Dedication

This work is dedicated:

To the soul of my father
To my mother
To any one who ever taught me
Acknowledgments

I would like to thank the staff of the nuclear medicine in the department of Radiation & Isotope Center of Khartoum (RICK).

I would like to express my sincere thanks to Dr. Siddik Mohammad Mustafa for his continuous guidance, supervision and patience during the preparation of this thesis.

I extend my deepest gratitude to Dr. Eltigani Mohammad Ahmed for help, guidance, valuable advice and endurance.

My great acknowledgement to Mr. Mohmed Alfadel (College of Medical Radiologic Sciences)
I would like to express my thanks to Mr. Salah Ali Fadlalla (College of Medical Radiologic Sciences), and Miss. Iman Abdel Hamid
Finally, thanks for all those who helped me in the preparation and improvement of this thesis.
Abbreviations

C : Sampling distribution

cm : Centimeter

CT : Computerized Tomography

df : Degree of freedom

DMSA : Dimercaptosuccinic acid

DTPA : Diethylenetriamine pentaacetic acid

Ei : Expected number of cases in ith category under Ho

ERPF : Effective Renal Plasma Flow

ESR : Erythrocyte Sedimentation Rate

g : gram

GFR : Glomerular Filtration Rate

HIV : Human Immunodeficiency Virus

H0 : null hypothesis

In : Inch

IVU : Intravenous Urography

keV : Kilo electron volt

L/min : Liter / mint

MAG-3 : Mercaptoacetyltriglycine
**MBq**: Mega Bequerel  
**MDP**: Methylene Dithosphonate  
**MRI**: Magnetic Resonance Imaging  
**NaI (T1)**: Sodium Iodide (Thallium)  
**Oi**: observed number of cases categorized in ith category  
**pH**: puissance d’hydrogene  
**RBCs**: Red Blood Cells  
**RIA**: Radio Immune Assay  
**RICK**: Radiation & Isotope Center of Khartoum  
**SPECT**: Single Photon Emission Computerized Tomography  
**SPSS**: Statistical Professional for Social Science  
**TB**: Tuberculosis  
**Tc99m**: Technetium 99m  
**U/S**: Ultrasonography  
**USA**: United State of America  
**UTI**: urinary tract infection  
**V/Q**: ventilation perfusion ratio  
**VUR**: vesicoureteric reflux  
**WHO**: World Health Organization  
$\chi^2$: chi-square test
Abstract

Pediatric nuclear medicine, in order to survive, must be innovative in finding ways of competing with other pediatric imaging studies for better health care. In this study a group of thirty-one patients with urinary tract infection confirmed by clinical investigation, (fever, pain...etc), laboratory investigation (RBC & pus cell) and urine culture, were evaluated by nuclear medicine study.

The aim of the study was to compare the diagnostic value of cortical scintigraphy using Tc99m dimercaptosuccinic acid (Tc\textsuperscript{99m}-DMSA), with two other routine investigations; the intravenous urographin (IVU), and ultrasonography (US), for diagnosis of renal parenchymal abnormality in children. The Tc\textsuperscript{99m}-DMSA renal scan was utilized as the gold standard test for renal involvement. All patients had Tc\textsuperscript{99m}-DMSA renal scan, and US, and only 22 patients had contrast IVU.

The Tc\textsuperscript{99m}-DMSA renal scan showed abnormality renal scanning in about 94% of patients, US abnormalities were detected in about 81% of patient, while the IVU detected defects in about 87%.

Because the prevalence of upper UTI in children is high, Tc\textsuperscript{99m}-DMSA renal scan is undoubtedly the available
tool for pediatricians as a guide in giving appropriate antibiotic therapy and to prevent further renal damage.

The study concludes that, the renal cortical scintigraphy with Tc$^{99m}$-DMSA has been reported to be a useful children diagnostic study of acute parenchymal renal infections, Moreover, is presently the method of choice to detect acute parenchymal infection.
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