Role of MRI in assessment of adrenal masses

Essay

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بسم الله الرحمن الرحيم

"قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنتَ 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

A **:** Amplitude.

ACC **:** Adrenocortical carcinomas.

ACTH **:** Adrenocorticotropic hormone.

ADC **:** Apparent diffusion coefficient.

AP **:** Anteroposterior

ASR **:** The adrenal-to-spleen ratio.

AU **:** Arbitrary units.

Cho **:** Choline.

CMV **:** Cytomegalovirus.

Cr **:** Creatine.

CRH **:** Corticotrophin releasing hormone.

DWI **:** Diffusion-weighted imaging.

FH **:** From feet to head.

FIRM **:** Fast inversion-recovery motion- insensitive.

FOV **:** Field of view.

FSE **:** Fast spin-echo.

GRE **:** Gradient echo.

HASTE **:** Breath-hold half-Fourier transform single shot spin-echo.

HU **:** Hounsefield unit.

Hz **:** Hertz.

IP **:** Inphase images.

IV **:** Intravenous.

LIP **:** lipid.

MIBG **:** Meta-iodobenzylguanidine.

mmol/kg **:** Millimol per kilogram.

MPGs **:** Motion-probing gradients.

MP-RAGE **:** Magnetization prepared rapid acquisition gradient echo.

MRS **:** Magnetic resonance spectroscopy.

Msec **:** Millisecond.

NB **:** Neuroblastoma.

NTs **:** Neuroblastic tumors .

OP **:** Out-of-phase.

P **:** Probability value.

ppm **:** Parts per million.

PPNAD **:** Primary pigmented nodular adrenocortical disease.

PPV **:** Positive predictive value.

RARE **:** Rapid acquisition with relaxation enhancement.

RARE **:** Rapid acquisition with relaxation enhancement.

RF **:** Radio-frequency.

ROI **:** Regions of interest.

S/mm2 **:** Seconds per millimetre squared.

SAR **:** Specific absorption ratio.

SE **:** Spin-echo.

SE-EPI-SSh **:** Single-shot echoplanar technique.

SENSE **:** Sensitivity encoding.

SGE **:** Spoiled Gradient-Echo.

SGRE **:** Spoiled gradient recalled-echo.

SIs **:** Signal intensities.

SNR **:** Signal-to-noise ratio.

SPIR **:** Spectrally selective inversion recovery.

SSFSE **:** Single shot fast spin echo.

T **:** Tesla.

TE **:** Echo time.

TR **:** Repetition time.

Turbo FLASH **:** Turbo fast low-angle shot.

VS **:** Versus.

WDHA **:** watery diarrhea, hypochlorhydria, and alkalosis syndrome.

2D **:** 2-dimensional.

3D **:** 3-dimensional.

LIST OF FIGURES

LIST OF TABLES

CONTENTS

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).***