Amniotic Fluid Lamellar Body Count as a Predictor of Fetal Lung Maturity in Diabetic Patients Undergoing Elective Caesarean Section

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بسم الله الرحمن الرحيم

وقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ
ورَسُولُهُ والْمُؤْمِنُونَ

صدق الله العظيم

سورة التوبة آية (105)

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Nouran Mahmoud Atif Abul-Fadl

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List of Abbreviations

ACOG	: American College of Obstetrician
ADA	: American Diabetic Association
ALI	: Acute Lung Injury
AMP	: Adenosine Monophosphate
ARDS	: Adult Respiratory Distress Syndrome
ABCA3	: ATP-Binding Casette Transporter A3
AQPS	: Aquaporin Channel
A-FLM	: Amniostat
AUC	: Area Under the Curve
APGAR	: Appearance, Pulse, Grimace, Activity, Respiration
BMI	: Body Mass Index
CaMK	: Calcium-Calmodulin Dependant Protein Kinase
CBC	: Complete Blood Count
CDP	: Continuous Distending Pressure
CNP	: Continuous Negative Pressure
CPAP	: Continuous Positive Airway Pressure
CPDA	: Citrate phosphate dextrose adenine
CAP	: College of American Pathologists
CS	: Cesarean Section
CVD	: Cardiovascular diseases
DM	: Diabetes Mellitus
DPH	: Diphenylhexatriane
ECG	: Electrocardiogram
EFW	: Estimated Fetal Weight

FHR : Fetal Heart Rate
FLM : Fetal Lung Maturity
FRC : Functional Residual Capacity
F Pol : Fluorescence Polarization
F_aCO2 : Fraction of arterial carbon dioxide
GA : Gestational Age
GDM : Gestational Diabetes Mellitus
IDM : Infant of Diabetic Mother
IDDM : Insulin Dependent Diabetes Mellitus
IPPV : Intermittent Positive Pressure Ventilation
IRDS : Infant Respiratory Distress Syndrome
IVH : Intravenricular Hemorrhage
L/S : Lecithin /Sphingomyelin Ratio
LBC : Lamellar Body Count
LGA : Large for Gestational Age
LMP : Last Menstrual Period
LSCS : Lower Segment Cesarean Section
MG : Multigravida
NEC : Necrotizing Enterocolis
NBD-PC : Fluorescence polarization
PCV : Packed Cell Volume
PG : Primigravida
PGDM : Pregestational Diabetes Mellitus
PI : Phosphatidyl Inositol
PKA : Protein Kinase A
PKC : Protein Kinase C

PVH : Periventricular Hemorrhage

P/V : Ventilation Perfusion Imbalance

P_aCO2 : Partial Pressure of arterial Carbon Dioxide

P_aO2 : Partial Pressure of arterial Oxygen

RDS : Respiratory Distress Syndrome

ROP : Retinopathy Of Prematurity

ROC : Reciever Operating Characteristic

SP-A : Surfactant Protein A

SP-B : Surfactant Protein B

SP-C : Surfactant Protein C

TD_xFLM : Surfactant/Albumin Ratio

THAM : Tris-Hydroxy-Amino-Methane

TTN : Transient Tachypnea of Newborn

TM : Tubular Myelin

WHO : World Health Organization

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Introduction

Introduction In the process of lung maturity, the lungs are the last vital organs that need to develop in order to enable life in the extrauterine environment. Despite the development of artificial surfactants and advances in respiratory support, respiratory distress syndrome (RDS) continues to be a major problem in newborns. **(Stoll and Kleigman, 2000)**

As the successful establishment of adequate lung function at birth is dependent on the maturity of the respiratory system **(Stoll and Kleigman, 2000)**, the ability to accurately predict neonatal lung maturity would be a helpful adjunct in the management of pregnancies when premature delivery is expected or administration of glucocorticoids is needed. **(Dubin, 1989)**

Although respiratory distress syndrome (RDS) is generally a disease of preterm neonates, it does develop in term newborns, especially in the setting of sepsis or meconium aspiration. It was also found that male infants are more likely to develop RDS than females, and white infants are more frequently and severely affected than black infants. **(Jobe, 2004)**

Because of the importance of the lung function for survival, perinatal research and care are directed to the examination of its maturity. The accurate antenatal prediction

of fetal lung maturity (FLM) based on results from amniotic fluid samples is of utmost importance in the prevention of neonatal respiratory distress syndrome and its complications. **(Jobe, 1990)**

Delivery for fetal indications is necessary when the risks to the fetus from a hostile intrauterine environment are greater than the risks of severe neonatal problems, including respiratory distress, even if the fetus is preterm. Amongst the unfavorable intrauterine environment is maternal hyperinsulinemia and insulin resistance occurring in diabetic patients. Hyperinsulinemia delays lung maturation by inhibiting surfactant proteins thus predisposing to respiratory distress in the neonate. **(Kristensen *et al.*, 2005; DeRoche *et al.*, 2002)**

Despite the considerable improvement in neonatal care, the morbidity for respiratory complications such as respiratory distress syndrome (RDS) in the infants born to diabetic mothers is considerable, as is the financial burden of the resulting care. **(E.G. Livingston *et al.*, 1995)** There has been a long-standing debate regarding the effect of maternal diabetes on FLM. Others have challenged the concept that, gestational age rather than overt diabetes is likely the most significant associated factor with respiratory distress. **(Berkowitz *et al.*, 1996; Kjos *et al.*, 1990)**