EFFECT OF REPEATED HEAMODIALYSIS ON CREATINE KINASE - MB ISOENZYME IN SERUM OF URAEMIC PATIENTS

THESIS

SUBMITTED FOR PARTIAL FULFILMET OF MASTER DEGREE IN CLINICAL PATHOLOGY

BY

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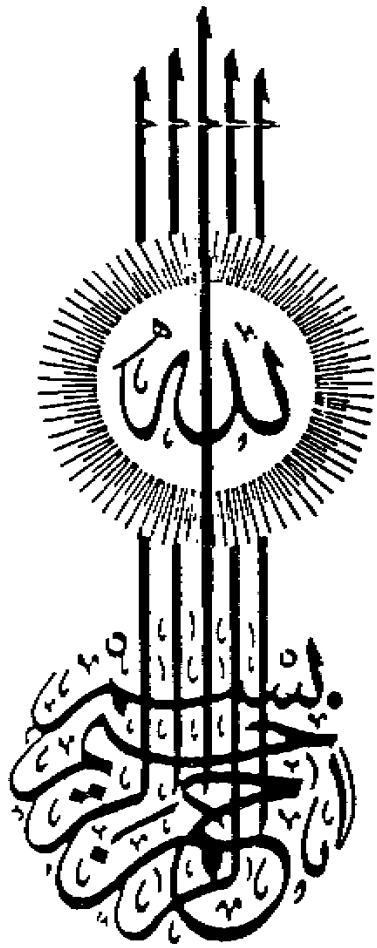
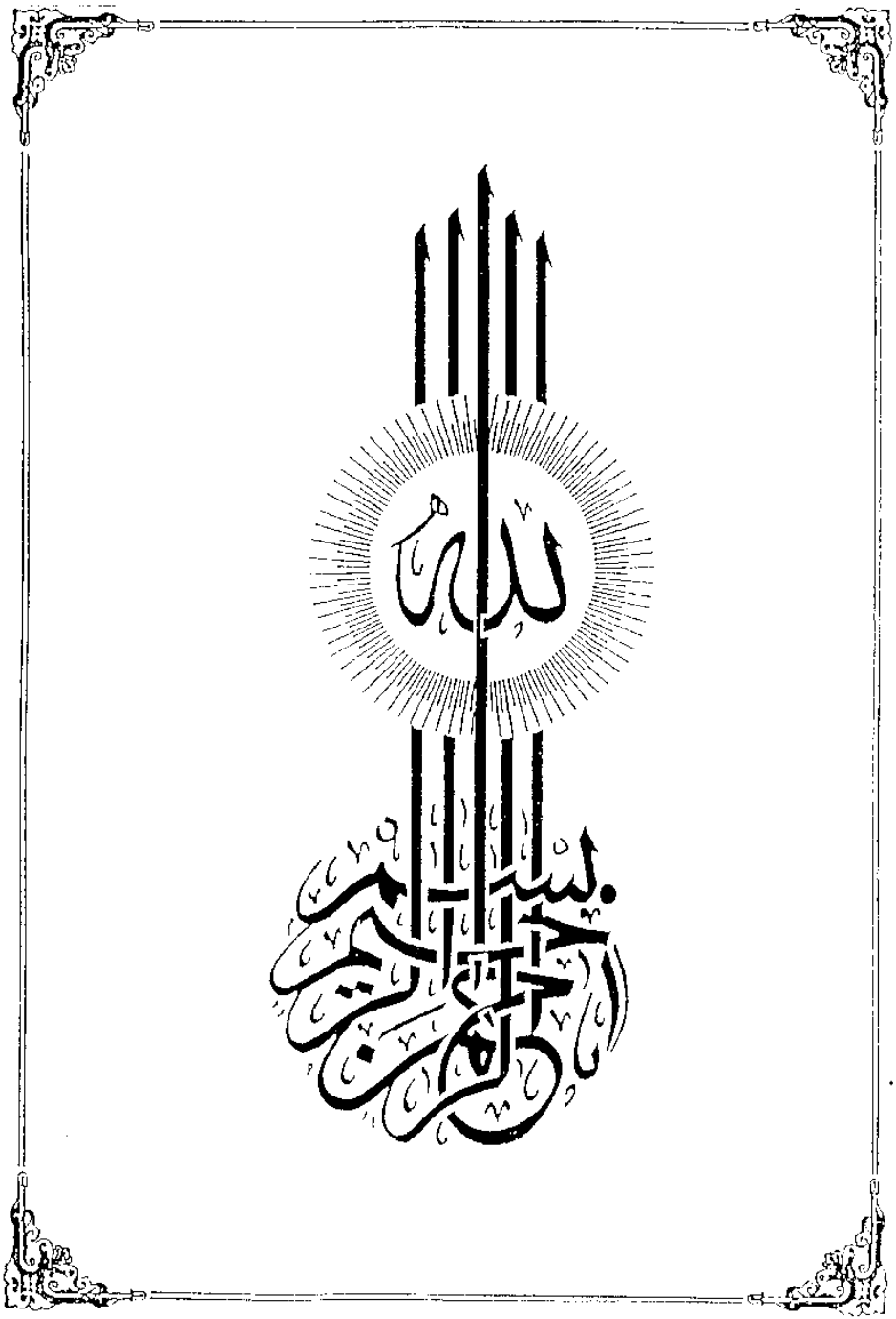
1988



سبحانك

لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم



TO MY FAMILY

ACKNOWLEDGEMENT

I do feel greatly indebted to professor Sawsan Hosney Hamza , for her kind and indispensible guidance , her patience with me in writing and rewriting, together with her continous and ethusiastic stimulations throughout the work, contributed to its final accomplishment. It is really wonderful to work under her supervision .

My sincere gratitude should be expressed to Dr. Nadia Mohamed Abd - El Moneim Nagui for her bounteous givings and continous hardling of all obsticales met with, made this work possible . Her kind advise and guidance were of paramount importance in bringing this work to light .

Finally , my deep thanks to every patient who freely co-operated with me to make this work possible and I wish to all of them the best health , hoping that this work would be of value to them as well as to others .

CONTENTS

Introduction

I- GENERAL INTRODUCTION AND AIM OF THE WORK

A number of human enzymes occur in different body tissues as distinct isomeric species . Three isoenzymes of creatine kinase (CK) have been identified : CK -I (BB,brain type), CK-II (MB, intermediate type) and CK-III (MM,muscle type). The CK - MM isoenzyme is detectable in serum and reflects normal skeletal muscle metabolism in which creatine is converted to creatinine . In contrast CK - BB is not normally present in serum (Van Der Veen and Willibrands , 1966).

Elevated levels of CK are well demonstrated in neuromuscular disorders (Somer ,etal., 1976), hypothyroidism (Rao and Frame, 1978), hypoparathyroidism (Wolf, 1973) as well as in CSF of some psychotic patients (Vele, etal., 1974) .The importance of separating CK-isoenzymes in diagnosis of muscle disorders (Somer, etal., 1976) and in myocardial infarction is well established (Bleifeld ,etal., 1977) .

Elevation of serum CK-MB isoenzyme activity is believed to be highly specific for the diagnosis of myocardial infarction (Smith,etal., 1976 and Roberts and Sobel, 1978) . There are however reports of increased

serum CK-MB activity noted with muscular dystrophy (Silverman ,etal., 1976), myositis (Brownlow and Elevitch , 1974) , hypothyroidism (Goldman,etal., 1977), hypothermia (Carlson,etal., 1978), cardiac arrythemia (Mercer and Varat, 1975) , following minor iatrogenic cardiac trauma (Tonkin, etal., 1975) , after subarachnoid haemorrhage (Fabinyi , etal., 1977) and with pericarditis (Horowitz, etal.,1974).

A high incidence of arteriosclerotic cardiovascular complication has been reported in patients undergoing long-term maintenance haemodialysis (Linder ,etal., 1974) . On the otherhand , some investigators showed increased CK-MB isoenzyme activity in serum of uraemic patients who are undergoing maintenance dialysis and who had no evidence of acute myocardial infarction at the time their sera were studied (Cohen , etal., 1980 and Martinez-Vea , etal., 1982) . They stated that increased proportions of CK - MB isoenzyme may not indicate cardiac disease , thereby decreasing the reliability of this laboratory test in this group of patients known to be particularly at risk for coronary heart disease .

The aim of this work is to determine the levels of CK-MB activity in our longterm haemodialysis population and in uraemic patients not undergoing haemodialysis

in order to evaluate the diagnostic value of this isoenzyme in these groups of patients .

Review of Literature

II- REVIEW OF LITERATURE

A- URAEMIA AND HAEMODIALYSIS

1 - Uraemia :-

a - Definition, aetiology and pathogenesis :

Uraemia is a syndrome which develops as a comsequence of a significant reduction im renal function and is due to resultant impairement of renal excretory , metabolic , endocrinal and haemostatic functions . The syndrome consists of anaemia , osteodystrophy , neuropathy , acidosis and is frequently accompained by hypertension and subsequently generalized detorioration in organ function .

Chronic renal failure may be caused by any condition which destroys the renal architecture . Conditions leading to end stage renal failure include : congenital disease as polycystic kidney , glomerulonephritis , hypertension , infections , urinary tract obstruction , systemic diseases (as diabetes mellitus) and drug sensitivities .

The pathogenesis of uraemia may be due to accumulation of toxins with many other substances in abnormal concentrations . The suggested toxins are water , electrolytes (as sodium , potassium and hydrogen) , phosphates ,

parathyroid hormone, renin, urea, creatinine, phenols and indols .

The identification of toxins, although is difficult, is important as it may lead to development of more selective dialysers designed to remove the toxic materials (Bricker, 1972) .

b - Clinical picture :

Many patients remain asymptomatic until severe renal impairement occurs i.e. creatinine clearance is less than 10 ml/min . The main symptoms are general weakness, anorexia, nausea, headache, pallor and loss of libido . The symptoms are non specific and mainly due to complications rather than the renal tract affection and thus may be misinterpreted . The main clinical features of uraemic syndrome include :

i. Anaemia :

Anaemia is a common feature associating uraemia especially when serum creatinine concentration exceeds 3.5 mg/dl (Orringer and Mattern, 1986) .

The haemoglobin concentration of most patients with blood urea nitrogen (BUN) over 100mg/dl, ranges between 3.4 and 9.5 mg/dl . Other factors may affect the