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MDCT Evaluation of Renal Mass

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Abstract
Aim: *To find out types of lesion(benign/malignant), age & sex distribution and diagnostic yield of MDCT .*
Result: *This study was conducted to evaluate the role of MDCT in detection and characterization of renal masses. This study included 60 patients (38 males:22 females)in the range of 2-69 years. All these patients of renal masses were studied and CT was correlated to differentiate between benign and malignant lesions.*
Conclusion: *MDCT is useful tool for detection and characterization of renal masses.*
Keywords: *MDCT, Renal mass, Renal cell carcinoma, Wilms tumor.*

Introduction

Renal cell carcinoma is the single most common malignancy of the kidney comprising of 3 % of all cancer diagnosed in human[1]. Detection of malignant renal masses and their differentiation from their benign counterparts is vital for management and treatment of patient. Treatment plan is changed accordingly. MDCT with its rapid scanning time and multiplanar reformatting ability has emerged as the single important tool for detection and characterization of renal mass.

Material and study method

The study was carried out on 60 patients within 2 years(october2017-october 2019)from the medical and urological wards of V.S.S Medical college, Burla with provisional diagnosis of renal mass or patients who were diagnosed to have renal mass on ultrasound and referred to CT for further characterization. Patients were evaluated with CANON 160n slice MDCT.

Inclusion criteria

All patients with clinically suspected renal mass

Exclusion criteria

Simple cyst was not included in the study

Results

Table –1 Age distribution of patients

age (in years)	Frequency (n)	Percentage(%)
2- 10	5	8.3
30-39	4	6.7
40-49	5	8.3
50-59	15	25
60-69	31	51.7
Total	60	100

Table- 2 Gender distribution

male	38	63.3%
female	22	36.7%
total	60	100%

Table-3 Renal mass distribution according to age in years

Diagnosis	Age in years					Total	
	2-10	30-39	40-49	50-59	60-69	number	percentage
Renal cell carcinoma	0	0	1	9	26	36	60%
	0	0	2.7%	25%	72.2%		
Wilms tumor	8	0	0	0	0	8	13.3%
	100%	0	0	0	0		
Transitional cell tumor	0	1	0	0	2	3	5%
	0	33.3%	0	0	66.7		
Metastasis	0	0	0	1	2	3	5%
	0	0	0	33.3%	66.7%		
Abscess	0	0	3	0	0	3	5%
	0	0	100%	0	0		
Complex cyst	0	0	4	0	0	4	6.7%
	0	0	100%	0	0		
Oncocytoma	0	0	0	2	0	2	3.3%
	0	0	0	100%	0		
Multilocular cystic nephoma	0	0	0	0	1	1	1.7%
	0	0	0	0	100%		
						60	100%

Table -4 Renal mass according to gender

Diagnosis	No. of patients	Gender	
		Male	Female
Renal cell carcinoma	36	25	11
		69.5%	30.5%
Wilms tumor	8	4	4
		50%	50%
Transitional cell tumor	3	3	0
		100%	0%
Metastasis	3	3	0
		100%	0%
Abscess	3	2	1
		66.7%	33.3%
Complex cyst	4	2	2
		50%	50%
Oncocytoma	2	2	0
		100%	%
Multilocular cystic nephroma	1	0	1
		0	100%

Table -5 CT features of renal mass (malignant)

Renal mass	Calcification	hydronephrosis	necrosis	Ureter	Renal vein	IVC	adrenal	liver	lung	Lymph node
Renal cell carcinoma	13	0	20	0	8	3	3	1	6	12
	36.1%	0	55.6%	0	22.2%	8.3%	8.3%	2.7%	16.7%	33.3%
Wilms tumor	0	0	8	0	3	0	0	1	0	4
	0	0	100%	0	37.5%	0	0	2.7%	0	50%
Transitional cell tumor	0	2	0	3	0	0	0	0	0	0
	0	66.7%	0	100%	0	0	0	0	0	0

Table 6 Attenuation characteristics of individual renal masses

Diagnosis	UE HU	CMP HU	NP HU	CMP-UE HU	NP-UE HU	CMP-NP HU	No.of patients
Renal cell carcinoma	29	65.3	85.2	36.3	56.2	19.9	36
Wilms tumor	24.5	47.5	53	23	28.5	5.5	8
metastasis	26	44.5	64.5	18.5	38.5	20	3
Transitional cell tumor	12	17	18.9	5	6.9	1.9	3
Abscess	25.3	32.3	42.6	7	17.3	10.3	3
Complex cyst	16.2	22.9	33	6.7	16.8	10.1	4
oncocytoma	30	60	84	30	54	24	2
Cystic nephroma	7	11	11	4	4	0	1

(UE-Un enhanced, CMP-Cortico medullary phage, NP-Nephrogenic phage, HU-Hounsfield unit)

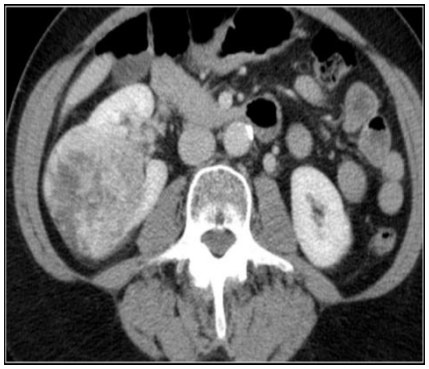

Fig 1 showing right renal cell carcinoma

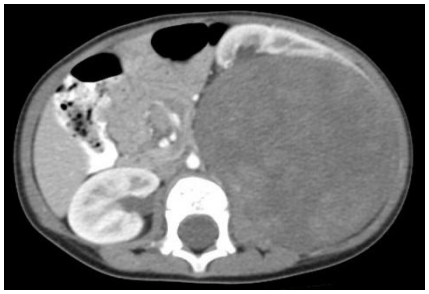

Fig 2 showing Wilms tumor

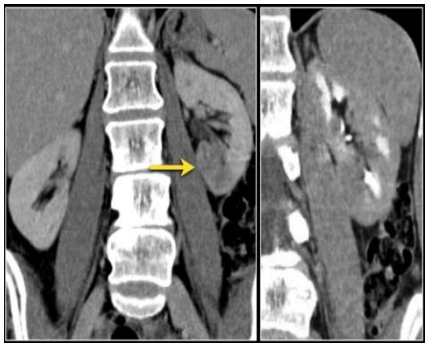

Fig 3 showing transitional cell tumor

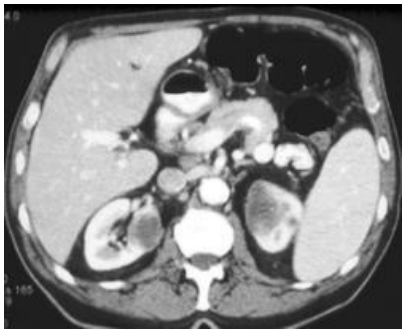

Fig 4 showing renal metastasis

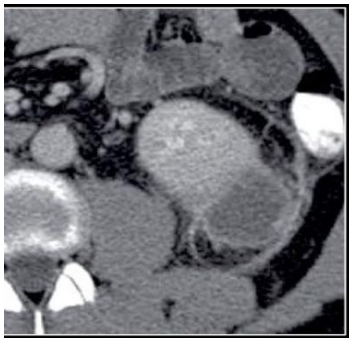

Fig 5 showing renal abscess

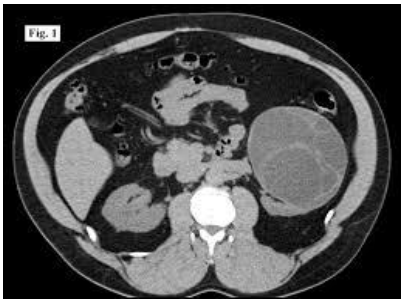

Fig 6 showing complex cyst

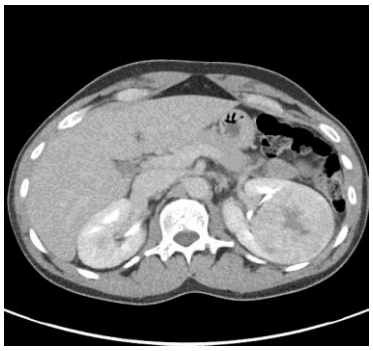

Fig 7 showing oncocytoma-central scar spoke wheel pattern

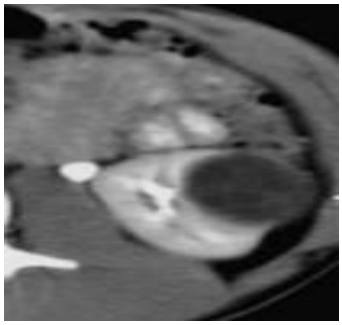

Fig 8 showing multi locular cystic nephroma

Discussion

Regarding age distribution of renal mass, in our study the maximum percentage of patients, 31 (51.7%) were in the age range of 60-69 years.26 out of 36 patients (72.2%) of renal cell carcinoma were in the age range of 60-69 years and was consistent with Gudbjarotsson et al[2] who have found that diagnosis of renal cell carcinoma peaks in 6th decade. 8 out of 8 patients with Wilms tumor were below 10 years of age which was correlated with Lonergan et al[3] who have described that peak incident of wilm tumor is at 3-4 year. Regarding gender distribution of renal mass,in our study male:female=1.7:1. There is male dominance (69.5%) in case of renal cell carcinoma which was well correlated with Verhoest G et al[4].

In our study, out of 60 cases, 50 cases diagnosed to be malignant (83%) and 10 cases diagnosed to be benign (17%). Renal cell carcinoma (n=36) accounted for 60% of renal mass and 72% of malignant renal mass. Transitional cell tumor (n=3) accounted for 5% of renal mass, Wilms tumor (n=8) accounted for 13.3% of renal mass, metastasis (n=3) accounted for 5% of renal mass, complex cyst (n=4) accounted for 6.7 % of renal mass, renal abscess (n=3) accounted for 5% of renal mass, multilocular cystic nephroma(1) accounted for 1.7% of renal mass. This was consistent with Smith et al[5]. Regarding image characteristics of renal mass, in our study calcification has been seen 13 out of 36 case of renal cell carcinoma(36.1%). Malignant renal masses showed more amount of necrosis when compared to the bening renal masses (55.6% in RCC and 100% in Wilms tumor). Renal vein invasion has been seen 22.2% cases of RCC and 37.5% cases of Wilms tumor. 3 out of 36 (8.3%) cases of RCC showed inferior renal vein thrombosis.

The most common site of metastasis from RCC was to lymphnode (33.3%) and from Wilms tumor was to lymphnode (50%). This study was well correlated with Zagoria et al[6]. In our study, from table-6 renal cell carcinoma displayed soft tissue attenuation on precontrast study and HU of 65.3% and 85.3% n CMP and NP respectively which was correlated with Garant et al[7] and Jinaki et al[8] where they have showed RCC being very vascular tumor showing significant enhancement (>20 HU) in CMP and NP. In our study, we compared the CMP and NP to the UE phase and increase in 20 HU was taken as malignant. This was well correlated with Kopka et al[9] study who have evaluated the combination of UE, CMP and NP in detection of renal mass.

Conclusion

Evaluation of renal mass by MDCT can provide information regarding extent of the lesion, lesion enhancement pattern, surrounding structure invasion. Differentiation of renal mass into benign and malignant lesion is possible by the enhancement pattern used in CT scan so that clinician can take proper decision on patient's treatment and management. So MDCT is certainly a sensitive tool for detection and characterization of renal mass.

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