

CORD BLOOD MOTILIN LEVEL IN MECONIUM ASPIRATION SYNDROME

THESIS

Submitted for Partial Fulfillment
of Master Degree in
Pediatrics

By

Hala Mohamed Samy Gaber

M.B., B.Ch.

Ain Shams University

Supervised by

Prof.Dr. Mohamed Salah El-Kholy

Professor of Pediatrics

Faculty of Medicine

Ain Shams University

Dr. Hisham Awad

Lecturer of Pediatrics

Faculty of Medicine

Ain Shams University

Dr. Azza Sadek

Lecturer of Clinical Pathology

Faculty of Medicine

Ain Shams University

**FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY
1994**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

سورة البقرة آية رقم ٢٢



ACKNOWLEDGMENT

I would like to express my thanks and deepest gratitude to **Prof. Dr. Mohamed Salah El-Kholy**, Professor of pediatrics, Faculty of Medicine, Ain Shams University for his support and continuous encouragement.

I am pleased to express my deep appreciation to **Dr. Hisham Awad**, Lecturer of Pediatrics, Ain Shams University, for his great supervision, and continuous support throughout this study.

I wish to express my deep gratitude to **Dr. Azza Sadek El-Danasoury**, Lecturer of Clinical Pathology, Ain Shams University, for her cooperation and effective efforts.

Finally, deep appreciation is expressed to all staff members and patients of the neonatology unit in maternity hospital, of Ain Shams University.

LIST OF ABBREVIATION

C.P.T.	: Chest physiotherapy.
CS	: Cesarean section.
E.C.M.O.	: Extracorporeal membrane oxygenation.
I.M.C.	: Interdigestive myoelectric complex.
I.P.P.V.	: Intermittent positive pressure ventilation.
M.A.S.	: Meconium aspiration syndrome.
M.M.C.	: Migrating myoelectric complex.
NANC	: Non adrenergic non cholinergic.
P mol/L	: Picomol/L.
PPHN	: Persistent pulmonary Hypertension of Newborn.
PVR	: Pulmonary vascular resistance .
RDS	: Respiratory distress syndrome.
TTN	: Transient tachypnea of newborn.

LIST OF TABLES

Tab. No.	Title	Page No.
1	Constituents of meconium.	4
2	Respiratory function in meconium aspiration syndrome.	16
3	Causes of deaths among 1162 neonates with MAS.	45
4	External characteristics of the Dubowitz examination.	61
5	The clinical picture of the neonates of both groups.	69
6	Comparison between cases of MAS and control as regard Apgar scores at 1 and 5 minutes.	71
7	Mean value $\pm$ SD of motilin level in patient and control groups.	72
8	Relation between motilin level and mode of delivery	72
9	Correlation between motilin level and severity of respiratory distress among cases of MAS.	76
10	Correlation study between motilin level and different parameters of both groups.	78

CONTENTS

	Page
Introduction	1
Review of Literature	3
Meconium aspiration syndrome	3
Clinical picture of meconium aspiration syndrome	13
Diagnosis of M.A.S.	19
Differential diagnosis of M.A.S.	22
Complications of M.A.S.	27
Management of M.A.S.	32
Prognosis of M.A.S.	44
Patterns of normal motility of upper gastrointestinal tract	46
Gastrointestinal hormones	49
Motilin hormone.	53
Subjects and Methods	59
Results	68
Discussion	82
Summary, Conclusion and Recommendations	89
References	93
Arabic summary	----

INTRODUCTION

Meconium aspiration syndrome (M.A.S.) is an illness which follows the inhalation of meconium before, during or immediately after delivery.

The baby will fulfill the standard criteria for respiratory distress with tachypnea ≥ 60 /minute and dyspnea, grunting is rare. Additional oxygen therapy is required. (*Greenough and Roberton, 1992*).

Meconium aspiration syndrome can be defined as respiratory distress in an infant who was meconium stained at birth. Meconium stained amniotic fluid is seen in 5-15% of births, but this syndrome usually occurs in term or post term neonates (*Kliegman et al., 1992*).

Passage of meconium has been often used as a marker of antepartum or intrapartum asphyxia. The hypothesis is that in utero hypoxia causes increased intestinal peristalsis and relaxed anal sphincter tone, resulting in meconium passage (*Wiswell et al., 1993*).

Some investigators found an association between fetal distress and elevated motilin (a major gut hormone at birth) (*Mahmoud et al, 1988*).

The aim of this study is to demonstrate the relation between fetal distress in neonates with MAS and umbilical cord blood motilin level at birth.

MECONIUM ASPIRATION SYNDROME

Meconium aspiration syndrome is a major respiratory problem in the newborn. It is a result of intrauterine asphyxia, its occurrence is unaffected by obstetric and pediatric intervention at birth (Katz 1992).

Definition of Meconium:

Meconium is a breakdown product of digested amniotic fluid, gastrointestinal secretions, mucous, bile, cellular debris and swallowed vernix, caseosa, blood (Avery, 1981).

It is a viscous, black green and odourless liquid. The substance may first be found in the fetal gastrointestinal tract between the 10th and 16th week of gestation (Holtzman et al., 1989). At birth from 60 to 200 gram of meconium may be passed by a full-term neonate. In utero passage of the substance is uncommon due to the relative lack of strong peristalsis, good anal sphincter tone, and a "cap" of particularly viscous meconium in the rectum (Carson et al, 1979).

Recent biophysical studies have demonstrated that meconium is one of substances which inhibit endogenous surfactant and modulate the pathogenesis of secondary surfactant deficiency states in a variety of aspiration and congenital pneumonia (Moses et al, 1991).

Table 1: Constituents of meconium (Gregory et al., 1974)

Carbohydrate	80%
PH	5.5-7
Lipid	minimal
Nitrogen	high
Blood group substance	present
- Electrolytes	Na, K, Ca, Mg, Fe, Cu, Zn, Mn

Definition of Meconium Aspiration Syndrome (M.A.S.):

Meconium aspiration syndrome (MAS) was defined as respiratory distress in a neonate who was meconium stained at birth, who has compatible chest roentgenographic findings, and whose symptoms can not be otherwise explained (Wiswell et al., 1990).

This illness follows the inhalation of meconium before, during or immediately after delivery.

Incidence of MAS:

In a recent study by Wiswell et al.,1990 it was found that in the United States, approximately 13% of the 4 million babies born are meconium stained, 55 of these infants will develop MAS, 30% of whom will require mechanical ventilation. At least more than 4% will die.

Meconium aspiration remains a significant cause of morbidity and mortality during the neonatal period. The reported neonatal mortality rate of meconium aspiration syndrome is $\geq 25\%$ (Davis, 1985).

In Europe the incidence is between 1:1000, 1;2000 where as in North America rates of 2-5:1000 have been reported. The high incidence is also reported from the Middle East (Greenough A, 1992).

MAS developed in 5.4% of meconium stained neonates. Males were more prone to develop the disorder than female neonates. There were no racial predilection for MAS (Wiswell et al, 1990).

Meconium staining of the liquor occurs in 5% or less of preterm, 9% to 14% of all pregnancies at the time of delivery the incidence can be as high as 44% in patients at a gestational age of 42 weeks.

Etiology of MAS:

Aspiration of amniotic fluid with or without meconium may occur during intrauterine life, physiological breathing may account for some of the cases of amniotic fluid aspiration. However, meconium aspiration must be regarded as a pathologic state, and in many cases it is an acute preterminal event. While in other cases aspiration of meconium may develop in more chronic form, allowing time for actual intrauterine pneumonitis to develop. In the first acute category which may include sudden hypoxia resulting from prolonged, cord occlusion or significant placenta separation can cause a fetal gasping reflex. The same hypoxic stimuli may also be responsible for meconium passage (Brown and Gleicher, 1981).

Passage of meconium in-utero may result from various stimuli, and is often used as a marker of antepartum or

intrapartum asphyxia. The hypothesis is that in utero asphyxia causes increased intestinal peristalsis and relaxed anal sphincter tone, resulting in meconium passage. In addition, compression of the fetal head or umbilical cord as in the presence of oligohydramnios may cause a vagal response which result in meconium passage especially in a mature fetus (Wiswell, Bent, 1993).

Meconium passage may be a sign only of increasing fetal maturity. The passage of meconium is probably due to one or a combination of the above mentioned causes (Miller et al., 1980).

Where as the idiopathic respiratory distress syndrome is associated with the premature baby, the usual cause of respiratory distress in postmature and light for dates infants is meconium aspiration as a complication of intrauterine growth retardation.

Meconium is irritating to the bronchiolar epithelium. In this situation the oxygen supply to the fetus has been interrupted with the result that the distressed baby had made vigorous gasps in-utero at the same time passing meconium into amniotic fluid so MAS develops (Scott et al., 1986).

In cases of chronic placental insufficiency the hypoxic stress results in exaggerated fetal respiratory efforts, and amniotic fluid is aspirated to varying degrees. Chemical

pneumonitis may develop as a result of meconium contamination. In some cases, infected amniotic fluid may be aspirated after prolonged rupture of the membranes, this may result in intrauterine bacterial pneumonitis (Brown and Gleicher 1981).

The issue of in utero aspiration of meconium-stained fluid as an etiology of MAS has been controversial.

Carson et al, (1985) reported that the incidence of fatal MAS during 5-year period was zero when their combined obstetric-pediatric approach was used on a large clinical service.

Block et al., (1981), have demonstrated that baboon fetuses aspirate meconium-stained amniotic fluid when they are made acidotic, but hypoxemia alone does not produce meconium aspiration.

In a study of 77 cases of MAS. documented among 527 deliveries, 4 cases occurred in early labour with normal fetal heart tracing, 3 cases followed Cesarean at term and 1 case followed an elective cesarean section for a primigravida breech presentation. Aggressive airway management was used in every case, it included intrapartum pharyngeal suctioning with a Delee catheter and tracheal intubation with suctioning under vision.