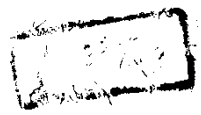
# RADIONUCLIDE ASSESSMENT OF RENAL FUNCTION UPTAKE AND CLEARANCE STUDIES

**Thesis**

**Submitted for Partial Fulfilment of**
M.D. degree in Radiodiagnosis



**Presented by**

**Mervat Mohamed Ibrahim**

M.B.B. Ch.
M. Sc. in Radiodiagnosis



**Under Supervision of**

**PROF. DR. ABD EL-ZAHER HASSAN**

*Prof. of Radiodiagnosis*
*Ain Shams University*

**PROF. DR. SALWA TAHA ISMAIL**

*Ass. Prof. of Radiodiagnosis*
*Ain Shams University*

**PROF. DR. TARIF HAMZA SALLAM**

*Prof of Clinical Pathology*
*Ain Shams University*

**Co-SUPERVISOR DR. AHMED TALAAT KHAIRY**

*Lecturer of Radiodiagnosis*
*Ain Shams University*

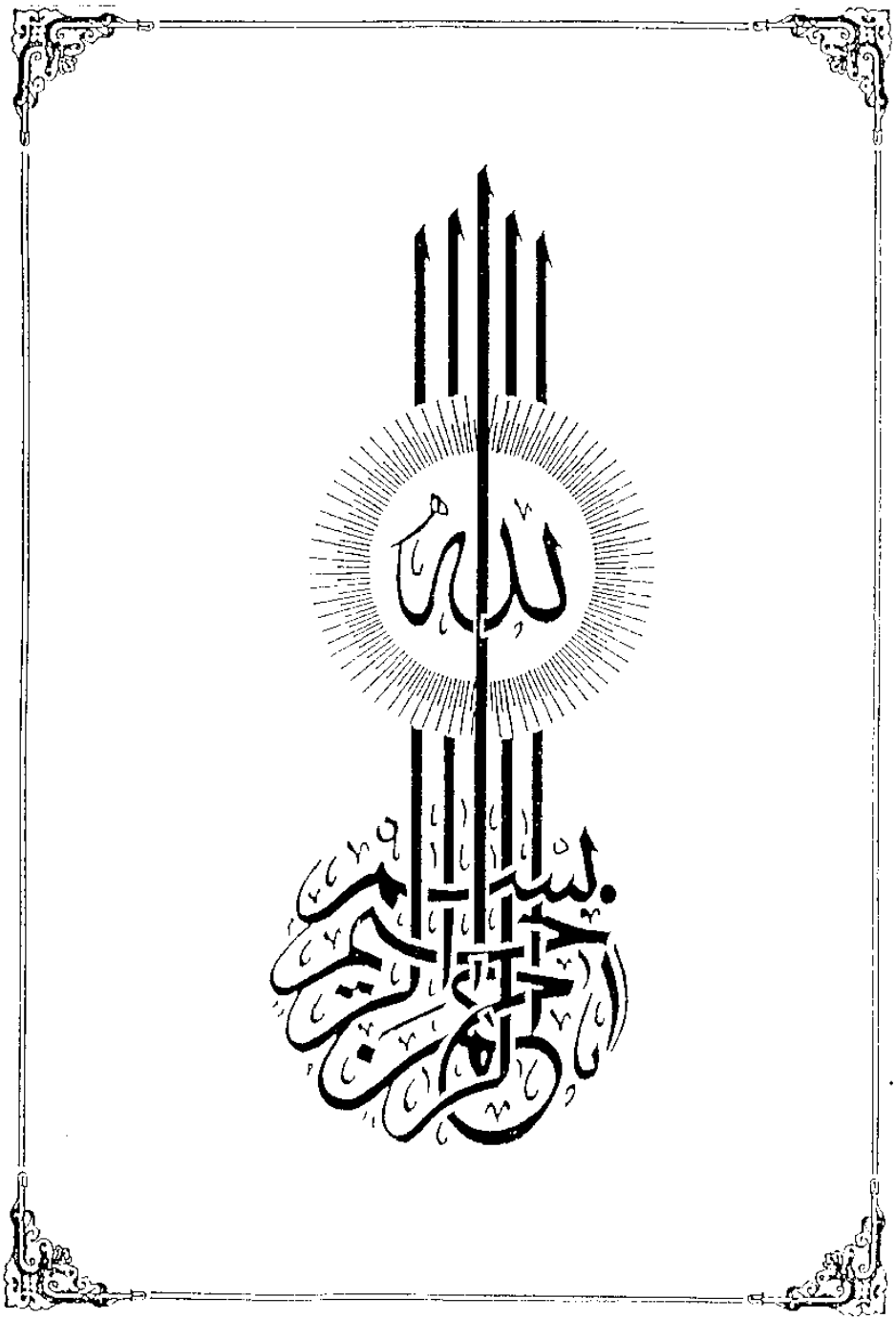


**AIN SHAMS UNIVERSITY**

**FACULTY OF MEDICINE**

**DEPARTMENT OF RADIODIAGNOSIS**

1989



# ACKNOWLEDGEMENT

*I am greatly indebted to Professor Dr. ABD EL-ZAHER HASSAN, for his masterly teaching, precious advice, generous help and support.*

*I am very grateful to Professor Dr. TARIF HAMZA SALLAM, for his kind advices and great role in performing the laboratory studies in this work.*

*I would like to pay a special attribute to Prof. Dr. SALWA TAHA for her continuous support and guidance.*

*My sincere gratitude goes to Dr. AHMED TALAAT KHAIRY for his encouragement, supervision, helpful suggestions and valuable advices which were essential for this work to be finally achieved.*

*My special thanks to Prof. Dr. MOHAMED SAMY EL BEBLAWY, Chairman of the Department for his kindness, encouragement and support.*

*Last but not least, special thanks are given to all the staff of Radiodiagnosis Department, and my colleagues for their collaboration and advices.*

*Mervat Mohamed Ibrahim*

## CONTENTS

# AIM OF WORK

# INTRODUCTION AND AIM OF THE WORK

The use of radionuclides has become a routine part of the management of patients with nephrourological problems because a number of important questions may be answered by application of these simple non invasive techniques. These include the following: What is the overall renal function? What contribution does each kidney make to the total function? Is there out-flow obstruction present in a kidney whose pelvis and/or ureter is dilated. Has operation for relief of obstruction improved renal function or not?

Various radionuclide quantitative techniques providing numeric indices have been available for many years. They have not been widely used because the techniques and the calculations exceeded the scope of routine nuclear medicine practice. Validation of simplified methods and the introduction of computer technology have made uptake and clearance functions simple enough so that they can be performed reproducibly in most nuclear medicine departments.

The determination of the glomerular filtration rate (GFR) as measured by creatinine clearance has been a recognized mean of assessing renal function. During the past few years, several accurate radionuclide techniques have been developed in order to determine GFR. However, these procedures require multiple blood samples and take a long

time thus imposing logistical constraints upon a busy nuclear medicine department.

Accordingly, the aim of this work is to evaluate renal scintigraphy and the related simple quantitative and semiquantitative studies in reflecting renal function. the validity will be assessed by comparing the radionuclide-computed GFR values with 24 hr creatinine clearance values. Also the scintigraphic results will be compared with available other imaging techniques in some cases.

# ANATOMY