Relationship Between Free T4&TSH
AND
Respiratory Distress Syndrome
IN
Preterm Infant

Thesis Submitted For The Partial Fulfillment
Of The Master Degree In Pediatrics

BY
Naglaa Sayed Abd Allah
M.B.B.Ch Cairo University

Under Supervision
OF
Dr. Mervat Al-sayed Haroun
Professor Doctor
Pediatric Department
Cairo University
Dr.Esmael Mohamed EL Hawary
Assisstant Professor Doctor
Pediatric Department
Cairo University
Dr .Fatma Fathy AL -Mogy
Professor Doctor
Clinical pathology Department
Cairo University

Faculty of medicine
Cairo University
2009

ACKNOWLEDGEMENT

First,grace and foremost thanks to God for blessing this work,as part of his generous help throughout our lives.

I would like to express my sincere gratitude and respect to Prof.Dr.Mervat Alsayed Haroun Prof.of pediatrics,Cairo university,for her continous guidance and supervision,her kind encouragement and support throughout the entire period of the study.

It is my pleasure to express my unlimited appreciation and deepest thanks to Prof.Dr Esmael Mohamed Alhawary, Assistant, Prof.of pediatrics,Cairo university,for his continous supervision and great help.

I would like to express my sincere gratitude and respect to Prof.Dr.Fatma Fathy Almogy Prof.of clinical pathology,Cairo university,for her continous guidance and supervision.

I am deeply grateful to my parents, family,colleagues and friends.

Furthermore I would like to convey my special thanks to my husband,my brothers,my sister and my kids Yasmin and Malack.

Lastly,I would like to thank everyone who helped in completing this work.

To all those I say:

جزاكم الله خيرا

Index

Page

Abstract

Respiratory distress syndrome (RDS) is one of the most common respiratory complications of prematurity.In this study we explore the relationship between RDS and free thyroxin (FT4), thyroid stimulating hormone (TSH) in preterm neonates during 1st postnatal 24 hours to explore whether thyroid hormones affect lung surfactant production and hence occurance of RDS or not and after the 2nd postnatal day to explore whether hypoxia from RDS affects thyroid hormones level or not.

Key Words:

(Prematurity - Respiratory distress syndrome (RDS) – free thyroxin (FT4), thyroid stimulating hormone (TSH)**)**

Abbreviations

AAPCON	American Academy of Pediatrics, Committee on Nutrition
ACOG	the American College of Obstetricians and Gynecologists
ADHD	attention deficit hyperactivity disorder
anti-HBs	antibody to hepatitis B surface antigen
AP50	acute-phase proteins
BCG	Bacillus Calmitte Guirette
BMI	body mass index
BPD	Broncho-Pulmonary Dysplasia
C cells	calcitonin cells
CH50	total hemolytic complement
CPAP	continuous positive airway pressure
CPS	Canadian Pediatric Society
D1	Type I deiodinase
D2	TypeII deiodinase
D3	inner-ring (tyrosyl) iodothyronine monodeiodinase
DCD	Developmental coordination disorder
DIT	di-iodotyrosine
ELBW	Extremely low birth weight
ESPGAN-CON	European Society of Pediatric Gastroenterology and Nutrition, Committee on Nutrition of the Preterm Infant; VLBW, very low birthweight.
FT4	free T4
GBS	gram positive streptococci

D

HBIG	hepatitis B immunoglobulins
HBsAg	hepatitis B surface antigen
HFOV	high frequency oscillatory ventilation
Hib	Haemophilus influenzae type b
HMD	hyaline membrane disease
HSA	human serum albumin
IL-1	interleukin -1
IPPV	intermittent positive pressure ventilation
IPV	intramuscular polio vaccine
IUGR	Intrauterine growth restriction
IVH	Intraventricular hemorrhage
L/S ratio.	Lecithin/ sphingomyelin ratio
MDI	iodothyronine monodeiodinases
MI	myocardial infarction
MIT	mono-iodotyrosine
mRNA	messenger riboneucleic acid
NEC	Necrotizing enterocolitis
NICHD	the National Institute of Child Health and Human Development
NICU	neonatal intensive care unit
NIH	National Institutes of Health
NK	natural killer
NTI	nonthyroidal illness
P	properdin
parafollicular C cells	parafollicular calcitonin cells
PDA	Patent Ductus Arteriosus
PEEP	positive end expiratory pressure
PG	phophatidylglyserol
PIE	pulmonary interstitial emphysema

E

PMR	perinatal mortality rate
PN	parenteral nutrition
PPROM	premature rupture of the amniotic membrane
r T3	reverse Triiodothyronine
RDA	recommended dietary allowance
RDS	Respiratory Distress Syndrome
SF-albumin ratio	surfactant-albumin ratio
SGA	small for gestational age
SP-B	surfactant protein B
SP-D	surfactant protein D
T (2)	diiodothyronines
T3	triiodothyronine
T4	thyroxine
TBG	thyroid-binding globulin
TBG	thyroid binding globulin
TBII	thyrotropin-binding inhibitory immunoglobulins
TBPA	thyroxine-binding prealbumin
TG	thyroglobulin
TH	thyroid hormone
The NMR	neonatal mortality rate
TRH	thyrotropin-releasing hormone
TSH	thyroid stimulating hormone
TSI	Maternal thyroid-stimulating immunoglobulins
TTR	transthyretin or thyroxine-binding prealbumin

F

List of figures

List of tables

K

Introduction

1 Prematurity is a common problem in our neonatal intensive care units .It's defined as occurance of birth through the end of the last day of 37th week of gestation. It represents 12% of all births in united status, the incidence increases in recent years. Although most premature deliveries occur for unkown reasons, there are many risk factors associated with prematurity as low socio economic status, maternal illness, maternal activity, multiple gestations, poor fetal condition,ETC.

It results in many complications in the form of respiratory, cardiovascular,neurological,hematological,metabolic and immunological problems.**(Cloherty et al, 2008).**

2 Respiratory distress syndrome (RDS) is one of the most common respiratory complications of prematurity,It's a clinical diagnosis which is warranted in a pretem newborn with respiratory difficulty, including tachypnea>60 breath per minute,chest retractions and cyanosis in room air that persist or progress over the 1^{ST} 48-96h of life and a characteristic chest X ray appearance(a fine reticular granularity of the parenchyma and air bronchograms) **(Stoll and Kliegman,2004).**

It occurs in 60-80% of infants less than 28 weeks of gestation, in 15-30% of those between 32 &36 weeks,in about 5% beyond 37 weeks and rarely at term **(Miller ,2002).**

Signs of RDS usually appear within minutes of birth,although they may not be recognized for several hours in larger premature infants **.(Levine et al** ,**2001)**

Factors increase risk of RDS are prematurity, male sex, cesarean section,maternal diabetes and Hydrops fetalis,

Factors decrease risk of RDS are chronic intrauterine stress, maternal hypertention,corticosteroids and **thyroid hormones (Gomella et al**,**2004).**

Management includes antenatal corticosteroids **(Jope, 2000)**, surfactant replacement,respiratory support,antibiotics,fluid support and sedation. **(Soll RF, 2002)**

Major morbidity and poor postnatal growth remain high for the smallest infant with RDS.

3 A variety of hormones including glucocorticoids and **thyroid hormones** are considered to influence pulmonary development and lung surfactant production.glucocorticoids can interact synergistically with other factors such as **thyroid hormones** and prolactin to promote early lung maturation .several clinical studies have confirmed that pregnant women at risk of preterm delivery benefit from a combined treatment of **thyroid releasing**

hormone(TRH) and glucocorticoids,although several recent multicenter trials have contraindicated these findings. **(Tanaka et al, 2007).**

Since it has been reported that **TSH** surge is stimulated by stress at birth, which in turn enhances increased production of lung surfactant and since it has been known that intrauterine **thyroid hormone** deficiency may be one of the factors predisposing to RDS in preterm infants.

Many studies were done to report the relationship between RDS and **thyroid hormones** levels but reports are controversial; so we make our study to explore this field.