

# بسم الله الرحمن الرحيم





HOSSAM MAGHRABY





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



HOSSAM MAGHRABY



## جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغيار



HOSSAM MAGHRABY



#### Comparison between the Oro-Helical Length Technique And the 7-8-9 Rule in Determination of the Ideal Endotracheal Tube Insertion Depth in Neonates

#### Thesis

Submitted for Partial Fulfillment of Master Degree in Pediatrics

By

#### Maha Abd El Raouf Abd El Hafiz

M.B.B.CH- Ain Shams University

Under Supervision of

#### Prof. Dr. Abeer Salah Eldin El Sakka

Professor of pediatrics Faculty of Medicine-Ain Shams University

#### Dr. Dina Mohamed Shinkar

Lecturer of pediatrics
Faculty of Medicine -Ain Shams University

Faculty of Medicine Ain Shams University 2020



سورة البقرة الآية: ٣٢

#### Acknowledgment

First and foremost, I feel always indebted to AUAH, the Most Kind and Most Merciful.

I'd like to express my respectful thanks and profound gratitude to **Prof. Or. Abeer Salah Eldin El Sakaa**, Professor of Pediatrics - Faculty of Medicine- Ain Shams University for her keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.

I am also delighted to express my deepest gratitude and thanks to **Dr. Dina Mohamed Shinkar**, Assistant Professor of Pediatrics, Faculty of Medicine, Ain Shams University, for her kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.

I would like to express my hearty thanks to all my family for their support till this work was completed.

Last but not least my sincere thanks and appreciation to all patients participated in this study.

Maha Abdel Raouf Abdel Hafiz

### List of Contents

Title	Page No.
List of Tables	i
List of Figures	iv
List of Abbreviations	vii
Introduction	1
Aim of the Work	4
Review of Literature	
Neonatal Respiratory Distress	5
Congenital Pneumonia	22
Neonatal Endotracheal Intubation	32
Patients and Methods	54
Results	63
Discussion	81
Summary	94
Conclusion	
Recommendations	98
References	99
Arabic Summary	

### List of Tables

Table No.	Title	Page	No.
Table (1):	Showing surfactant preparations (an derived) licensed in Europe in 2018		17
<b>Table (2):</b>	CDC definition of pneumonia; must criteria in all three categories		26
<b>Table (3):</b>	Endotracheal tube size babies of value weights and gestational ages		34
<b>Table (4):</b>	Showing the 7-8-9 rule method use estimation proper ETT depth in neona		37
<b>Table (5):</b>	Initial endotracheal tube insertion ("tip ro lip") for orotracheal intubation	-	37
<b>Table (6):</b>	Endotracheal tube (ETT) size and leng insertion table using the 7_8_9 rule	_	58
<b>Table (7):</b>	The demographic data of all streen neonates		
<b>Table (8):</b>	Weight groups of studied neonates		66
<b>Table (9):</b>	The clinical characteristics of all st neonates		66
<b>Table (10):</b>	The OHL in different weight subgroup		
<b>Table</b> (11):	Comparison between OHL method and 7-8-9 rule group regarding incidence of ETT malposition	group the	
<b>Table (12):</b>	Comparison between preterm and full neonates regarding the incidence of malposition	ETT	69
<b>Table (13):</b>	Comparison between OHL method and 7-8-9 rule group regarding the loc of ETT in chest X ray	ation	70

### List of Tables (Cont...)

Table No.	Title	Page	No.
Table (14):	Comparison between preterm and function of ETT in chest X ray	ng the	71
Table (15):	Comparison between the preterm neor OHL method group and 7-8-9 rule regarding the location of ETT in chest	group	71
Table (16):	Comparison between the full neonates in OHL method group and rule group regarding the location of chest X ray	d 7-8-9 ETT in	73
Table (17):	Comparison between neonates in method group and 7-8-9 rule regarding the incidence of pneumo and hyperinflation	group othorax	74
Table (18):	Comparison between neonates in method group and 7-8-9 rule regarding the incidence of acc extubation	group idental	74
<b>Table (19):</b>	Comparison between neonates in method group and 7-8-9 rule regarding chest expansion in chest X	group	76
Table (20):	Comparison between preterm and function neonates in OHL group regarding expansion in chest X ray	g chest	76
Table (21):	Comparison between preterm and function neonates in 7-8-9 group regarding expansion in chest X ray	g chest	77
Table (22):	Comparison between neonates in method group and 7-8-9 rule regarding duration of mechanism and mode of ventilation and	group hanical	77

### List of Tables (Cont...)

Table No.	Title	Page No.
Table (23):	Comparison between the difference the estimated and the ideal Edepth in the OHL group and 7-8	ETT insertion
<b>Table (24):</b>	Correlation between OHL and gestational age	· ·

### List of Figures

Fig. No.	Title	Page	No.
Figure (1):	Management of respiratory distress newborn		6
Figure (2):	Showing stages of human development		9
Figure (3):	Bar chart demonstrates the compose of lung surfactant		10
Figure (4):	Showing respiratory distress syndron	ne	12
Figure (5):	Normal and abnormal transthoracic appearances of NRDS		13
Figure (6):	Showing neonatal pneumonia		22
Figure (7):	Showing pathophysiology of meconaspiration syndrome		29
Figure (8):	Showing meconium aspiration syndro	me	30
Figure (9):	Endotracheal tubes (size 2.5, 3.0, 3.5)		34
<b>Figure (10):</b>	Laryngoscope for endoreacheal intub		35
<b>Figure</b> (11):	Measuring the NTL. Measure from middle of the nasal septum to the tragus and add 1 cm to the measurement.	the ear	
<b>Figure</b> (12):	Endotracheal tube with a vocal cord at that is used to approximate the insedepth	guide rtion	
Figure (13):	The detector turns yellow in the presof exhaled CO2		41
<b>Figure</b> (14):	Endotracheal tube in the correct posin neonate		42
<b>Figure (15):</b>	Malposition of endotracheal tube neonate		43
<b>Figure (16):</b>	Suprasternal digital palpation metho	d	44

### List of Figures (Cont...)

Fig. No.	Title	Page No.
Figure (17):	Showing neonatal pneumothorax .	49
<b>Figure</b> (18):	Showing lung collapse in a neonat	e51
<b>Figure (19):</b>	The OHL estimation	59
Figure (20):	A schematic presentation of the included in the study	
Figure (21):	Comparison between OHL metho and 7-8-9 rule group regardin weight.	g birth
Figure (22):	Comparison between OHL metho and 7-8-9 rule group re- gestational age	egarding
Figure (23):	Comparison between OHL metho and 7-8-9 rule group regarding ma	· -
Figure (24):	Comparison between OHL metho and 7-8-9 rule group regardincidence of ETT malposition	ing the
Figure (25):	Comparison between preterm a term neonates regarding the incident ETT malposition	dence of
Figure (26):	Comparison between OHL metho and 7-8-9 rule group regardi location of ETT in chest X ray	ing the
Figure (27):	Comparison between the neonates in OHL method group as rule group regarding the location in chest X ray	nd 7-8-9 of ETT

### List of Figures (Cont...)

Fig. No.	Title	Page No.
Figure (28):	Comparison between the full neonates in OHL method group and rule group regarding the location of in chest X ray	l 7-8-9 f ETT
Figure (29):	Comparison between neonates in method group and 7-8-9 rule regarding the incidence of pneumothyperinflation and accidental extubation.	group horax,
Figure (30):	Comparison between the difference between the estimated and the idea insertion depth in both groups	ıl ETT
Figure (31):	Correlation between OHL and weight	
<b>Figure (32):</b>	Correlation between OHL and gesta age	

### List of Abbreviations

Abb.	Full term
APP	.American Academy of Pediatrics
	Bronchopulmonary dysplasia
BW	
	. Centers for Disease Control
<i>CMV</i>	•
CO2	
	. Continuous positive airway pressure
	. Computerized tomography
CXR	
	.Dipalmitoyl phosphatidylcholine
	. Electrocardiography
	Extremely low birth weight
ETI	.Endotracheal intubation
ETT	.Endotracheal tube
FIRS	.Fetal inflammatory response syndrome
<i>GA</i>	. Gestational age
<i>GAST</i>	. Gastric aspirate shake test
<i>HFOV</i>	.High frequency oscillatory ventilation
<i>HHFNC</i>	.Heated humidified high flow nasal cannula
HSV	.Herpes simplex virus
<i>IVH</i>	.Intraventricular hemorrhage
LUS	Lung ultrasound
<i>MAS</i>	Meconium aspiration syndrome
<i>MRSA</i>	Meticillin-resistant Staphylococcu aureus
<i>MSAF</i>	Meconium-stained amniotic fluid
<i>MV</i>	.Mechanical ventlitaion
<i>NEC</i>	Necrotizing enterocolitis
<i>NICU</i>	Neonatal intensive care unit
<i>NRP</i>	Neonatal Resuscitation Program

#### List of Abbreviations (Cont...)

Abb.	Full term
NITT	NT I down on a Long of L
	. Nasal tragus length
<i>OHL</i>	. Oro-helical length
PaO2	. Partial oxygen pressure
<i>PDA</i>	.Patent ductus arteriosus
<i>PEEP</i>	. Positive end-expiratory pressure
<i>PPHN</i>	.Persistent pulmonary hypertension of the newborn
<i>PTX</i>	. P neumothorax
RCT	$. Randomized\ controlled\ trial$
<i>RDS</i>	.Respiratory distress syndrome
<i>ROP</i>	. Retinopathy of prematurity
<i>RSV</i>	.Respiratory synctitial virus
<i>SP</i>	$. Spontaneous\ pneumothor ax$
<i>US</i>	$. \ Ultrasound$
<i>VAP</i>	. Ventilator-associated pneumonia
<i>VCG</i>	. Vocal cord guide