ISSN: 0976-3031

*Available Online at http://www.recentscientific.com*

*International Journal of Recent Scientific Research*
*Vol. 8, Issue, 1, pp. 15371-15373, January, 2017*

**International Journal of Recent Scientific Research**

**Research Article**

# COMPUTED TOMOGRAPHIC IMAGING OF RENAL MASSES-A PROSPECTIVE STUDY

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**ARTICLE INFO**

***Article History:***

Received 15th October, 2016
Received in revised form 25th November, 2016
Accepted 28th December, 2016
Published online 28th January, 2017

***Key Words:***

CT, Renal neoplasm, nephrographic phase
1st page

**ABSTRACT**

**Objective**: With use of HELICAL CT to compare the enhancement of renal neoplasm and renal cortex and to evaluate the enhancement of renal veins and inferior vena cava during corticomedullary and nephrographic phase.

**Conclusion**

- Renal neoplasm showed greater enhancement in the nephrogenic phase compared with that in corticomedullary phase.
- Renal cortex also showed greater enhancement in the nephrogenic phase compared with that in corticomedullary phase
- Renal veins are best visualized in corticomedullary phase and inferior vena cava is better visualized in nephrogenic phase.



## INTRODUCTION

The widespread use of USG and CT for survey examinations of abdomen has resulted in an increased rate of both neoplastic and non-neoplastic renal masses. Accurate differentiation of a renal neoplasm and a simple cyst or minimally complicated cyst has become an increasingly important CT application. In cases where sonography cannot give a diagnosis of a simple cyst, a dedicated renal CT is indicated. The helical CT scanner permits imaging during various phases of parenchymal enhancement, including corticomedullary, nephrographic and excretory phase. The purpose of the present study is to compare corticomedullary and nephrographic phases in the characterization of a renal mass and to evaluate the characteristics of renal parenchymal enhancement during these two phases.

### *Aims and objectives*

- To study the diagnostic accuracy of helical CT in detection and characterization of renal masses which are considered indeterminate or malignant on ultrasonography.
- To compare the enhancement of renal neoplasm and renal cortex during corticomedullary and nephrographic phase.
- To evaluate the enhancement of renal veins and inferior vena cava during corticomedullary and nephrographic phase.

## METHODOLOGY

- All scans were performed on TOSHIBA ACTIVION 16 slice CT Scanner.
- Patients referred to the department of radio diagnosis with clinical suspicion of renal mass were considered for the study.
- Time period of our study was October 2015 to September 2016 [12months]
- Cases were followed up until the completion of treatment (maximum 6 months).
- Patients with history of trauma were excluded from our study.

### *CT Imaging protocol*

- Triphasic renal CT imaging was adapted for our study.
- Patient was kept nil orally 4 hours prior to the scan
- Routine antero-posterior to program of the abdomen in supine position with breath holding.
- Axial plane sections of 5mm thickness from the level of lung bases to the level of ischial tuberosity.
- IV contrast was infused with suspended inspiration.

## RESULTS

- 33 patients were considered for our study. 20 were males and 13females with maximum age of 82years and minimum age of 22years was noted.

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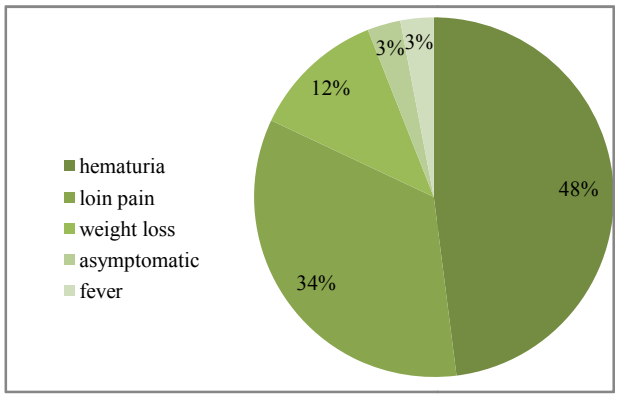
- The main symptoms patients presented were haematuria [48.4%], loin pain [33.3%], and weight loss [12.2%]. Only one patient presented with fever [3%] while one other had come for routine screening and was discovered with renal mass.




***CT attenuation values***

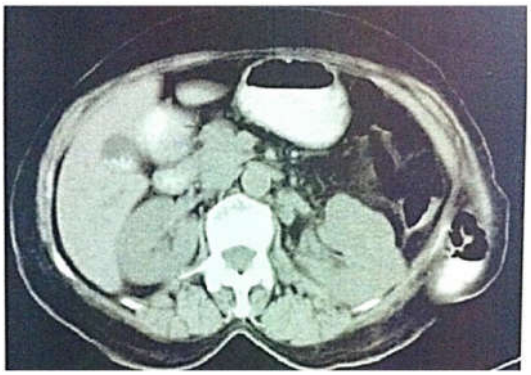
- Mean attenuation values were measured in Hounsfield Units for each renal neoplasm in unenhanced, corticomedullary and nephrographic phase images.
- The mean attenuation values were calculated from the absolute attenuation values in each phase images.
- Lesion enhancement was then determined by measuring the difference in mean attenuation numbers between unenhanced and enhanced images.

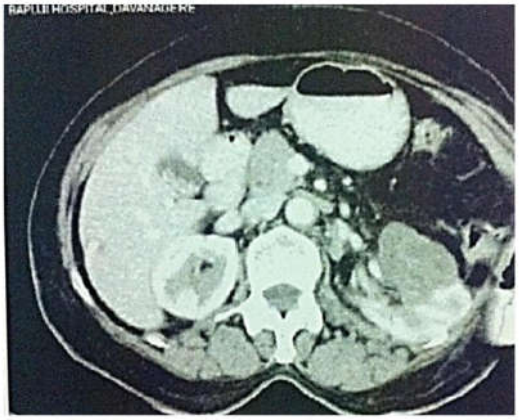
| | | ARTERIAL | | VENOUS | |
|---|---|---|---|---|---|
| Region studied | Unenhanced attenuation (HU) | Corticomedullary phase attenuation | Nephrographic phase attenuation | Corticomedullary phase attenuation | Nephrographic phase (HU) |
| Neoplasms | 23 +/- 7 | 49+/- 22 | 68+/- 26 | 26+/- 14 | 45+/- 19 |
| Cortex | 32 +/- 3 | 137+/- 30 | 163+/- 36 | 105+/- 29 | 131+/- 40 |
| Cysts | 12+/- 2 | 13+/- 1 | 14+/- 2 | 1 +/- 2 | 2+/- 3 |

- The mean attenuation of renal neoplasms in unenhanced phase is 23+/- 7HU.The value increase in corticomedullary phase to 49+/-22 HU and in nephrographic phase to 68+/-26 HU. Of thirty neoplasms, twenty nine neoplasms showed greater enhancement in the nephrographic phase compared with that in corticomedullary phase, one tumour showed greatest enhancement phase, showed less enhancement in nephrographic phase.
- Three radiologically benign cysts were diagnosed in three patients who ranged in age from 22-65 years (mean, 45 years). The average cyst size was 6.3+/- 1.4cm (range: 5.8cms). The mean cyst enhancement was 1+/-2 HU during corticomedullary phase and 2+/- 3 HU during nephrographic phase.

## CONCLUSION

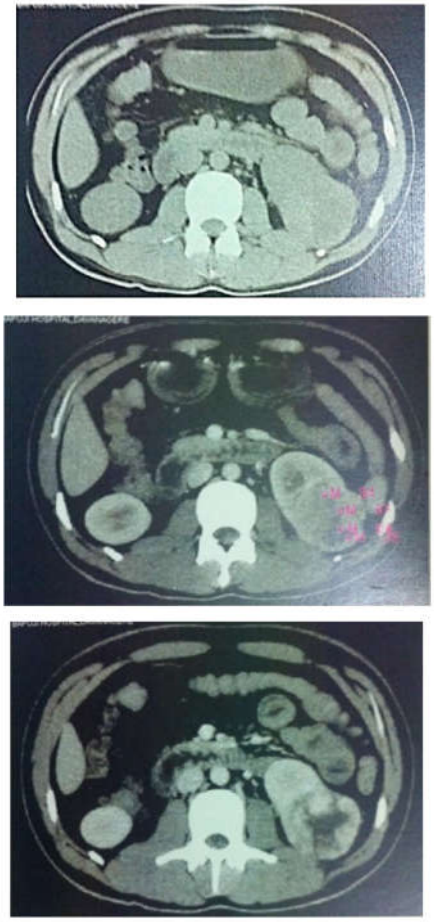
- This study was a prospective study conducted in the department of Radiodiagnosis and Imaging , J.J.M Medical College, to evaluate the role of multiphasic helical CT in the detection and characterization of indeterminate or malignant renal masses on ultrasonography and to compare the enhancement of renal parenchyma during corticomedullary and nephrographic phases.
- Renal neoplasm showed greater enhancement in the nephrographic phase in the nephrographic phase compared with that in corticomedullary phase
- Renal cortex also showed greater enhancement in the nephrographic phase compared with that in corticomedullary phase.
- Renal vein are best visualised in corticomedullary phase and inferior vena cava is better visualised in nephrographic phase.



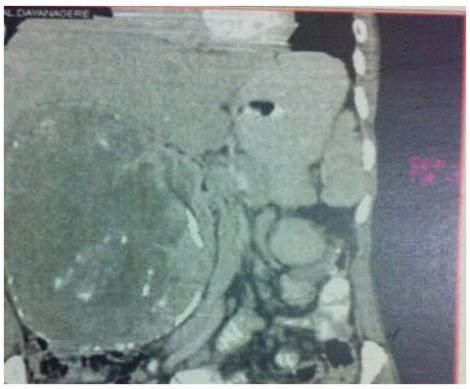


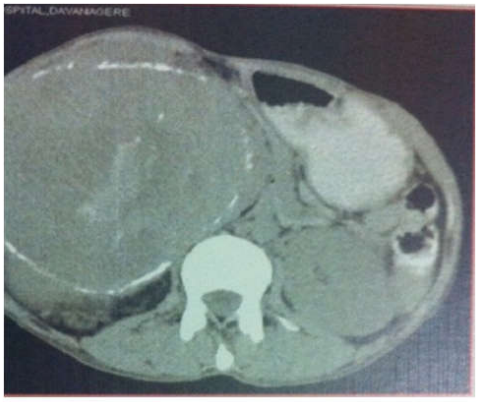
1 CT appearance of renal cell carcinoma: NECT- showing soft tissue exophytic mass in the left kidney.Lesion shows enhancement on contrast administration.

2 CT APPEARENCE OF STAGE III RENAL CELL CARCINOMA: Renal cell carcinoma of right kidney with enhancing retrocaval metastatic lymph node.RCC with enhancing tumour thrombus in the inferior vena cava. RCC with renal vein invasion.



3 CT APPEARANCE OF RENAL ONCOCYTOMA: NECT shows soft tissue exophytic mass with hypodense area in left kidney.CECT shows enhancing shoft tissue mass with non-enhancing hypodensearea representing central scar.





4 CT APPEARANCE OF MULTILOCULAR CYSTIC NEPHROMA: NECT shows large multiseptated cystic lesion with thick calcified wall in the right kidney. Lesion shows no enhancement on contrast administration. Coronal reformatted image showing clearly maintained fat plane all around the lesion.

## References


1. Birnbaum BA, Jacobs JE, RamchandaniP. Multiphasic renal CT: comparison of renal mass enhancement during the corticomedullary and nephrographic phases. *Radiology* 1996; 200:753–758.
2. Cohan RH, Sherman LS, Korobkin M, BassJC, Francis IR. Renal masses: assessment of corticomedullary-phase and nephrographicphase CT scans. *Radiology* 1995; 196:445–451.
3. Herts BR, Coll DM, Novick AC, *et al*. Enhancement characteristics of papillary renalneoplasms revealed on triphasic helical CT of the kidneys. *AJR Am J Roentgenol* 2002; 178:367–372.
4. Bosniak MA, Rofsky NM. Problems in the detection and characterization of small renalmasses. *Radiology* 1996; 198:638–641.
5. Chung EP, Herts BR, Linnell G, *et al*. Analysis of changes in attenuation of proven renal cysts on different scanning phases of triphasic MDCT. *AJR Am J Roentgenol* 2004; 182:405–410.
6. Israel GM, Hindman N, Bosniak MA. Evaluationof cystic renal masses: comparison of CT and MR imaging by using the Bosniak classification system. *Radiology* 2004; 231:365–371.
7. Dechet CB, Zincke H, Sebo TJ, *et al*. Prospective analysis of computerized tomography and needle biopsy with permanent sectioning to determine the nature of solid renalmasses in adults. *J Urol* 2003; 169:71–74.