ROLE OF MULTI PARAMETRIC MRI IN THE EVALUATION OF MALIGNANT RENAL MASSES

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By

Ahmad Ibrahim Sayed

M.B., B.Ch.

Supervised By

Prof. Dr. Dalia Zaki Zidan

Assistant Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Dr. Aya Yassin Ahmed

Lecturer of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University

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دور التصوير باشعة الرنين المغناطيسى متعدد الأطوار
فى تقييم الكتل الكلويه السرطانية

رسالة

توطئة للحصول على
درجة الماجستير في الأشعة التشخيصية

مقدمة من

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بكالوريوس الطب والجراحة

تحت إشراف

أ. د. داليا زكى زيدان

أستاذ مساعد الأشعة التشخيصية
كلية الطب
جامعة عين شمس

د. آيه ياسين أحمد

مدرس الأشعة التشخيصية
كلية الطب
جامعة عين شمس

كلية الطب

جامعة عين شمس

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Contents

List Of Figures

List of Tables

List of Abbreviations

3D FSPGR	three dimensional fast spoiled gradient echo
3D MR	*Three Dimensional Magnetic Resonance*
3T	Three Tesla
ADC	Apparent Diffusion Coefficient
CDC	Collecting Duct Carcinoma
CT	Computed Tomography
ccRCC	clear cell renal cell carcinoma
DCE MR	Dynamic Contrast Medium Enhanced Magnetic Resonance
DTI	diffusion-tensor imaging
DWI	Diffusion Weighted Imaging
EPI	echoplanar imaging
ESRD	End-Stage Renal Disease
ERCP	Endoscopic Retrograde Cholangiopancreatography
FLASH	Fast Low Angle Shot
FFE	Fast Field Echo
FISP	Fast Imaging with Steady state Precession renal disease
Gd	Gadolinium
GRE	gradient echo
GI	Gastrointestinal
GFR	Glomerular Filtration Rate
H&E	hematoxylin-eosin
HASTE	Half Fourier single-shot turbo spin echo sequence
ISSs	integrated staging systems
IVC	Inferior Vena Cava

IVU	Intravenous Urography
MIP	Maximum Intensity Projection
Msec	Millie second
MRU	*Magnetic Resonance Urography*
MT	Magnetization Transfer
MRI	Magnetic Resonance Imaging
MRCP	Magnetic Resonance Cholangiopancreatography
NSF	Nephrogenic systemic fibrosis
NFD	nephrogenic fibrosing dermopathy
NK-κB	nuclear factor kappa B
PRL	primary renal lymphoma
PSIF	The reversed FISP sequence
RF	Radiofrequency
RMC	Renal Medullary Carcinoma
RCC	Renal Cell Carcinoma.
RARE	Rapid Acquisition with Relaxation Enhancement
ROI	Area of Interest
SSTSE	Single shot turbo spin echo
SNR	signal-to-noise ratio
Sec	Second
SPAIR	SPectral Attenuated Inversion Recovery
STIR	Short TI Inversion Recovery
SE	Spin Echo
TSE	turbo spin echo
TCC	Transitional Cell Carcinoma
TNM	Primary tumor, lymphnode, metastases
TRs	short repetition times
UUT TCC	Upper Urothelial Tract Transitional Cell Carcinoma
VIBE	Volume Interpolated Body Examination
VR	Volume rendering

VHL	Von-Hippel Lindau

Introduction

Introduction

Globally there are over 200,000 new cases of renal cancer per year, with more than 100,000 deaths and the incidence is increasing at around 2% per year in Europe and North America **[Woodward et al., 2011]**. For 2011 it is estimated that about 61,000 new cases will be diagnosed and approximately 13,000 patients will die from this disease in the US [**Siegel et al., 2011]**.

Renal cell carcinoma (RCC) accounts for 80–90% of all renal malignancies and the overall 5 year survival rate is approximately 45% **[Szendroi et al., 2010]**.

Renal masses are a common finding in sectional imaging. Thus, distinguishing the different tumor types, such as clear cell renal cell carcinoma (ccRCC) and transitional cell carcinoma (TCC), is crucial for the decision-making process and determining the appropriate (interventional) therapy options. Functional magnetic resonance imaging lends hope of being able to facilitate differentiation between renal malignancies and benign lesions. In this regard, several studies have investigated different functional magnetic resonance (MR) techniques such as dynamic contrast medium-enhanced (DCE) MR, arterial spin labeling, MR spectroscopy, blood oxygen level-dependent MR, and diffusion-weighted MR imaging (DWI) **[Palmowski et al., 2010]** & [**Thoeny and Keyzer, 2011]** .

By Diffusion weighted technique, T1 signal characteristics of a renal lesion appear to be related to the apparent diffusion coefficient (ADC) of the lesion.

ADC may be helpful in characterizing and differentiating renal masses **[Zhang et al., 2009]**. MR urography can also be used to evaluate the urinary tract and has the advantage of not using ionizing radiation and the potential to provide more functional information than CT **[Silverman et al., 2009]**.

Aim of the Work