

## Radiology

**KEYWORDS:** MDCT, CT,  
Adrenal masses

**MULTIPHASIC MRI AND MDCT IN EVALUATION OF  
ADRENAL MASSES- A CROSS-SECTIONAL  
OBSERVATIONAL STUDY**



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INTERNATIONAL JOURNAL  
OF PURE MEDICAL RESEARCH**ABSTRACT**

**Objectives-** To identify adrenal masses and characterize them based on imaging features and invasion using MDCT and MRI.

**Methods-** Based on clinical suspicion of adrenal mass or ultrasonography indicating a adrenal mass, Patients underwent MDCT and MRI of abdomen. Multiple phases were acquired depending on nature of case and whether multiple phases are able to add to or rule out a diagnosis.

**Result-** In the 40 patients who underwent the study-10(25%) were adrenal adenomas,4(10%) myelolipoma, 10(25%) were pheochromocytoma of both benign and malignant type, 2(5%) were adrenocortical carcinoma, 7(20%) were metastatic lesions 1(2.5%) were teratoma, Infectious causes included adrenal tuberculosis in 2 patients (5%) 4 cases (10%) of adrenal hyperplasia.

**Conclusion-** Due to fast acquisition, high spatial resolution, volumetric imaging with multiplanar and 3D reconstruction and better evaluation of vascular anatomy and their relation with the mass contrast enhanced MDCT is a good modality for evaluation and characterization of adrenal masses. MRI has better soft tissue contrast resolution and availability of multiple sequences like 'in phase and out phase imaging, GRE helps to understand characteristics of mass.

**MATERIALS AND METHODS**

This study is conducted in the Department of Radiodiagnosis at a tertiary care hospital in India.

**STUDY DESIGN** - Cross sectional Observational study

**PERIOD OF STUDY** - 1<sup>st</sup> May 2020 to 31<sup>st</sup> October 2021

**SAMPLE SIZE**- The study comprises of 40 patients.

- **Inclusion criteria-** based on clinical suspicion of adrenal pathology or ultrasonography indicating a adrenal mass.
- **Exclusion criteria-** patients with contraindication to contrast ,pregnant females (CT).

**METHODOLOGY**

Based on clinical suspicion of adrenal mass or ultrasonography indicating a adrenal mass, Patients underwent MDCT and MRI of abdomen along with contrast administration at different phases including arterial(30sec), venous(80sec) and delayed phases in our 128 slice SIEMENS SOMATOM scanner and 3T SIEMENS SOMATOM MAGNETOM SKYRA.

Multiple phases were acquired depending on nature of case

and whether multiple phases are able to add to or rule out a diagnosis.

**RESULTS**

In the 40 patients who underwent the study-

- 10(25%) were adrenal adenomas,
- 4(10%) were myelolipoma,
- 10(25%) were pheochromocytoma of both benign and malignant type,
- 2(5%) were adrenocortical carcinoma,
- 7(20%) were metastatic lesions
- 1(2.5%) were teratoma
- Infectious causes included adrenal tuberculosis in 2 patients (5%)
- 4 cases (10%) of adrenal hyperplasia.

**DISCUSSION**

Adrenals are paired endocrine glands in retroperitoneum enclosed within perinephric fascia. Right adrenal gland is located superior to right kidney. Left adrenal gland is located anterior to superior pole of left kidney. Y, V or T shaped. Central body and two limbs. Adrenal cortex and medulla cannot be differentiated in imaging.

Adrenal masses range from benign to highly malignant lesions. They possess certain properties of contrast uptake and washout which help them to characterize towards a differential diagnosis. Characteristics (eg, lesion size, washout values, the presence of calcification, fat, or haemorrhage, unilateral vs bilateral distribution) provides a road map to reach towards diagnosis. Mean portal venous and delayed enhancement of adenomas at 97 HU (88 to 122 HU) and 62 HU (55–84 HU) was significantly lower than that of pheochromocytomas at 130 HU (80–180 HU) and 73 HU (58–99 HU).

Adrenocortical carcinoma showed heterogenous enhancement with areas of necrosis. 10% cases showed metastases and suspicious adjacent renal involvement was also noted in few cases. In our study - Adenoma showed APW> 65%, RPW>40% while pheochromocytoma showed APW< 50%, RPW <40% which is consistent to already published literature. Calcification were seen in 30% of cases, necrosis was seen in 25% cases- mainly malignant masses. Metastases were seen to involve lungs (20%), lymph nodes (50%),liver (30%).

**CONCLUSION**

Due to fast acquisition, high spatial resolution, volumetric imaging with multiplanar and 3D reconstruction and better evaluation of vascular anatomy and their relation with the mass contrast enhanced MDCT is a good modality for

evaluation and characterization of adrenal masses. MRI has better soft tissue contrast resolution and availability of multiple sequences like 'in phase and out phase imaging, GRE helps to understand characteristics of mass. Use of multiple phases helps to better understand tumour characteristics as well as to assess invasive nature especially vascular invasion.

#### ACKNOWLEDGEMENTS

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#### FUNDING

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#### ETHICAL CLEARANCE

The study design was revised, approved, and ethically cleared by the Bio-medical & Health Research Ethics Committee.

#### COMPETING INTERESTS

The authors declare no conflicts of interest.

#### AUTHOR CONTRIBUTIONS

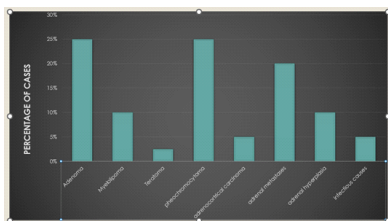
All authors contributed significantly to the conception, design, data collection and writing the study.

#### INFORMED CONSENT

Appropriate informed consent was obtained from the patients.

#### FIGURE LEGENDS

Figure 1: Percentage of cases of various diseases.



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