

EVALUATION OF RENOMEGALY BY ULTRASOUND IN A RURAL POPULATIONBalathimmaiah Akkala¹, Jagan Mohan Reddy², Mala Venkata Ramanappa³, Panil Kumar B. E⁴, Kaipa Janardhan Reddy⁵¹Professor and HOD, Department of Radio-diagnosis, Santhiram Medical College and General Hospital, Nandyal, Kurnool, Andhra Pradesh.²Assistant Professor, Department of Radio-diagnosis, Santhiram Medical College and General Hospital, Nandyal, Kurnool, Andhra Pradesh.³Professor, Department of Radio-diagnosis, Santhiram Medical College and General Hospital, Nandyal, Kurnool, Andhra Pradesh.⁴Professor, Department of Radio-diagnosis, Santhiram Medical College and General Hospital, Nandyal, Kurnool, Andhra Pradesh.⁵Assistant Professor, Department of Radio-diagnosis, Santhiram Medical College and General Hospital, Nandyal, Kurnool, Andhra Pradesh.**ABSTRACT****BACKGROUND**

Renomegaly is easily picked up by ultrasound examination. Improved computer technology led to improved resolution which further made Ultrasonography the 1st line of investigation in the evaluation of renomegaly.

MATERIALS AND METHODS

This is a cross sectional study of renomegaly in rural patients who attended SRGH as in patients or out patients with renomegaly. Only previously diagnosed and operated cases were excluded.

RESULTS

Hydronephrosis was the most common condition and lymphoma was least common condition.

CONCLUSION

Ultrasonography is a very effective modality in diagnosis of renomegaly. Characterization of renal masses into solid or cystic is excellent.

KEYWORDS

Simple Cyst, Complex Cyst, Hypernephroma, Polycystic Kidney, Renal Trauma, Pyonephrosis, Pyelonephritis and Lymphoma.

HOW TO CITE THIS ARTICLE: Akkala B, Reddy JM, Ramanappa MV, et al. Evaluation of renomegaly by ultrasound in a rural population. J. Evid. Based Med. Healthc. 2018; 5(51), 3527-3532. DOI: 10.18410/jebmh/2018/719

BACKGROUND

Renomegaly is best detected with ultrasonography.¹ CT or MRI is required to further characterisation of the lesion. Renal size is related to sex, age and built of the patient. Normal size of the kidneys in females is 9.5 cm -12.5 cm and that of males is 10.1 -12.6 cm. Renal size is smaller in infants and children. We have considered renomegaly when the kidney size is more than 12.7 cm. American college of Radiology appropriateness criteria for evaluation of renomegaly awards 8 points for ultrasound, 9 points for C.T. with contrast (high radiation) and 8 points for MRI. Hence the renal ultrasound plays very important role particularly in Indian conditions.

Financial or Other, Competing Interest: None.

Submission 23-11-2018, Peer Review 26-11-2018, Acceptance 13-12-2018, Published 17-12-2018.

Corresponding Author:

Dr. Jagan Mohan Reddy,

Assistant Professor,

Department of Radio-diagnosis,

Santhiram Medical College and General Hospital,

Nandyal-518501, Kurnool Dist., Andhra Pradesh.

E-mail: drbalathimmaiah@yahoo.com

DOI: 10.18410/jebmh/2018/719

**Causes of Renomegaly-****Cystic Diseases-**

- Cortical cysts - simple & complex
- Parapelvic cysts
- Medullary cysts
- Medullary sponge kidney
- Polycystic kidney diseases
- Multicystic dysplastic kidney
- Acquired cystic kidney disease
- Von-Hippel -landau disease
- Tuberos sclerotic
- Renal cystic disease associated with neoplasm
- Multilocular neoplasm

Infections

- Pyonephrosis
- Pyelonephritis
- Emphysematous pyelonephritis
- Obstructive hydronephrosis

Renal Tumours

- Renal cell carcinoma
- Transitional cell carcinoma

- Adenocarcinoma
- Lymphoma
- Oncocytoma
- Leukaemia
- Wilm’s tumour
- Metastasis
- Sarcomas

Aims and Objectives

To evaluate various causes of renomegaly by ultrasonography and to study their prevalence in rural patients. Secondly to help the surgeon in selecting cases for surgery or medical management.

MATERIALS AND METHODS:

This study was done at Santhiram General Hospital (SRGH) during the period from 2014 to 2017. During this period 60 cases of renomegaly were detected. Some of them were further evaluated by C.T. Operated cases were analysed with ultrasound findings. Early detection of renomegaly characterization helps clinician plan the treatment.

This is a prospective study of renomegaly in the department of Radio-diagnosis of SRGH Nandyal. Sixty cases of renomegaly were detected.

Exclusion Criteria

Glomerulonephritis, Goodpasture syndrome.

RESULTS

The present study was done for a period of 36 months from November 2014. Patients from 0 to 75 years having renomegaly were studied. The youngest in our study was 2 months old and oldest was 75 years. The male female ratio was 3:2, (male patients were 36, female patients 24). More number of patients were between 40 and 60 years.

Sl. No.	Age	No.	Males	Female	Percentage
1	0-10	2	0	2	3.3
2	11-20	5	3	2	8.3
3	21-30	7	4	3	11.7
4	31-40	9	6	3	15
5	41-50	10	6	4	16.7
6	51-60	16	12	4	26.7
7	61-70	10	5	5	16.7
8	71-80	1	0	1	1.6
	Total	60	36	24	100

Table 1. Age Wise Distribution of Cases

Sl. No.	Age	No.	Males	Females	% of
1	Renal Cysts	9	7	2	15
2	Complex Renal Cysts	2	2	0	3.8
3	Polycystic Kidneys	7	1	6	11.2
4	Hydronephrosis	18	10	8	30
5	Solid Masses	11	7	4	18.2

6	Trauma	1	1	0	1.7
7	Pyelonephritis and Pyonephrosis	10	4	6	16.7
8	XGP	1	1	0	1.7
9	Lymphoma	1	0	1	1.7
	Total	60	36	24	100%

Table 2. Renomegaly Character Wise

The most common cause of renomegaly in present study is hydronephrosis constituting 30% followed by solid masses with 18.2% as shown in the above table. The male Female ratio was 3:2. Involvement of both kidneys was less common than one side kidney involvement. Younger people of 20-30 years of age group showed more predilection for hydronephrosis. Though patients all ages were involved, the mean age is 30 yrs.

The main cause of hydronephrosis was calculus disease accounting to 60% followed by pelviureteric junction obstruction. The incidence was more during 3rd decade. The unilateral hydronephrosis was seen more on left side (60%). Two cases were due to Pelviureteric junction obstruction and a case showed crossed fused ectopic with upper moiety hydronephrosis. Bilateral hydronephrosis was present in 6 cases out of which 2 cases were secondary to pelviureteric junction obstruction, one case secondary to bladder outlet obstruction, 2 secondary to carcinoma cervix and another secondary to carcinoma urinary bladder.

The second common pathology in present study was solid lesions of kidney. It included renal cell carcinoma and angiomyolipoma. The most common disease was renal cell carcinoma accounting to 91% (10). Among these predominant in males (7) than females (4). One Angiomyolipoma was seen. Renal cell carcinoma was more prevalent in 5th and 6th decades, whereas in females this was prevalent in 5th and 6th decades. Two cases occurred in 6th decade.

Renal cell carcinoma was seen predominantly in males with M: F ratio of 7:3. It was predominantly seen in 6th decade of life. Out of 10 cases 6 (60%) cases were hypo echoic, 2 were hyper echoic and 1 was isoechoic on Ultrasonography. One cases which was considered as complex cyst turned out to be cystic renal cell carcinoma.

Third common condition Pyelonephritis and pyonephrosis were seen in 10 cases accounting for 16.7% of all renomegaly. Mean age was 45 years, predominantly seen in 5th decade more in females (M:F 2:3). These cases kidneys showed diffusely enlarged with altered echogenicity and corticomedullary junction changes namely loss of cortico-medullary differentiation and prominent renal sinuses.

Out of 10 cases 3 were of tubercular aetiology. In Tubercular pyelonephritis cases showed infundibular stenosis. Scarring of renal parenchyma.

Renal cysts were seen predominantly in older age groups from 40 to 80 years with the mean age of 60 years. It was common in 6th decade. It was common in males. Multiple cysts of different sizes in both kidneys seen.

Two cases of complex cysts were diagnosed on ultrasound. Complex cysts were common in age group of 41-50 years and males. They were well defined hypoechoic lesions with internal septations. Polycystic kidney disease was seen in 7 cases showed multiple well-defined anechoic areas. These cases showed enlarged kidneys with loss of corticomedullary differentiation.



Figure 1. USG Image of Right Hydronephrosis showing Dilated Calyces and Pelvis



Figure 2. USG Image showing Adult Polycystic Kidney Disease



Figure 3. USG Image showing Adult Polycystic Kidney Disease



Figure 4. USG Image showing Septated Cortical Cyst in Right Kidney



Figure 5. USG Image showing Left Renal Cortical Cyst



Figure 6. USG Image showing Right Renal Cyst with Mural Nodule



Figure 7. CT Axial Image showing Subcapsular Abscess in Right Kidney



Figure 8. CT Plain Study Axial Image showing Left Renal Mass



Figure 12. CT Scan showing Emphysematous Pyelonephritis



Figure 9. CT Contrast Image showing Left Renal Cell Carcinoma showing Non-Homogenous Enhancement Due to Necrosis

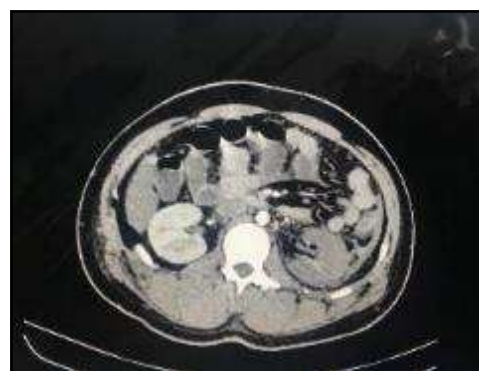


Figure 13. CT Scan Axial Image showing Avascular Left Kidney and Renal Vein Thrombus



Figure 10. CT Axial Image showing Multiloculated Cyst in Left Kidney



Figure 14. CT Scan Axial Image showing Avascular Left Kidney and Renal Vein Thrombus



Figure 11. CT Scan Sagittal Image showing Emphysematous Pyelonephritis



Figure 15. USG Image showing Left Kidney Pyelonephritis



Figure 16. USG Image showing Peri Renal Haematoma in Right Kidney

DISCUSSION

Our study consisted of 60 cases. Renomegaly was dealt under the headings of simple cysts, complex cysts, hydronephrosis, pyonephrosis, solid lesions and polycystic renal disease, and others. Pyonephrosis and hydronephrosis were the predominant group with dilation of pelvicalyceal system with aetiologies of calculus, Pelviureteric junction obstruction and bladder outlet obstruction. Some of these cases showed splaying of PCS some showed large dilated communicating PCS with septae and with thinned out cortex without colour flow on Doppler which correlates with A study conducted by Ellis et al.²

Cysts were detected in older age group predominately in 6th decade. As per Bosniak³ classification. Both simple and septate showed cysts various levels septal thickening and calcifications. These cysts fall into grade 1 simple cysts, grade 2 septate cysts and grade 3 thick septate cysts. Most of these cysts fall in to these three categories. Cysts of varying sizes were noted in both kidneys. These were well defined sharply marginated anechoic lesions with thin wall and distal acoustic enhancement. No vascularity on colour Doppler. These were mainly seen in the cortex. 4 cases had parapelvic cysts.

Donoald Lotham King, et al⁴ in 1972 claimed 90% accuracy in detecting renal masses. They reported 88% accuracy in differentiating cystic renal masses. In present study the accuracy of detecting solid renal masses was 96%. As per complex renal cysts it was 50%. In case of simple cysts 100%. Out 152 cases out of which 121 were confirmed. Incorrectly diagnosed cases 12. In present study only one case went wrong this may be due to improved resolution in ultrasound units. A study by Douglass A Lingard et.al, in 1979 showed 95% accuracy in differentiating renal pathologies. Renal masses 85% accuracy. Complicated cysts 95%, simple cysts 100% accuracy, polycystic diseases and extra renal lesion 100% accurate. On comparison this study showed 100% accuracy in renal cysts, 85 accurate in case of complex renal cysts, 95% accurate in case of solid masses.

Histologic diagnosis of renal masses is done by biopsy or post-surgery. In present study 3 atypical renal masses were finally diagnosed as renal cell carcinoma on biopsy. Hence USG guided FNAC of ATYPICAL renal masses is very essential. More so in complex renal cysts with solid areas to

rule out malignancy. In 1982, Michel A. Fieldberg et al⁵ has presented a case of multilocular cystic renal cell carcinoma which was thought as multilocular cystic lesion on FNAC.

Sonography is accurate in differentiating classic polycystic kidney⁶ disease from moderate hydronephrosis. In our study 7 cases polycystic kidney diseases were diagnosed with 100% accuracy. These cases showed multiple small cysts of varying sizes with thin wall and distal acoustic enhancement with no vascularity on colour Doppler.

In 1983, BR Subramanyam et.al.³ diagnosed pyonephrosis with persistent internal echoes, dispersed or dependent. Dilated pelvicalyceal system was present. They classified them in to three groups. Group I included the collecting system distended with anechoic urine.

Group 2 internal echoes within the fluid-filled collecting system.⁷

Group 3 had thick internal contents. The study proved high degree of accuracy of 96% in the differentiation of pyonephrosis⁸ with mean age group of 46.75 years with male predominance.

One case showed urine debris level in renal pelvis and in urinary bladder. Four cases of emphysematous pyelonephritis showed gas with in PCS with dirty shadowing. All these cases had gross pyuria and macrophages and bacterial growth in urine are positive.

Out of 12 cases, 3 cases were proved to be tubercular aetiology.⁹ In our study also 3 cases of tubercular aetiology diagnosed.

In his study John H, Cronan et al¹⁰ observed an accuracy of 91% by CT, 70% by ultrasound in staging renal cell carcinoma. In present study we diagnosed 11 cases as RCC. One of them turned out to be angiomyolipoma accounting to an accuracy of 91.2%. In our study the majority 7 RCC were hypoechoic lesions. 2 hyperechoic lesions 1 mixed echogenicity. Four cases showed. Renal vein and 2 cases IVC thrombosis.

We compared present study with Barry B Goldberg¹¹ study only one case of necrotic tumour was mistaken as complex cyst. We have diagnosed all the cystic lesions correctly. Hence ultra sound has got good accuracy in evaluating renomegaly and can be used as primary evaluating modality. Simple cysts were picked up with 100% accuracy. Hydronephrosis and pyonephrosis with 100% accuracy. Solid complex lesions with more than 90% accuracy making ultrasonography¹² the investigation choice to start with.

CONCLUSION

Ultrasonography is the first-choice investigation to pick up renal lesions although C.T. is necessary to establish the characterization and staging whenever malignancy is strongly suspected. It is widely available. It is a simple, safe, quick and radiation free investigation.

Ultrasonography along with Doppler gives almost 100% diagnostic confidence in renal cysts and hydronephrosis and in cases of renal pyonephrosis and renal abscess.

Careful assessment of cyst outline and internal contents (mural lesions) is necessary to differentiate them from cystic renal cell carcinomas.

Ultrasound guided biopsy or FNAC is helpful for correct diagnosis in cases of complex cysts and solid renal mass lesions.

US plays an important role in the characterization and up to certain extent, staging of solid malignancies. CT Examination is always required in further characterizing the masses.

REFERENCES

- [1] Bartrum RJ. Introduction. In: Winsberg F, Cooperberg PL. eds. Real-time ultrasonography. New York: Churchill Livingstone 1982:1-5.
- [2] Barnett E, Morley P. Ultrasound in the investigation of space occupying lesions of the urinary tract. *BJR* 1971;44(526):733-742.
- [3] Subramanyam BR, Raghavendra BN, Bosniak MA, et al. Sonography of pyonephrosis: a prospective study. *AJR Am J Roentgenol* 1983;140(5):991-993.
- [4] King DL. Renal ultrasonography: an aid in the clinical evaluation of renal masses. *Radiology* 1972;105(3):633-640.
- [5] Feldberg MA, van Waes PF. Multilocular cystic renal cell carcinoma. *AJR Am J Roentgenol* 1982;138(5):953-955.
- [6] Damascelli B, Lattuada A, Musumeci R, et al. Two-dimensional ultrasonic investigations of the urinary tract. *BJR* 1968;41(491):837-843.
- [7] Hidalgo H, Dunnick NR, Rosenberg ER, et al. Parapelvic cysts: appearance on CT and sonography. *AJR Am J Roentgenol* 1982;138(4):667-671.
- [8] Coleman BG, Arger PH, Mulhern CB, et al. Pyonephrosis: sonography in the diagnosis and management. *AJR Am J Roentgenol* 1981;137(5):939-943.
- [9] Cohen HL, Moore WH. History of emergency ultrasound. *J Ultrasound Med* 2004;23(4):451-458.
- [10] Cronan JJ, Zeman RK, Rosenfield AT. Comparison of computerized tomography, ultrasound and angiography in staging renal cell carcinoma. *J Urol* 1982;127(4):712-714.
- [11] Goldberg BB, Ostrum BJ, Isard HJ. Nephrosonography: ultrasound differentiation of renal masses. *Radiology* 1968;90(6):1113-1118.
- [12] Holm HH, Kristensen JK, Rasmussen SN, et al. Ultrasound as a guide in percutaneous puncture technique. *Ultrasonics* 1972;10(2):83-86.