DIAGNOSTIC VALUE OF CHEST ULTRASONOGRAPHY FOR RESPIRATORY DISTRESS SYNDROME IN NEONATES

Thesis

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Dedication

To my Parents, who gave me every thing I have.

To my husband who gave me support and encouragement and my little daughter who delights my life.

To all my Friends who helped me.

Abstract

This study was conducted on 60 preterm neonates, delivered in El-Kasr El-Ainy hospital. They were admitted in the neonatal intensive care unit because of respiratory distress and 25 preterm neonates with no respiratory distress as control group.

The aim of the study to determine the possible application of ultrasound in the diagnosis of RDS thus reducing the number of chest X-rays performed on neonates in NICUs.

Thirty one cases were males (51.7%) and twenty nine cases were females (48.3%).

Ten were delivered vaginally (16.7%) and fifty by cesarean section (83.3%).

The mean gestational age for studied cases was 30 weeks; the mean weight was 1.354kg.

Chest X-ray and ultrasonography were done in the first 48 hours of life.

Key Words:

Base excess – Alanine aminotransferase-Surface tension.

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List of Abbreviations

ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
BE	Base excess
BPD	Bronchopulmonary dysplasia
CBC	Complete blood picture
CLD	Chronic lung disease
CPAP	Continuous positive airway pressure
CRP	C-Reactive protein
CS	Caesarean section
DPPC	Dipalmitoylphosphatidylcholine
ECMO	Extracorporeal membrane oxygenation
ET	Endotracheal tube
FiO2	Fraction of inspired oxygen
H-E	Hematoxylineosin
HFOV	High-frequency oscillatory ventilation
HFV	High-frequency ventilation
ICU	Intensive care unit
IDMs	Infants of diabetic mothers
iNO	Inhaled nitric oxide
IUGR	Intrauterine growth retardation
IVH	Interventricular hemorrhage
L/S	Lecithin-sphingomyelin ratio
LBW	Low birth weight
NCPAP	Nasal continuous positive airway pressure
NEC	Necrotizing enterocolitis
NICUs	Nursery intensive care units
NIPPV	Nasal Intermittent Positive Pressure Ventilation

P	Pressure
PCO2	Partial pressure of carbon dioxide
PCV	Pressure controlled ventilation
PDA	Patent ductus arteriosis
PEEP	Positive end expiratory pressure
PG	Prostaglandin
PO2	Partial pressure of oxygen
RD	Respiratory distress
RDS	Respiratory distress syndrome
ROP	Retinopathy of prematurity
SaO2	Saturation of oxygen
SIMV	Synchronous intermittent mandatory ventilation
SP	Surfactant proteins
T	Surface tension
TTN	Transient tachypnea of newborn
US	Ultrasound
VD	Vaginal delivery
VLBW	Very low birth weight
WBC	White blood cells

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INTRODUCTION

Neonatal respiratory distress syndrome (RDS) also known as hyaline membrane disease, it is the most common clinical syndrome encountered among neonates treated in neonatal intensive care units and has its own well-established algorithm of diagnosis and therapy.The fetal lung is filled with fluid actively secreted by the pulmonary epithelium on a chloride ion gradient **(Katz et al., 2011).**

Of the many complications of prematurity, lung diseases such as RDS and its complications (pulmonary hemorrhage, pneumonia, atelectasis, pneumothorax, air leak syndrome, and bronchopulmonary dysplasia (BPD)), remain the most common cause of neonatal morbidity **(Jovan Lovrenski, 2012).**

It is due at least in part, to insufficiency of pulmonary surfactant and is mainly confined to preterm infants. RDS patients present with respiratory distress (cyanosis, tachypnea, grunting and recession) and respiratory failure. Edema is frequently seen on the 2nd day due to fluid retention and capillary leek. The diagnosis can be confirmed by X-ray showing ground glass appearance and air bronchograms, although these radiological features are not pathognomonic of RDS **(Bedetti et al., 2006)**.

The incidence and severity of RDS are related inversely to the gestational age of the infant. Fanaroff et al reported the results of the National Institute of Child Health and Human Development Neonatal Research Network study showing that the rates of RDS were 44% in infants weighing 501-1.500g, 71% in those 501-750g, 55% in those 751-

1.000g, 37% in those 1.001-1.250g and 23% in those 1.251-1.500g **(Fanaroff et al., 2007)**.

Enormous efforts have been made to understand the pathophysiology of RDS and to optimize the care of those infants, which has led to improvement in the morbidity and mortality. The mortality rate of RDS decreased by approximately 50% during the last decade with the advancement of surfactant therapy **(Copetti et al., 2007).**

The Neonatal respiratory disease is currently diagnosed on the basis of clinical signs and plain chest X-ray (CXR) **(Francesco Raimondi et al., 2013)**.

Ulrasonography imaging is increasingly being used as a non-invasive procedure at Nursery Intensive Care Units (NICUs) for the diagnosis of the central nervous system, abdominal cavity, heart and hip joints. It has the advantage over x-ray that it doesn't expose the infant on ionizing radiation and because of its high degree of accurcy, safty and low cost. **(Bober et al., 2006).**