

**PANCREATIC SIZING OF CHILDREN AND
ADOLESCENTS WITH INSULIN DEPENDENT
DIABETES MELLITUS (IDDM)**

THESIS

SUBMITTED FOR PARTIAL FULFILLMENT OF
MASTER DEGREE

in
PEDIATRICS

By

Nada Taher Yousef

M.B.B.Ch.

1993



53759

678.92462
11. T

SUPERVISED BY

Dr. Mona Hussein El-Samahy

Prof. of Pediatrics

Faculty of Medicine - Ain Shams University

Dr. Omar Hussein

Prof. of Radiology

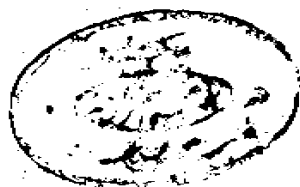
Faculty of Medicine - Ain Shams University

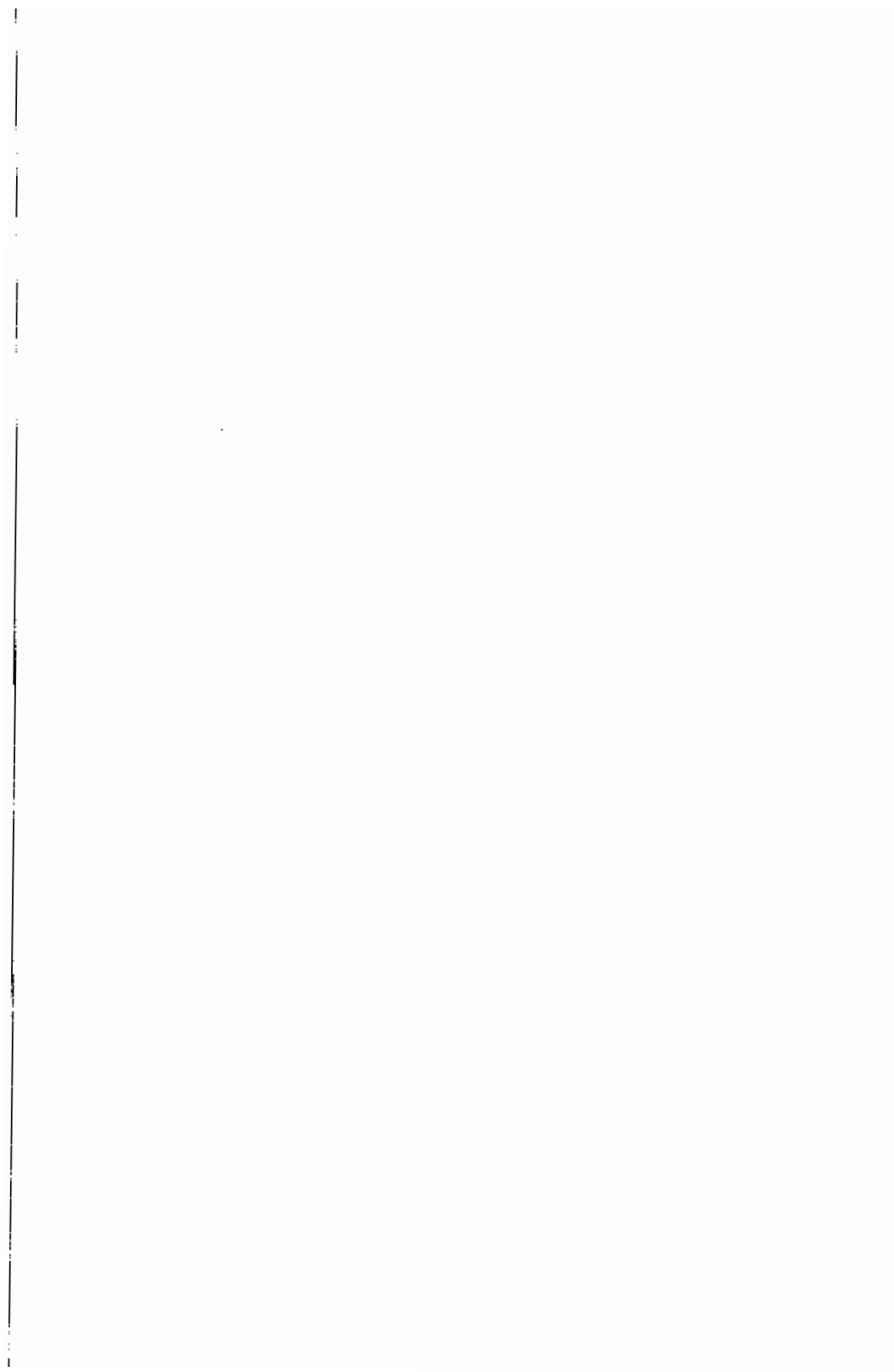
Dr. Sahar M. A. Hassanein

Lecturer of Pediatrics

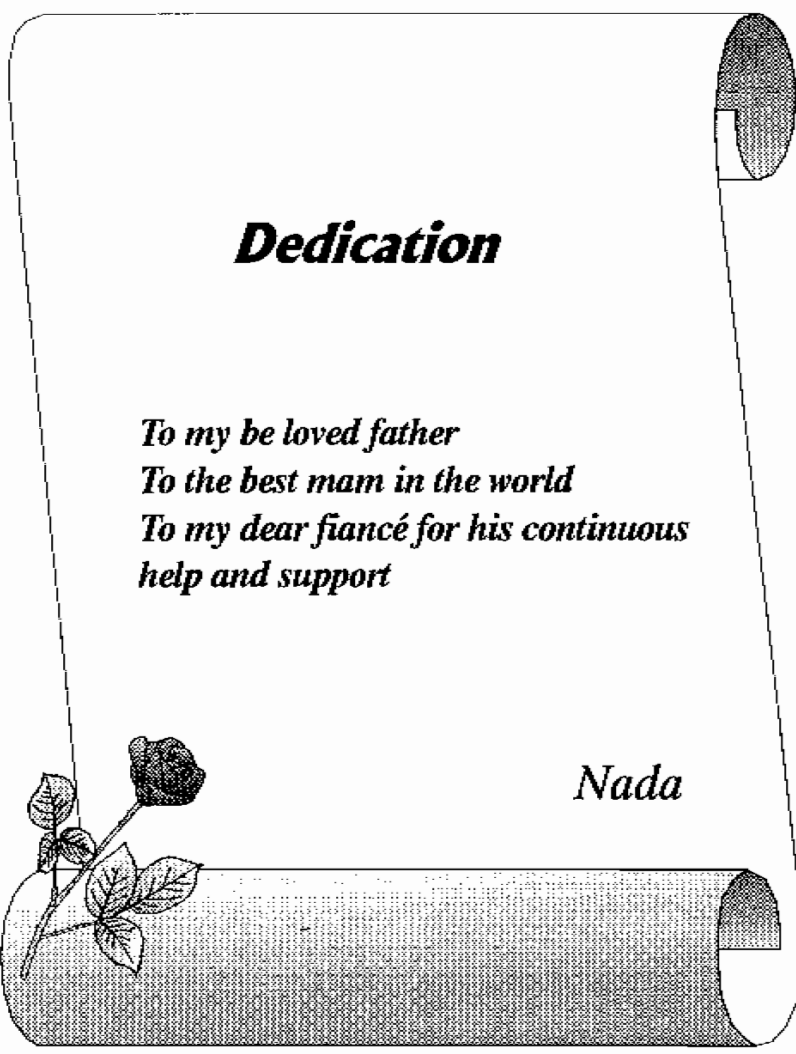
Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
1997









Dedication

*To my be loved father
To the best mam in the world
To my dear fiancé for his continuous
help and support*

Nada

ACKNOWLEDGMENT

First, thanks are all to Allah for blessing this study until it has reached its end.

I would like to express my sincere thanks and deepest gratitude to Prof. Dr. Mona Hussein El-Samahy, Prof. of Pediatrics, Ain Shams University, who offered me the magnificent encouragement, generous support and useful comments with continued supervision throughout this study.

I would like to express my sincere thanks to Prof. Dr. Omar Hussein, Professor of Radiology, Ain Shams University, who kindly offered me much of his time and experience, providing me with his helpful advice and proper suggestions.

I would like to express my deepest gratitude to Dr. Sahar Hassanein, Lecturer of Pediatrics, Ain Shams University, who offered much of her time for providing me with precious guidance, which is beyond acknowledgment.

I wish to thank her for her cardinal support during planning and throughout this work.

Last, I would like to thank my patients and wish them a long and healthy life.

CONTENTS

LIST OF ABBREVIATIONS	i
LIST OF TABLES	ii
LIST OF FIGURES	iii
INTRODUCTION	1
AIM OF THE WORK	2
REVIEW OF LITERATURE	
Basic principles of ultrasound	3
Anatomy of pancreas	14
Diabetes mellitus	26
SUBJECT AND METHODS	55
RESULTS	61
DISCUSSION	89
SUMMARY	96
CONCLUSION AND RECOMMENDATIONS	100
REFERENCES	102
ARABIC SUMMARY	

LIST OF ABBREVIATIONS

DKA:	Diabetic ketoacidosis
DM:	Diabetes mellitus
FPG:	Fasting plasma glucose
H/B:	Head/body of pancreatic ratio
HbA1c:	Glycosylated hemoglobin
Ht:	Height percentile for age
Hz:	Hertz
IDDM:	Insulin dependent diabetes mellitus
M/S:	Meter/second
MHz:	Mega Hertz
OGTT:	Oral glucose tolerance test
PG:	Plasma glucose
RBG:	Random blood glucose
S1:	Transverse diameter of head of pancreas
S2:	Sagittal scan of head of pancreas
S3:	Sagittal scan of body of pancreas
S4:	Sagittal scan of tail of pancreas
S5:	Surface area of head of pancreas
S6:	Sum of sagittal diameters of pancreas
SD:	Standard deviation
T/B:	Tail/body of pancreatic ratio
Wt:	Weight percentile
X:	Mean
Y:	Year

LIST OF TABLES

Table (1):	The speed of transmission of sound through various materials (P. 5).
Table (2):	Types of diabetes (P. 30).
Table (3):	Major metabolic events during the fed and fasting state or during high and low insulin (P. 38).
Table (4):	Collection of various complications of diabetes (P. 51).
Table (5,7):	Clinical and laboratory data for IDDM patients aged ≤ 12 years and > 12 years (P. 70,71,73,74).
Table (6,8):	Clinical and laboratory data for controls aged ≤ 12 years and > 12 years (P. 72,75).
Table (9):	Comparison between patients with IDDM and controls aged ≤ 12 years as regard sonographic data of pancreas (P. 76).
Table (10):	Comparison between patients with IDDM and controls aged ≤ 12 years as regard sonographic data of pancreas (P. 76).
Table (11):	Correlation between sonographic data of pancreas and different clinical and laboratory data for patients with IDDM aged < 12 years (P. 77).
Table (12):	Correlation between sonographic data of pancreas and different clinical and laboratory data for patients with IDDM aged > 12 years (P. 78).
Table (13):	Comparison between patients with disease duration < 1 year and patients with disease duration 1-5 years as regard sonographic data of pancreas (P. 79).
Table (14):	Comparison between patients with disease duration 1-5 years and patients with disease duration > 5 years as regard sonographic data of pancreas (P. 79).
Table (15):	Correlation between sonographic data of pancreas and different clinical and laboratory data for patients with IDDM and the disease duration < 1 year (P. 80).

- Table (16): Correlation between sonographic data of pancreas and different clinical and laboratory data for patients with IDDM and the disease duration 1-5 years (P. 81).
- Table (17): Correlation between sonographic data of pancreas and different clinical and laboratory data for patients with IDDM and the disease duration >5 years (P. 82).
- Table (18): Comparison between patients with IDDM and controls as regard head/body ratio (P. 83).
- Table (19): Comparison between patients with IDDM and controls as regard tail/body ratio (P. 83).
- Table (20): Comparison between patients with IDDM and controls as regard head/body ratio and tail/body ratio according to disease duration (P. 84).

LIST OF FIGURES

- Fig. (1): Comparison of the ultrasonic A-mode and B-mode displays (P. 8).
- Fig. (2): Posterior aspect of pancreas and its relation to the surrounding structures (P. 18).
- Fig. (3): Major arteries of the pancreas; A. Anterior view; B. Posterior view (P. 24).
- Fig. (4): Outline the effect of insulin in carbohydrate metabolism (P. 36).
- Fig. (5): A sonographic picture of patient No. 5 with IDDM aged 14 years and with disease duration 3 years (P. 68).
A. showing pancreas as a whole
B. Showing sagittal scan of head, body and tail of pancreas
C. Showing transverse diameter of head of pancreas
- Fig. (6): Negative correlation between duration of IDDM and both transverse diameter of head of pancreas (P. 85).
- Fig. (7): Negative correlation between duration of IDDM and surface area of head of pancreas (P. 85).
- Fig. (8): Negative correlation between HbA_{1c} and transverse diameter of head of pancreas (P. 87).
- Fig. (9): Negative correlation between HbA_{1c} and sagittal scan of tail of pancreas (P. 88).

