SCINTIGRAPHY IN RENAL DISEASES IN INFANCY AND CHILDHOOD

Thesis
Submitted for partial fulfilment
of M.S. degree in Pediatrics.

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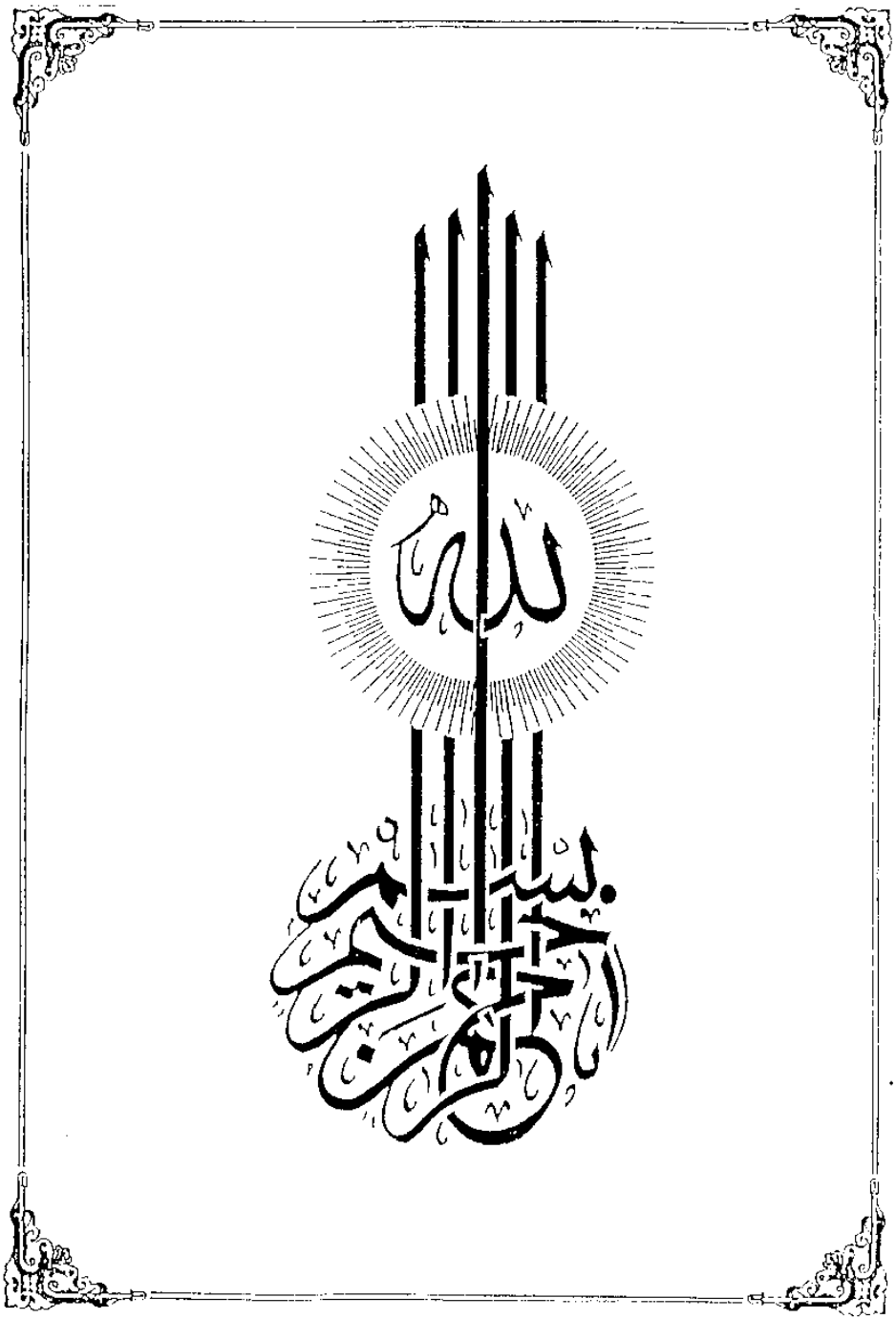

ABBREVIATIONS

ADH	=	*Antidiuretic hormone.*
ARF	=	*Acute Renal failure*
ASOT	=	*Antistreptolysin O titre.*
B	=	*Bilharziasis .*
C_3Nef	=	*Nephritic factor.*
CRP	=	*C reactive protein.*
DTPA	=	*Diethylene triamine penta acetic acid .*
DMSA	=	*Dimercaptosuccinic acid .*
F.G.S.	=	*Focal glomerulosclerosis .*
GBM	=	*Glomerular basement membrane.*
GFR	=	*Glomerular filtration rate.*
GHA	=	*Glucoheptonate.*
G6PD	=	*Glucose 6 phosphate dehydrogenase.*
TVU	=	*Intravenous uroqraphy .*
TVP	=	*Intravenous Pyelography.*
MCNS	=	*Minimal change nephrotic syndrome .*
MPGN	=	*Membranoproliferative glomerulonephritis .*
N.S	=	*Nephrotic syndrome .*
OIH	=	*Orthoiodohyppurate.*
PAN	=	*Polyarteritis nodosum .*
PMT	=	*Photo multiplier tube.*
S.P	=	*Standerd deviation .*
SG	=	*Specific gravity.*

SLE = *systemic lupus erythematoses.*

UTI = *Urinary tract infection.*

VLDL = *Very low density lipo protein .*

VUR = *Vesico ureteric reflux.*

LIST OF TABLES

		PAGE
- *Table 1*	*classification of Immune mediated glomerulonephritis*	*17*
- *Table 2*	*summerizes the recommended paediatric doses of different traces.*	*39*
- *Table 3*	*showing clinical picture , laboratory Data and radioisotopic scanining in nephrotic cases in relapse (group I)*	*65*
- *Table 4*	*showing clinical picture, laboratory Data and radioisotopic scanning in nephritic cases (group II)*	*66*
- *Table 5*	*showing clinical picture, laboratory data and scintigraphy in cases with urinary tract infection (group III)*	*67*
- *Table 6*	*showing clinical picture, laboratory data and renal scintigraphy in cases with renal failure (group IV)*	*68*

LIST OF FIGURES

		PAGE
Fig (1)	*Normal renogram curve.*	*41*
Fig (2)	*shows obstructive curves of both kidneys.*	*42*
Fig (3 a)	*Scintillation camera.*	*59*
Fig (3 b)	*Operating consule to control various camera function*	*59*
Fig (4)	*Computer equipment*	*60*
Fig (5)	*Normal Tc-99m DTPA renal images.*	*63*
Fig (6)	*Areas of interest for both kidneys, background and bladder.*	*63*
Fig (7 a)	*Shows the effect of furosemide on the curve in case of dilatation without true obstruction*	*64*
Fig (7 b)	*Shows the effect of furosemide on curve in case of true obstruction.*	*64*
Fig (8 a)	*Isotopic dynamic scan with Tc-99m DTPA in nephrotic syndrome*	*78*
Fig (8 b)	*Renogram in nephrotic syndrome*	*79*
Fig (9 a)	*Isotopic dynamic scan with Tc-99m DTPA in acute glomerulonephritis*	*86*
Fig (9 b)	*Renogram in acute glomerulonephritis*	*87*
Fig (10 a)	*Tc-99m DMSA static scan showing advanced loss of cortical function by the fibrosed left kidney and regional scarring of the right kidney .*	*100*
Fig (10 b)	*Time / activily curves of both kidneys.*	*100*
Fig (11 a)	*Isotopic dynamic scan with Tc-99m DTPA in chronic renal failure*	*102*
Fig (11 b)	*Renogram of chronic renal failure*	*103*

C O N T E N T S

PAGE

. INTRODUCTION AND AIM OF THE WORK 1

. REVIEW OF LITERATURE

. Anatomy of the Kidney 2

. Physiology of the Kidney 5

. Diseases of the Kidney 8

. Nephrotic syndrome 8

. Acute glomerulonephritis 16

. Urinary tract infection 19

. Renal failure 26

. Investigations of the Kidney 33

. Renal Radiopharmaceuticals 33

. Normal and Pathological Scintigraphic features 40

. Other Imaging Techniques 49

. Renal Function Tests 53

. MATERIAL AND METHODS 57

. RESULTS 65

. DISCUSSION 106

. SUMMARY AND RECOMMENDATIONS 114

. REFERENCES 117

. ARABIC SUMMARY

AIM OF THE WORK

INTRODUCTION AND AIM OF THE WORK

The nerphrotic syndrome in children can be defined as a derangement characterized by fluid-electrolyte imbalances, proteinuria, hypoproteinemia, hyperlipidemia and edema.

Less commonly recognized features such as hematuria, oliguria and hypertension sometimes form the clinical presentation of childhood nephrotic syndrome (Strauss et al ,1987).

Acute glomerulonephritis and renal failure are mainly charactrized by oliguria, hematuria, hypertension and edema in a way that mimics the picture of nephrotic patients.

Renal scintigraphy is one of the new diagnostic tools of renal functions and can be used in order to diagnose several pathologic lesions noninvasively with no known hazards to the patient.

In the present study the aim of the work is to apply renal scintigraphy for descrimination between nephrotic and nephritic cases and for early identification of cases who are passing into renal failure through detection of early renal embarrassement and derangement of renal functions.

Identification of underlying causes of renal failure as calculous diseases, reflux nephrophathy, pyelonephritis, and renal ischemia will be searched for.

REVIEW OF LITERATURE

ANATOMY

RENAL ANATOMY

The kidneys are retroperitoneal structure. The kidneys can be usually palpated in the neonate. The external surface of the foetal kidney is lobulated and these lobulations gradually disappear with age. The base of each lobe forms the kidney surface. The apex is the papilla which enters the urine collecting system at a minor calyx. Each lobe consists of the cortex or the outer zone and the medulla or the deeper zone. (Last, 1986)

BLOOD SUPPLY

Each kidney receives about 10% of the cardiac output. The renal artery is the main artery and arises from the aorta. The principal branches of the renal artery are the interlobar arteries. At the junctions of cortex and medulla the interlobar arteries divide to form the arcuate arteries. From these arteries the interlobular arteries arise and branch to form the afferent arterioles, each of which supplies a glomerulus - a spherical network of capillary loops surrounded by a Bowman capsule. Other interlobular arteries pass directly to the cortex to provide much of its blood supply. (Bargar and Herd, 1973)

THE NEPHRON

It is the functioning unit in the formation of urine and there are about 1 million of them in each kidney. (Latta, 1983)

The glomerulus

The glomerulus is the filtering apparatus of the nephron. Each glomerulus consists of capillary network arising from the afferent arteriole after it enters Bowman capsule. The walls of the network form a membrane across which the process of filtration occurs. The walls of the capillaries have 3 layers. (1) The endothelium is thin and attenuated and is traversed by multiple fenestrae. (2) The glomerular basement membranes (GBM) which is an uninterrupted, highly convoluted membrane. (3) The epithelium consists of relatively large cells with extensive cytoplasmic projections these subdivide into foot processes which are in direct contact with the GBM and between them are the filtration slits. In addition to the endothelial and epithelial cells, there are also the mesangial cells which lie deep in the central region of the glomerulus. (Latta, 1983)

Bowman capsule

It surrounds the glomerulus and its basement membrane is continous with the basement membrane of the proximal convoluted tubule. (Latta, 1983)

The tubules

Distal to the glomerulus the nephron becomes a tubule which is formed of the proximal convoluted tubule, the loop of Henle, the distal tubule and the collecting duct. The proximal convoluted tubule is situated in the cortex. The spaces between cells play an important role in the passage of solutes and water from the cells to the peritubular capillaries, also the proximal convoluted tubule participates in tubular secretion. (Micheale et al., 1980) The loop

of Henle is a continuation of the proximal convoluted tubule, after decending into the medulla, it turns abruptly back on itself to ascend toward the cortex, where it becomes the distal tubule . The loop of Henle is formed of a thin segment which is confined to the descending portion and the thick segment (the ascending limb). Latta, 1983)