorous=89	ET=41	NONET=49
Fetal distress	22(53.6%)	16(32.6%)
LSCS delivery	19(46.3%)	18(36.7%)
Normal Delivery	22(53.6%)	26(53%)
Male	20(48.7%)	33(67.3%)
Female	21(51.2%)	16(32.6%)
Mean birthweight	2.6kg	2.6kg
Mean gestational age	38.6wks	38.3wks

Table-2: Outcome of neonates in ET and nonET group

	ET group=41	Non ET group=48	Odds ratio	Confidence interval	P value
NORMAL	25	39	2.77	(1.0-7.1)	0.03
MAS	14	7	3.08	(1.0-9.1)	0.05
DEATH	3	1	3.77	(0.37-37.1)	0.23

DISCUSSION

The present study is an prospective observational cohort study done in tertiary care medical college hospital. The incidence of meconium aspiration syndrome among meconium stained liquor cases is about 5% in different studies [6], with 5% allowable error and 80% power the approximate sample size is 97. In the present study, morbidity and mortality of intubated neonates in the immediate neonatal period is more than nonintubated neonates. Al TakaroniAM [7] in his study of selective tracheal suctioning to prevent meconium aspiration syndrome found poorer outcome of intubated group. Gupta V et al. [8] in his study found that incidence of meconium aspiration syndrome to be very high in neonates with low 1 minute Apgar scores inspite of repeated tracheal suctioning which give credence to the idea that MAS is predominantly antenatal event due to probable fetal gasping in hypoxic environment and not an intrapartum event. Murphy et al found [9] significant muscularisation of small pulmonary arterioles in fatal meconium aspiration syndrome in autopsy suggesting long standing hypoxemia. Ghidini and Spong [10] postulated that severe MAS may not be in fact causally related to the aspiration of meconium but rather caused by other pathologic processes occurring in utero, such as chronic asphyxia, infection, or persistent pulmonary hypertension. Previous recommendations of oropharyngeal suctioning of meconium before delivery

of shoulders [11] and routine intubation of vigorous meconium stained neonates [3] were proved to be of no value by randomized controlled trials. The only evidence that direct tracheal suctioning of meconium may be of value was based on comparison of suctioned babies with historic controls but there was apparent selection bias in the group of intubated neonates in these studies [12,13]. According to the International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science, the available evidence does not support or refute the routine endotracheal suctioning of depressed infants born through MSAF [14]. However, if attempted intubation is prolonged and unsuccessful bag and mask ventilation should be considered, particularly if there is persistent bradycardia [15]. The present recommendation of tracheal suctioning of depressed neonates may be harmful due to delay in initiation of bag and mask ventilation and needs to be changed.

What is already known? Tracheal suctioning of meconium in nonvigorous neonates decreases the incidence of meconium aspiration syndrome. What this study adds? Outcome of nonvigorous neonates not improved by tracheal suctioning at birth

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