STUDY OF SOME ASPECTS OF CALCIUM AND PHOSPHORUS METABOLISM IN DIABETES MELLITUS

THESIS

SUBMITTED IN PARTIAL FULFILMENT

FOR (M. D.) DEGREE IN

Endocrinology and Metabolism

BY

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M. B., B. Ch., M. S. « endocrine & Metabolism »

UNDER SUPERVISION OF

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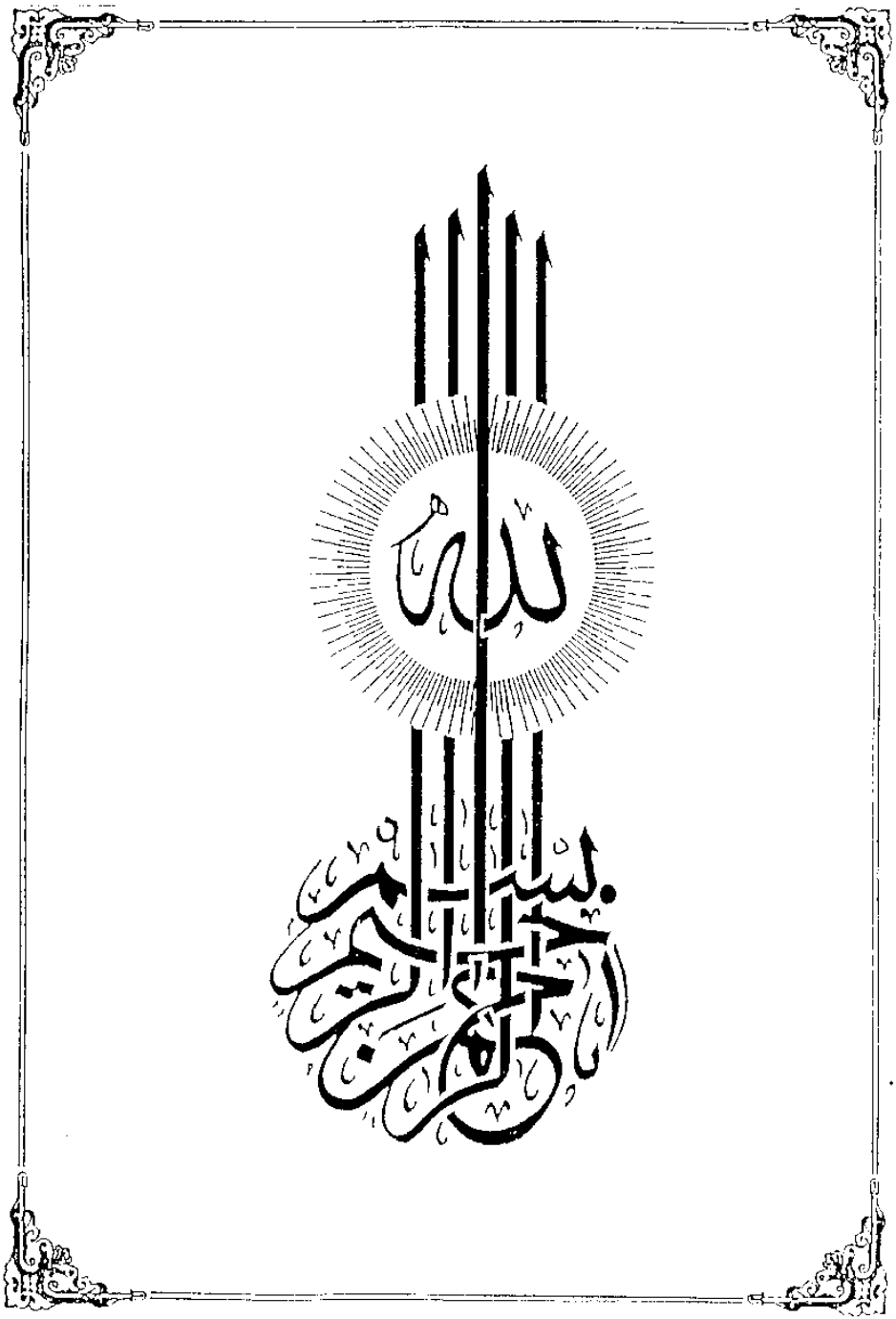

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CONTENTS

GLOSSARY

ATP	*: Adenosine triphosphate.*
ATPase	*: Adenosine triphosphatase.*
Ca	*: Calcium.*
Ct	*: Calcitonin.*
cAMP	*: Cyclic 3` 5` adenosine monophosphate.*
DHT_3	*: Dihydrotachysterol.*
DNA	*: Deoxyribonucleic acid.*
$H\ PO^{-}_{4}$	*: dibasic phosphate.*
2,3-DPG	*: diphosphoglyceric acid.*
1 st	*: first.*
IDDM	*: Insulin dependent diabetes mellitus.*
Mg^{++}	*: Magnesium.*
$H_2\ PO_4$	*: monobasic phosphate.*
NIH	*: national institutes of health.*
NIDDM	*: non insulin dependent diabetes mellitus.*
PTH	*: parathyroid hormone.*
PSP	*: parathyroid secretory protein.*
P	*: phosphorus.*
RNA	*: Ribonucleic acid.*

Tmp/GFR : *tubular maximum for phosphate/the glomerular filtration rate.*

$25(OH)D_3$: *25-hydroxycholecalciferol.*

$1,25(OH)_2 D_3$: *1,25 dihydroxycholecalciferol.*

INTRODUCTION AND AIM OF THE WORK

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Despite the wealth of information available concerning the variety of systemic complications of diabetes mellitus, little is known about the effect of this disease on the metabolism of minerals and the integrity of bone. In recent years it has become apparent however, that involvement of the skeletal system must be regarded as yet another complication of diabetes (Hough and Avioli, 1984).

The effect of diabetes mellitus on the metabolism of minerals is poorly understood. Clinical studies often employing a heterogeneous patient population; have yielded conflicting data as to the type, extent, and severity of disordered mineral homeostasis in diabetes (Frazer et al., 1981)

Therefore, the aim of this present study was designed to investigate the change in some aspects of calcium, phosphorus metabolism and the behaviour of associated hormones (Parathyroid and calcitonin) in groups of diabetic patients and healthy controls.

REVIEW OF LITERATURE

DIABETES MELLITUS

1-1- DEFINITION OF DIABETES MELLITUS :

It has been established that diabetes mellitus is a genetically and clinically heterogeneous group of disorders that share glucose intolerance in common (Fajans et al.,1978).

Diabetes mellitus is not a disease entity but multiple diseases affecting different organs with one common basic Pathology viz; laying down of periodic acid schiff (P.A.S) positive staining material in the basement membranes leading to their thickening; or what is commonly called microangiopathies (Ghareeb, 1972).

The term diabetes mellitus is also used in a more specific sense to designate a group of primary diseases Characterized not only by hyperglycemia but many other pathophysiologic Features (johnson, 1982).

So, abroader definition of diabetes is that it is a syndrome characterized by a state of chronic hyperglycemia caused by diminished insulin action (insulin

deficiency or/and insulin resistance), and covering in its complete picture two areas, metabolic defects and structural damage triad :

1)Metabolic defects : beside hyperglycemia there is accelerated fat and protein catabolism.

2)Structural damage triad (long-term sequelae):

a- Large vessel disease including accelerated atherosclerosis and medial calcification.

b- Microvascular disease characterized by thickening and abnormality of function of capillary basement membrane resulting in nephropathy and retinopathy.

c- Neuropathy : There are peripheral sensory and motor defects, autonomic nervous system dysfunction, segmental demyelination and abnormalities of Shwann cell (Porte and Halter, 1981).

Chronic hyperglycemia may be asymptomatic or in some instances glycosuria is detected accidentally e-g during routine medical examination. On the other hand diabetes mellitus may be presented with acute symptoms that include thirst, Polyuria and