The National Ribat University

Faculty of Graduate Studies and scientificResearch

Ultrasound of theObstructive Uropathy

A thesis Submitted forPartial Fulfillment of Requirements of MSc degree in Medical Diagnostic Ultrasound

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الآية

{وَسِيقَ الَّذِينَ اتَّقَوْا رَبَّهُمْ إِلَى الْجَنَّةِ زُمَرًا حَتَّى إِذَا جَاؤُوهَا وَفُتِحَتْ أَبْوَابُهَا وَقَالَ لَهُمْ خَزَنَتُهَا سَلَامٌ عَلَيْكُمْ طِبْتُمْ فَادْخُلُوهَا خَالِدِينَ * وَقَالُوا الْحَمْدُ لِلَّهِ الَّذِي صَدَقَنَا وَعْدَهُ وَأَوْرَثَنَا الْأَرْضَ نَتَبَوَّأُ مِنَ الْجَنَّةِ حَيْثُ نَشَاءُ فَنِعْمَ أَجْرُ الْعَامِلِينَ* وَتَرَى الْمَلَائِكَةَ حَافِّينَ مِنْ حَوْلِ الْعَرْشِ يُسَبِّحُونَ بِحَمْدِ رَبِّهِمْ وَقُضِيَ بَيْنَهُم بِالْحَقِّ وَقِيلَ الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ} .

صدق الله العظيم

سورة الزمر الآية: 71 -75

Dedication

I dedicate this study to my beloved husband and best friend **Mohammed Abed Elwahid** who untiringly gave his understanding care and big support during the entire study and special thanks for his brother**Mahmuod**.

I dedicate it to my family specially my **mother** and my **father** who gave me moral support, and encouragement.

I dedicate it to my lovely daughter **Nour**.

Acknowledgement

Am very grateful to God almighty for graces and blessing.

I want to express immediate appreciation and deepest thanks extended for any person who in way or another contributed in making this study possible specially my supervisor **Dr. Kamal EldinElbadawiBabiker** for his efforts, comments, critique and editing study.

Abstract

This is a descriptive cross sectional studywas done to evaluate49patients selected randomly who referred for abdominal US in Bahri Teaching Hospital from24/12/2015 to 13/4/2016and suffering from urinary tract obstruction for all ages, gender and ethnic groups. The problem of the study was there are many causes of obstructive uropathy. The study was done to evaluate the role of US in diagnosis the obstructive uropathy, depending on practical scanning through which the datawas collected in a configuration of data collection sheet. The data were analyzed by using Statistical Packaged for Social Sciences (SPSS) and Excel under windows.The result was concluded from the processed data and discussed in details to determine the role of US accuracy in diagnostic obstructive uropathy and the result was summarized to draw the conclusion. The study concluded that the age group (51-60) yrs were more affected withobstructiveuropathy and the male gender more affected than female. The most causative factors were the upper urinary tract obstruction due to kidney stones,then tumors and BPH.

US examination can easily determine deferent types of hydronephosis. US have high accuracy in detection fluid which results from obstruction. Stones, tumors, and prostate enlargement are more causes of obstruction.US noninvasive, portable and no need for contrast media.

مستخلصالدراسة

انسداد المسالك البولية يسبب توسع نظام التجميع القريب إلى الانسداد, الموجات الصوتية تلعب دورا بارزا باعتبارها واحدة من التحقيقات في الاعتلال الانسدادي.في الغالبية العظمى من الحالات، انسداد المسالك البولية يسبب توسع نظام جمع نظام التجميع الأقرب إلى موقعالانسداد. إذا كان انسداد المسالك البولية ثنائي أو أحادي الجانب وما إذا كان شمل الحالب، يعتمد على سبب وموقع الانسداد.

وقد أجريت هذه الدراسة لتقييم 49 مريضا تم اختيارهم عشوائيا الذين تم تحويلهم إلى قسم الموجات الصوتية في مستشفى بحري التعليمي من 2015/12/24 إلى 2016/4/13 ويعانوا من انسداد المسالك جميع الأعمار والجنس والمجموعات العرقية فيوقد اعتمدت هذه الدراسة على المسح العملي الذي تم من خلاله جمع البيانات في تكوين ورقة جمع البياناتوقد تم تحليل البيانات باستخدام الحزمة الإحصائية للدراسات الاجتماعية و إكسيل,وقد استنتجت النتائج من البيانات وخلصت الدراسة إلى أن الفئة العمرية (51–60) سنه أكثر تأثرا بالاعتلال الانسدادي والذكور أكثر تأثرا من الإناثوانسداد المسالك البولية العليا بسبب حصي الكلى يأتي أول الاسبابويليه الاورام و تضخم غدة البروستات.

فحصالموجات الصوتية يمكنه بسهولة تحديد أنواع مختلفة منالاعتلالات الانسدادية البولية فهي لديها دقة عالية في الكشف عن السوائل التي تنتج عن انسداد المسالك البولية، الحصاوي والأورام، وتضخم غدة البروستات هي أكثر أسباب الانسداد. الموجات الصوتية وسيلة غير معقده، وليس هناك حاجة لوسائل تباين.

List of contents

List of Tables

List of Figures

List of abbreviations

BPH	Benign Prostatic Hyperplasia
Lt	Left
RCC	Renal Cell Carcinoma
Rt	Right
US	Ultrasound

Chapter one

Introduction

1. Introduction and objectives

1.1 Introduction:

US is a real time modality, does not utilize ionizing radiation, and provides quantitative measurement and imaging of blood flow. Urinary tract obstruction is common cause of acute and chronic renal failure. A wide variety of pathological process intrinsic and extrinsic to urinary system can cause obstruction. Because the degree and duration of obstruction are the chief determination of renal dysfunction, early recognition and treatment is the key to preventing renal loss. Obstruction of urinary tract at any level eventually result in elevation of intraluminal ureteral pressure with prolonged obstruction ureteral peristalsis overcomes and increases hydrostatic pressure are transmitted directly to nephron tubules [(1)]. Diagnosis is usually established through history, clinical examination, and investigations. Ultrasonography is one of the well accepted and sensitive imaging modality for the diagnosis and follow-up of urinary tract disorder. The advantages of using US imaging include its mobility, low cost, and no need for contrast media as well as the ability to detect fluid collection which result from obstruction. Other imaging techniques, such as intravenous urogram (IVU) and radioisotope scans are used as complementary tools for diagnosis. [(1)]

The role of US is to detect the presence or absence of hydronephrosis; estimatethe amount of residual cortex present and to detect the presence of a pelvic mass or otheretiology.In the vast majority of cases, urinary tract obstruction causes dilatation of the collecting system proximal to the site of obstruction.Whether the hydronephrosis is bilateral or unilateral and whether or not it involves the ureter(s) depends on the cause and site of the obstructing lesion.Sometimes only one moiety of the kidney may be obstructed by a stone or tumor, whilst the rest of the kidney remains normal. If the obstruction is long-standing the renal cortex may atrophy, becoming thin. Normal thickness of cortex is a good prognostic indicator. [(4)]

1.2 Objectives:

1.2.1 General objectives:

To evaluate the role of US in diagnosis the causes of obstructive uropathy.

1.2.2 Specificobjectives:

To diagnose the pathological status of the urinary tract obstruction using US.

To accurately diagnose the causes of obstructive uropathy.

To assess the feature of obstructiveuropathy.

Chapter Two

Literature review and previous studies

2. Literature review and previous studies

2.1 Anatomy and physiology:

Urinary system consists of; two ureters, two kidneys, one urinary bladder andone urethra.

2.1.1 The kidney:

The kidneys are enclosed by a fibrous capsule which is, surrounded by per renal fat. In the adult, each kidney measures approximately 11 cm long, 2.5 cm thick, and 5 cm wide and weighs 120 to 170 grams. The kidneys are mobile and will move depending on body position. In the supine position, the superior pole of the left kidney is at the level of the 12th thoracic vertebra, and the inferior pole is at the level of the third lumbar vertebra. (2)

The normal adult kidney is bean shaped with a smooth, convex contour anteriorly, posteriorly, and laterally.Medially, the surface is concave the medial surface is known as the renal hilum. The renal hilum is continuous with a central cavity called the renal sinus. Within the renal sinus are the major branches of the renal artery, major tributaries of the renal vein, and the collecting System. The remainder of the renal sinus is packed with fat. The collecting system (renal pelvis) lies posterior to the renal vessels in the renal hilum renal parenchyma is composed of cortex and medullary pyramids. (2)

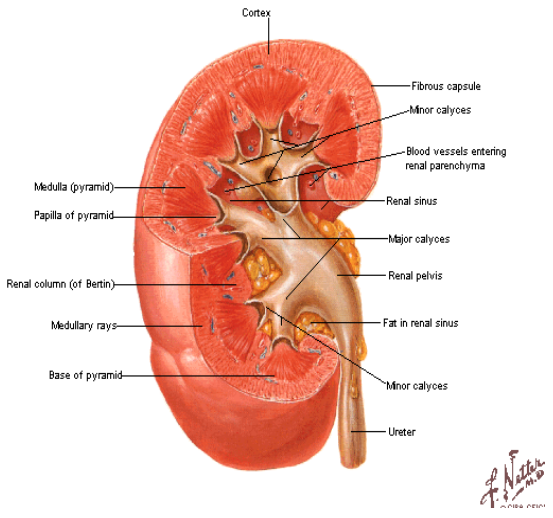


Fig (2.1): Structure of the kidney. (1)

2.1.2 Blood supply of the kidneys:

The kidneys are supplied with blood by the renal arteries, which are branches of the abdominal aorta; arise at the level of the first-second lumbar vertebra.The renal artery divides into several segmental brancheswithin the renal sinus. Some Branches go posterior to the pelvis while others go anterior to the pelvis. The interlobararteries enter the parenchyma through the renal columns and extend to the bases of thepyramids. (1)

At the junction of the cortex with the medulla the vessel arches across the base of the pyramid. This is known as the arcuate artery. It gives off branches called the interlobular arterieswhich supply the majority of the cortical nephrons via afferent arterioles. In about 30 % of people there additional artery called ‘aberrant’ arises from aorta, below level of renal arteryFig (2.2).(1)

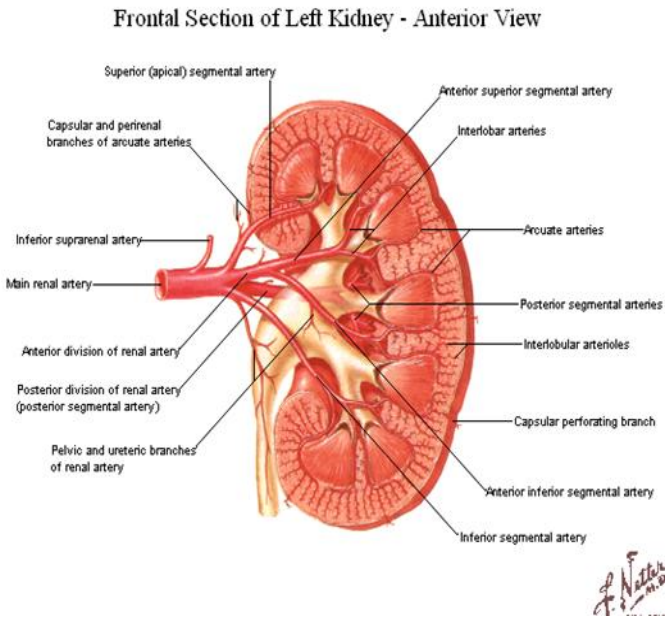


Fig (2.2): Arterial supply of the kidney.(1)

The renal vein return blood to hilum ,are called interlobular , interlobular , arcuate , interloper ,and segmental they form the renal vein which pass medially in front of corresponding artery , to drain into IVC .The Lt. one is longer, crosses aorta behind SMA, and receives Lt Suprarenal vein, Lt. gonadal vein. (1)

2.1.3 Lymphatic drainage andInnervations:

Lymphatic's from the kidneys run close to the renal vein and Drain into the Para-aortic (lateral) lymph nodes. The lymph then passes by the lumbar trunks, to the cisterna chili and Thoracic duct.Sympathetic innervations through celiac plexus and superior mesenteric plexus.Parasympathetic innervations through preganglionic at hilum. [3]

2.1.4 Functions:

The two kidneys excrete most of the waste products of metabolism. The waste products leave the kidneys as urine which passes down through the ureters to the urinary bladder. The urine leaves the body through urethra. [3]

2.2Obstructiveuropathy:

2.2.1 Pelvicalyceal system dilatation and obstructiveuropathy:

Not all PCS dilatation, is pathological, or indeed obstructive, that is, there can be dilatation without physiological obstruction.Mild dilatation of the renal collecting system is a common finding, most commonly secondary to an over distended bladder. Following micturition, the collecting system decompresses and returns to normal. An external renal pelvis is a non obstructivebaggy dilatation of the pelvis and can be regarded as a normal variant. The intra renal collecting system is normal in this situation. Pregnancy is another common cause of mild PCS dilatation, more frequently on the right, particularly in the second and third trimester. This is thought to be due partly to pressure on the ureters from the advancing pregnancy and partly hormonal. It is however wrong to assume that the kidney is not obstructed just because the patient is pregnant. If symptomatic, the suspicion of obstruction in a dilated system is increased, particularly if echoes are present in the PCS. [4]

2.1.2Obstructive uropathy:

Renal obstruction, particularly if long standing, can irreversibly damage the kidney or kidneys, leading eventually to renal failure. If diagnosed early enough, renal function can be preserved and therefore US plays a prominent role as one of the first-line investigations in patients with loin pain, renal colic or micturition disorders. In the vast majority of cases, urinary tract obstruction causes dilatation of the collecting system proximal to the site of obstruction.Whether the hydronephrosis is bilateral or unilateral and whether or not it involves the ureter(s) depends on the cause and site of the obstructing lesion.Sometimes only one moiety of the kidney may be obstructed by a stone or tumor, whilst the rest of the kidney remains normal. In a duplex kidney, dilatation of the upper pole moiety is a common occurrence due to an anomaly at the VUJ, that is, an ureterocoele.If the obstruction is long-standing the renal cortex may atrophy, becoming thin. Normal thickness of cortex is a good prognostic indicator. [4]

2.1.3 Causes:

In infants and children ureteropelvic junction obstruction, posterior urethral valves in males and Prune Belly Syndrome are the most common causes of obstruction. Calculi are the most common cause in adults followed by tumors of the kidney, ureter and bladder. Less common causes are inflammatory ureteral strictures, neurogenic bladder andBladder outlet obstruction. [4]

2.1.4 Symptoms:

Obstruction of longer standing may present with a more diffuse loin pain, with a loin mass or, if infection supervenes with fever, malaise as well as focal signs of obstruction. Increased serum creatinine and BUN levels may occur. [4]

2.1.5 Sonographic technique:

The role of USis to detect the presence or absence of hydronephrosis; estimate the amount of residual cortex present and to detect the presence of a pelvic mass or other etiology. Coronal views are recommended for demonstrating continuity between calyces, renal pelvis, and proximal ureter. Long and short axis views of the kidneys may both be obtained sing the coronal approach. No hydronephrosis will be evident if it is a very recent obstruction or if decompression has occurred. Hydronephrosis may persist for months after obstruction has been relieved. Confirmation of functional urinary obstruction must be provided by Doppler US findings, or by additional imaging (intravenous urography, radionuclide studies). Color Doppler image which demonstrates flow in the renal vessels and absence of flow in the dilated collecting system. If hydronephrosis is detected and the urinary bladder is full, reevaluation of the kidneys should be performed following voiding or bladder drainage as over distention of the bladder can cause a transient dilatation of the upper collecting system called pyelocaliectasis.Pyelocaliectasis disappears after voiding; hydronephrosis remains evident after voiding.Evaluation of the kidneys should include imaging of as much of the ureters as possible and evaluation of the urinary bladder and urethra. [(4)]

2.1.6 Sonographic appearances:

Divide into4 stages:

Mild**;** there is minimal dilatation of the collecting system. The calyces are blunted but some pyramidal indentation remains. On US this appears as a single, ellipsoidal fluid collection spreading the central echo complex. Slight dilatation of the renalPelvis and calyces will be seenFig (2.3).[(4)]

Fig (2.3): US image of LtKidney shows mild obstructiondue torenal pelvic stone.[3]

Moderate;the calyces are clubbed and there is no pyramidal indentation into the calyces. On US there is a lobulated fluid collection with a few septae between the distended calyces. The parenchymal thickness is preserved.[4]

Severe**;**the calyces are still discretely defined and separate from each other. The collecting system is markedly dilated with thinning of the parenchyma.

Fig (2.4): US image of the Rt kidney shows moderatehydronephrosis due to vesical stone.[3]

Extreme;the calyces are so distended that they blend into one another except for residual margins that appear as thin septae. On US there are

multiple rounded fluid containing structures which are the distended calyces. These distended calyces displace the central echo complex and totally replace the normal parenchymaFig (2.5). [4]

Fig (2.5): US image of Lt Kidney showsextreme obstruction due to renal pelvic stone. [3]

2.1.7 Pitfalls in diagnosing Hydronephrosis

a. Failure to Look for Bladder Outlet Obstruction**;** Post void bladder scans are essential even on patients with Foley catheters as an improperly positioned catheter may drain some urine but not enough to relieve bladder outlet obstruction.
b. Minimal Hydronephrosis**;**Minimalhydronephrosis may be due to over hydration, vesicoureteral reflux or an early sign of significant obstruction.
c. Dilatation without Obstruction**:** Dilatation of the collecting system can occur in the absence of flow-reducing obstruction, for example, a patient with congenital UPJ obstruction.
d. Dilatation from Reflux**;** the only sonographic finding that differentiates between obstruction-induced and reflux-induced hydronephrosis is minute-to-minute variation in the degree of dilatation, particularly when the ureters and calyces become larger as the bladder becomes smaller.

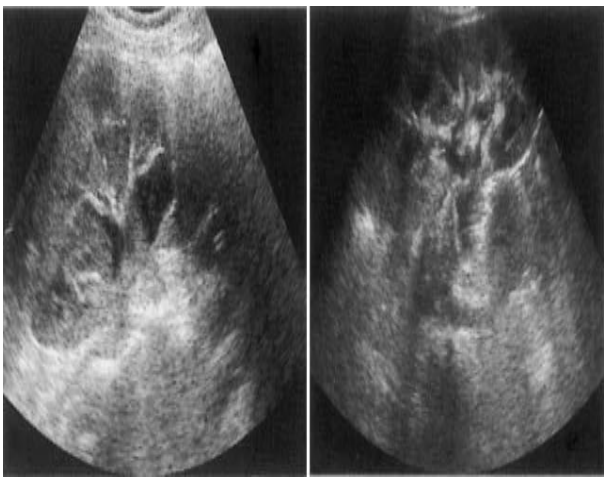
e. Blood Vessels Mimic Dilated Calyces;Normal intra renal arteries and veins are demonstrated sonographically and may mimic dilated calyces. Color Doppler readily differentiates the vessels from the calyces.

f. Para pelvic Cysts Mimic Dilated Calyces;Although a parapelvic cyst is usually rounded and easily distinguished from a dilated collecting system, there are situations where a parapelvic cyst is lobulated and the lobules extend into the region of the papillae, thus mimicking dilated calyces. A simple rule helps prevent this error: diagnosis hydronephrosis only when the dilated calyces are similar in size and clearly communicate with a centrally located, dilated renal pelvis.

g. Papillary Necrosis**;** the cavities in the renal pyramids may be mistaken for hydronephrosis. However, two findings in papillary necrosis are diagnostic only the calyces are enlarged (the infundibula and pelvis are not dilated); and the medullary pyramids are blunted, small or invisible. [3]

2.1.8 Pyonephrosis:

Pyonephrosis is a urological emergency. An obstructed kidney is prone to become infected.High fever and loin pain can suggest obstructive pyonephrosis. Pus or pus cells may also be detected in the urine. Low level echoes can be seen within the dilated PCS on ultrasound, and may represent pus. Sometimes, however, the urine may appear anechoic, despite being infected. The clinical history should help differentiate pyo- from simple hydronephrosis.Percutaneous drainage by US or fluoroscopically guided nephrostomy is usually necessary, partly as diagnostic confirmation and partly as a therapeutic procedureFig (2.6).[4]



A **B**

Figs(2.6:A&B): (A) US images of two different kidneys showing Pyonephrosis, (B) A hyperechoic blood clot can be seen within the collecting system.

2.1.9 Haemo-hydronephrosis:

Blood within the dilated PCS may be due to trauma or other local or semi local pathological processes such as infection or tumor. It is not usually possible to determine whether obstruction is caused by a blood clot or whether the blood is the result of an obstructing lesion which is also causing bleeding. Renal colic as a result of obstruction by a blood clot in the absence of trauma or blood dyscrasia must naturally be thoroughly investigated to exclude an underlying lesion. Like pyonephrosis, low-level echoes may be seen on US within the collecting system. [(4)]

2.1.10 Non-obstructive hydronephrosis:

Not all renal dilatation is the result of an obstructive process and the kidney may frequently be dilated for other reasons. [(4)]

2.1.10.1 Reflux:

This is the most common cause of non-obstructive renal dilatation, and is normally diagnosed in children.Reflux is associated with recurrent urinary tract infections and can result in reflux nephropathy, in which the renal parenchyma is irretrievably damaged.Reflux can be distinguished from other causes of renal dilatation by observing the dilatation of the ureters at the bladder base, due to the retrograde passage of urineFig (2.7).[(4)]

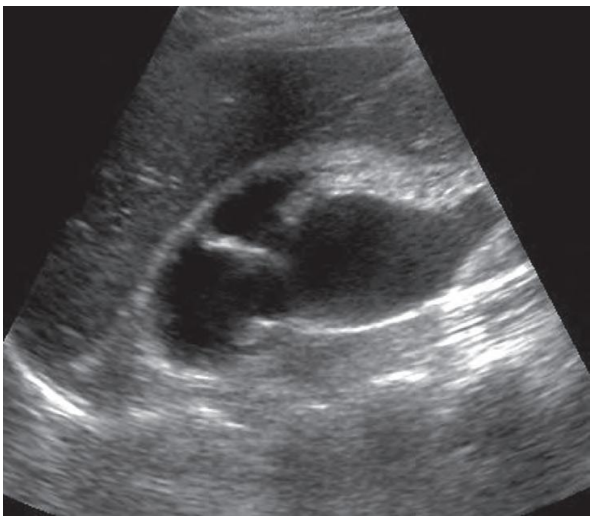


Fig (2.7):US image of kidney shows areflux nephropathy.[4]

2.1.10.2 Papillary necrosis:

The renal papillae, which are situated in the medulla adjacent to the calyces, are susceptible to ischemia due to relatively low oxygenation in the region of the medullary junction. This is particularly associated with diabetic patients and those on long term anti-inflammatory or analgesic medication.The papillae tend to necrose and slough off, causing blunting of calyces on IVU. Sloughed-off papillae may lodge in the entrance to the calyces, causing obstruction.Papillary necrosis is difficult to detect on ultrasound unless advanced. It appears as prominent calyces with increased corticomedullarydifferentiationFig (2.8).[4]

Fig (2.8): US image of a kidney shows a papillary necrosis.[4]

2.1.10.3 Congenital megacalyces:

This is a congenital condition in which the PCS is dilated due to poor development of the papillae. The calyces are normally markedly enlarged but the cortex is normal and the ureters are of normal caliber and not dilated. Occasionally this is associated with congenital mega ureter in which the muscular layer of the ureter is atonicFig (2.9).[4]

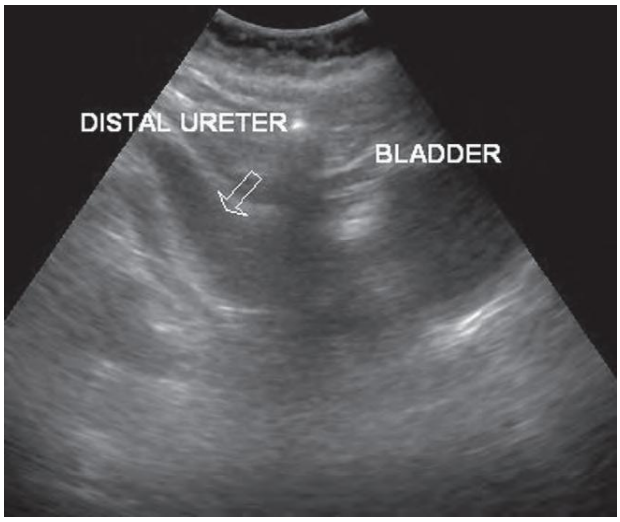


Fig (2.9):US image of a kidney shows acongenital megaureter.[4]

2.11 Previous studies:

In a study done by Will Bentley, at Manchester Royal Infirmary (2007),he reported that US is able to detect calculi and hydronephrosis in a high percent of patients. It is positive predictive value is excellent, and if hydronephrosis or calculi are identified by US, a confident diagnosis can be made. However, the negative predictive power of ultrasound is not as strong. In the absence of hydronephrosis or a calculus, these conditions cannot be definitively ruled out, as 1 in 5 patients will still have an obstruction. In patients with strong clinical evidence of obstruction, but a negative US report, either another form of imaging should be considered, or ultrasound should be repeated at regular intervals to look for developing hydronephrosis. A number of these studies also highlight that the diagnostic ability of US is increased when used in

conjunction with another form of imaging. For most clinicians the most convenient will probably be KUB X-ray. [4]

In another study done by El Imam M, etalin Sudanese Patients (2006); they reported that the incidence of hydronephrosis was found to be 3.1% among 59,664 patients ranging in age from birth to 80 years. Five hundred twenty patients were diagnosed with obstructive uropathy during their study; 345 (66%) patients presented with chronic obstruction and 175 (34%) with acute obstruction. The patterns of clinical presentation of the obstructed patients included pain at the site of obstruction in 48%, lower urinary tract symptoms in 42%, urine retention in 36.5%, mass effect in 22%, and anuria in 4%. Patients in the pediatric age group constituted 4% of the total. The common causative factors of obstruction included congenital urethral valves, pelvi-ureteral junction obstruction, urolithiasis, and iatrogenic trauma, especially in the obstetric practice. Benign prostatic hyperplasia (BPH) was the largest single cause of urinary obstruction in one series; BPH accounted for more than 30% of cases.The second most common cause of obstructive uropathy was urinary stone disease at a different site in the urinary tract the incidence and causes of urinary tract obstruction vary with the age of the patient. Uretero-pelvic junction obstruction accounts for the majority of cases in children, while calculi are more common in young adults. On the other hand, benign prostatic hyperplasia or carcinoma, retroperitoneal or pelvic neoplasm, and calculi are the primary causes in older patients. Ureteral obstruction with subsequent hydronephrosis is a common clinical occurrence.Renal function was completely recovered with early management in 100% of patients with acute obstruction and was stabilized in 90%.[5]

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Chapter three

Materials and Methods

3. Materials and methods

3.1Study Design:

This was a descriptive cross sectional study where the patient selected randomly.

3.2 Study Area:

This study has been carried out at BahriTeachingHospital.

3.3 StudyDuration:

The study has done on the period 24/12/2015 to 13/4/2016. Time available was 6 days a week during these days 3 hours per days had spent on the research work.

3.4 Study Population:

The study included 49patients who referred toBahriTeachingHospital for abdominal US and suffering from urinary tract obstruction for all ages, gender and ethnic groups.

3.4.1 Inclusion criteria:

Patientssuffering from urinary tract obstruction for all ages, gender and ethnic groups.

3.4.2 Exclusion criteria:

Surgical operation of any part of urinary tract.

3.5 Sample size and type:

The data of the study was collected from 50 patients, selected randomly.

3.6Study Variable:

Study Variableincludesclinical findings(pain, dysuria, fever, oligouria, urine retention); US findings(hydronephrosis, Stone, Tumor);Age; Gender; and Ethnic.

3.7 Data collection:

The data was collected using data collection sheet that designed especially of study.

3.8 Ultrasound technique:

US machines with high frequencies transducer 7.5 to 5 MHz, coupling gel and TV card with 16 bit to capture the US image using the personal computer.

The right kidney is readily demonstrated through the right lobe of the liver. Generally a subcostal approach displays the (more anterior) lower pole to best effect,while an intercostal approach is best for demonstrating the upper pole. The left kidney is not usually demonstrable sagittally because it lies posterior to the stomach and splenic flexure. The spleen can be used as an acoustic window to the upper pole by scanning coronally, from the patient's Lt side, lying supine or decubitus (Lt side raised), but, unless the spleen is enlarged, the lower pole must usually be imaged from the left side posteriorly. Coronal sections of both kidneys re particularly useful as they display the renal pelvicalyceal system (PCS) and its relationship to the renal hilum. This section demonstrates the main blood vessels and ureter (if dilated). [3]

As with any other organ, the kidneys must be examined in both longitudinal and transverse (axial) planes. This usually requires a combination of subcostal and intercostal scanning with anterior, posterior and lateral approaches. The operator must be flexible in approach to obtain the necessary results.[3]

The bladder should be filled and examined to complete the renal tract scan. An excessively full bladder may cause mild dilatation of the PCS, which will return to normal following micturition. [3]

3.9 Data analysis:

The data were analyzed by using Statistical Packaged for Social Studies (SPSS) and Excel under windows.The variables had been included in the study portrayed using Bar graph.As well the association between the hydronephrosis (independent variable) and the others variables (dependant) were investigated using multiple linear regression stepwise analysis and logistic regression. The result was concluded from the processed data and discussed in details to determine the role of US accuracy in diagnostic

obstructive uropathy and was summarized to draw the conclusion. The reference was given in appendices.

3.10 Data management:

The data were be analyzed as mentioned above and descriptivestatistic presented in the table, charts, graphs and figuresas based on observed data.

3.11 Ethical considerations:

The procedures of the scanning with USwere explained to the patients and the purpose of incorporating their data in the study, where the written consent acquired in case of agreement. Permission from the hospital and the department was granted including approval ofthe Faculty of Radiology. No patient identification or any individual patient detail had been published.

Chapter four

Results

4. Results

Table (4.1): Shows age distribution among patients.

Age group	Frequency	Percent
1-10	4	8.2
11-20	3	6.1
21-30	8	16.3
31-40	7	14.3
41 – 50	7	14.3
51-60	10	20.4
61-70	6	12.2
71-80	4	8.2
Total	49	100

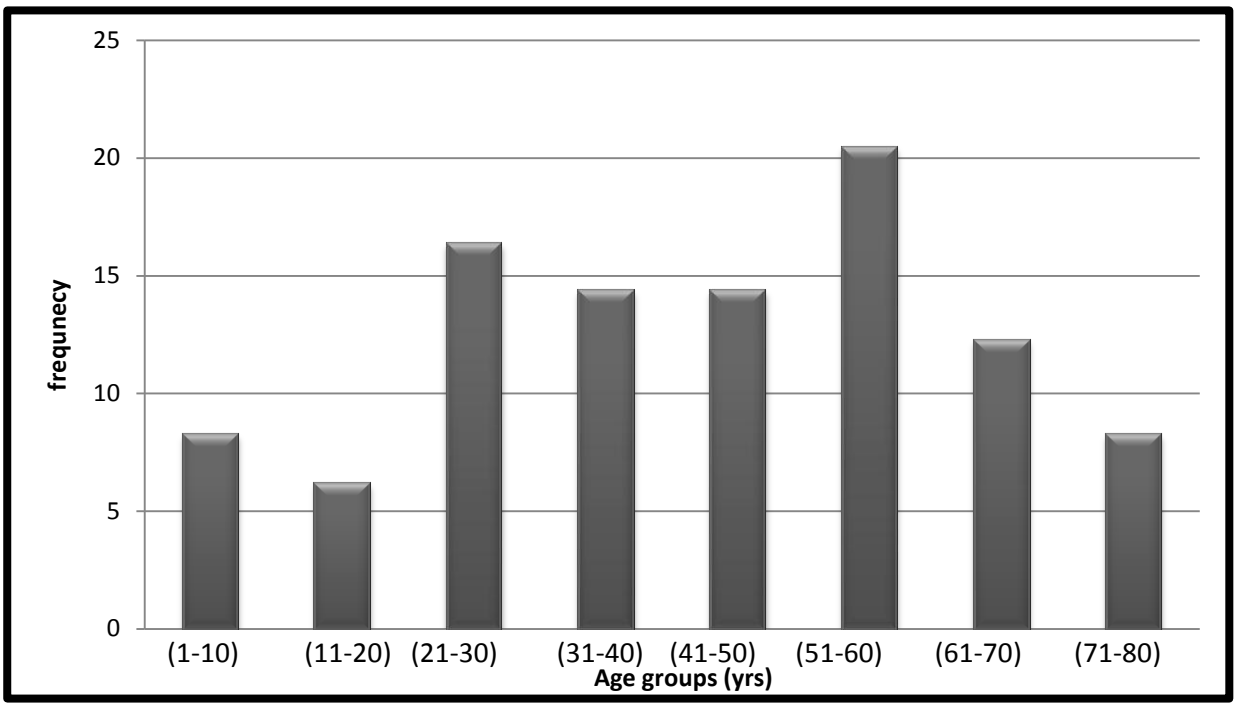

Fig (4.1): Showsage distribution among patients.

Table (4.2): Shows distribution of gender.

Gender	Frequency	Percent
Male	35	71.4
Female	14	28.6
Total	49	100

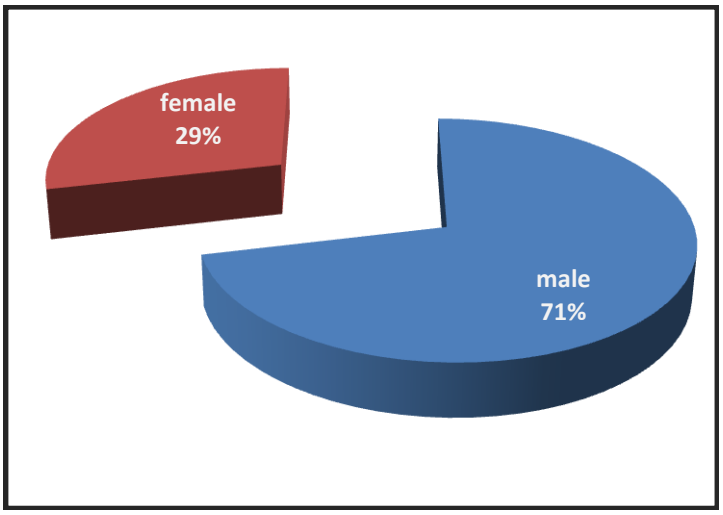

Fig (4.2): Showsdistribution of gender.

Table (4.3): shows the site of obstruction.

Site of obstruction	Frequency	Percent
Kidney	21	42.8
Ureter	14	28.6
Urinary bladder	14	28.6
Total	49	100

Table (4.4): Shows the different US findings in all patients.

US finding	Frequency	Percent
Stones	38	77.6
Tumor	8	16.3
BPH	3	6.1
Total	49	100

Table (4.5): Shows the different Clinical findings in all patients.

Clinical findings	Frequency	Percent
Pain	44	89.8
Dysuria	33	67.3
Urine retention	22	45
Fever	25	51

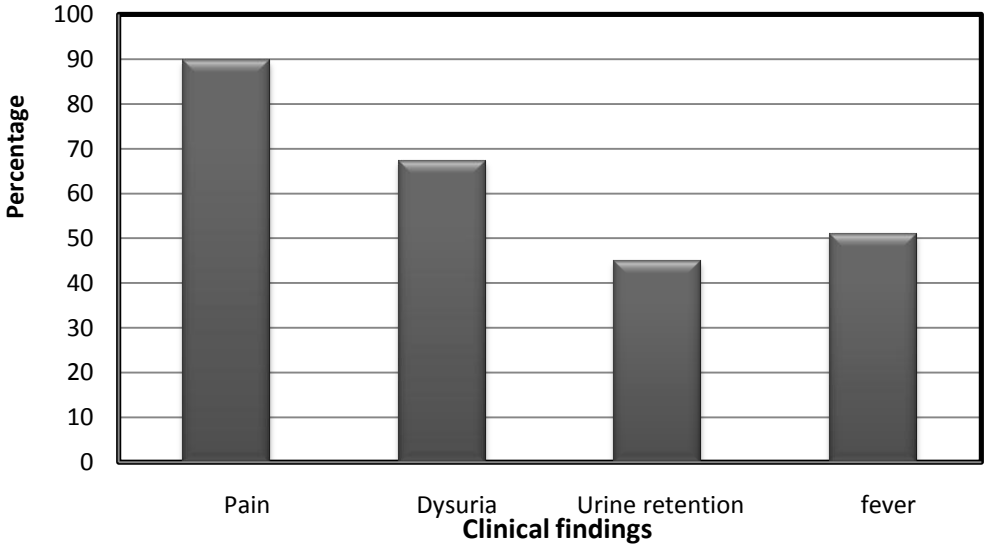

Fig (4.3): Shows the different clinical findings in all patients.

Chapter Five

Discussion, Conclusion and Recommendations

5.1 Discussion:

This study was doneon patients who were referred to US department in Bahri Teaching Hospital with a total number of patients 49 who developed obstructive uropathy from different types of diseases.

This study was conductedon total number of patients 49 who were referred to US department in Bahri Teaching Hospital,developed obstructive uropathy from different age during the mentioned period.According to age of subjects underwent the study,they assigned into eight age groups, group one, 4 (8.2%) out of the total number of 50 had age ranged from (1-10) yrs, group two3 (6.1%) their age ranged from (11-20) yr, group three 8 (16.3%) from (21-30) yrs, group four7 (14.3%) from (31-40)yrs, group five 7 (14.3%) from (41-50)yrs, group six10 (20.4%) from (51-60) yrs, group seven 6 (12.2%) from (61-70) yrs, group eight 4 (8.2%) from (71-80) yrs.

Outof 40 patients 35,were males (71.4%) and 14 patients were female (28.6%) that means there obstructive uropathy occurs more commonly in male.

The main causes of the obstructive uropathy which were revealed by US were 21(42.8%) kidney obstruction,14(28.6%) urinary bladderobstructionand 14 (28.6%) patients had ureter obstruction.The present study, alsorevealed that thekidney was common site of obstruction, which agrees with what mentioned in literature.

Regarding the clinical signs and symptoms most of the patients were complained ofpain, dysuria and fever which agree with what mentioned in literature.

Concerning the US findings, out of 49 patients 38(77.6%)were diagnosed as renal stone, 8 (16.3%) as tumor and 3(6.1%) as BPH.The study revealed that therenal stonewas the firstmost common cause of urinaryobstruction andrenal mass was the second most common cause.

5.2 Conclusion:

This study was doneon patients who were referred to US department in BahriTeaching Hospital with a total number of patients 49, who developed obstructive uropathy from different diseases.

The study concluded that the age group (51-60) yrs, was more affected withobstructiveuropathy and the male genderwas more affected than female.

The most causative factorswere the urinary tract stone and the kidneys were most common site.

Most of patients with obstructive uropathyweresuffering from pain, dysuria and fever.US examination can easily determine differentcausative factors of hydronephosis.

5.3Recommendations:

1. Governmental hospital and private centers should provide an excellent advanced machine supplied with Doppler system to enhance the accurate investigation of obstructive uropathy.
2. All sonographers should take more great care to their patients and machine.
3. A computerized program should be used for reporting and follow up will be of great help and great use for researchers to obtain statistical data.
4. Well-equipped US imagingdepartment with advanced systems to keep information of the patientswill help to follow up the patients and make available data for researches.

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Appendices

Appendices

The National Ribat University

Faculty of Graduate Studies and Scientific Research

Ultrasound of the Obstructive Uropathy

Data collection sheet

Patient data: Age…… Case No……. Gender……. Date……

Site of obstruction	**Yes**	**No**
Urinary bladder		
Ureter Kidney		

Clinical findings	**Yes**	**No**
Pain		
Dysuria Urine retention		

Ultrasound finding	**Yes**	**No**
Hydronephrosis Stone Tumor		

Comments:……
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Images

Image (1): US image shows renal pelvic stone.

Image (2): US image shows obstructive uropathy and hydrourter due to RCC.

Image (3): US image shows obstructive uropathy with hydronephrosis due to BPH.

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Image (4): US image of the Rt kidney shows hydronephrosis due to obstrusation by vesical stone.

Image (5):US image of Lt Kidney shows obstruction due to renal pelvic stone.