ROLE OF ERYTHROPOIETIN IN HIGH RISK NEONATES

THESIS

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By

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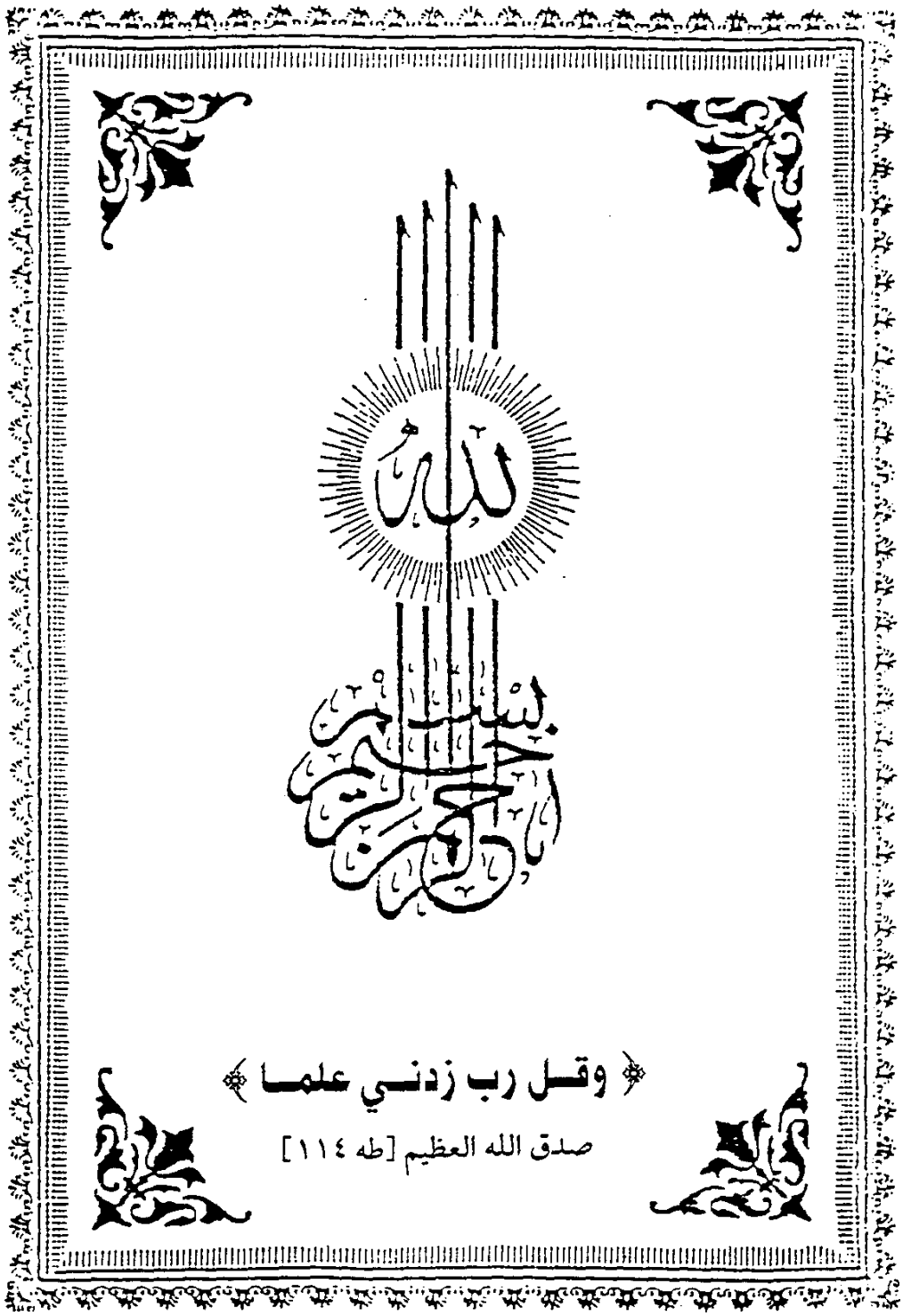

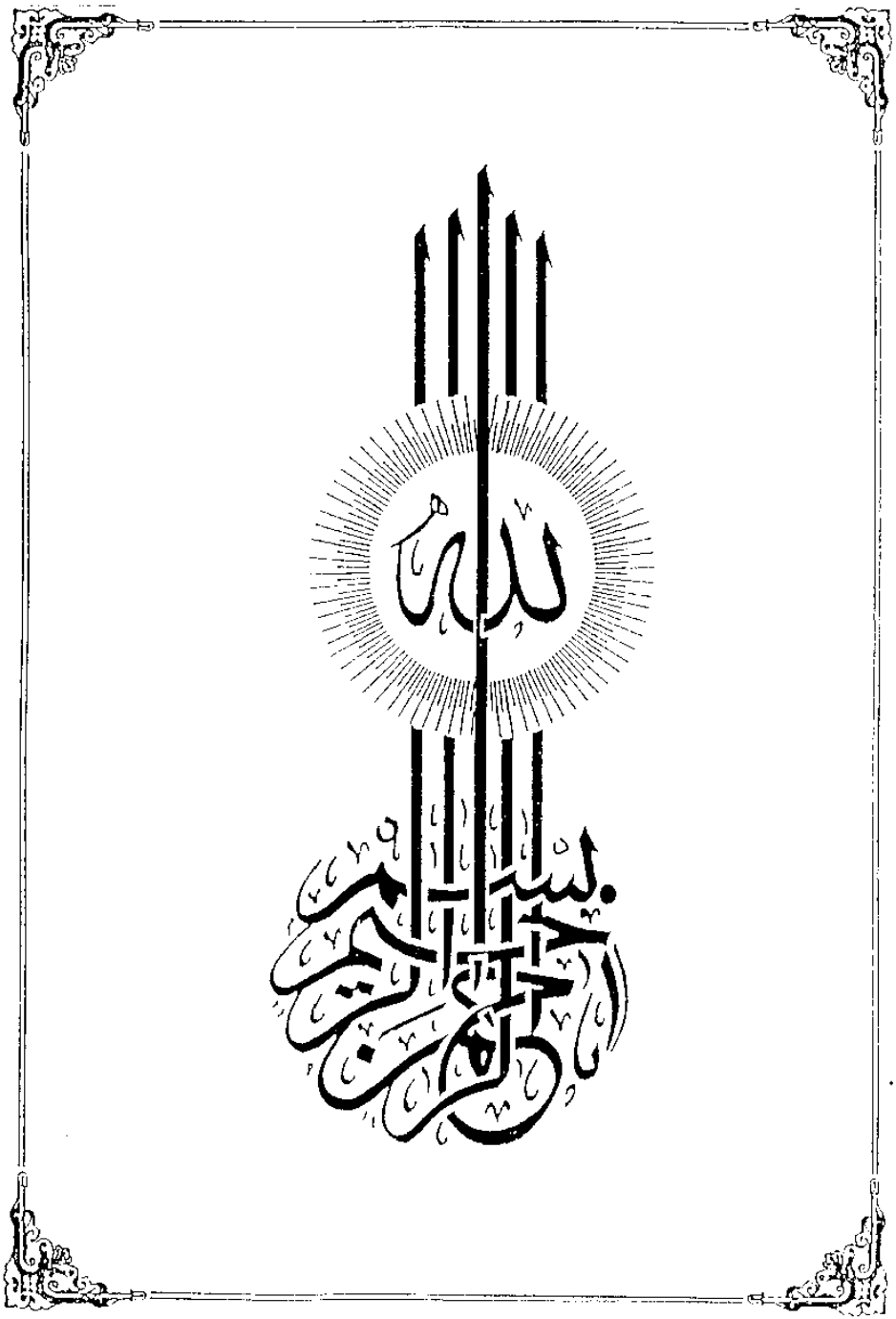

TO...

To every one who has taught me a letter ..

To my parents .. To my Family ..

To all the Children.

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LIST OF ABBREVIATIONS

AGA	= Appropriate for gestational age
BFU-E	= Burst forming unit - erythroid
bpm	= beat per minute
CFU-E	= Colony forming unit erythroid
DM	= Diabetes mellitus
e.g.	= For example
EPO	= Erythropoietin
g	= gram
Hb	= Hemoglobin
HIE	= Hypoxic ischemic encephalopathy
IDDM	= Insulin dependent diabetes mellitus
IDM	= Infant of diabetic mother
IU	= International unit
IUGR	= Intra uterine growth retardation
IUGR API	= Intra uterine growth retardation adequate ponderal index
IUGR-LPI	= Intra uterine growth retardation low ponderal index
K	= Potassium
Kg	= Kilogram
L/S ratio	= Lecithin/sphingomylin
LBW	= Low birth weight
LGA	= Large for gestational age
mEq	= Milli equivalent
mg	= milligram
min	= minute
ml	= milli litre

LIST OF ABBREVIATIONS (contin.)

mRNA	= Messenger ribonucleic acid
NS	= Not significant
OFC	= Occipito frontal circumference
PCO2	= Partial carbon dioxide tension
po2	= Partial oxygen tension
PT	= Preterm
RDS	= Respiratory distress syndrome
Retic.	= Reticulocyte
rHuEPO	= Recombinent Human Erythropoietin
RIA	= Radioimmunoassay
S	= Significant
S.L.E	= Systemic lupus erythrematosis
SD	= Standard deviation
sec	= second
SGA	= Small for gestational age
SN	= Serial number
TORCH	= Toxoplasmosis, others, rubella, cytomegal virus, hepatitis.
TTN	= Transient tachypnea of newborn
VS	= Versus
Y	= Year

INTRODUCTION

INTRODUCTION

Synthesis of red cells is regulated by a specific hormone Erythropoietin. The prohormone of erythropoietin is produced in epithelial cells of the glomerular tuft. A serum factor activates it to biologically active erythropoietin. This process is stimulated by a decrease in tissue oxygenation.

The principal action of erythropoietin is to induce differentiation of stem cells into an erythrocytic sequence, So any disorder in the production of erythropoietin causes many hematological disturbances and vice versa as in some high risk neonates.

The term high risk infant designates infants who should be under close observation by experienced physicians and nurses. Approximately 9% of all births require special or neonatal intensive care *(Bjerkedahi et al., 1973)*.

Preterm infants meet many major problems exposing them to many hazards necessitating careful handling. These problems are due to functional and anatomical immaturity of different organs. Among these problems are hematological problems especially anemia of prematurity*(Dallman, 1981)*.

Preterm neonates are more liable to anemia than term neonates. The etiology of this condition remains poorly understood inspite of active investigations. Various factors are

probably responsible for anemia of prematurity such as erythropoietin deficiency, shortened red cell survival, vitamin E deficiency, repeated blood sampling and relatively more rapid rate of growth in preterm as compared to term neonates *(Wardrop et al., 1978)*.

Stockman et al. (1984), found that serum erythropoietin concentrations in preterm infants are inappropriately low for the degree of anemia when compared with similar hemoglobin values as a physiological response to impaired tissue oxygenation.

However, the increase in erythropoietin concentration early in the course of anemia appears to be ineffective in eliciting a reticulocytic response, but it may predict which infants would be likely candidates for treatment with recombinant erythropoietin as an alternative to blood transfusion.

Ruth et al. (1988) found that a high erythropoietin level after normal pregnancy indicates an increased risk for perinatal brain damage.

It was found that small for gestational age fetuses develop tissue hypoxia due to hypoxaemic hypoxia secondary to reduced

utero-placental perfusion which in turn stimulates erythropoietin production in fetal life. A compensatory increase in fetal plasma erythropoietin in Rhesus isoimmunized pregnancies was also recorded as a result of chronic fetal hypoxia especially in severe cases leading to erythropoietic abnormalities *(Shannon et al., 1991)*.

Infants of diabetic mothers (IDM) are regarded fragile infants, as they are liable to many grave complications such as hypoglycemia, hypocalcemia, respiratory distress, jaundice, polycythemia, renal vein thrombosis and congenital anomalies. Intrauterine hypoxemia or placental vascular insufficiency leads to neonates with reduced iron stores at birth and an increased erythropoietin level. Infants of diabetic mothers are also at risk for such changes*(Chockalingam et al., 1987)*.