بسم الله الرحمن الرحيم

Sudan University of Sciences & Technology

College of post graduate Studies and Scientific Research

Estimation of Bone Scientigraphy Accuracy in Diagnosis of Multiple Myeloma with bone scientigraphy

تـ قويم د قة تصوير العظام بالنظائر المشعة في تشخيص سرطان نخاع العظام المتعدد

Thesis submitted for partial fulfillment for the award of M.Sc. degree in nuclear medicine technology

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Abstract

Multiple myeloma is one of common cancer in Sudanese people and it’s once of common cause of cancer death and want good diagnosis to begin the first road to kill this disease. Therefore evaluation of multiple myeloma with bone scientigraphy it’s crucial. Hence the main objective of this study is to evaluate the multiple myeloma by using bone scientigraphy with 99mTc-MDP. The data of this study was collected from 50 patients of multiple myeloma attending to RICK (Radiation and Isotope Center of Khartoum) and RICA (Radiation and Isotopes Center of Al-jazeera). The procedure done by taking 25 mCi of Tc-99m MDP utilizing 3 hour delayed regional planar images on a Mediso SPECT (Single Photon Emission Computed Tomography) body scan and get all last investigations done as laboratory tests, bone marrow aspiration, and X-ray from the patient’s file. The bone scientigraphy analysis to show the accuracy of bone scientigraphy by comparing with X-ray and was comparing the bone scientigraphy with other investigations to evaluate the bone scientigraphy.

The results of this study showed that there is a high incidence multiple myeloma in male than female almost two folds, were 32 (64%) male and 18 (36%) female. The age of the patient ranged from 27-80 years with a higher incidence of multiple myeloma in the age ranged between 59 to 80 years (48%). The bone scientigraphy demarcated 32 (64%) as have multiple myeloma, while X-ray reveals 44 (88%) patients as having typical characteristics of multiple myeloma out of 50 patients. Laboratory test result for multiple myeloma patients which include HB, WBC, Platelets and calcium in general they are within the normal limits.

ملخص الدراسة

سرطان المايلوما المتعددة من السرطانات المنتشره فى السودان أحد أنواع

السرطانات المسببه للوفاة ويحتاج الى تشخيص جيد للبدء في أول الطرق لا قضاء على هذا المرض لذلك ت قويم المايلوما المتعددة بواسطة فحص العظام باستخدام النظائر المشعة يعتبر من الأهميه بمكان لذا كان الهدف الأساسى من قيام هذه الدراسه هو ت قويم المايلوما المتعددة بواسطة فحص العظام باستخدام التكنيشيوم المشع المحمل بالميثالين داي فوسفانيت. أجريت على المرضى عملية حـ قن بالمادة المشعة التكنيشيوم المحملة بال أم دي بي وبعد ثلاث ساعات أجريت لهم عملية التصوير فحص العظام بواسطة الـ قاما كاميرا لكافة الهيكل العظمي، كما قورنت نتائج فحص العظام بالمادة المشعة بفحوصات المريض السابـ قة مثل فحوصات المختبر، فحص نخاع العظام المخبري، وكذلك فحص العظام بالأشعة السينية.

النتائج التي ظهرت من خلال هذه الدراسة أن مرض المايلوما المتعدد أكثر انتشاراً في الذكور 32 (64%) من الإناث 18 (36%)، كما أن أعمار الحالات محل الدراسة هم من بين 27 إلى 80 سنه ولوحظ أن هذا المرض أكثر انتشاراً في الأعمار من 59 إلى 80 سنة (48%). أظهر فحص العظام بواسطة التكنيشيوم المحمل بإم دي بي 32 حالة (64%) بأنها تحمل المايلوما المتعدد، في حين أن الأشعة السينية أظهرت 44 حالة (88%) بأنها تحمل ذلك المرض. الفحوصات المخبرية التي أجريت لهؤلاء المرضى هي فحص الهيمو قلوبين، كريات الدم البيضاء، الكالسيوم، وكذلك الصفائح الدموية وكانت النتائج بشكل عام في الحد العادي أي لايوجد اختلاف كبير عن الشخص الصحيح.

Dedication

With my love and appreciation I dedicate this thesis:-

To my father's soul,

To my mother for her endless support and who always prays for me,

To any one who ever taught me,

To my brothers and sisters,

To my colleagues and to all people that I do love and respect.

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LIST OF CONTENTS

Content **Page**

CHAPTER FIVE (DISCUSSION & CONCLUSION)

LIST OF TABLES & FIGURES

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

APC	Antigen Presenting Cells
bFGF	basic fibroblast growth factor
CBC	Complete Blood Count
CD	Cluster of Differentiation
CDRs	Complementary Determining Regions
CNS	Central Nervous System
CRP	C-reactive protein
CT	Computed Tomography
E	Extension
ECOG	Eastern Cooperative Oncology Group
ER	Endoplasmic Reticulum
FDG	Fluorodeoxyglucose
FISH	Fluorescence In Situ Hybridization
FRs	Framework Areas

GA	Golgi Apparatus
Hb	Hemoglobin
I	Intensity
IgG	Immunoglobulin G
IL	Interleukin
M	Mitochondria
MGUS	Monoclonal Gammopathy of Undetermined Significance
MHC	Major Histocompatibility Complex
MIBI	Methoxyisobutylisonitrile
MIG	Monoclonal Immunoglobulin
MM	Multiple Myeloma
MRI	Magnetic resonance imaging
NM	Nuclear Medicine
OAF	Osteoclast Activating Factor
PCLI	plasma cell labeling index
PET	Positron Emission Tomography
POEMS	Polyneuropathy, Organomegaly, Endocrinopathy, Monoclonal gammopathy, and Skin changes syndrome
RNA	Ribonucleic Acid
SIFE	Serum Immunofixation Electrophoresis
SPECT	Single photon emission computed tomography
SPEP	Serum Protein Electrophoresis
STK	Serum Thymidinekinase
Tc-99m-	Technetium-99m Methylene Diphosphonate

MDP	
TGF	Transforming Growth Factor
TNF	Tumor Necrosis Factor
UIFE	Urine Immunofixation Electrophoresis
UPEP	Urine protein electrophoresis
VEGF	Vascular Endothelial Growth Factor