Sudan University of Science and Technology

College of Graduate Studies

Characterization of Renal Lesions Using Computed Tomography Imaging

توصيف الافات الكلويه باستخدام التصوير المقطعي

A Thesis S ubmitted for Partial Fulfillment of the Requirements of M.sc Degree in Diagnostic Radiological Technology

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2018

الأيـــــة

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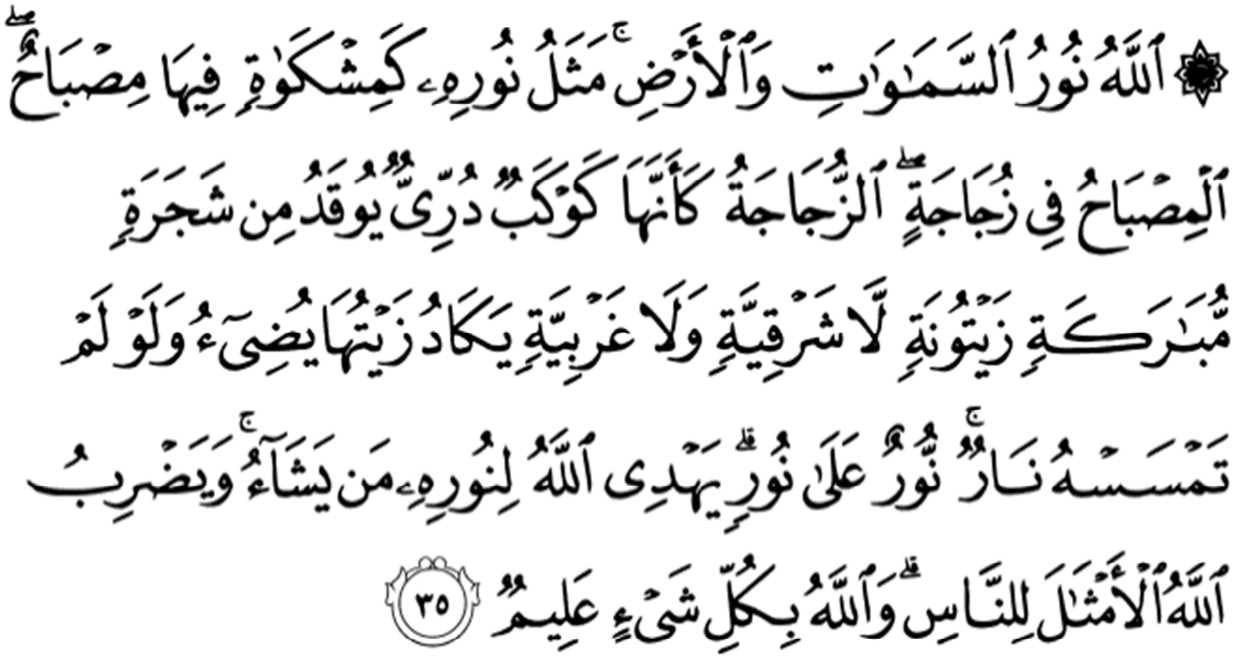
قال تعالى



صدق الله العظيم
سورة النور الاية (35).

Dedication

To

My Father, Mother and Brothers

Acknowledgments

This research project would not have been possible without the support of many people. The author wishes to express his gratitude to my supervisor, Dr. Asmaa Ibrahem Ahmed Elamein who was abundantly helpful and offered invaluable assistance, support and guidance.
Special thanks also to all my graduate friends, especially group for sharing the literature and invaluable assistance.
Not forgetting to my best friend who always been there.

Abstract

This was a descriptive and analytic study, the main objective of this study was to Characterize Renal Lesions using computed tomography. The study was conduct at the Al zytuona Hospital and altamyouz center for emergency During the period from February 2018 to march 2018, Data was collected from patients referred to the computed tomography scan department . the study included (50) patients from different ages , male and female having different renal lesions . study has come out with many result including that The renal lesions most common in male (60%) than female (40%), The most effected group between (41-60) years ,the most common lesions to be found was stone (46%), cyst (36%) , mass (10%)cyst+mass(8%) respectively, Common site of renal lesion at the region of lower pole (50%) , Cortex (22%) , Upper pole (16%) ,

Middle pole (12%) respectively **.** Therefore Radiological examination alone is most suitable in order to diagnose the normal and abnormal appearance and structure.The study recommended that Computed tomography should applied as a best tool to diagnosis renal lesion. So it is provide measurement ct number,teture, and shape of the lesion .

الخلاصه

تعتبر هذه الدراسه وصفية تحليليه كان الهدف الرئيسي من هذه الدراسه لتوصيف الافات الكلويه باستخدام الاشعه المقطعيه أجريت هذه الدراسه في مستشفى الزيتونه ومركز التميز للطوارئ والاصابات في الفتره من فبراير 2018 وحتى مارس 2018 . شملت الدراسه 50 مريض من مختلف الفئات العمريه زكور واناث بمختلف الآفات الكلويه . وجدت الدراسه عدة نتائج للافات الكلويه حيث أن الذكور بنسبة (60%) أكثر تأثرا من الاناث بنسبة (40%)

وكانت الفئه العمريه الأكثر تأثرا بين (41-60) سنه وأكثر الآفات شيوعا التي اكتشفت هي الحصاوي في الكلى بنسبة (46%) تليها التكيسات بنسبة (36%) ثم الاورام بنسبة والأورام بنسبة (10%) تليها التكيسات والأورام بنسبة (8%) على التوالي ووجد أن اكثر الأماكن عرضة كانت الجزء السفلي بنسبة (25%) ثم القشره بنسبة (22%) ثم الجزء العلوي بنسبة (16%) ثم الجزء الأوسط بنسبة (12%) على التوالي وقد أوصت الدراسه باستخدام الاشعه المقطعيه كأداه لتشخيص الافات الكلوية حيث توفر القياسات والرقم المحوسي والشكل واليه لكل مرض .

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List of Abbreviations

CT	Computed Tomography
CTU	Computed Tomography Urography
CM	Contrast Media
IV	Intra Venous
KUB	Kidney Ureter Bladder
MRI	Magnetic Resonance Imaging
MDCT	Multi Detector Computed Tomography
RCC	Renal Cell Carcinoma
TCC	Transional Cell Carcinoma
UJPO	Uretrio Pelvic junction obstruction
US	Ultra Sound

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CHAPTER ONE

1.1Introduction

The increasing indication for abdominal CT, MRI, and US has led to increased incidental detection of small solid renal masses.

With this increase in the number of smaller tumors discovered, there has been concomitant increase in the rate of benign and malignant lesions encountered. When a solid renal mass is encountered, the first step is to exclude angiomyolipoma by identifying region of fat within the mass with unenhanced CT [Beland MD, Mayo2007]

If no fat is detected on CT scans, numerous causes are possible, but the main one is the presence of a malignant lesion, such as renal cell carcinoma (RCC) (clear cell, papillary, and chromophobe subtypes), metastasis, or lymphoma, or of a benign lesion, such as oncocytoma, angiomyolipoma with minimal fat, granuloma, or an inflammatory lesion. [Beland MD, Mayo2007]

Contrary to past trends whereby all enhancing solid renal masses were treated as RCC and proof of malignancy was obtained after nephrectomy [Bosniak MA,et,1993], biopsy of renal tumors is now largely use in the evaluation of small renal tumors and has been found safe, accurate, and cost-effective Biopsy also is recommended as an aid in differentiating benign from malignant tumors [Ramzi M, Marberger,2009].

A major reason for deciding on renal tumor biopsy is that imaging alone is often insufficient for differentiating the benign versus malignant nature of solid renal tumors without fat [Beland MD, Mayo2007].

However , studies have shown that some imagin2g features and the degree of enhancement on CT imaging are helpful in differentiating renal cortical

tumor subtype, despite overlap, and that some CT finding can be used to characterize benign tumors. [Zhang J, Lefkowit 2007]

Segmental enhancement inversion in the corticomedullary and excretory phases has been found to be a characteristic enhancement pattern of oncocytoma, and homogeneous and prolong enhancement or a sufficient percentage of voxels and pixels with negative attenuation at histogram analysis has been found useful for chatacterizing angiomyolipoma without visible fat at CT. [Zhang J, Lefkowit 2007]

1.2 Research problem:-

There are increasing in the rate effecting of the renal lesion wide spread the world, especially in Sudan.

And most of this cause is hereditary and with availability and develop of CT we can diagnosis early and have proper treatment.

The Computer Tomography has ability to make diagnosis more simply and easy, and can be the first procedure in renal disease.

There are interface in renal diseases in the textures and shapes, whether it's malignant or benign, as routinely to differentiate between them done biopsy which is invasive way, therefore this study aim to find radiology or CT features which can reduce invasive biopsy procedure.

1.3 Objectives

1.3.1 General objective:-

To characterize the renal lesion using CT.

1.3.2 specific objective:-

1- To calcify the renal diseases (cystic and solid).

2- To characterize size and determine site for each case.

3- To correlate CT finding with pt, gender, clinical finding and site .

1.4 Significant of the study:-

This study will reveal changes in the renal lesion using of CT. So the purpose of this study is to diagnose Accurate and clear details of renal lesion changes .

1.5 Overview of the study:-

The study will fall into five chapters, Chapter one consists of introduction that about the renal lesion , objectives, significant of the study and the overview of the study. Chapter two included the literature review, Chapter three detailed the material and methods, Chapter four included the presentation of the results, and finally chapter five include the discussions, conclusion, recommendation.

CHAPTER TWO

Anatomy of the Kidneys

2-1-Location:-

The kidneys are a pair of organs found along the posterior muscular wall of the abdominal cavity. The left kidney is located slightly more superior than the right kidney due to the larger size of the liver on the right side of the body. Unlike the other abdominal organs, the kidneys lie behind the peritoneum that lines the abdominal cavity and are thus considered to be retroperitoneal organs. The ribs and muscles of the back protect the kidneys from external damage. Adipose tissue known as perirenal fat surrounds the kidneys and acts as protective padding {Molit DL et al 2000}.

2-1-1Structure:-

The kidneys are bean-shaped with the convex side of each organ located laterally and the concave side medial. The indentation on the concave side of the kidney, known as the renal hilus, provides a space for the renal artery, renal vein, and ureter to enter the kidney. {Molit DL et al 2000}.

A thin layer of fibrous connective tissue forms the renal capsule surrounding each kidney. The renal capsule provides a stiff outer shell to maintain the shape of the soft inner tissues. {Molit DL et al 2000}.

Deep to the renal capsule is the soft, dense, vascular renal cortex. Seven cone-shaped renal pyramids form the renal medulla deep to the renal cortex. The renal pyramids are aligned with their bases facing outward toward the renal cortex and their apexes point inward toward the center of the kidney. {Molit DL et al 2000}.

Each apex connects to a minor calyx, a small hollow tube that collects urine. The minor calyces merge to form 3 larger major calyces, which further merge to form the hollow renal pelvis at the center of the kidney.{Molit DL et al 2000}.

The renal pelvis exits the kidney at the renal hilus, where urine drains into the ureter.

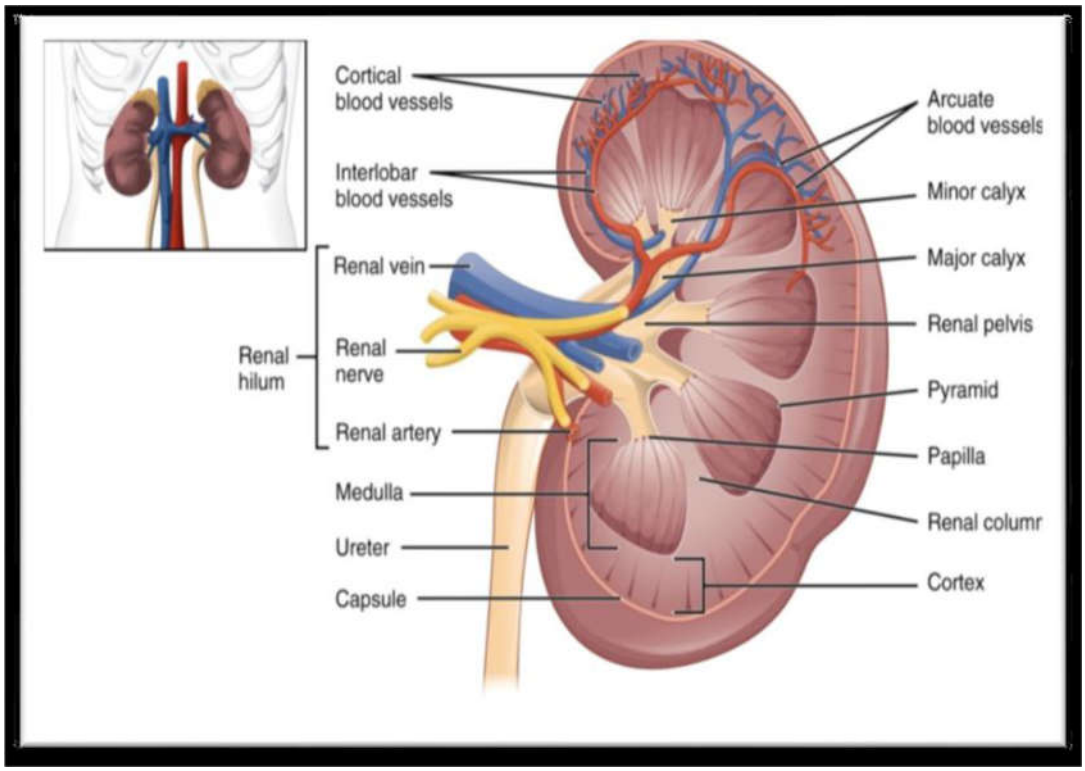


Figure 2.1 : shows cross section renal anatomy.{Molit DL et al 2000}.

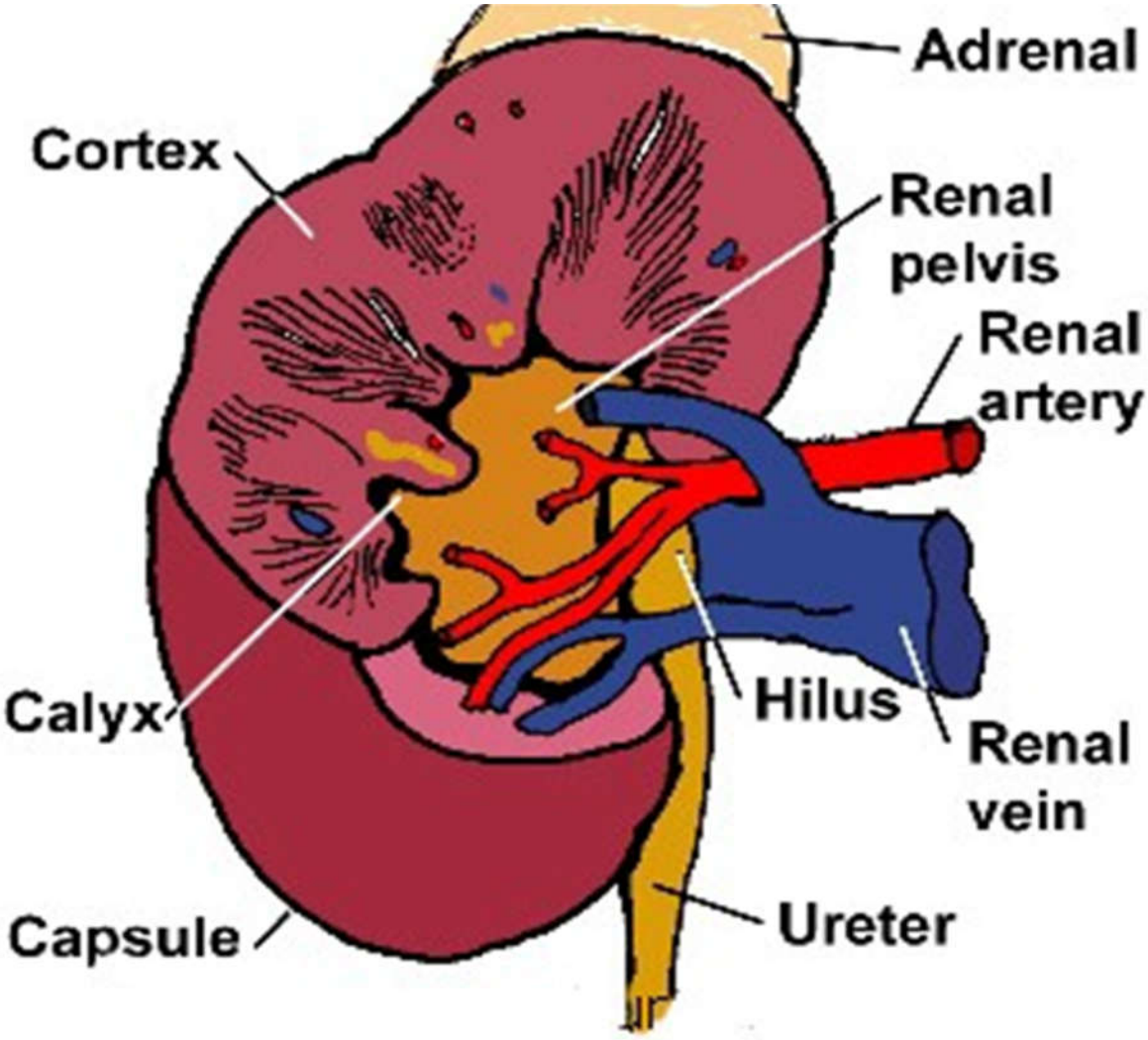


Figure 2.2 show renal site and cross section anatomy{Levy AD et al 2004}

2-1-3 Blood Supply:-

The renal arteries branch directly from the abdominal *aorta* and enter the kidneys through the renal hilus.Inside our kidneys, *the renal arteries* diverge into the smaller afferent arterioles of the kidneys.Each afferent arteriole carries blood into the renal cortex, where it separates into a bundle of capillaries known as a glomerulus.From the glomerulus, the blood recollects into smaller efferent arterioles that descend into the renal medulla.The efferent arterioles separate into the peritubular capillaries that surround the renal tubules.Next, the peritubular capillaries merge to form veins that merge again to form the large *renal vein*.Finally, the renal vein exits the kidney and joins with the *inferior vena cava*, which carries blood back to the heart. .{Molit DL et al 2000}.

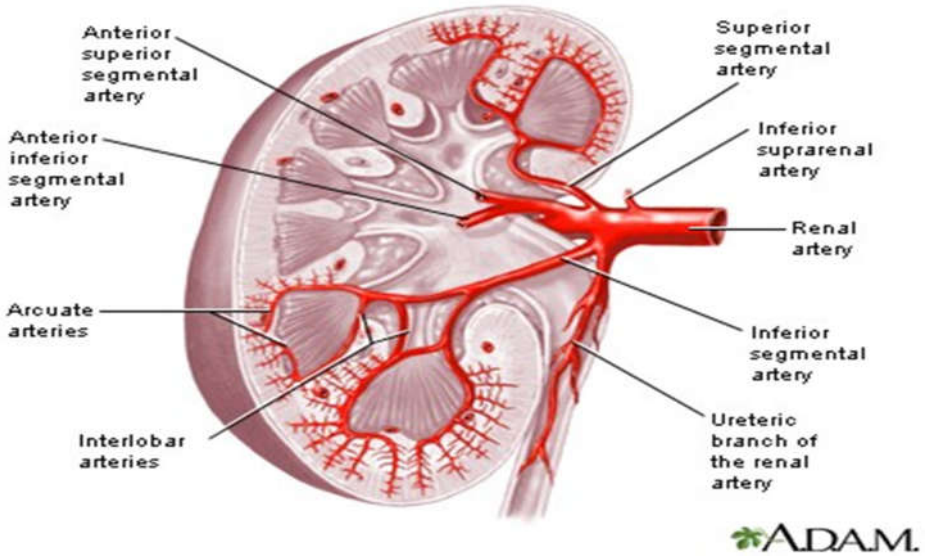


Figure 2.3 show the vascularity of the kidney {Molit DL et al 2000}.

2.2 The Physiology

The kidneys play a major role in the control of the constancy of the internal environment. The blood flowing in kidneys is first filtered is call glomerular filtration so that the all blood constituents, except blood cell and plasma protein, go into the microtubular system. In these tubules, modifications of the filtrate take so that useful substances, including most of the filtered water, are quickly reabsorbed back into the blood. Unwanted substances that escape filtration are actively secreted into the lumen. The final concentration of electrolytes and other constituents of urine are adjusted according to the requirements of the regulation of the extracellular fluid composition. Glomerular filtration, tubular reabsorption and tubular secretion are rightly described as renal mechanisms that allow the kidney to undertake its various homoeostatic functions. Several hormones act on the kidney to enable it to adjust the final composition of urine in response to changes in the internal environment. the special features of renal circulation deserve an early description . These special characteristics are essential for the nephrons to perform their various function. Function of the

Urinary system will be summarized in; Regulation blood volume and pressure,regulating plasma concentration of sodium, potassium , chloride and other ions,stabilizing blood PH,conserving nutrients, and Detoxifying poisons with the liver. (M.Y. sukar, et al 2000).

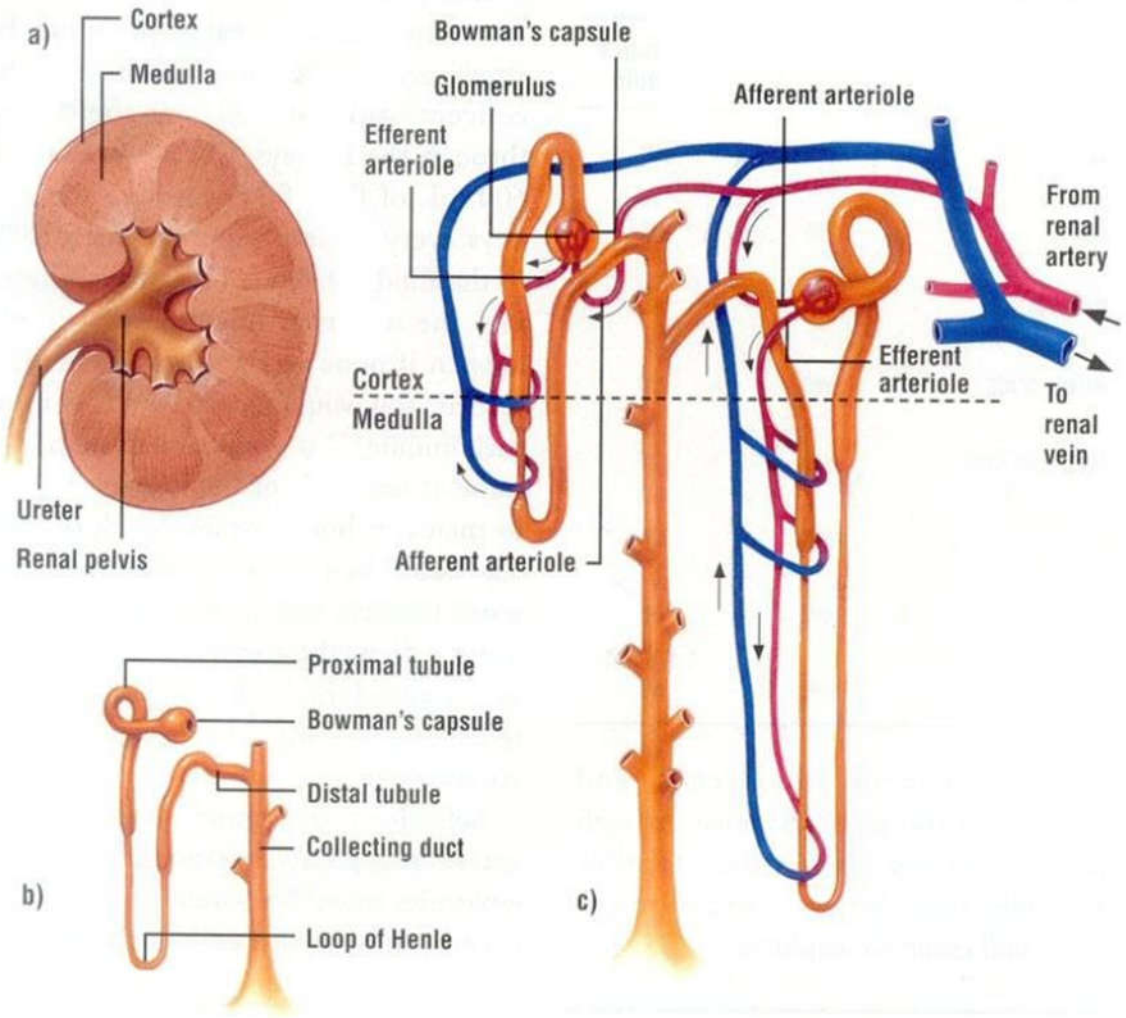


Figure 2.4 show the physiology of kidney

(M.Y. sukar, et al 2000)

2.3 Pathology:-

Congenital

Congenital hydronephrosis

Congenital obstruction of urinary tract Duplex kidneys , or double kidneys , occur in approximately 1% of population. This occurrence normally causes no complication , but can occasionally cause urine infections.

Duplicated ureter occurs in approximately one in 400 live births. Nutcracker syndrome. Polycystic kidney disease:

Autosomal dominant polycystic kidney disease afflicts patients later in life. Approximately one in 1000 people will develop this condition .Autosomal recessive polycystic kidney disease is far less common, but more severe, than the dominant condition. It is apparent in utero or at birth. 7-Renal agenesis. Failure of one kidney to form occurs in approximately one in 750 live births. Failure of both kidneys to form is invariably fatal.

Renal dysplasia Unilateral small kidney Multicystic dyspastic kidney occurs in approximately one in every 240live births.

Ureteropelvic Junction Obstruction or UPJO ; although most cases appear congenital, some appear to be an acquired condition.{Radiographic pathology, Ronald L. Eisenberg 2012}

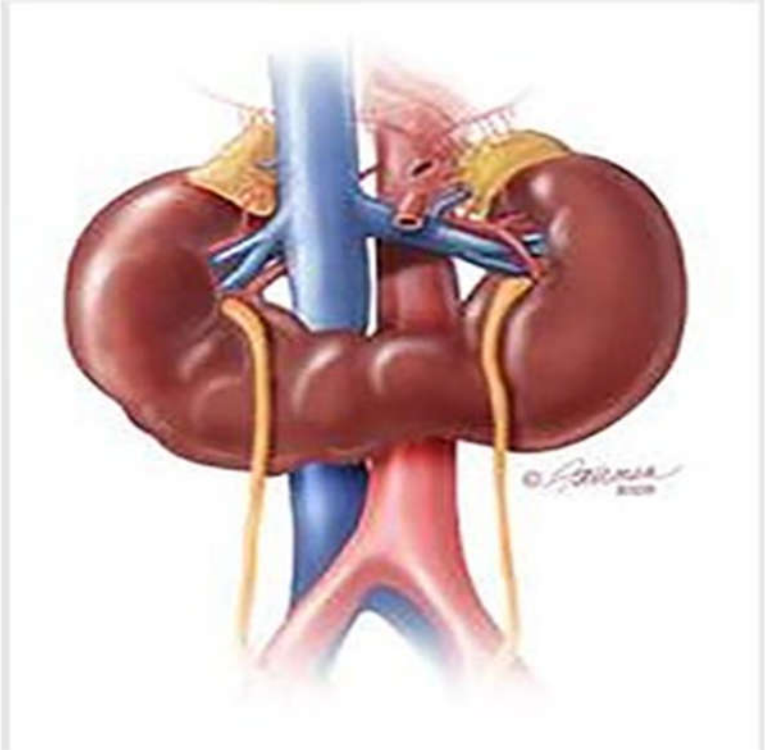


Figure 2.5 :shows horseshoe kidney.{Radiographic pathology,Ronald L.Eisenberg 2012}

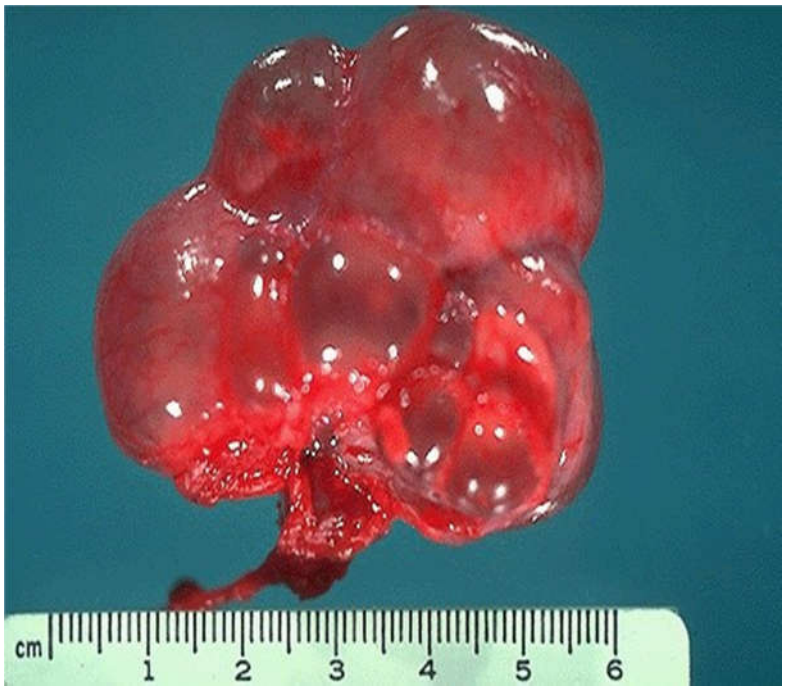


Figure 2.6 shows multicystic kidney.{Radiographic pathology,Ronald L.Eisenberg 2012}

Acquired

Diabetic nephropathy. Glomerulonephritis . Hydronephrosis is the enlargement of one or both of the kidneys caused by obstruction of the flow of urine. Interstitial nephritis Kidney stones (nephrolithiasis) are a relatively common and particularly painful disorder. Kidney tumor : .Wilms tumor. Renal cell carcinoma. Lupus nephritis. Minimal change disease. In nephritic syndrome, the glomerulus has been damaged so that a large amount of protein in the blood enters the urine. Other frequent features of the nephritic syndrome include swelling, low serum albumin, and high cholesterol. Pyelonephritis is infection of the kidneys and is frequently caused by complication of a urinary tract infection Renal failure: Acute renal failure. Chronic kidney disease {Levy AD et al 2004}

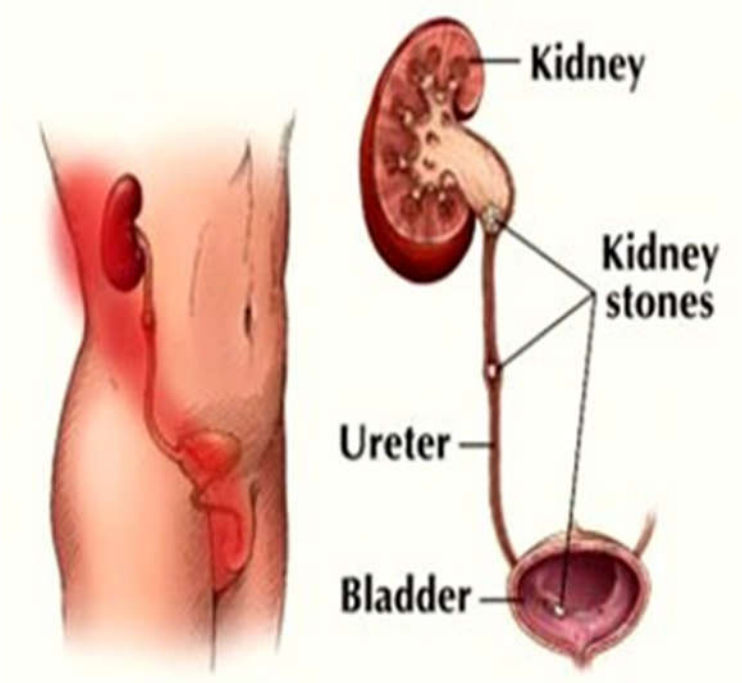


Figure 2.7: shows kidney stones

{Levy AD et al 2004}

2.1.4Principles of Computed tomography (CT):

Computed tomography (CT) was first introduced as a clinical tool in 1971 when Drs. Godfrey Hounsfield and James Ambrose successfully diagnosed a brain tumor in a 41-year-old woman. In its most basic form, a rotating X-ray beam emits ionizing radiation of a defined thickness, which is used to irradiate the patient from numerous projections. Detectors located on the other side of the patient, opposite the source of the beam, register the amount of radiation that has penetrated through the patient. By calculating these values for numerous projections, a two dimensional image of a specified thickness is generated. These images possess contrast resolution that is far superior to conventional radiography, demonstrating the ability to distinguish substances of only slightly different densities. Once such a 2-D image is acquired, the patient is advanced through the CT gantry for a predefined distance, and then the process is repeated. This is known as "step-and-shoot" technology(G. Bongartz et al .2004).

2.1.4.1Spiral CT imaging:

Method of CT imaging was allowing for uninterrupted scanning during continuous patient advancement through the gantry, thus describing a spiral or helical pattern of data acquisition .With the introduction of spiral CT came the need to start thinking differently (G. Bongartz et al .2004).

2.1.4.2 Generation OF CT:

First Generation: The CT scanners (early 1970s) have single detector and the combination of both translate and rotate motions, scan times were very long: of the order of a few minutes(fig 2:10)(Greg 2001).

Second Generation: The Second generation CT scanners (fig2:11) were developed to decrease scan times. Theyhad a narrow fan-beam of x-rays and a small numberof detectors. Multiple projections wereacquired simultaneously (one per detector) duringeach translation and therefore the number oftranslations required was reduced accordingly(Greg 2001).

Third Generation: The Third generation is that shown in (fig2:12), i.e. the fan beam

of x-rays is wide enough to cover the full width of the patient and therefore no translation motion is required. The x-ray tube and detector arc rotate only. The arc of detectors may contain up to 1000 individual detectors(Greg 2001).

Fourth Generation: The Fourth generation scanners the detectors form a complete ring around the patient and only the x-ray tube has to rotate. These scanners may use up to nearly 5000 individual detectors.A fourth generation CT scanner is depicted in(fig2:13)(Greg 2001)

Fifth Generation: The fifth generation of CT scanners has eliminated all mechanical motion by using an x-ray tube with an anode that forms a circular arc of about 210◦ around the patient. The scanning motion is achieved by using magnetic fields to sweep the electron beam along the anode. This Scanner can acquire a complete set of projection data in as little as 50 MS and is designed specifically for cardiac imaging(fig2:14)(Greg 2001).

Helical CT: The conventional way in which CT is used is to keep the patient stationary during the scanning process. Scanning is then halted while the patient is positioned, using a motorized table-top, for the next scan(Greg 2001).

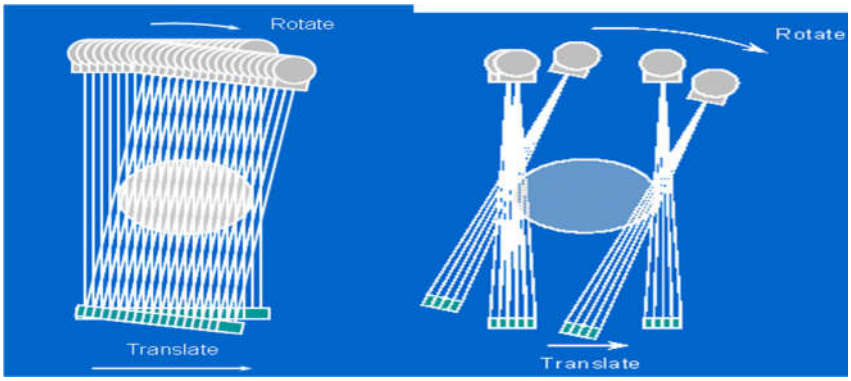
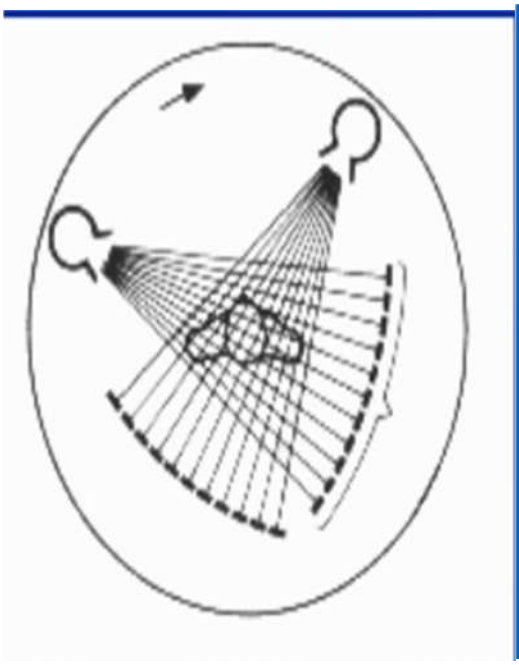


Fig (2:10) Shows First generation

Fig (2:11) Shows second generation



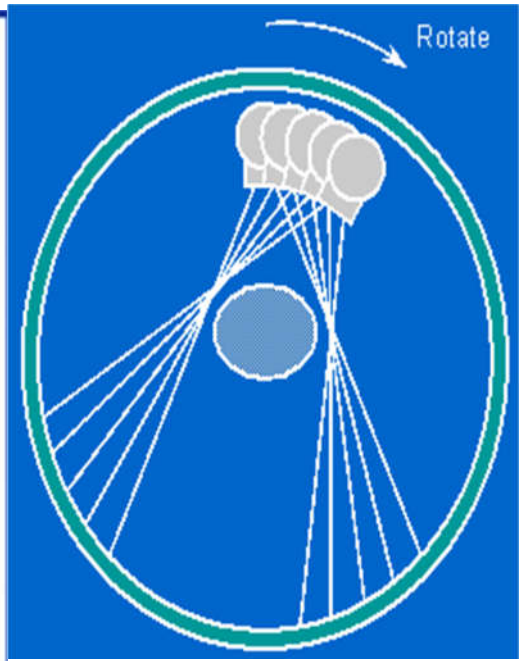


Fig (2:12) Shows third generation Fig (2:13) Shows fourth generation

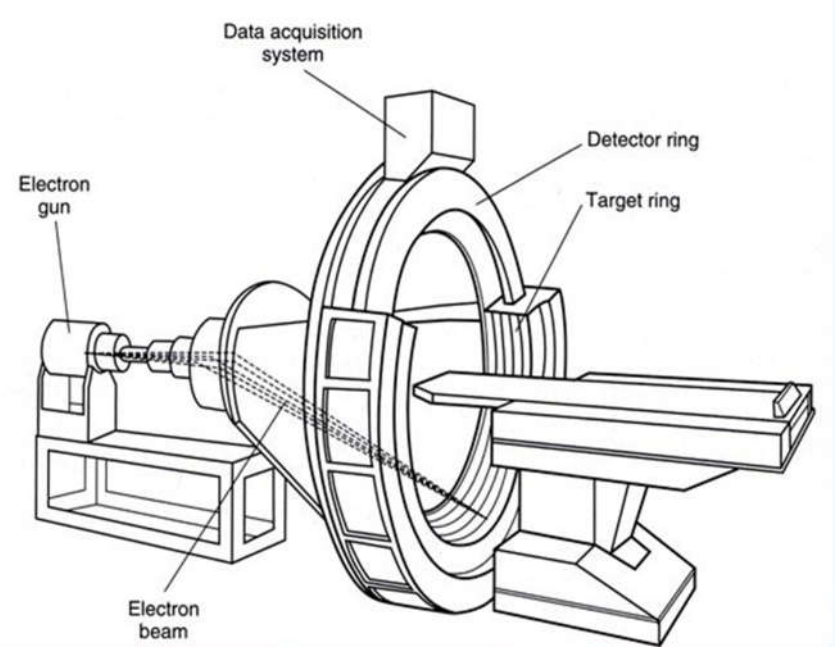


Fig (2:14) Shows fifth generation

2.1.5Technique of abdomen :

2.1.5.1 Patient's preparation:

For adequate examination of the abdomen and pelvis by CT, sometimes we need to opacity the gastrointestinal tract by an orally administrated contrast material (gastrographin 38%). (D Karthikeyan 2005).

The contrast material is diluted by water to a concentration of 2-4% and taken orally by the patient at intervals to opacity the Gl tract from the stomach to the anus. The amount of contrast material and the intervals of intake are subject to great variations.

Patient should be fasting 4-6 hours before the examination. Patients indicated for IV contrast injection are injected with 4-5 ampules (20 ml each) as a bolus just before The start of examination, flow rate 1.5-2 ml/sec, scan delay 75-80 sec.

Non contrast scans should be obtained before contrast Injection when examining specific organs such as the liver, spleen, kidney and urinary bladder(D Karthikeyan 2005).

2.1.5.2 Patient position:

Patient in supine position, feet first on scanner table, the arms are raised and placed behind the patients head, out of scan plane.Median sagittal plane is perpendicular to the center of the table top and the coronal plane is parallel to it. The scanner table height is adjusted to ensure that the coronal plane alignment light is at the level of the mid-axillary line(M .Mahfouz 2007).A Tomogram is obtained to include the diaphragm and pubis, the scans are performed during normal inspirationGantry angle zero, for general abdomen 10 mm slice thickness and 10 mm table increments are selected through the entire abdomen for the spleen use less slice thickness 5 mm 5 mm table increments.In the multidetector CT (MDCT) facilities we may obtain reconstructed images in the sagittal and coronal planes which are very helpful in the diagnosis especially in cases of kideny pathology(M.Mahfouz 2007).

2.2 Previous study:-

According to European society of Radiology 2011 Recent studies shows that the most common lesion detect are '' Cyst'' In up to 27% of the patients over 50 years. CT masses are classified as solid or complex cystic. 85% of expansive solid masses are malignant therefore , a solid, enhancing mass must be considered malignant unless proven otherwise. Renal cell carcinoma (RCC) is the most common malignant tumor with a rising incidence of about 3% per year since 1975. The most common type of RCC is the clear cell RCC with 65% of renal cortical tumors. Further subtypes are papillary (basophilic and eosinophilic) Clear –cell RCC causes 90% of metastases of all renal malignancies. Other malignant masses include transitional cell carcinoma (TCC), lymphoma, metastases from carcinoma and primary /secondary sarcoma. Primary tumors of the lung , breast and gastrointestinal tract are the most common sources of renal Metastases.

Omer Abdelhameed Yousif Ahamed The study an evaluated study, aimed to characterize Renal Lesions using CT. The study was done in may 2016 at Alribat Hospital , Alamal Hospitel and Abdoon Sidahmed medical center . Data was collected from patients referred to the CT scan department . They were (50) patients from different ages , male and female having different renal lesions . The population divided in to four age groups below 20 , between 20 40 year , 40-60 year and more than 60 year . The researcher found that :- The most effected group between 20 - 40 year forming about 40% , The renal lesions most common in male 28 = 56% than female 22 = 44% , most common lesions to be found cyst , stones , tumours 58% , 30% 12% respectively , most effected side cortex , both upper and

lower poll , medulla 45% , 40% 15% respectively.

The study was a descriptive study by Zahraa Mohammed Ahmed Altayib 2015

of characterization of renal disease using computed tomography imaging which conducted in Khartoum state of Sudan in radiology department of Asia Hospital and Alamal Hospital, from Sept 2016 to Febr 2017,the problem of the study was increas . The study found that the most common lesion of renal was cyst , stones , tumors 52.8% , 35.7%,11.4% respectively, and the most effected age group is 20 - 40 year forming about 35.7% and female 51.4% are more affected than male 48.6% , the common site is renal pelvic, both upper and lower pole,cortex and medulla 34.4% ,32.9 % 21.4% 11.4% respectively.The study recommended that CT scan should be applied as a tool for diagnosing renal lesions, so it is provide measurement, CT number, texture and shape of the lesions

The study was discriptive study by Reham Mahjoob Taj Aldeen Mahjoob 2016 of characterization of renal disease using computed tomography imaging which conducted in Khartoum state of Sudan in radiology department of Yastshroon Hospital . 50 patient with flank pain were examined by CT with contrast media 16 patient out of 50 with kidney mass ,12 out of 50 patient stone and 8 patient with cyst and 14 patient out o 50 ith other renal disease , and most affected group is 40-60 . the result show that male is more affected than female 52% to 48% most affected site cortex 50% than the other part and lower pole 34% and upper 16% .

CHAPTER THREE

3.1 material:-

3.1.1 Type of study:-

This is descriptive and analytic study

3.1.2. Area of study:-

This study was performed at Radiology department in A lzytuona Hospital and Altmayouz center for emergency.

3.1.3. Duration of study :-

The study started from .15 February to March

3.1.4 Variable of study:-

The variables that collected from each subject include : gender, age, pathological finding from CTU .CT KUB. CT Abdomen

3.1.5 Population of study:-

This study include 50 subject (male and female).

3.1.6 sampling and sample size:-

The 50 patient were divided in to 4 groups according to the age factor ,from 0-20 , 20-40, 20-60 and more than 60.

3.1.7 Data collection:-

Data collection using data collecting sheet.

3-1.8 inclusion criteria:-

All patient with lesion in the kidney .

3.1.9 Machine used:-

The CT images were conducted using Multi-detector CT scanner . The scan parameters (thin section 5mm or less ,120 KV, 200MA 1.5 pitch) Features of CT scanner: Largest couch capacity is 180 kg CT machine in Alzaytona Hospital and Altamyouz center for emergency.

3-2 method:-

3-2-1 CT renal technique:-

The patient lays supine on the CT scanner couch , arm elevated, scout view is obtained usually in AP projection.

Pre contrast images of kidney are obtained to demonstrate calcifications and density of renal masses followed by dynamic IV contrast enhanced images with thin section through the kidneys, extending through the abdomen .

Frequently the pelvis is also imaged to see the entire urinary tract and look for adenopathy (enlarged of lymph node). {Stefan Ulzheimer Multislice CT: Current Technology and Future Developments 2009}.

Because scanning is so fast , dynamic images of kidneys show the arterial phase of enhancement, making it use full to obtain a third set of image through kidneys to better asses of the parenchyma .

Exception in transitional carcinoma the exam is extended in to the pelvis with delayed views of the bladder 3-5 minute delay images.

3-2-2 Data analysis:-

Data were first summarized into master data sheet, then analyzed by SPSS program and then used Microsoft excel (variables using descriptive tables, frequency, percentage distribution tables, cross tabulation)for data presentation .

3-2-3 Data presentation:-

tables and Bar chart.

3-2-4 Ethical consideration:-

Study cases were selected from patient underwent to CT KUB department.

Chapter Four

4.1 Result

Table (4.1): Shows gender distribution:-

gender	Frequency	Percentage
Male	30	60%
Female	20	40%
Total	50	100.0

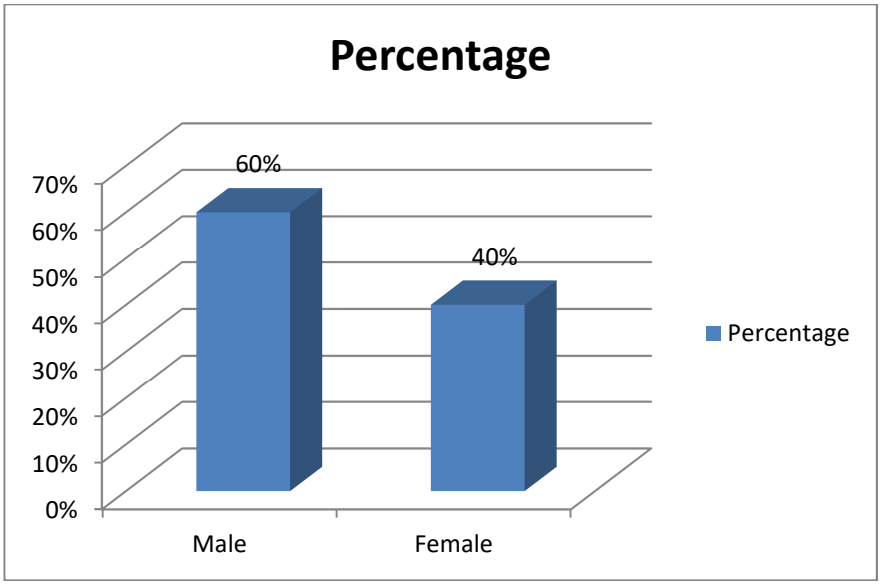


Fig (4.1): illustrated of gender distribution

Table 4.2: Shows Age group distribution:-

Age	Frequency	Percentage
less than 20	4	8%
20 - 40	8	16%
41 - 60	23	46%
More than 60	15	30%
Total	50	100%

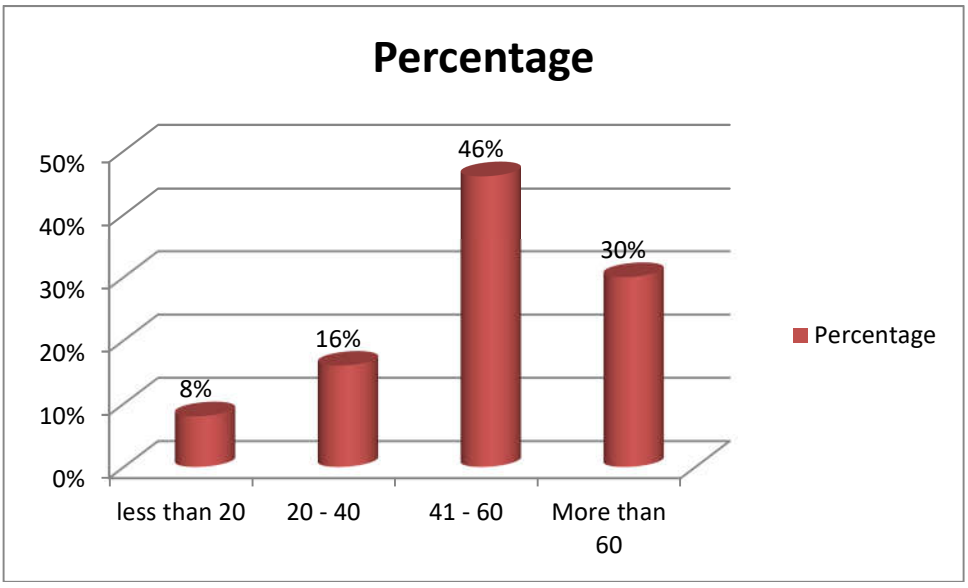


Fig4.2: illustrated of Age group distribution

Table(4: 3) Show the pathological finding of lesion type :-

Lesion type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Stone	23	46.0	46.0	46.0
	Cystic	18	36.0	36.0	80.0
	cystic +mass	4	8.0	8.0	88.0
	Mass	5	10.0	10.0	100.0
	Total	50	100.0	100.0	

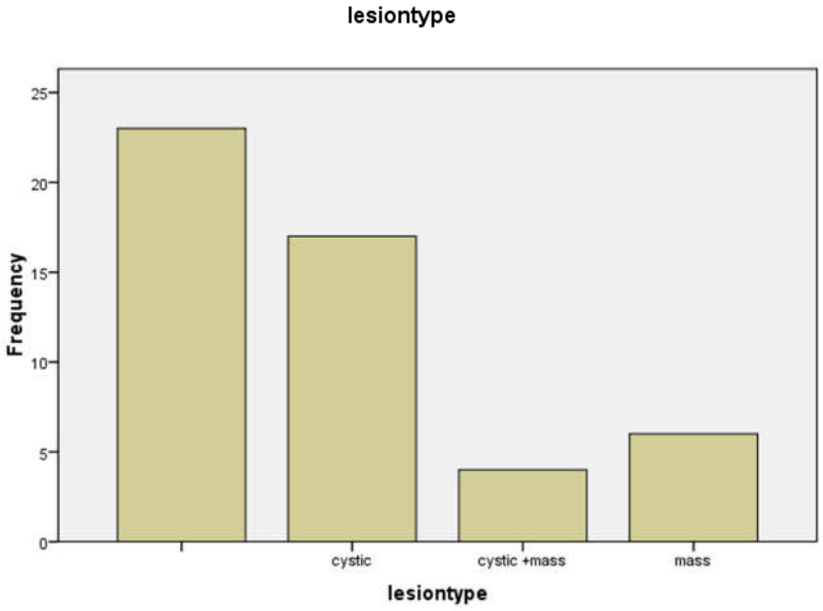


Fig (4: 3) illustrated Show the pathological finding of lesion type.

Table (4:4): Show pathological finding of lesion sites:-

The site	Frequency	Percentage
Cortex	11	22%
Upper pole	8	16%
Middle pole	6	12%
lower pole	25	50%
Total	50	100%

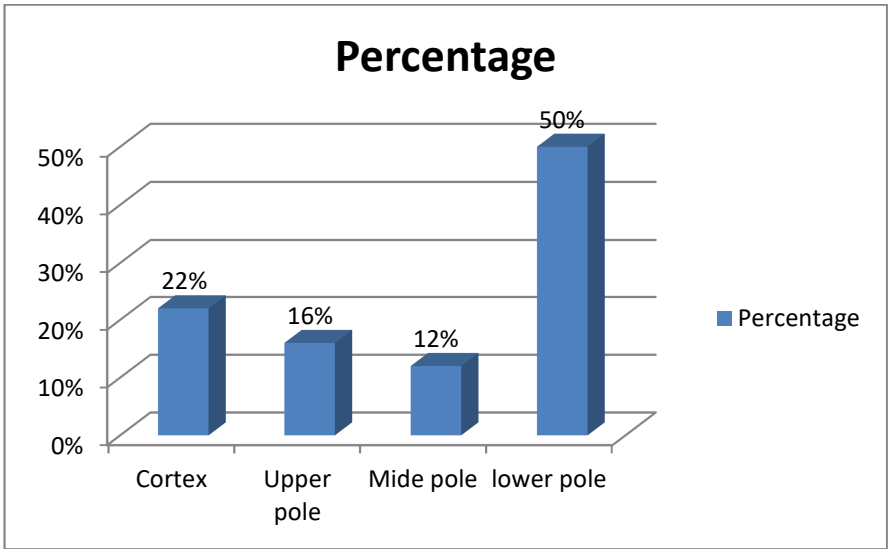


Fig (4: 4) illustrated showing the pathological finding of lesion Sites

Table4.5: Shows correlation between lesion type and gender:-

-

		lesion type				
		stone	Cystic	cystic +mass	Mass	Total
Gender	Female	8	8	1	3	19
	male	11	10	3	6	31
Total		19	18	4	9	50

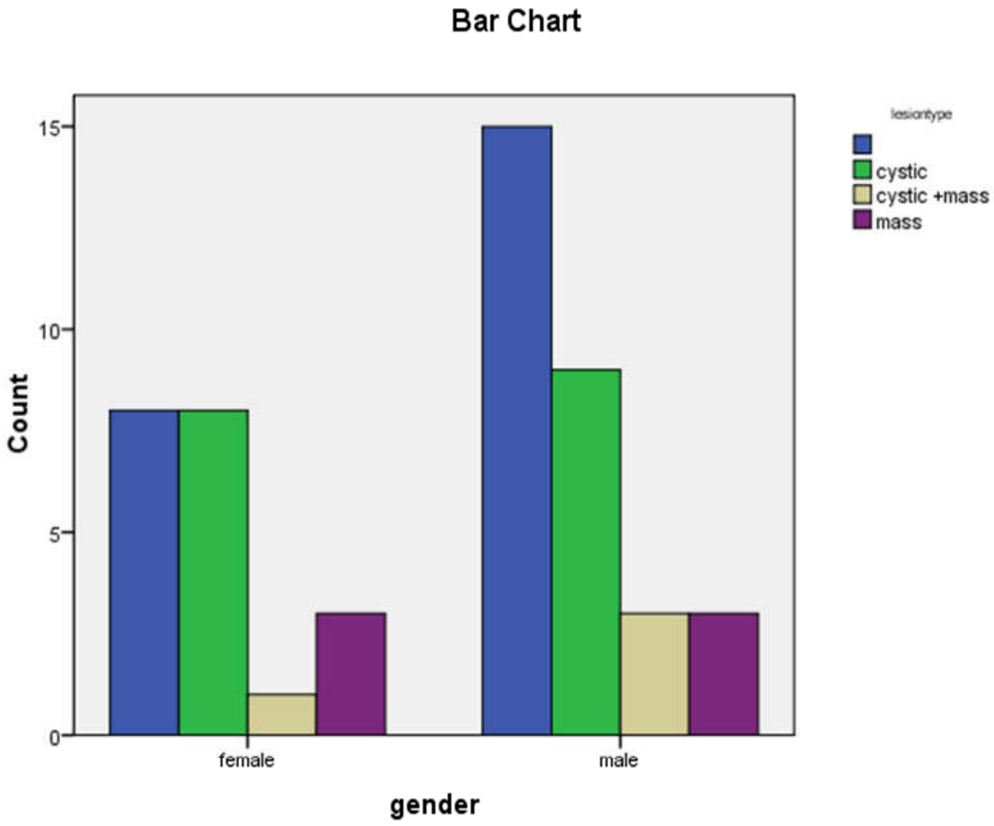


Fig 4.5:illustrated Shows correlation between lesion type and gender

Table4.6: Shows correlation between lesion and lesion site:-

lesiontype * lesionsite Crosstabulation

		cortex	upper pole	middle pole	lower pole	Total
Lesiontype	Stone	0	3	3	17	23
	Cystic	3	3	5	6	17
	cystic +mass	0	2	0	2	4
	Mass	3	1	0	2	6
Total		6	9	8	27	50

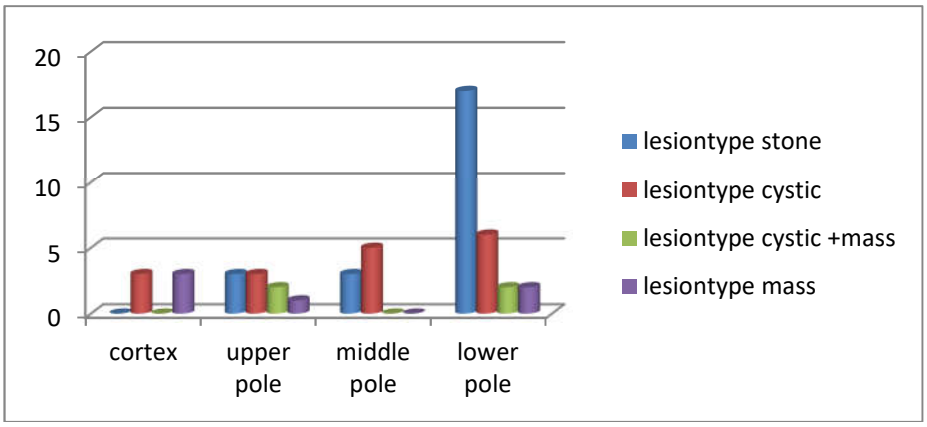


Fig 4.6: illustrated Shows correlation between lesion and lesion site

Chapter Five

5-1 Discussion:-

In the our study 50patients were had renal lesion with different gender 30 male and 20 female respectively Males (60%) are more affected than females (40 %) the result agree with previous study(Omer Abdalhameed Yousif 2016) (Table4-1). The sample was classified according to age starting from (less than20-more than60) years old and the most age group affected was (41-60) years old and this result agree with previous study (Reham Mahjoob Tajaldeen Mahjoob 2016) table (4-2) .We found the pathological finding of lesion type stone (46%), cyst (36%) , mass (10%) cyst+ mass(8%) respectively table and this result diss agree with previous study table (4-3). The most common site of renal lesion at the region of lower pole (50%) , Cortex (22%) , Upper pole (16%), Middle pole (12%) respectively. the result agree with previous study(Zhara Mohamed Ahmed Altayeb 2015) table(4-4). In this study across tabulation for the correlation between lesion type and gender showed the stone and cyst and cyst+mass ,mass is more in male than female and this result diss agree with previous study table(4-5). In this study correlation between lesion and lesion site Show the lower pole is most affected site in stone and cyst and cyst+mass and the cortex is most affected site in mass. And this result agree with (Eroupian Sociaty of Radiooldgy 2011). table(4-6).

5-2 conclusions:-

The study concluded that renal lesion most common in male than famle ,and stone classify as the most common lesion and age group between 41-60 most affected and lower pole is the most affected site, complex cystic and solid lesions can be characterized further. Therefore Radiological examination alone is most suitable in order to diagnose the normal and abnormal appearance and structure.

5-3 recommendation:-

1-CT should apply as the best tool to diagnose the renal lesions, because it provides: measurement , CT number, texture , and type of the lesion.

2-three image plane (axial , coronal and sagittal) should be done .

3-Study should be done by large samble size.

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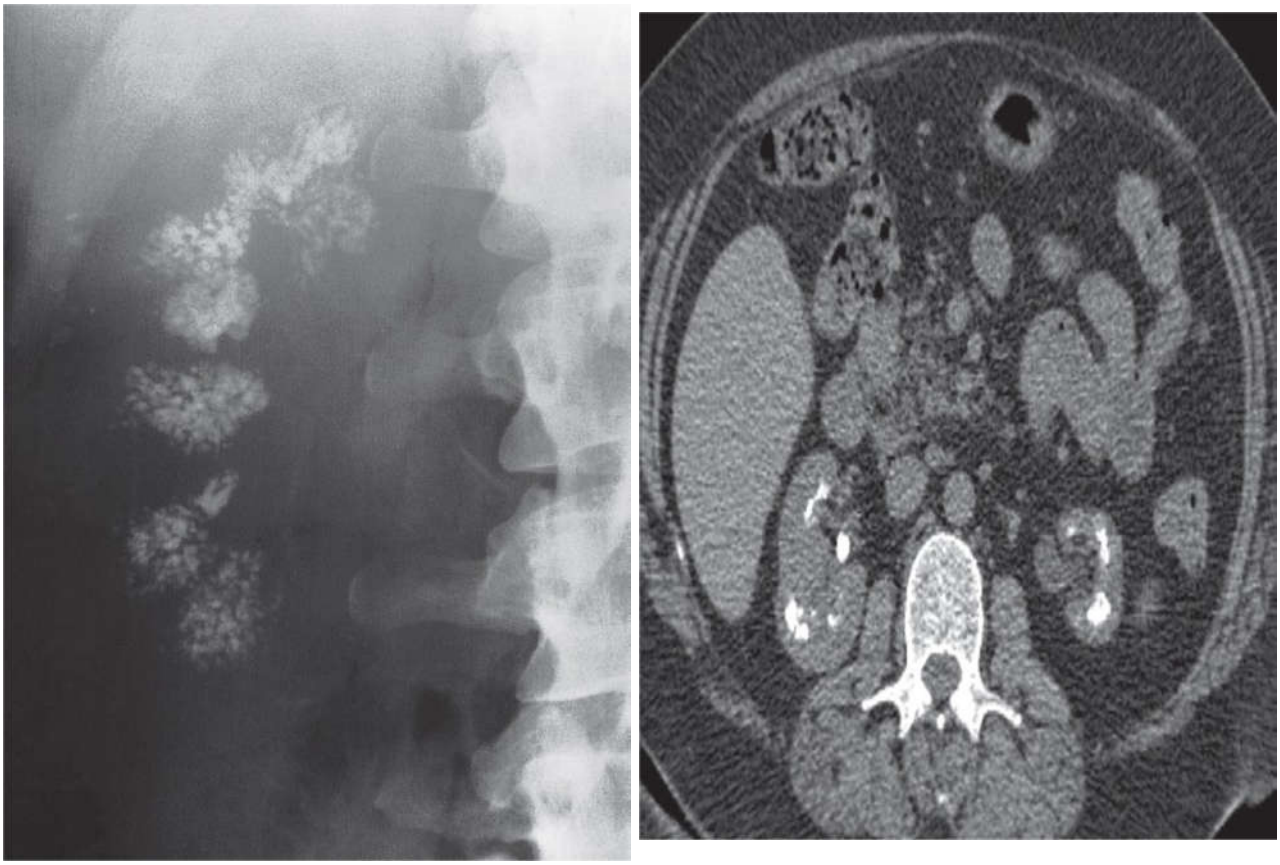
Appendixes (A)

No	Age	Sex	Stone			Lesion							
			Middle Poll	Upper poll	Lower poll	Cyst				Mass			
						Cortex	MID POLL	Upper poll	Lower poll	Cortex	MID POLL	Upper poll	Lower poll

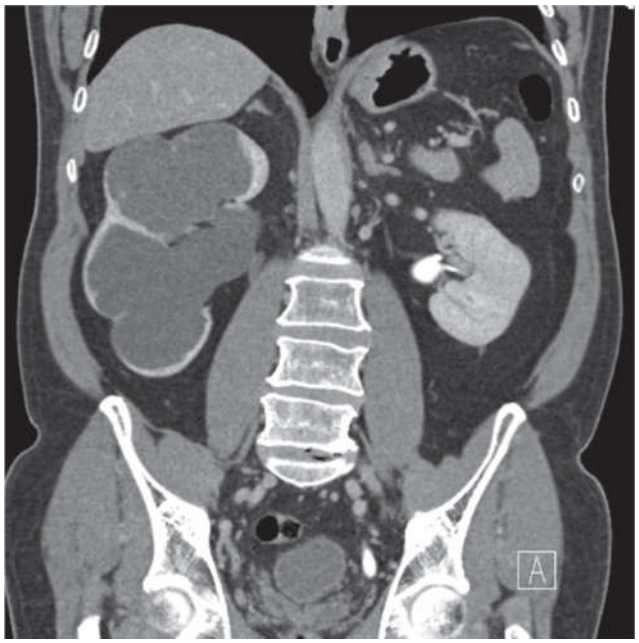
Cronal and Saggital CT Images for Male 52years old Hydronephrotic right kidney (RK) and two stones in the dilated right ureter .The patient also has kidney stones in the left pelvicaliceal system.



Plain Film and Axial CT Mages of Male 40 years old Nephrocalcinosis. On plain film bilateral renal parenchymal calcifications are demonstrated on CT KUB.

3

Axial CT Mages of Female 49 years old at the corticomedullary phase of enhancement**.** here is obstruction of the right kidney with dilatation of the pelvicaliceal system CT at the delayed phase of enhancement. Intravenous contrast is seen in the left renal pelvis but not in the obstructed right renal pelvis.



Cronal CT Images of male 60years old Intrinsic PUJ obstruction. The pelvicaliceal system is considerably dilated.

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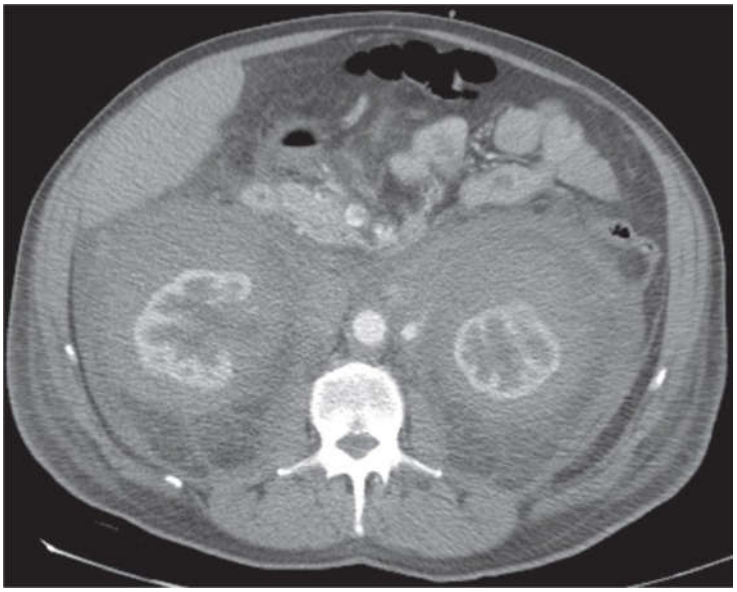
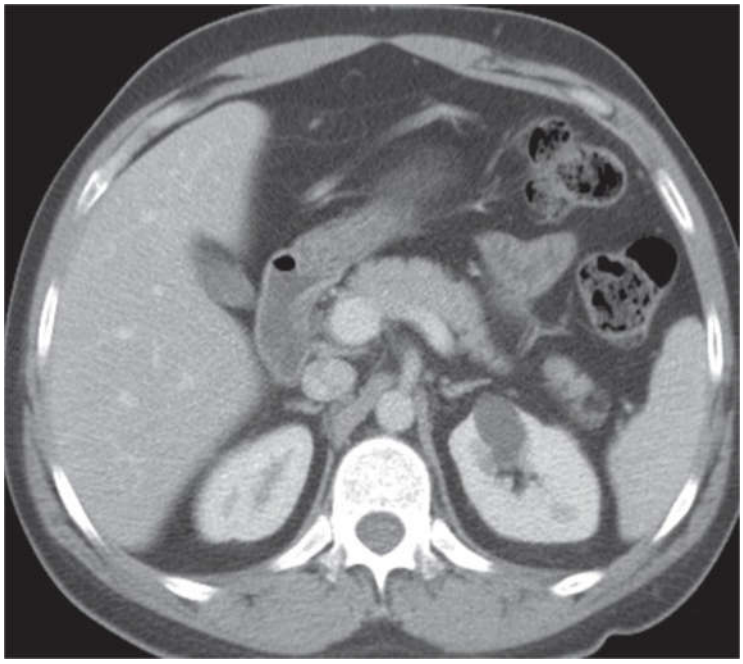
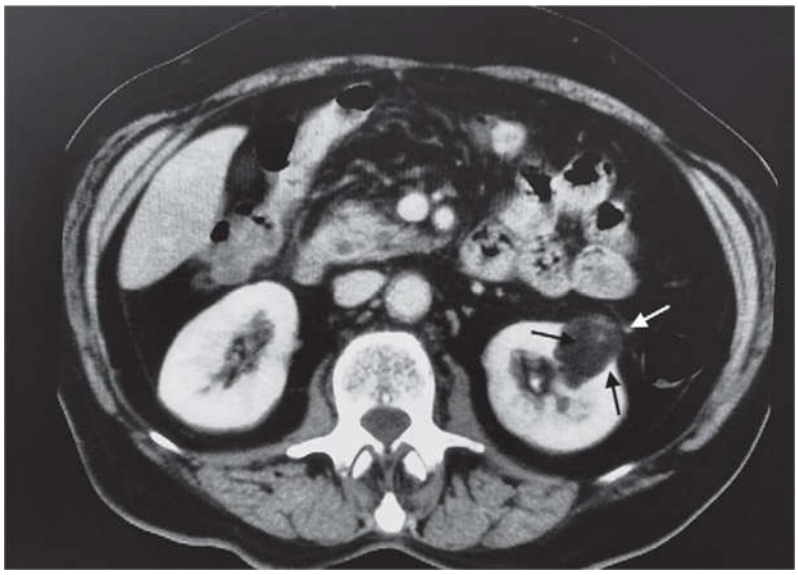


Axial CT Images Shows Mild hydronephrosis on the right. Both kidneys are surrounded by dense fibrosis.



Axial CT Images of Male 50 years old Cyst in the left kidney on CT showing a well-defined edge

6



Axial CT Images of female 53 years old Angiomyolipoma seen as a well-defined mass of fat density on CT.