Sudan University of Sciences and Technology

College of Graduate Studies

Importance of Requestfor Creatinine and Urea to Patient Under Going CT Contrast Examination

اهمية طلب فحص الكرياتين و اليورياللمرضي عندفحص الاشعة المقطعية الملونة

A thesis Submitted for partial fulfillment of the Requirementsof M.scDegree in Radiologic Science

By:-

Alaa Ibrahim abdelrahimSiddig

Supervisor:-

Dr: Hussein Ahmed Hassan Ahmed

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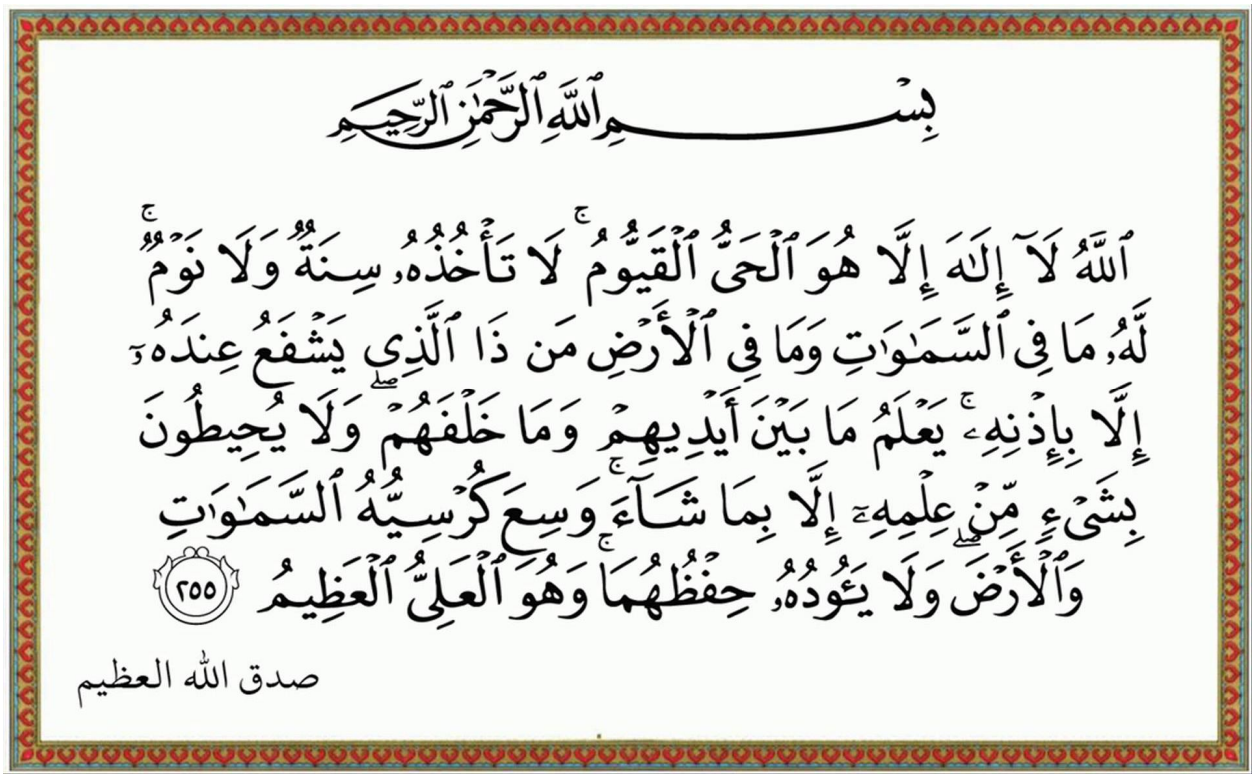
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ٱللَّهُ لَآ إِلَٰهَ إِلَّا هُوَ ٱلْحَىُّ ٱلْقَيُّومُ ۚ لَا تَأْخُذُهُۥ سِنَةٌ وَلَا نَوْمٌ ۚ
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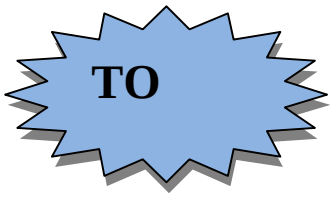
إِلَّا بِإِذْنِهِۦ ۚ يَعْلَمُ مَا بَيْنَ أَيْدِيهِمْ وَمَا خَلْفَهُمْ ۖ وَلَا يُحِيطُونَ
بِشَىْءٍ مِّنْ عِلْمِهِۦٓ إِلَّا بِمَا شَآءَ ۚ وَسِعَ كُرْسِيُّهُ ٱلسَّمَٰوَٰتِ
وَٱلْأَرْضَ ۖ وَلَا يَـُٔودُهُۥ حِفْظُهُمَا ۚ وَهُوَ ٱلْعَلِىُّ ٱلْعَظِيمُ ٢٥٥
صدق الله العظيم

Dedication



My large family

My little family

All Help me in this work

Acknowledgements

After god, I would like to express my deepest gratitude to Dr: Hussein Ahmed Hassan, without his help this work could not have been accomplished.

My thanks also go to Dr. Omer Ali

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Abstract

In this study were calculate the creatinine and urea level for all patient underwent CT contrast examination.

A total of 50 patients were examined in Al faisal specialized hospital using spiral CT scans (in September 2016 – November 2016) .The range age of sample (15_90 years).

The objective of the study identification important requesting creatinine and urea test to patient before CT contrast examination.

The creatinine and urea level in human body is very important for some patient come to CT contrast examination not for all,

In creatinine level result 90% of patient in normal range, however those not need this requesting creatinine . and 10% only had high level of creatinine those found in patient over 60 years , diabetes , hypertension and renal insufficiency , those are high risk and need to requesting creatinine .

In urea level result 76% of patient in normal range those not need to requesting urea, and 24% had high urea level found in patient over 60 years , diabetes , hypertension and renal insufficiency . Those are high risk and need to requesting urea.

This result can use to avoid the Loss of time and the cost of laboratory tests.

الملخص

في هذه الدراسة تم تجميع نتائج فحوصات الكرياتين واليوريا لكل مرضي فحوصات الاشعة المقطعية الملونة.

تم فحص 50 مريض بمستشفي الفيصل التخصصي . في الفترة من ديسمبر 2016 حتي نوفمبر 2016 وبلغ مدي العمر من(15 _ 90 سنة).

الهدف من الدراسة معرفة اهمية طلب فحص الكرياتين و اليوريا لبعض مرضي فحوصات الاشعة المقطعية الملونة .

مستوي الكرياتين واليوريا في جسم الانسان مهم لبعض مرضي فحوصات الاشعة المقطعية الملونة ليس لكل المرضي.

في نتائج مستوي الكرياتين 90% من المرضي كانت نتائجهم في العدل الطبيعي وبالتالي لا يحتاجون لطلب فحص الكرياتين ، و10%من المرضي فقط كان لديهم ارتفاع في مستوي الكرياتين وكانو من المرضي فوق سن 60 سنة ومرضي السكري وارتفاع ضغط الدم وهم اكثرخطر ويحتاجون لطب فحص الكرياتين .

في نتائج مستوي اليوريا 76% من المرضي كانت نتائجهم في المعدل الطبيعي وبالتالي لا يحتاجون لطلب فحص اليوريا ، 24%من المرضي كان لديهم ارتفاع في مستوي اليوريا وكانو من المرضي فوق سن 60 سنة ومرضي السكري وارتفاع ضغط الدم والمرضي الذين لديهم تاريخ قصور كلوي . هم اكثرخطر ويحتاجون لطب فحص اليوريا .

في هذه الدراسة يمكن تفادي ضياع الوقت وتكلفة الفحص المعملي وذلك بوضع بعض الاسئلة التي يمكن ان تساعد في معرفة من يحتاج طلب الفحص .

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List of Abbreviations

BUN	Blood urea nitrogen
CT	Computed tomography
GFR	Glomerular filtration
GI	Gastrointestinal
IV	Intravenous
MR	Magnetic resonance

Chapter one

1.1 Introduction

CT examinations it's non invasive procedure and become an important tool in medical imagingmakes use of computer-processed combinations of many X-ray images taken from different angles to produce cross-sectional images of specific areas**.**

During many computed tomography examinations, patients may be asked to take a special contrast agent(orally, rectally or via injection). Intravenous, oral and rectal CT contrast are pharmaceutical agents (liquids) and are sometimes referred to as "dye". CT contrast is used to make specific organs, blood vessels and/or tissue types "stand out" with more image contrast to better show the presence of disease or injury. The purpose of contrast media is to artificially increase subject contrast to body tissues and areas where there is little natural subject contrast. The abdominal viscera, for example, have very difficult to identify specific organs or distinguish one organ from another.

The decision to administer contrast in patients undergoing CT should always be a matter of clinical judgment, based on the individual circumstances of the patient and following consultation between the radiologist and requesting provider.patients may be asked to have a Creatinine blood test prior to having their CT Scan. This blood test is performed to ensure that your body can safely process contrast medium often used during a CT Scanexamination.Radiographer needs to determine who have their kidney function checked before being injected with contrast material for a scan. In this study will determine who need to submit blood work containing BUN (blood urea nitrogen) and creatinine levels.

1.2 Problem of the study:-

There is over spent time and efforts because of requesting renal function test in CT contrast examination in spite of almost time there is no need.

1.3 Objectives of the study:-

1.3.1 The general objective:-

Identify important request creatinine and urea test to some patient before CT contrast examination.

1.3.2 The specific objective:-

Determine important categories that creatinine and blood urea may abnormal such as in:

Age over 60

Hypertension requiring medication

Diabetes mellitus

History of renal insufficiency

1.4 Significant of study:-

Identifying certain categories of work examination

Make questionnaire for every patient will be asked a series of questions that help us determine which patients do not need laboratory testing to measure their kidney function. The questionnaire has been proven to be a simple and reliable way to identify those people at risk of having renal problems and avoiding the need to get blood tests on all patients.

1.5 Overview of the study:-

This study was consisting of five chapters.

Chapter onewas an introduction introduce briefly this thesis and contained.

Chapter twowas anatomy of kidney and function, CT machine, contrast agent and finally blood test to measure creatinine and urea level.

Chapter threewas describe the methodology (material, method) used in this study.

Chapter four was included result of presentation of final finding of study.

Chapter fiveincluded discussion, conclusion and recommendation for future scope in addition to references.

Charter Two

2.1 Anatomy

The urinary system consists of two kidneys, two ureters, a urinary bladder, and a urethra. The kidneys are retroperitoneal structures of the abdomen, having migrated upward from the pelvis during development. They are maintained in their normal position by intra-abdominal pressure and by their connections with the perirenal fat and renal fascia. (Jack T. Stern, et.al 1997)

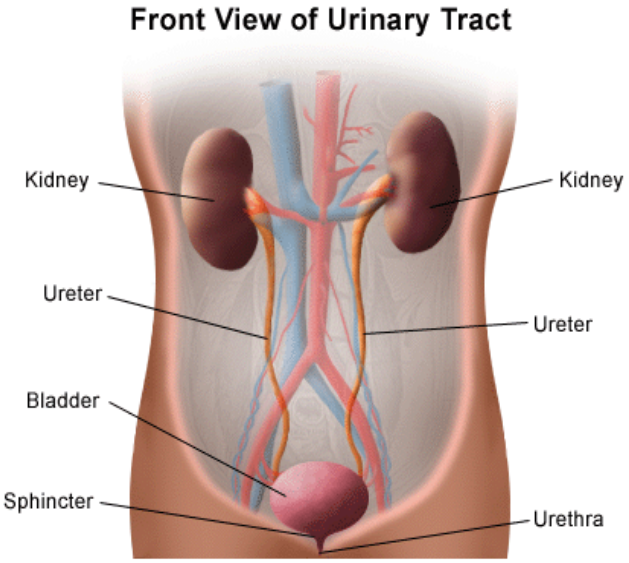

Figure (2.1) showed the structure and component of renal system

The kidney is bean-shaped with a superior and inferior pole. The mid-portion of the kidney is often called the mid-pole. In adults, each kidney is normally 10-12 cm in length, 3-5 cm in width and weighs 150-260 g. The left kidney is usually slightly larger than the right. The kidney has a fibrous capsule, which is surrounded by para-renal fat. The kidney itself can be divided into renal parenchyma, consisting of renal cortex and medulla, and the renal sinus containing renal pelvis, calyces, renal vessels, nerves, lymphatics and perirenalfat. The renal parenchyma has two layers: cortex and medulla. The

renal cortex lies peripherally under the capsule while the renal medullaconsists of 10-14 renal pyramids, which are separated from each other by an extension of renal cortex called renal columns. Urine is produced in the renal lobes, which consists of the renal pyramid with associated overlying renal cortex and adjacent renal columns. Each renal lobe drains at a papilla into aminor calyx, four or five of these unite to form a major calyx. Each kidney normally has two or three major calyxes, which unite to form the renal pelvis. Therenal hilum is the entry to the renal sinus and lies vertically at the anteromedial aspect of the kidney. It contains the renal vessels and nerves, fat and the renal pelvis, which typically emerges posterior to the renal vessels, with the renal vein being anterior to the renal artery.

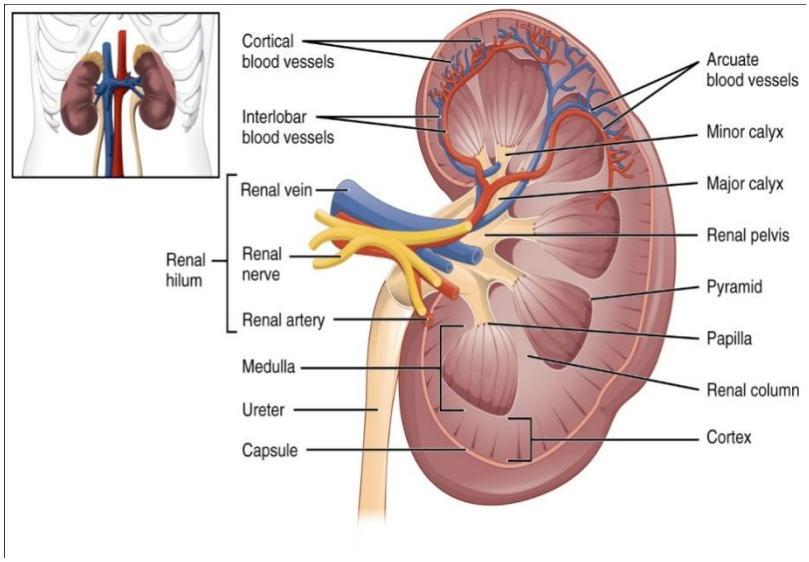

Figure (2.2) showed the internal anatomical structure of the pelvic-calceal system in addition to its nerve and blood supply.

The nephron of the kidney is made up of two major parts; the renal corpuscle and the tubules. These are then both sub-divided into various parts and overall it

is this structure which allows the kidney to filter the blood and then alter the composition of this filtrate to ensure that waste products are excreted and useful compounds preserved. Renal corpuscle can be subdivided into the glomerulus and the Bowman's capsule. The tubules are split into the proximal tubule, the loop of Henle, the distal tubule and the collecting ducts.

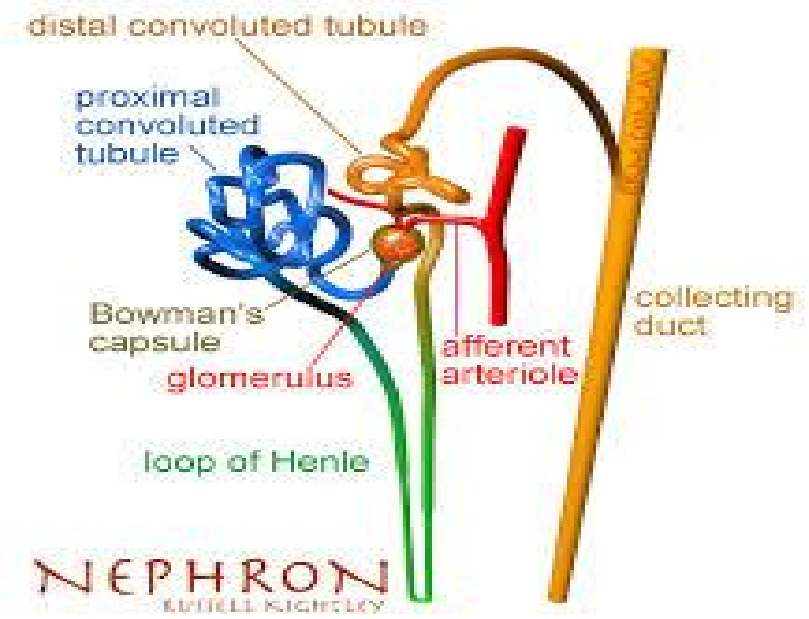

Figure (2.3) showed the internal structure of kidney's functional unit

2.1.1 Blood supply:

Blood reaches the kidneys through the renal arteries, which are short and come directly from the abdominal aorta. It divided into several inter-lobar arteries and give rise to the arcuate arteries, which cross the border between the cortex and the medulla of the kidney. From the arcuate arteries many branches radiate into the renal cortex; the inter-lobar arteries, the afferent arterioles arise at right angle from the interlobular arteries and end in the glomeruli. (M.Y. sukar, et al 2000)

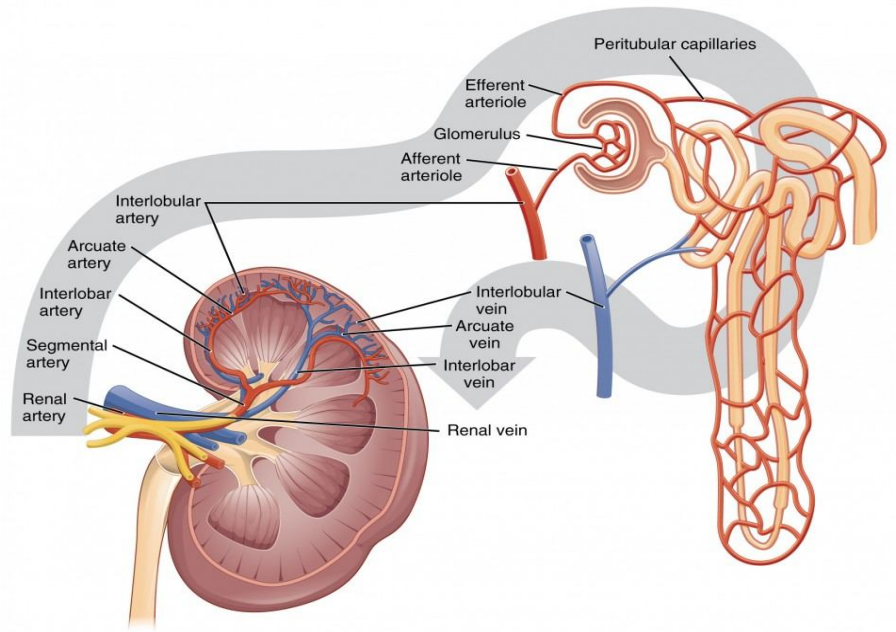

Figure (2.4) demonstrate the and blood pathway from and into the kidney

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 micro tubular system. In these tubules, modifications of the filtrate take so that useful substance, including most of the filtered water, is 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 functions. 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).

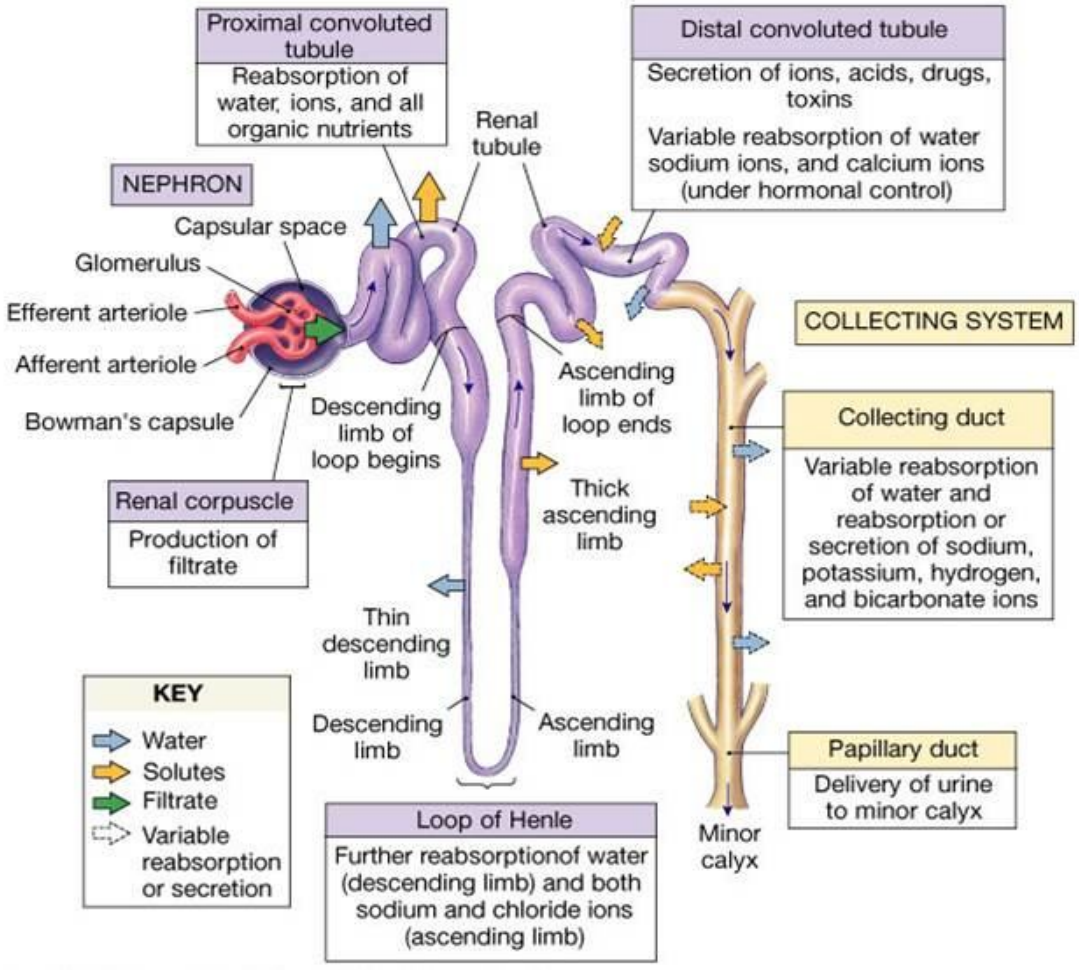

Figure (2.5) demonstrate the renal structure with its specific function

2.3 Instrumentation:-

2.3.1 CT scanner:-

The three major systems are housed in separate room as follows:-

The imaging system is located in the scanner room

The computer system is located in the computer room

The display , recording , and storage system is located in the operators room

The purpose of the imaging system is to produce x-ray, shape and filter the x-ray beam to pass through only a defined cross-section of the patient, detect and measure the radiation passing through the cross-section and convert the transmitted photons into digital information.

The major components of the imaging system are the x-ray tube and generator,collimator,filter,detectors, and detector electronic.

The computer system generally includes input – output devices central processing unit, array processor, interface devices .back-projector processors, storage devices and communications hardware.

The computer system receives the digital data from the DAS and processes it to reconstruct an image of the cross-section anatomy.

The purpose of the image display,recording, storage, and communication system is as follow:-

To display the output digital image from the computer

To provide a hard copy of the image on a recording medium they provide for a permanent copy of the reconstructed image and accommodate the preference of the radiologist during diagnostic interpretation.

To facilitate the storage and retrieval of digital data.

To communicate image , diagnostic reports , and patient demographic data in an electronic communications . (Euclid Seeram , 2001) .

2.3.2Gantry:-

The gantry is a mounted framework the surround the patient in a vertical plane .the gantry houses imaging components such as the slip rings, x-ray tube , high-tension generator , collimators , detectors , and DAS. Two important features of the gantry are the gantry aperture and gantry tilting rage . (Euclid Seeram , 2001) .

2.3.3 Patient couch:-

The patient couch , or patient table , provides a platform or which the patient lies during the examination . The couch should be strong and rigid to support the weight of the patient . It should provide for safety and comfort of the patient during the examination .(Euclid Seeram , 2001) .

2.3.4What happens during computed tomography :-

CT scans are designed to look at specific parts of the body and are tailored for each person, to investigate their particular condition. This means that all CT scans are slightly different.The CT scan equipment is a large square machine with a circular hole or gantry. The general process involves you lying on a bed attached to the scanner (this may be feet first or head first depending on the part of the body being looked at). The bed will then be raised up to a height level with the circular hole in the scanner and the bed slides in and out of the hole several times while pictures are being taken. It is important to try not to move during the scan as it will affect the quality of the pictures and make them harder for the radiologist to interpret.

The radiographer performing the scan may ask you to hold your breath for some scans. Most scanners in use now are able to give instructions in different languages to help you understand what you need to do and what is happening.

The first few scans are usually done to set up the machine ready for the test. When the test is programmed into the computer by the radiographer and the scan is ready to go, they may remind you to keep still. If your test requires an iodinated contrast injection, the radiographer will come into the room to administer it using either a hand held syringe or a mechanical pump. The pump helps to put the iodinated contrast in at a set rate and allows for the scanner to target specific areas of the body.When the iodinated contrast is injected, most people will get a strange metallic taste in the mouth and feel a warm sensation through the body. Do not be concerned if this happens, it is a common sensation and usually goes away within a couple of minutes.Once the radiographer has reviewed the images briefly to check that the appropriate areas have been shown, they will come into the room to help patient off the bed

2.3.5 How long does computed tomography take

each test is different and so the time it takes to complete the scan will vary depending upon why you are having it. CT scans that do not require an injection or much preparation are usually quite quick and may be completed within 5 minutes.In the case of tests which require you to drink a contrast solution or have an injection, the preparation time is often much longer than that of the scan itself. When a drink is required for an abdominal scan, you are often asked to have that drink an hour before the appointment time. This may be done prior to you arriving at the hospital or radiology practice or while you are in the waiting area.If you are asked to arrive early, the time leading up to the scan will often be used to prepare you. This may include getting you changed into a gown, discussing the need for injection of iodinated contrast or contrast to drink, inserting a cannula and explaining what to expect from the test.Even when you

are having a scan that requires an injection or a drink and other preparation, the length of the scan itself (in other words the amount of time you are in the CT scanner machine) is usually under 10 minutes.

2.3.6 Advantages:-

There are several advantagesof CT scans:-

Are a fast, effective and accurate way of assisting your doctor to make a diagnosis .CT completely eliminates the superimposition of images of structures outside the area of interest . high-contrast resolution,data from a single CT imaging procedure consisting of either multiple contiguous or one helical scan can be viewed as images in the axial, coronal, or sagittal planes, depending on the diagnostic task. This is referred to as multiplanar reformatted imaging.

2.3.7 Adverseeffect:-

The radiation used in CT scans can damage body cells, including DNA molecules, which can lead to cancer. According to the National Council on Radiation Protection and Measurements, between the 1980s and 2006, the use of CT scans has increased sixfold (600%). The radiation doses received from CT scans are 100 to 1,000 times higher than conventional X-rays .(Web site)

2.4Contrast agents:-

contrast agents or contrast media, are used to improve images of the inside of the body produced by x-ray ,computed tomography (CT),magnetic resonance (MR).When introduced into the body prior to an imaging exam, contrast materials make certain structures or tissues in the body appear different on the images than they would if no contrast material had been administered. Contrast materials help distinguish or “contrast” selected areas of the body from surrounding tissue. By improving the visibility of specific organs, blood vessels or tissues, Contrast

agents are used to differentiate between organs and improve lesion detection and characterization contrast materials help physicians diagnose medical conditions.(Thieme, 2007)

2.5 Types of Contrast Agents:-

The most common contrast agents used with CT imaging are barium- and iodine-based. The specific agent and route of administration are based on clinical indications and patient factors.

2.5.1ORAL CONTRAST:-

Oral contrast agents are barium- or iodine-based and are used for bowel opacification. Barium-sulfate contrast materials that are swallowed or administered by mouth (orally) are used to enhance x-ray and CT images of the gastrointestinal (GI) tract, including:

Pharynx

Esophagus

Stomach

The small intestine

The large intestine (colon)

2.5.2RECTAL CONTRAST:-

Barium-sulfate contrast materials that are administered by enema (rectally) are used to enhance x-ray and CT images of the lower gastrointestinal (GI) tract (colon and rectum).

2.5.3 IV CONTRAST :-

Iodine-based contrast materials injected into a vein (intravenously) are used to enhance x-ray and CT images.

Typically they are used to enhance the:-

Internal organs, including the heart, lungs, liver, adrenal glands, kidneys, pancreas, gallbladder, spleen, uterus, and bladder

Gastrointestinal tract, including the stomach, small intestine and large intestine

Arteries and veins of the body, including vessels in the brain, neck, chest, abdomen, pelvis and legs

Brain

Breast (Thieme, 2007)

2.6 Bloodtest require

2.6.1creatinine:-

creatinine (a blood measurement) is an important indicator of renal health because it is an easily measured byproduct of muscle metabolism that is excreted unchanged by the kidneys.The kidneys are a pair of bean-shaped organs that are located at the bottom of the ribcage in the right and left sides of the back. Within them are about a million tiny blood filtering units called nephrons. In each nephron, blood is continually filtered through a microscopic cluster of looping blood vessels, called a glomerulus. The glomerulus allows the passage of water and small molecules but retains blood cells and larger molecules. Attached to

each glomerulus is a tiny tube (tubule) that collects the fluid and molecules that pass through the glomerulus and then reabsorbs what can be used by the body. The remaining waste forms urine.Creatinine is a chemical waste molecule that is generated from muscle metabolism , Creatinine is transported through the bloodstream to the kidneys. The kidneys filter out most of the creatinine and dispose of it in the urine.The kidneys maintain the blood creatinine in a normal range. Creatinine has been found to be a fairly reliable indicator of kidney function. Elevated creatinine level signifies impaired kidney function or kidney diseaseAs the kidneys become impaired for any reason, the creatinine level in the blood will rise due to poor clearance of creatinine by the kidneys. Abnormally high levels of creatinine thus warn of possible malfunction or failure of the kidneys. It is for this reason that standard blood tests routinely check the amount of creatinine in the blood.A more precise measure of the kidney function can be estimated by calculating how much creatinine is cleared from the body by the kidneys. This is referred to as creatinine clearance and it estimates the rate of filtration by kidneys (glomerular filtration rate, or GFR) .Normal levels of creatinine in the blood are approximately 0.6 to 1.2 milligrams (mg) per deciliter (dL) .Any condition that impairs the function of the kidneys is likely to raise the creatinine level in the blood. It is important to recognize whether the process leading to kidney dysfunction**.(**Charles Patrick Davis, MD, PhD)

2.6.2Blood urea:-

Blood urea nitrogen (BUN) level is another indicator of kidney function.

Urea is also a metabolic byproduct which can build up if kidney function is impaired. The BUN-to-creatinine ratio generally provides more precise information about kidney function. Normal BUN range is 8-25 mg/dL. (Charles Patrick Davis, MD, PhD)

2.7 Previous study :-

The following article was written by Ronald Zagoria, MD, FACR, Professor and Chief of Abdominal Imaging in the UCSF Department of Radiology and Biomedical Imaging. January 19, 2015 - 9:24am

We know that most patients have normal kidney function and need no precautions, however, not every patient with impaired kidney function will be aware of it. We know that the likelihood of impaired renal function is substantially higher in some people, such as patients over 60 years old and those who have certain illnesses, such as diabetes. At UCSF we use a questionnaire to identify patients who need lab testing before scanning to ensure that it's safe to inject the contrast material. Every patient will be asked a series of questions that help us determine which patients do not need laboratory testing to measure their kidney function. The questionnaire has been proven to be a simple and reliable way to identify those people at risk of having renal problems and avoiding the need to get blood tests on all patients.

Many patients receive a contrast agent intravenously (IV) during their CT test.

Some patients may be asked to have a Creatinine blood test prior to having their CT Scan. This blood test is performed to ensure that your body can safely process contrast medium often used during a CT Scan examination. The blood test is not required for all patients .

http://www.oghimaging.com/

Tell your doctor if you have any allergies, especially to iodine or x-ray contrast, since for some CT exams an iodine dye (or contrast) is given intravenously. If you are allergic, medication will be prescribed for you to take prior to the testing. If you have a history of kidney problems or diabetes, blood tests (creatinine, blood urea nitrogen) will be done before the CT scan to check that your kidneys are functioning properly. The intravenous contrast material used during a CT scan can cause kidney damage in people with poor kidney function.

Chapter three

Material and Method

3-1Materials:

3.1.1studypopulation

A total of 50 patients (.. male 16, .. female 34 ; mean age 55 years) were included with requested CT contrast examination .

3.1.2 CT unite :-

The CT machine used is Toshiba4Slice , one monitor (one screen) , one injector (automatic injector) .

3.1.3 Contrast character and dose :-

- **For chest :-**

Average dose 100ml , 1.5 ml/sec for 30ml followed by 0.4 ml/sec for an entire injected volume of 100ml ,For children 2 ml per kilogram body weight.

- **Abdomen & Pelvis**

Iv :-

(75- 90)ml according to patient weight , 3-4ml/sec .

Oral only:

1200-1500 ml 45 min prior to scan.

300 ml immediately before scan.

Right lateral decubitus position 3-5 min. before scan

3-2Method:

3.2.1 CT technique

The selected protocol used chest ,abdominal , and pelvis region , Kvp (120), mAs (60 _ 160) . Start scan area using slice thickness 10 mm , start with scout view to localize start and end position.

3.2.2 Data analysis :-

All data collected will use as input to the statistical software Excel and SPSS.

Chapter Four

Results

In this study , a total of 50 patients were examined in alfaisal specialized hospital in Khartoum , the study data are presented in the following tables and graphs .

Table (4.1) shows the range, mean, and standard deviation for age, creatinin, and urea:

	Minimum	**Maximum**	**Mean**	**Std. Deviation**
Age	15	90	54.6	16.80
Creatinine	0.1	1.6	0.8	0.28
Urea	10	56	21.6	9.22

Table (4.2) shows the means and standard deviations of creatinine and urea by gender:

Gender	**Mean±SD**	
	Creatinine	**Urea**
Male	0.837±0.369	22.88±9.688
Female	0.724±0.216	21.06±9.082

Table (4.3) shows the means and standard deviations of creatinine and urea by age:

Age	**Mean±SD**	
	Creatinine	**Urea**
Less than or equal 60 years	0.673±0.245	20.23±6.816
Greater than 60 years	0.890±0.273	23.75±11.854

Table (4.4) shows study group gender distribution.

	Frequency	Percent
Male	16	32%
Female	34	68%
Total	50	100%

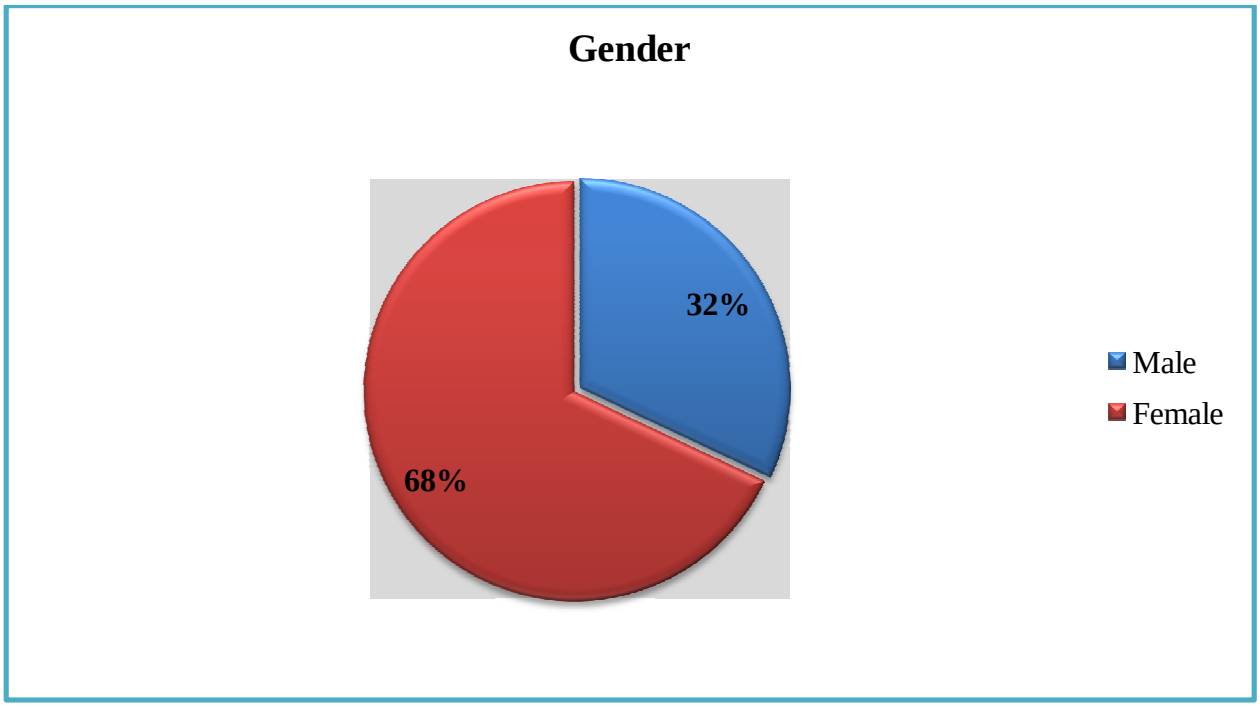

Figure (4.1) shows study group gender distribution.

Table (4.5) shows Study group age distribution.

Years	Frequency	Percent
Less than 30	5	10%
From 31 to 40	5	10%
From 41 to 50	6	12%
From 51 to 60	14	28%
More than 60	20	40%
Total	50	100%

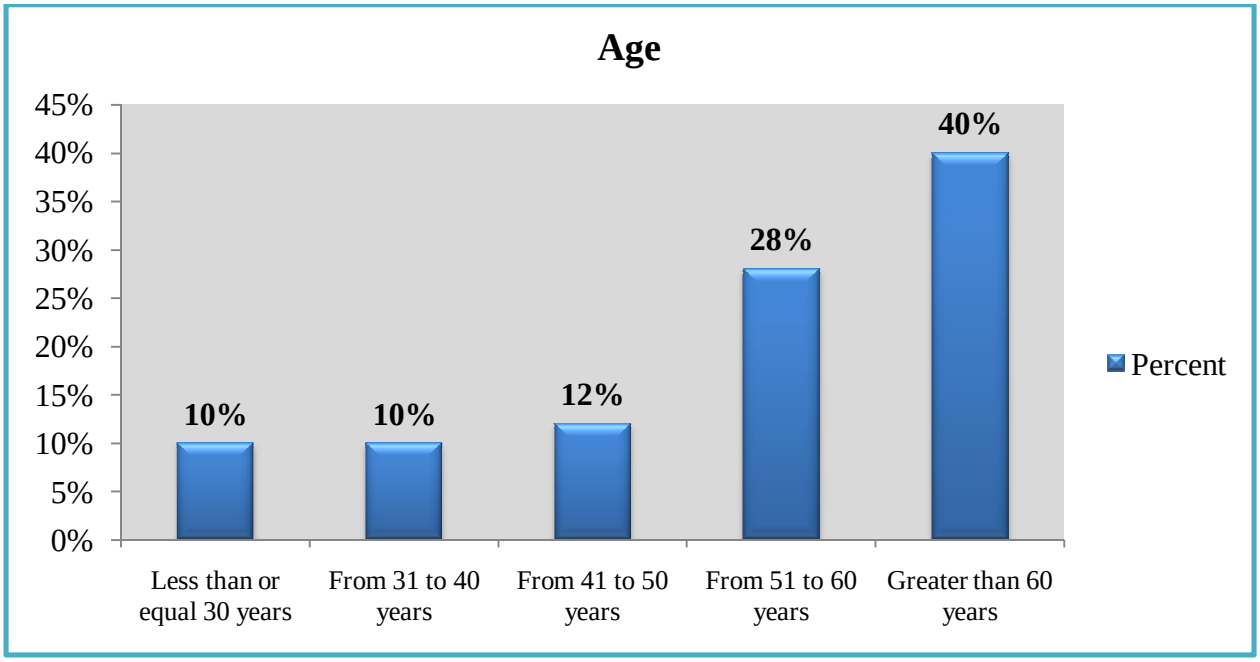

Figure (4.2) shows Study group age distribution.

Table (4.6) shows study group creatinine level

Creatine level	**Range**	**Frequency**	**Percent**
Normal	0.6 – 1.2	45	90%
High	1.3- 1.6	5	10%

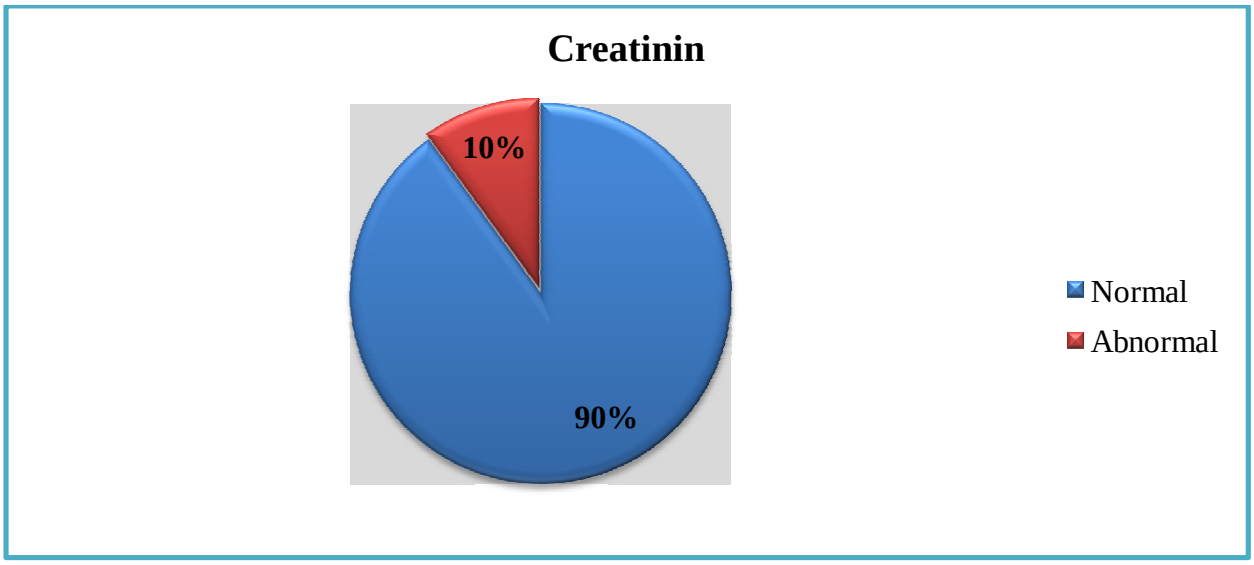

Figure (4.3) shows study group creatinine level.

Table (4.7) shows study group urea level.

Level	Range	Frequency	Percent
Normal	8-25 mg/dL	38	76%
High	26-60 mg/dL	12	24%

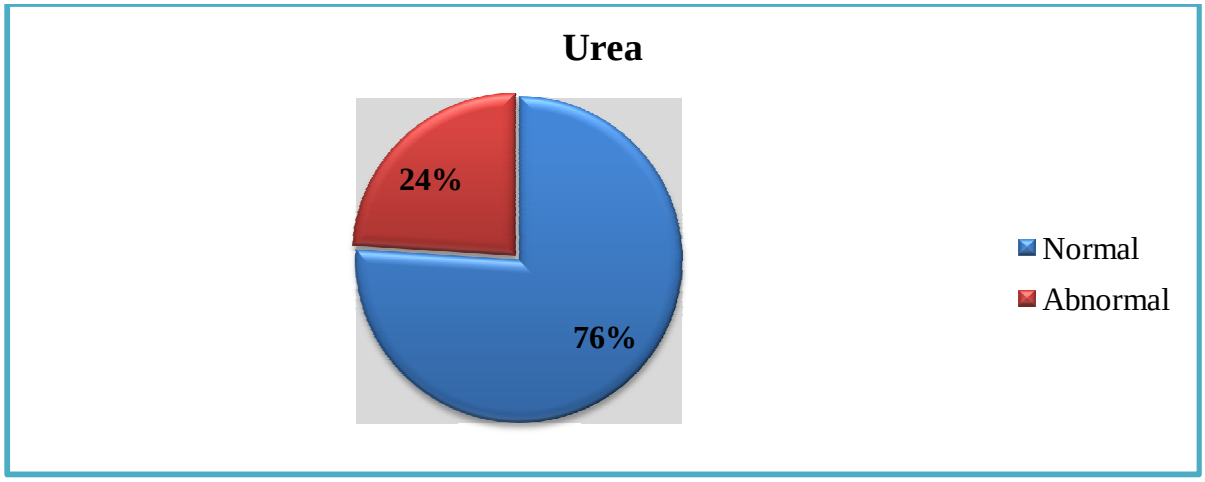

Figure (4.4) shows study group urea level

Table (4.8) shows study group health situations:

health situations	**Frequency**	**Percent**
None	26	52%
Diabetes	2	4%
Hypertension	11	22%
Renal abnormalities	3	6%
Diabetes and Hypertension	7	14%
Hypertension and renal abnormalities	1	2%
Total	50	100%

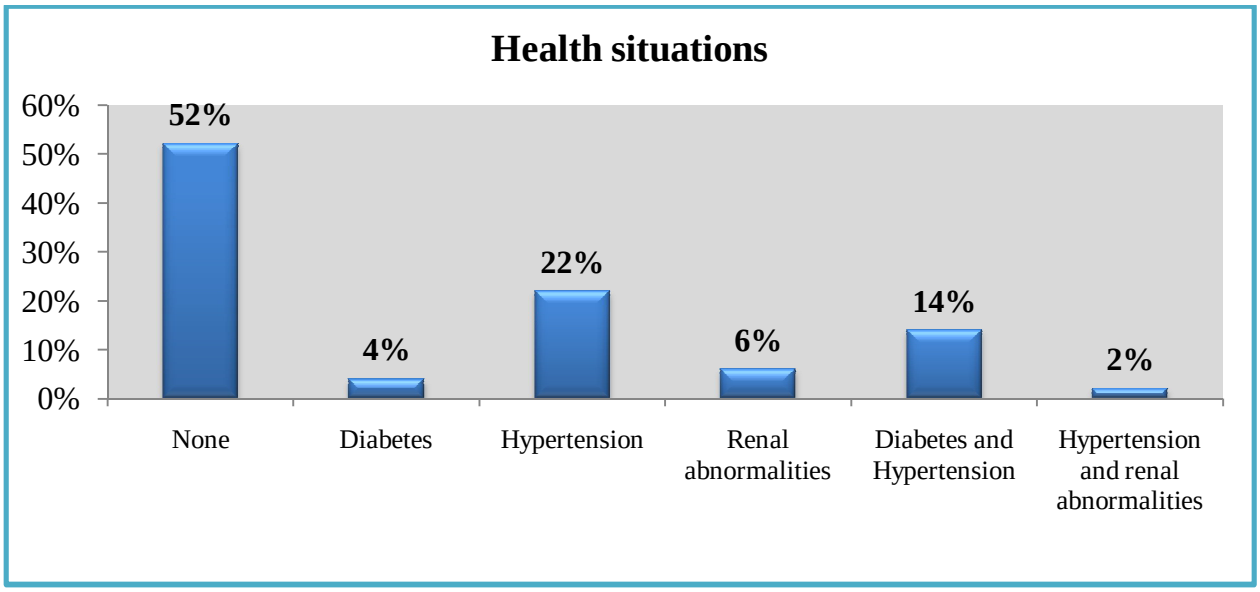

Figure (4.5) shows the distribution of patients by health situations:

Table (4.9) Health situations * Age Cross tabulation:

		Age		**Total**
		Less than or equal 60 years	Greater than 60 years	
Health situations	None	18(36%)	8(16%)	26(52%)
	Diabetes	0(0%)	2(4%)	2(4%)
	Hypertension	5(10%)	6(12%)	11(22%)
	Renal abnormalities	3(6%)	0(0%)	3(6%)
	Diabetes and Hypertension	4(8%)	3(6%)	7(14%)
	Hypertension and rena abnormalities	0(0%)	1(2%)	1(2%)
Total		30(60%)	20(40%)	50(100%)

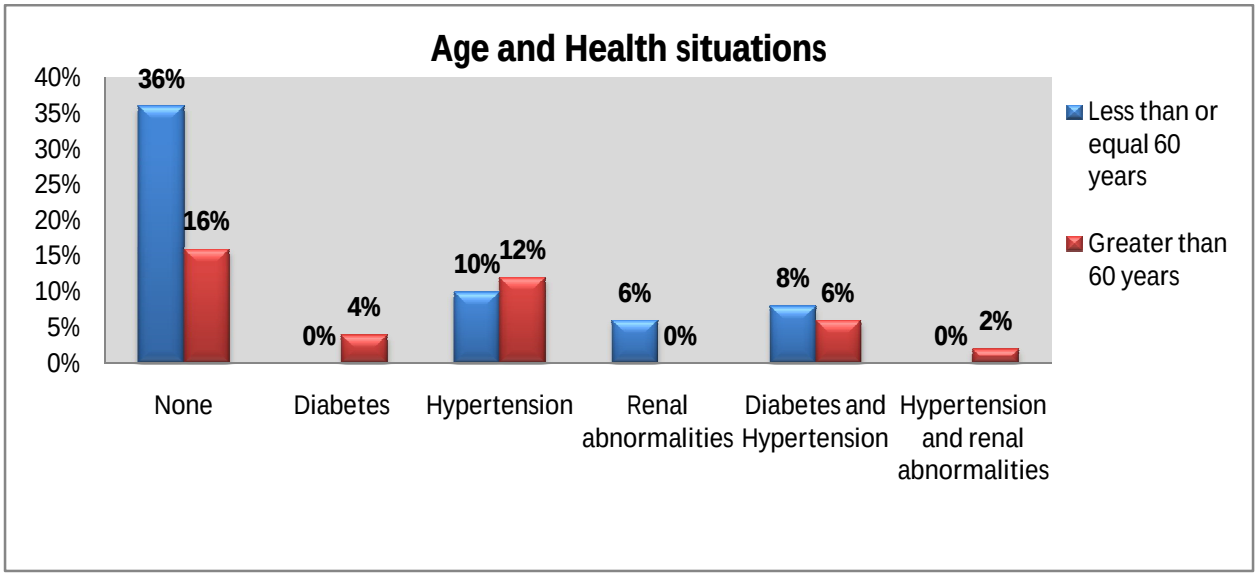

Figure (4.6) Health situations and Age Cross tabulation:

Table (4.10) Health situations * Creatinin Cross tabulation:

		Creatinin		Total
		Normal	Abnormal	
Health situations	None	23(46%)	3(6%)	26(52%)
	Diabetes	2(4%)	0(0%)	2(4%)
	Hypertension	10(20%)	1(2%)	11(22%)
	Renal abnormalities	3(6%)	0(0%)	3(6%)
	Diabetes and Hypertension	6(12%)	1(2%)	7(14%)
	Hypertension and rena abnormalities	1(2%)	0(0%)	1(2%)
Total		45(90%)	5(10%)	50(100%)

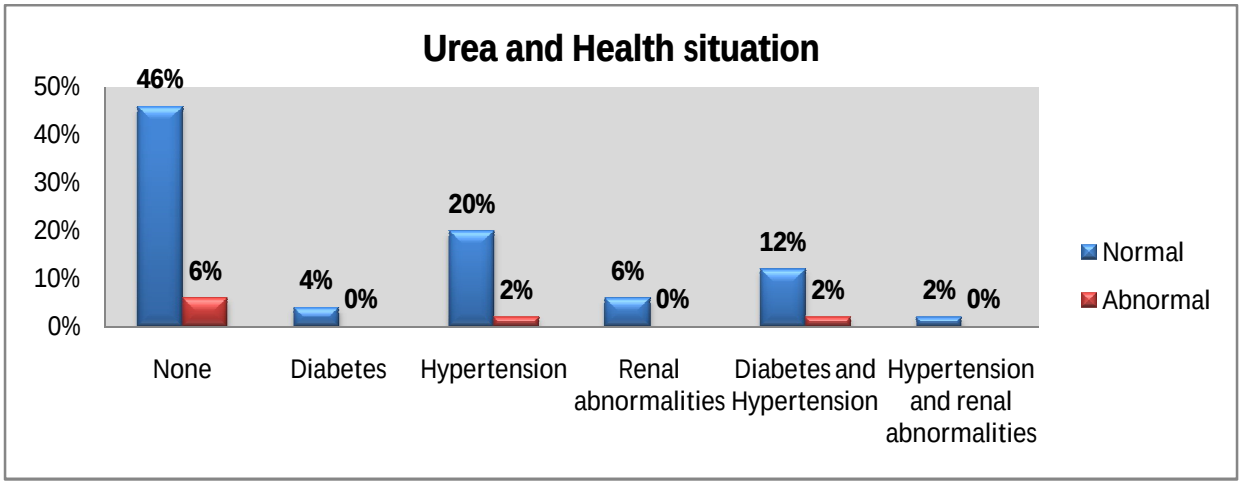

Figure (4.7) Health situations * Creatinin Cross tabulation:

Table (4.11) Health situations * Urea Cross tabulation:

		Urea		Total
		Normal	Abnormal	
Health situations	None	20(40%)	6(12%)	26(52%)
	Diabetes	2(4%)	0(0%)	2(4%)
	Hypertension	7(14%)	4(8%)	11(22%)
	Renal abnormalities	2(4%)	1(2%)	3(6%)
	Diabetes and Hypertension	6(12%)	1(2%)	7(14%)
	Hypertension and renal abnormalities	1(2%)	0(0%)	1(2%)
Total		38(76%)	12(24%)	50

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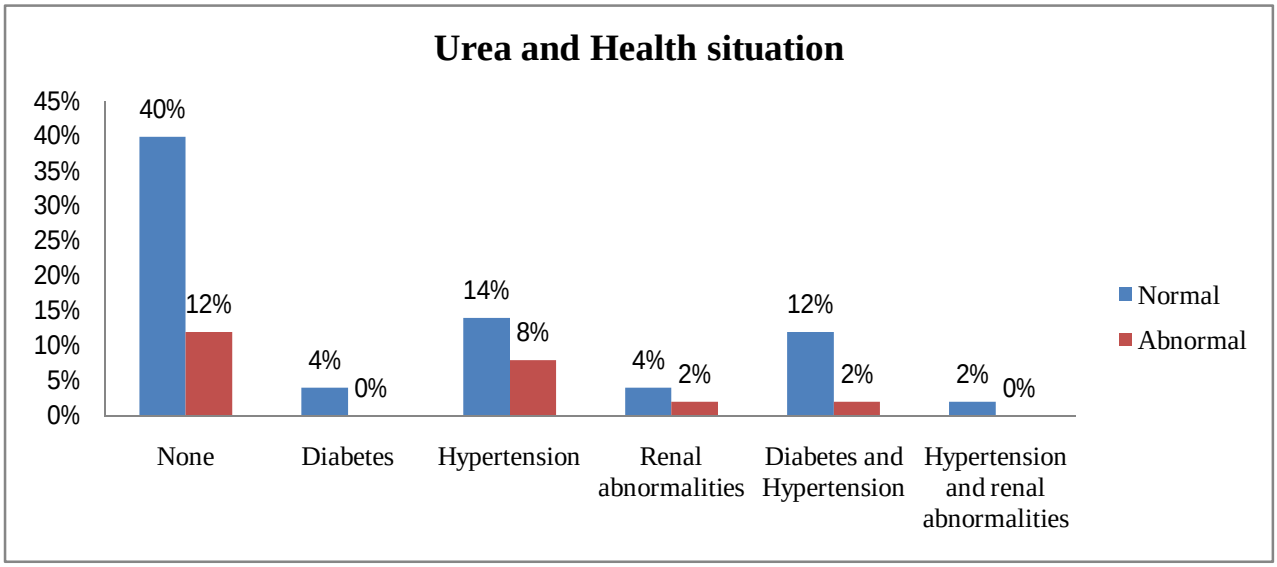

Figure (4.8) Health situations * Urea Cross tabulation:

Table (4.12) Age and (Creatinine, Urea) Cross tabulation:

		Age		**Total**
		Less than 60 years	Greater than 60 years	
Creatinin	Normal	29(58%)	16(32%)	45(90%)
	Abnormal	1(2%)	4(8%)	5(10%)
Urea	Normal	23(46%)	15(30%)	38(76%)
	Abnormal	7(14%)	5(10%0	12(24%)
Total		30(60%)	20(40%)	50(100%0

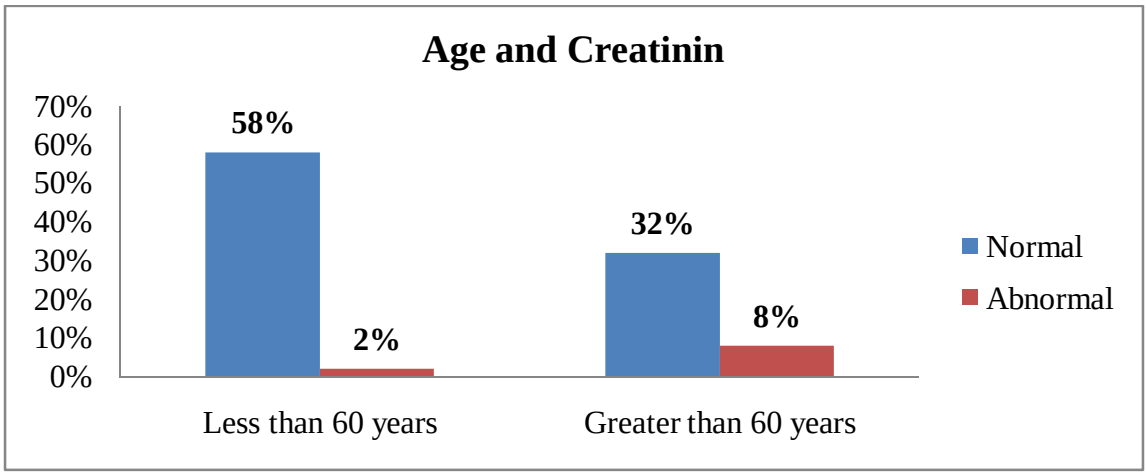

Figure (4.9) Age and Creatinin Cross tabulation:

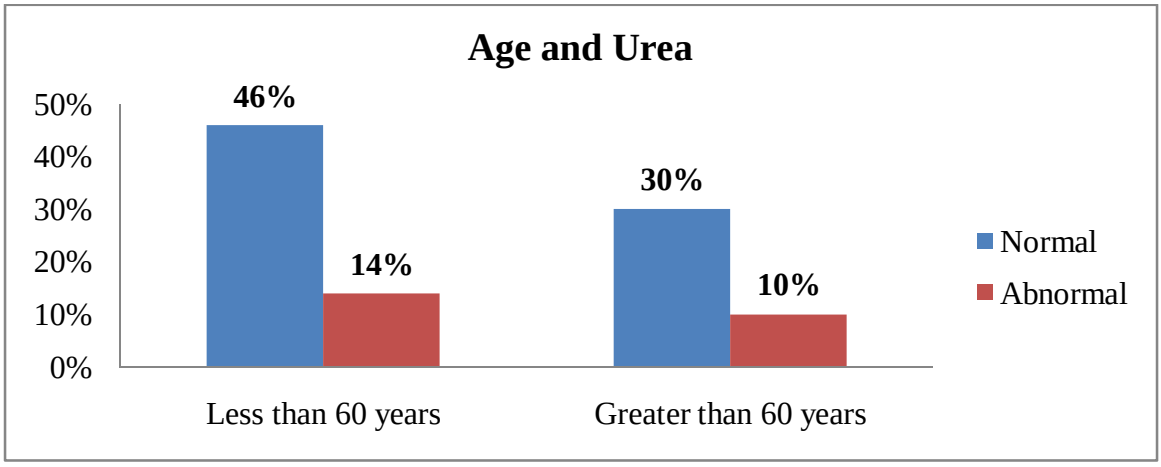

Figure (4.10) Age and Urea Cross tabulation:

Table (4.13) Geander and (Creatinine, Urea) Cross tabulation:

		Gender		Total	P-value
		Male	Female		
Creatinin	Normal	13(26%)	32(64%)	45(90%)	0.157
	Abnormal	3(6%)	2(4%)	5(10%)	
Urea	Normal	11(22%)	27(54%)	38(76%)	0.41
	Abnormal	5(10%)	7(14%)	12(24%)	
Total		16(32%)	34(68%)	50(100%)	

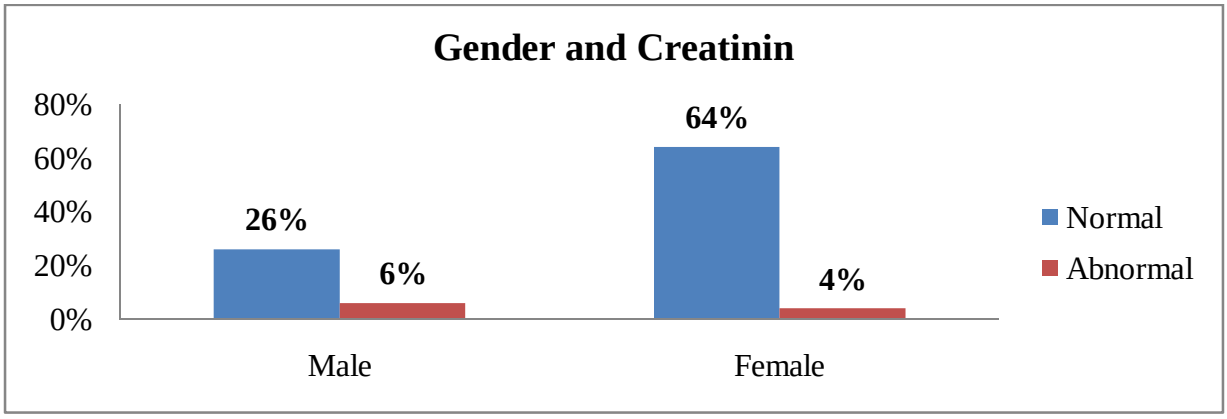

Figure (4.11) Gender and Creatinine Cross tabulation:

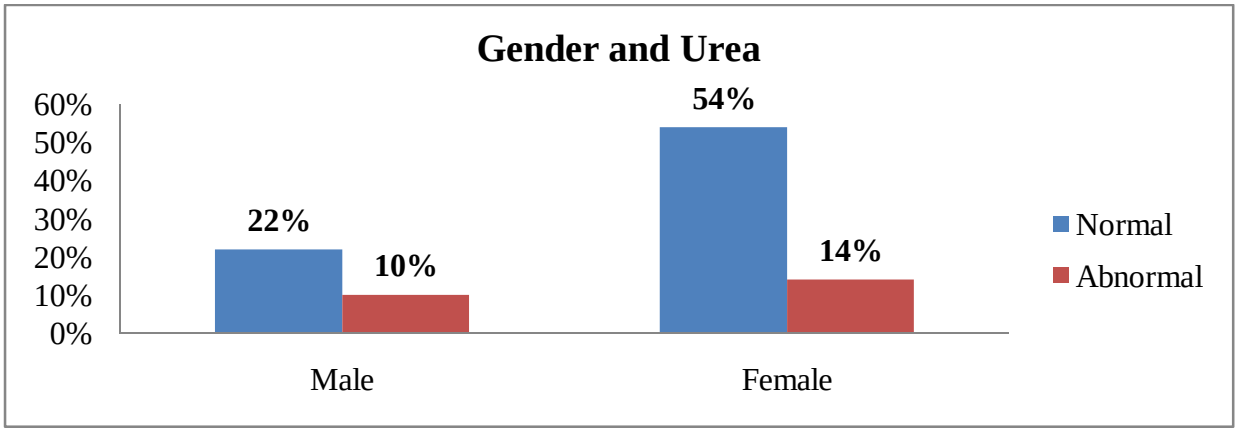

Figure (4.12) Gender and Urea Cross tabulation:

Chapter five

Discussion, Conclusion, Recommendation

5.1Discussion

They showed 90% of the study group normal creatinine level and 10%had high creatinine level because most of study sample had no renalproblem , diabetes , or hypertension .

(8%) of abnormal over 60 years patient , (2%) of abnormal from diabetes and hypertension patient .

The creatinine level had high level in male rather than female

The 76%of patient had normal urea level , and 24% had high urea level

The high urealevel10% of patient over 60 years , 2%of diabetes patient, 2% of hypertension patient , 2% of renal abnormality patient .

5.2Conclusion:-

The creatinine and urea result for the patient who give the IV or oral contrast study of normal value unless patient with history of diabetes, hypertension, renal abnormality or over 60 years patient. This cane avoid loss of time and the cost of laboratory test . Make a questionnaire in CT department help to identify who need the creatinin and urea test.

5.3 Recommendations:-

Further study with large group to get results guarantee

Collect data from more CT department that it includes several samples.

Use considered other variables such as life style (foods and drinks) and other habit’s (smoking, practiced sport, etc)

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Appendix

Patient NO	Age	gender	Results	health situation		
				Hypertension	Diabetes mellitus	Renal insufficiency