

# ***Role of MRI in assessment of adrenal masses***

## ***Essay***

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In Radiodiagnosis*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ  
الْحَكِيمُ"

صدق الله العظيم

سورة البقرة الآية (32)

***TO MY  
MOTHER, FATHER,  
AND BROTHERS,***

***TO***

***WHOM I AM OVERWHELMINGLY INDEBTED TO,  
THANK YOU AND GOD  
BLESS YOU***

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**LIST OF ABBREVIATIONS**

<b>A</b>	: Amplitude.
<b>ACC</b>	: Adrenocortical carcinomas.
<b>ACTH</b>	: Adrenocorticotrophic hormone.
<b>ADC</b>	: Apparent diffusion coefficient.
<b>AP</b>	: Anteroposterior
<b>ASR</b>	: The adrenal-to-spleen ratio.
<b>AU</b>	: Arbitrary units.
<b>Cho</b>	: Choline.
<b>CMV</b>	: Cytomegalovirus.
<b>Cr</b>	: Creatine.
<b>CRH</b>	: Corticotrophin releasing hormone.
<b>DWI</b>	: Diffusion-weighted imaging.
<b>FH</b>	: From feet to head.
<b>FIRM</b>	: Fast inversion-recovery motion- insensitive.
<b>FOV</b>	: Field of view.
<b>FSE</b>	: Fast spin-echo.
<b>GRE</b>	: Gradient echo.
<b>HASTE</b>	: Breath-hold half-Fourier transform single shot spin-echo.
<b>HU</b>	: Hounsefield unit.
<b>Hz</b>	: Hertz.
<b>IP</b>	: Inphase images.
<b>IV</b>	: Intravenous.
<b>LIP</b>	: lipid.

<b>MIBG</b>	: Meta-iodobenzylguanidine.
<b>mmol/kg</b>	: Millimol per kilogram.
<b>MPGs</b>	: Motion-probing gradients.
<b>MP-RAGE</b>	: Magnetization prepared rapid acquisition gradient echo.
<b>MRS</b>	: Magnetic resonance spectroscopy.
<b>Msec</b>	: Millisecond.
<b>NB</b>	: Neuroblastoma.
<b>NTs</b>	: Neuroblastic tumors .
<b>OP</b>	: Out-of-phase.
<b>P</b>	: Probability value.
<b>ppm</b>	: Parts per million.
<b>PPNAD</b>	: Primary pigmented nodular adrenocortical disease.
<b>PPV</b>	: Positive predictive value.
<b>RARE</b>	: Rapid acquisition with relaxation enhancement.
<b>RARE</b>	: Rapid acquisition with relaxation enhancement.
<b>RF</b>	: Radio-frequency.
<b>ROI</b>	: Regions of interest.
<b>S/mm<sup>2</sup></b>	: Seconds per millimetre squared.
<b>SAR</b>	: Specific absorption ratio.
<b>SE</b>	: Spin-echo.
<b>SE-EPI-SSH</b>	: Single-shot echoplanar technique.
<b>SENSE</b>	: Sensitivity encoding.
<b>SGE</b>	: Spoiled Gradient-Echo.
<b>SGRE</b>	: Spoiled gradient recalled-echo.
<b>SIs</b>	: Signal intensities.
<b>SNR</b>	: Signal-to-noise ratio.

### III | LIST OF ABBREVIATIONS

<b><i>SPIR</i></b>	: Spectrally selective inversion recovery.
<b>SSFSE</b>	: Single shot fast spin echo.
<b>T</b>	: Tesla.
<b>TE</b>	: Echo time.
<b>TR</b>	: Repetition time.
<b>Turbo FLASH</b>	: Turbo fast low-angle shot.
<b>VS</b>	: Versus.
<b>WDHA</b>	: watery diarrhea, hypochlorhydria, and alkalosis syndrome.
<b>2D</b>	: 2-dimensional.
<b>3D</b>	: 3-dimensional.

## **LIST OF FIGURES**

<b>FIGURE 1.1:</b> TRACING PHOTOGRAPH OF A NEONATAL KIDNEY AND ADRENALS .....	8
<b>FIGURE 1.2:</b> IN SITU LOCATION OF THE ADRENAL GLANDS .....	9
<b>FIGURE 1.3:</b> NORMAL ANATOMICAL RELATIONSHIP OF THE ADRENAL GLANDS .....	10
<b>FIGURE 1.4:</b> MICROSCOPIC SECTION DEMONSTRATING THE LAYERS OF THE ADRENAL CORTEX .....	11
<b>FIGURE 1.5:</b> MICROSCOPIC ANATOMY OF THE ADRENAL GLANDS. ....	12
<b>FIGURE 1.6:</b> ANATOMICAL RELATIONS OF THE LEFT ADRENAL GLAND DURING AN OPEN SURGERY .....	14
<b>FIGURE 1.7:</b> ANATOMICAL RELATIONS OF THE RIGHT ADRENAL GLAND DURING AN OPEN SURGERY .....	16
<b>FIGURE 1.8:</b> ARTERIAL SUPPLY AND VENOUS DRAINAGE OF THE ADRENAL GLANDS .....	18
<b>FIGURE 1.10:</b> THE NORMAL ADRENAL GLANDS ON T1W SGRE .....	20
<b>FIGURE 1.11:</b> NORMAL ADRENAL GLAND BY MRI IC CARCINOMA.....	23
<b>FIGURE 1.12:</b> RIGHT ADRENAL CORONAL T1-WEIGHTED IMAGE .....	23
<b>FIGURE 3.1:</b> BENIGN ADRENAL ADENOMAS ON IP AND OP MR IMAGES.....	24
<b>FIGURE 3.2:</b> NORMAL Y-SHAPED ADRENAL GLAND .....	50
<b>FIGURE 3.3:</b> DIAGRAM SHOWING DIFFUSION OF WATER MOLECULES .....	52
<b>FIGURE 3.4:</b> DIAGRAM SHOWING MEASURING WATER DIFFUSION .....	55
<b>FIGURE 3.4:</b> DIAGRAM SHOWING MEASURING WATER DIFFUSION .....	56
<b>FIGURE 3.5:</b> PLANNING FOR THE MR SPECTROSCOPY SEQUENCE .....	62
<b>FIGURE 3.5 CONTINUED:</b> PLANNING FOR THE MR SPECTROSCOPY SEQUENCE .....	63
<b>FIGURE 3.6:</b> RESPIRATORY ARTIFACTS IN DIFFERENT PATIENTS_ .....	66
<b>FIGURE 4.1:</b> RIGHT ADRENAL ADENOMA .....	74
<b>FIGURE 4.2:</b> LEFT ADRENAL ADENOMA .....	75
<b>FIGURE 4.3:</b> WELL-CIRCUMSCRIBED HOMOGENEOUS LEFT ADRENAL ADENOMA .....	76
<b>FIGURE 4.4:</b> ADRENAL ADENOMA .....	76
<b>FIGURE 4.5:</b> ADRENAL ADENOMA IN DIFFERENT PULSE SEQUENCES .....	78
<b>FIGURE 4.6:</b> MRI OF ADRENAL ADENOMAS .....	80



<b>FIGURE 4.6 CONTINUED: MRI OF ADRENAL ADENOMAS</b> .....	81
<b>FIGURE 4.7: ADRENAL CORTICAL CARCINOMA</b> .....	83
<b>FIGURE 4.7 CONTINUED: ADRENAL CORTICAL CARCINOMA</b> .....	84
<b>FIGURE 4.8: ADRENAL CORTICAL CARCINOMA, LARGE MASS OF THE LEFT ADRENAL GLAND</b> .....	85
<b>FIGURE 4.8 CONTINUED: ADRENAL CORTICAL CARCINOMA OF THE LEFT ADRENAL GLAND</b> .....	86
<b>FIGURE 4.9: ADRENAL HAEMORRHAGE</b> .....	88
<b>FIGURE 4.10: ADRENAL MYELOLIPOMA</b> .....	89
<b>FIGURE 4.11: PHEOCHROMOCYTOMA</b> .....	90
<b>FIGURE 4.11 CONTINUED: PHEOCHROMOCYTOMA</b> .....	91
<b>FIGURE 4.12: PHEOCHROMOCYTOMA</b> .....	92
<b>FIGURE 4.13: MRI OF GANGLIONEUROMA</b> .....	94
<b>FIGURE 4.14: NEUROBLASTOMA</b> .....	95
<b>FIGURE 4.15: ADRENAL CORTICAL HYPERPLASIA</b> .....	96
<b>FIGURE 4.16: ADRENAL METASTASIS</b> .....	97
<b>FIGURE 4.17: ADRENAL METASTASIS FROM RENAL CELL CARCINOMA</b> .....	97
<b>FIGURE 4.17 CONTINUED : ADRENAL METASTASIS FROM RENAL CELL CARCINOMA</b> .....	98
<b>FIGURE 4.18: ADRENAL CYST</b> .....	99
<b>FIGURE 4.19: ADRENAL PSEUDOCYST</b> .....	100
<b>FIGURE 4.20: LEFT ADRENAL MASS HAEMORRHAGE</b> .....	100
<b>FIGURE 4.21: LYMPHANGIOMA</b> .....	101
<b>FIGURE 4.22: DIFFERENT ADRENAL CYSTIC LESIONS</b> .....	102
<b>FIGURE 4.22 CONTINUED: DIFFERENT ADRENAL CYSTIC LESIONS</b> .....	103
<b>FIGURE 4.23: ADRENAL HISTOPLASMOSIS</b> .....	104
<b>FIGURE 4.24: BILATERAL LYMPHOMATOUS DEPOSITS</b> .....	104
<b>FIGURE 4.25: BOX PLOT OF ADC VALUES FOR LIPID-RICH AND LIPID-POOR ADRENAL ADENOMA</b> ....	106
<b>FIGURE 4.26: 57-YEAR-OLD MAN WITH LIPID-POOR ADRENAL ADENOMA</b> .....	107
<b>FIGURE 4.27: FEMALE PATIENT WITH LIPID-RICH ADRENAL</b> .....	107
<b>FIGURE 4.28: MALE PATIENT WITH ADRENAL METASTASIS FROM HEPATOCELLULAR CARCINOMA</b> ....	108

<b>FIGURE 4.29:</b> MALE PATIENT WITH ADRENAL CORTICAL CARCINOMA .....	109
<b>FIGURE 4.30:</b> BOX PLOT SHOWS ADC VALUES FOR DIFFERENT TYPES OF ADRENAL LESIONS. ....	109
<b>FIGURE 4.31:</b> POINT-RESOLVED MULTIVOXEL MR SPECTROSCOPY OF ADRENAL ADENOMA .....	112
<b>FIGURE 4.32:</b> RECEIVER OPERATING CHARACTERISTIC CURVES FOR DIFFERENT ADRENAL LESION.....	113
<b>FIGURE 4.33:</b> POINT-RESOLVED MULTIVOXEL MR IN ADRENAL PHEOCHROMOCYTOMA .....	116
<b>FIGURE 4.34:</b> POINT-RESOLVED MULTIVOXEL MR IN ADRENAL CARCINOMA .....	116
<b>FIGURE 4.35:</b> POINT-RESOLVED MULTIVOXEL MR IN ADRENAL METASTASIS .....	117

**LIST OF TABLES**

***Table 4.1: Staging of adrenal carcinoma.....84***

***Table 4.2: Comparison of MR Spectroscopy Choline-Creatine Ratio Results.....114***

***Table 4.3: Comparison of MR Spectroscopy Choline-Lipid Ratio Results.....114***

***Table 4.4: Comparison of MR Spectroscopy Lipid-Creatine Ratio Results.....114***

***Table 4.5: Comparison of MR Spectroscopy 4.0 – 4.3 ppm/Creatine Ratio.....115***

# **CONTENTS**

<b><i>Title</i></b>	<b><i>Page No.</i></b>
Introduction and Aim of the work.....	1
Chapter one: Anatomy of the adrenal gland.....	6
Chapter two: Pathology of adrenal masses.....	25
Chapter three: MRI techniques of adrenal masses.....	43
Chapter four: MRI imaging findings of adrenal masses.....	73
Summary & Conclusion.....	118
References.....	121
Arabic summary	

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## INTRODUCTION AND AIM OF WORK

## **INTRODUCTION**

Adrenal masses are common incidental findings in patients undergoing computed tomographic (CT) or magnetic resonance imaging (MRI) examinations for other purposes (*Mansmann et al., 2004*).

Adrenal lesions can be categorized as primary or metastatic, benign or malignant and functioning or nonfunctioning (*Young et al., 2007*).

The majority of adrenal masses is asymptomatic adenomas, and therefore is usually detected on radiological examinations for indications unrelated to the adrenal glands (*Savci et al., 2006*).

The adrenal glands are also common sites of metastases during the course of several malignant tumors (*Savci et al., 2006*); adrenal metastasis might contraindicate a curative treatment of the patient and affect survival (*Mitchell et al., 2007*).

Difficulties exists with adrenal imaging remain not only for diagnosis of atypical adenomas but also for detection of other adrenal alterations, such as metastases, pheochromocytomas, and adrenocortical carcinomas (*Faria et al., 2007*).

Adrenal imaging techniques include Unenhanced and contrast material-enhanced CT, MR imaging, and fluorine 18 fluorodeoxyglucose positron emission tomography (PET) (*Faria et al.,2007*).

Sequential noncontrast and contrast-enhanced CT studies are useful for differentiating 'true' adrenal masses from so-called 'pseudo' tumors, which are created by adjacent structures and for evaluating contrast-enhancement patterns (retention and washout of contrast medium) of adrenal masses (*Boland et al., 2008*).

The three-phase CT entails the use of an iodinated IV contrast agent and additional radiation exposure. There is considerable clinical and public interest, and some concern, in the risk of radiation from imaging and CT in particular (*Sandrasegaran et al., 2011*).

Co-registered PET CT studies using a variety of radiopharmaceuticals targeted at various characteristics of adrenocortical and adrenomedullary function provide additional ways of evaluating adrenal masses. These studies simultaneously combine anatomic cross-sectional information with functional, scintigraphic maps, which can improve the differentiation of benign from malignant lesions (*Gross et al., 2009*).

MRI is frequently used to characterize incidentally discovered adrenal masses, especially in instances for which CT is nondiagnostic, such as in the patient with metallic clip artifacts or complex masses with variable density (*Boland et al., 2008*).