DELAY IN THE FETAL HEMOGLOBIN SWITCH IN THE INFANTS OF DIABETIC MOTHERS

Thesis

Submitted for partial fulfillment of

Master Degree in Pediatrics

By

Hossam Eldin Kadry Wahba

(M.B., B.Ch.)

Supervisors

PROF.DR. SAADIA MOHAMED ABD EL-FATTAH
Professor of Pediatrics
Faculty of Medicine, Ain Shams University

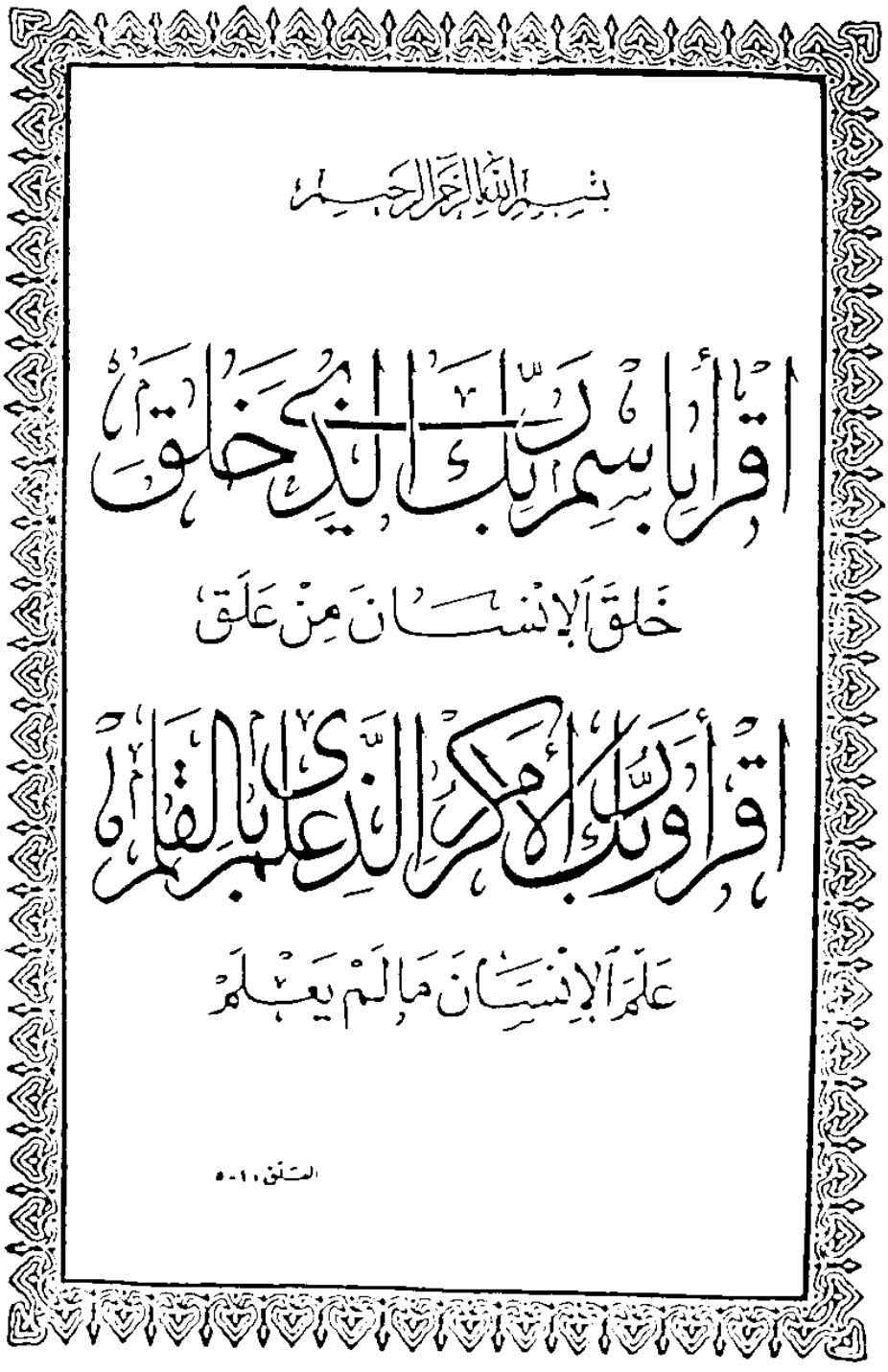
DR. EMAN AHMED ZAKY
Lecturer in Pediatrics
Faculty of Medicine, Ain Shams University

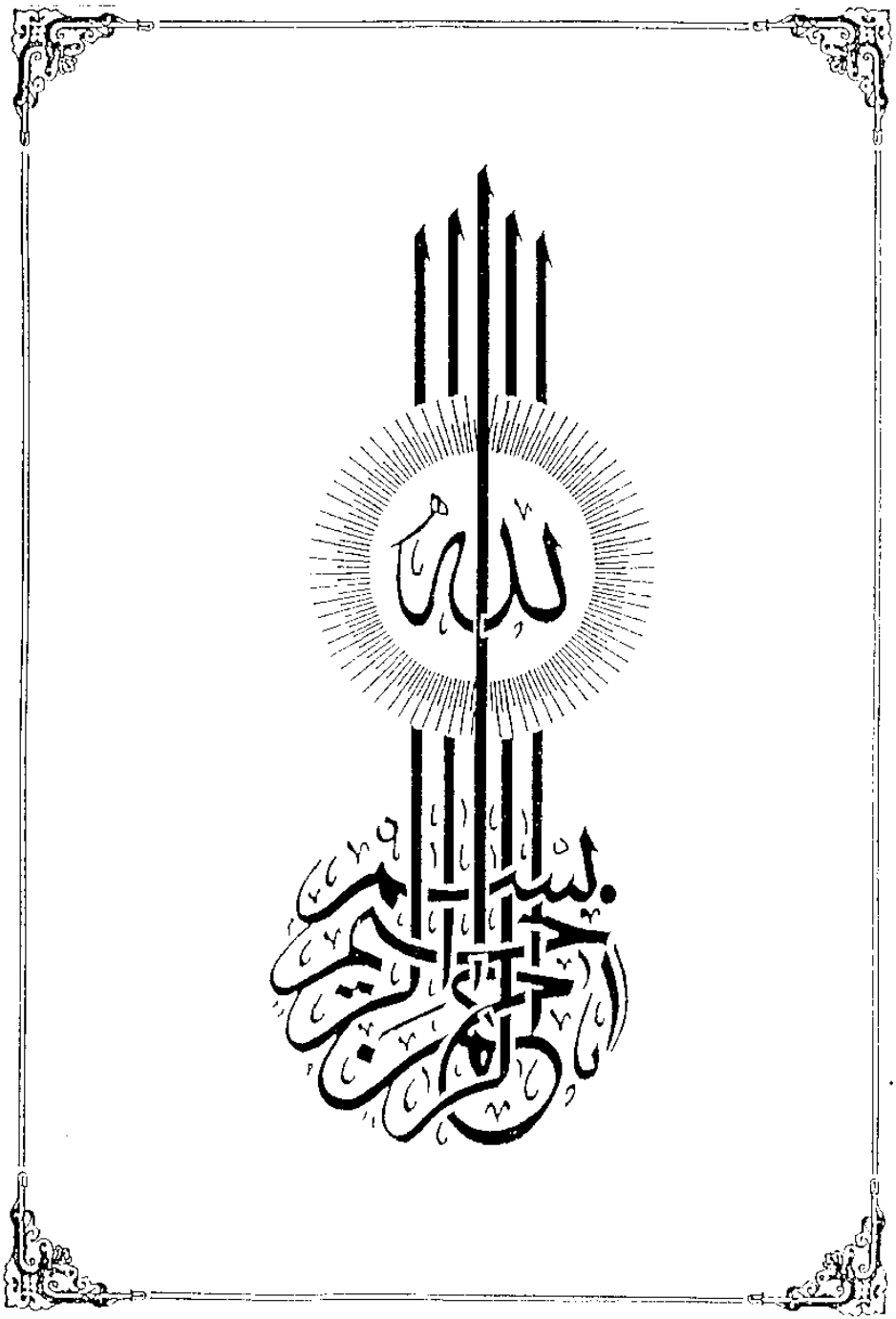
DR. HODA MOHAMED EL-GINDI
Lecturer in Clinical Pathology
Faculty of Medicine, Ain Shams University

Faculty of Medicine

Ain Shams University

(1995)





Acknowledgment

I would like to express my sincere thanks and deepest gratitude to Prof. **Dr. Saadi Mohamed Abd El-Fattah**, Professor of Pediatrics, Faculty of Medicine, Ain Shams University, who offered me the munificent encouragement, the generous support, and many useful criticism and suggestions throughout this study her precious guidance and continued supervision which were kindly given are beyond acknowledgment.

I wish to express may deepest gratitude to **Dr. Eman Ahmed Zaky** Lecturer of Pediatrics, Faculty of Medicine, Ain Shams University who offered much of her time and experience for providing me with helpful advices, suggestions and for her cardinal support during planning and throughout this work.

Also I would like to express many thanks to **Dr. Hoda El-Gindi**, Lecturer of Clinical Pathology, Faculty of Medicine, Ain Shams University for all her kind support and helpful advices throughout all this work.

LIST OF ABBREVIATIONS

1-	&	And.
2-	∝	Alpha chain.
3-	B	Beta chain.
4-	ɣ	Gamma chain.
5-	∈	epsilon chain.
6-	HBF	Fetal hemoglobin.
7-	HBA	Adult hemoglobin.
8-	L/S	Lecithin/syphingomyelin ratio.
9-	IDMS	Infant of diabetic mothers.
10-	%	Percent.
11-	δ	delta chain.
12-	ʒ	Zeta chain.
13-	JCMZ	Juvenile chronic myeloid leukemia.
14-	HPFH	Hereditary persistence of fetal hemoglobin.
15-	NICU	Neonatal intensive care unit.
16-	HPLC	High performance liquid chromatography.
17-	RDS	Respiratory distress syndrome.

LIST OF FIGURES

List of Figures (continue):

LIST OF TABLES

List of Tables (continue):

TABLE OF CONTENTS

INTRODUCTION AND AIM OF THE WORK

INTRODUCTION

Between 28 and 34 weeks of gestation a switch in non-alpha-globin production from predominantly gamma-globin to beta-globin begins and hemoglobin F ($alpha_2$ $gamma_2$) is largely replaced by hemoglobin A (Alpha2 beta2) **(Bard et al., 1970).**

This phenomenon ordinarily proceeds on apparently set developmental clock and it is not affected by the gestational age at birth or the anatomic site of blood production **(Bard and Prosmanne, 1982, Wood and Weatherall, 1983).**

It occurs despite the disastrous consequences that result when abnormal or insufficient beta-globin is produced in patients with beta-chain hemoglobinopathies or beta-thalassemia **(Ali, 1970).**

There are populations of patients with beta abnormalities in whom a higher than normal level of hemoglobin F is manitained, and such patients have been observed to have milder clinical courses than their counter parts with normal levels of hemoglobin F **(Perrine et al ., 1978, Perrine et al., 1981).**

Recently, insulin has been shown to affect gene expression in a number of mammalian systems **(Jones and Taylor, 1980, Clough et al., 1984).**

Infants of diabetic mothers are exposed to intermittent or continuous maternal hyperglycemia and have elevated levels of glycosylated proteins and of glycosylated hemoglobin F **(Elseweidy et al., 1984).**

In addition, they have excessive glucose utilization and are usually hypoglycemic in the neonatal period and have pancreatic beta-Islet-cell hyperplasia. Consequently, they are widely considered to be hyperinsulinemic **(Ballard, 1991).**

Perrine et al., (1985) found significant delay in the switch from gamma-globin to beta-globin in infants of diabetic mothers, They suggested that this finding might allow identification of physiologic factors that could modulate developmental gene suppresion.

AIM OF THE WORK

The aim of this work was to evaluate the fetal hemoglobin switch during it's natural evolution under exposure to higher than normal levels of insulin which occurs during gestation in infants of diabetic mothers.

REVIEW OF LITERATURE