Dedication

I dedicate this study to my colleague Dr.MohammedFadalmawla; you are always in mind, and that encourage me to do the best in my practical life.

Acknowledgement

I am greatly indebted to my supervisor Dr. Ahmed Abukonna for his continuous helps, supports and advice.Iwould like to thank the staff of Hajalsaffi hospital and Algeraifcentre.Finally I would like to thank everyone who has participated in the completion of this study.

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Abbreviation	Meaning
US	Ultrasound
H	Hydrogen
ADH	Anti diuretic hormone
ANP	A trial natriureticpeptide
ESRD	End stage renal disease
UPJ	Uretero pelvic junction
UVJ	Ureterovesicssal junction
CT	Computed tomography
MRI	Magnetic resonance imaging
ESRD	End stage renal disease
ARPKD	Autosomal recessive poly cystic kidney disease
ADPKD	Autosomal dominant poly cystic kidney disease
MCDK	Multi cystic dysplastic kidney
RCC	Renal cell carcinoma
VHL	Von hipper landau
ACRD	Acquired renal disease
ARF	Acute renal failure
CRF	Chronic renal failure
EIARF	Exercise induced acute renal failure
RI	Resistance index
EV	End diastolic velocity
CCDS	Color Doppler duplex sonography
ED	Emergency department
AM	After morning

Abstract

This is a descriptive observational study; the main objective was to determine the accuracy of ultrasound in assessing kidney in patient with loin pain and to find out the main causes of loin pain.The study was conducted at ultrasound department in Hajalsaffi hospital and Algrefgarb centerfrom july2018 up to September 2018.Random sample of sixty patients male and female with different ages who are complaining of loin pain were chosen, abdominal ultrasound examinationwas done using Shimadzu ultrasound machine (3.5 Hz probe).

The results of this study showed that the renal diseases were common causes of lion pain, other causes were identified. Stones were the common renal disorder and had the common value of complications with percentage of 83.3%. Males were most affected than femaleswith percentage of63.9%, 36.1% respectively. No significant renal changes in size or texture.

The study concluded that lion pain is an indicator for renal disorder, and Ultrasoundhad accuracy in detection of early renal disorder.Ultrasound machines should be availablein all hospital and medical centers and ultrasound investigation should be the first line for patients with loin pain.

الخلاصه

هذهدراسة وصفية تمت عن طريق االملاحظةو كان الهدف الاساسى منها تحديد دور فحوصات الموجات فوق الصوتية فى تقييم الكليتين لدى مرضى ألم الخاصرة ومعرفة الاسباب الرئيسية لهذه الأمراض. أجريت هذه الدراسة فى اقسام الموجات فوق الصوتية فى كل من مستشفى حاج الصافى التعليمى ومركزصحى الجريف غرب. أخذت عينة عشوائية من 60 مريض من الرجال والنساء بمختلف الأعمار يعانون من الآم الخاصرة. أخضع كل المرضى لاجراء فحوصات الموجات فوق الصوتية للبطن.امتدت هذه الدراسة من شهر يوليو 2018م وحتى شهر سبتمبر 2018م

أظهرت نتائج هذه الدراسةأن أمراض الكليتين هى السبب الرئيسى لألم الخاصرةوهنالك مسببات اخرى ،اكثر أمراض الكليتين شيوعا هى الحصاوى وتمثل المعدل الاعلى فى الاثار الجانبيةبنسبة 83,3%،الرجال أكثر اصابة من النساء بنسة 63.9% و 36.1% على التوالى.ومن هنا نستطيع القول بان الام الخاصرة مؤشر رئيسى لالام الكلى كما أن الموجات الصوتية ذات كفاءة فى تحديد أمراض الكلى فى مراحلها الاولى.

أوصت الدراسة بضرورة توفر أجهزة الموجات فوق الصوتيةفى جميع المستشفيات والمراكز العلاجية وإجراء فحص الموجات كفحص أولي و روتينى لمرضى الآم الخاصرة.

Chapter one

Introduction

1-1Introduction:

Loin pain is a common presenting symptom in general practice and the potential underlying causes are extensive,the most common include UTI, renal calculus and musculoskeletal problems.(Smith et al., 1995). Flank [loin] pain refers to discomfort in your upper abdomen or back and sides it develops in the area below the ribs and above the pelvis, usually the pain is worse on one side of your body. Most people experience loin pain ast least once in their life and the discomfort is usually temporary, however constant or sever flank pain may indicate a serious medical condition, such as dehydration or urinary tract infection. Kidney stone or another kidney problem may also cause persistent flank pain, thought loin pain is often a symptom of a kidneyproblem, and it can also be the result of other medical condition if it occurs along with additional symptoms (Zubair et al., 2016).

Symptoms associated with loin pain, pain maybe achy and dull or cramp like and sharp it may come and go in waves. It is important to take a detailed history of the patient's pain and any associated symptoms, such as fever, rigors, vomiting and lower urinary tract symptoms, muscular pain is often associated with movement. A patient with renal colic will classically describe severe abrupt exacerbations with a dull ache and restlessness(Hamm et al., 2002).Acute flank pain due to renal stones or acute pyelonephritis (APN) is a common problem in patients presenting to emergency departments. Radiology plays a vital role in the evaluation of these patients. Several imaging modalities can be used, including ultrasonography, computed tomography (CT), conventional radiography, and intravenous urography (Magrill et al., 2013).

The classic presentationof renal colic is the acute onset of unilateral flank pain with radiation to the groin, dysuria, and hematuria. US can be used to diagnose stones in the renal collecting system when a focal area of echogenicity with acoustic shadowing is identified. When examining the right kidney, the liver can be used as a sonic window, with the patient tilted 15° to the left(Tamm et al., 2003).

Figure 1-1 types of loin pain

Ultrasonography plays an important role in the evaluation of urinary tract disorders in cases of medical or surgical renal disorders, because of its lower cost, availability, and lack of ionizing radiation and because with it there is no need for contrast material injection or ingestion. It needs no intervention or preparation and specifically can differentiate between the multiple causes of flank pain. Urologist-operated sonography is a quick, cost-effective, and time-saving modality for both the physician and patient for obtaining first or final diagnosis. Based on its results, patients can be selected for appropriate management and further assessment(Nargund et al., 1996).

1-2 Problem of the study:

Now days loin pain is a common presenting symptom in general practice and the potential under lying causes are extensive. Renal disorders are the most serious one that lead to complications such as renal failure which puts the patient under high risk, so they need early diagnosing and treatment.

1-3Objectives of the study:

1-3-1 General objective:

To detect renal disease in patient complains of lion pain using ultrasound examination.

1-3-2 Specific objectives:

- To determine the common pathological changes in kidneys associated with lion pain.
- To identify causes of lion pain
- To detect complication of lion pain

1-4Overviews of the study:

This study falls into five chapters with chapter one is an introduction which include problemof the study, objectives and overview. Chapter two include literature review while chapterthree include material and method used for data collection and analysis. Chapter four presentsthe result of the study in a line graphs and table and finally chapter five which include the discussion, conclusion, and recommendation and finally references and appendices.

Chapter two

Theoretical background and Literature review

2-1 Embryology:

Three sets of kidneys develop in human embryos: thepronephros, mesonephros, and metanephros (definitiveor permanent kidney).The pronephroi appear early inthe fourth embryologic week and are rudimentary andnonfunctioning. The mesonephroi form late in thefourth week and function as interim kidneys until thedeveloping mesonephroi begin to function (ninth week).

The metanephroi (permanent kidneys) develop fromtwo sources: the uretric bud and metanephrogenicblastema.The uretric bud forms the ureter, renalpelvis, calices, and collecting ducts, interacting with andpenetrating the metanephrogenicblastema. This interactionis necessary to initiate uretric bud branching anddifferentiation of nephrons within the blastema . Initially, the permanent kidneys are found in thepelvis. With fetal growth, the kidneys come to lie in theupper retroperitoneum. With ascent, the kidneys rotatemedially 90 degrees so that the renal pelvis is directedanteromedially. The kidneys are in their adult locationand position by the ninth gestational week. As thekidneys ascend, they derive their blood supply fromnearby vessels; adult blood supply is from the abdominal aorta.(M.RUMACK, 2011)

2-2 Anatomy of the kidney:

2-2-1 Location and compounds of the kidney:

The two kidneys are located in the upper abdominalcavity on either side of the vertebral column, behindthe peritoneum (retroperitoneal). The upper portionsof the kidneys rest on the lower surface of thediaphragm and are enclosed and protected by the lower ribs cage The kidneys areembedded in adipose tissue that acts as a cushion andis in turn covered by a fibrous connective tissue membranecalled the renal fascia, which helps hold thekidneys in place .Each

kidney has an indentation called the hiluson its medial side. At the hilus, the renal artery entersthe kidney, and the renal vein and ureter emerge. Therenal artery is a branch of the abdominal aorta, and therenal vein returns blood to the inferior vena cava. The ureter carries urine from the kidney tothe urinary bladder.(Rizzo, 2015)

In a coronal or frontal section of the kidney, three areas can be distinguished. The lateral andmiddle areas are tissue layers, and the medial area at the hilus is a cavity. The outer tissue layer is called the renal cortex; it is made of renal corpuscles and convoluted tubules. These are parts of the nephron and aredescribed in the next section. The inner tissue layer isthe renal medulla, which is made of loops of Henleand collecting tubules (also parts of the nephron). Therenal medulla consists of wedge-shaped pieces calledrenal pyramids. The tip of each pyramid is its apex or papilla. The third area is the renal pelvis; this is not a layerof tissues, but rather a cavity formed by the expansionof the ureter within the kidney at the hilus. Funnelshapedextensions of the renal pelvis, called calycessingular: calyx, enclose the papillae of the renal pyramids.Urine flows from the renal pyramids into thecalyces, then to the renal pelvis and out into the ureter(Favorito, 2017).

2-2-2 The nephron:

The nephron is the structural and functional unit of the kidney. Each kidney contains approximately 1 million nephron. It is in the nephron, with their associated blood vessels, that urine is formed. Each nephron has two major portions: a renal corpuscle and a renal tubule. Each of these major parts has further subdivisions(Kirkpatrick and Bhimji, 2018).

2-2-3 Renal Corpuscle:

A renal corpuscle consists of a glomerulus surrounded by a Bowman’s capsule. The glomerulus is a capillary network that arises from an afferent arteriole and empties into an efferent arteriole. The diameter of the efferent arteriole is

smaller than that of the afferent arteriole, which helps maintain a fairly high blood pressure in the glomerulus (scanlon, 2007).

2-2-4Normal measuresment and echo pattern of the kidney:

In the adult, each kidney measures approximately 11 cmlong, 2.5 cm thick, and 5 cm wide and weighs 120 to170 grams theparenchymal volume of the right kidney is smaller than that of the left kidney, possibly because of a relativelylarger potential space for leftrenal growth (growthofright kidney inhibited by liver) or relatively increased leftrenal blood flow (left renal artery typically shorter thanright renal artery). Renal length correlates best with bodyheight, and renal size decreases with advancing agebecause of parenchymal reduction. The left kidney usually lies 1 to 2 cm higher than theright kidney(Tamm et al., 2003).

The kidneys are mobile and will movedepending on body position. In the supine position, thesuperior pole of the left kidney is at the level ofthe12ththoracic vertebra, and the inferior pole is at the level ofthe third lumbar vertebra.The normal adult kidney is bean shaped with asmooth, convex contour anteriorly, posteriorly, and laterally. Medially, the surface is concave; the medial surfaces known as the renal hilum. The renal hilum is continuouswith a central cavity called the renal sinus. Withinthe renal sinus are the major branches of the renal artery, major tributaries of the renal vein, and the collectingsystem.The remainder of the renal sinus is packed withfat. The collecting system (renal pelvis) lies posterior tothe renal vessels in the renal hilumrenal parenchyma is composed of cortex and medullarypyramids. The renal medullary pyramids arehypoechoic relative to the renal cortex and can be identified(Glassock and Rule, 2016).

In most normal adults Normal**renalcortex** is typically less echogenic than adjacent liver andspleen. Platt et al.found that 72% of 153 patients withrenal cortical echogenicity equal to that of the liver hadnormal renal function. Greater

renal echogenicity than liver echogenicity showed specificity and a positivepredictive value for abnormal renal function of 96% and67%, respectively. However, the sensitivity of this ultrasoundcriterion was poor (20%) (M.RUMACK, 2011).

2-2-5 blood vessels of the kidney:

The pathway of blood flow through the kidney is anessential part of the process of urine formation. Bloodfrom the abdominal aorta enters the **renal artery**, which branches extensively within the kidney intosmaller arteries. The smallest arteriesgive rise to afferent arterioles inthe renal cortex (see from the afferent arterioles, blood flowsinto the glomerulus (capillaries), to efferent arterioles, toperitubular capillaries, to veins within the kidney, tothe**renal vein**, and finally to the inferior vena cava. Notice that in this pathway there are two sets of capillaries, and recall that it is in capillaries that exchangestake place between the blood and surrounding tissues. Therefore, in the kidneys there are two sites of exchange. The exchanges that take place between the nephron and the capillaries of the kidneys will formurine frombloodplasma.(scanlon, 2007)

2-3 Physiology of the kidney:

The function of the kidneys is to maintain the balance of metabolism products and to remove excesses from the blood, this help to keep body in homeostasis by both removing and restoring selected amounts of solutes and water from the blood, so they regulate the volume of urine produced, they also regulate the concentration of ions in body fluid and blood.The kidneys control the proper balance of hydrogen ions in the blood, thus helping to regulate proper pH levels in the body; they also regulate blood pressure, vitamin D production and erythrocyte concentration.(Rizzo, 2015)

2-3-1 Formation of urine:

The formation of urine involves three major processes. The first is glomerular filtration, which takesplace in the renal corpuscles. The second and third aretubular reabsorption and tubular secretion, which take place in the renal tubules.

The kidneys form urine from blood plasma. Bloodflow through the kidneys is a major factor in determiningurinary output. Glomerular filtration is the first step in urine formation. Filtration is not selective in terms of use fullness of materials; it is selective only in terms of size(Larina et al., 2013).

High blood pressure in the glomeruli forces plasma, dissolved materials, and smallproteins intoBowman's capsules; the fluid is now called renal filtrate. Tubular reabsorption is selective in terms of usefulness.Nutrients such as glucose, amino acids, andvitamins are reabsorbed by active transport andmay have renal threshold levels(Smith et al., 1995).

Positive ions arereabsorbed by active transport and negativeions are reabsorbed most often by passive transport. Water is reabsorbed by osmosis, and small proteins are reabsorbed by pinocytosis. Reabsorption takes place from the filtrate in therenal tubules to the blood in the peritubular capillaries. Tubular secretion takes place from the blood in theperitubular capillaries to the filtrate in the renal tubules and can ensure that wastes such as creatinineor excess ions are actively put into the filtrateto be excreted Hormones such as aldosterone, ANP, and ADHinfluence the reabsorption of water and help maintainnormal blood volume and blood pressure. Thesecretion of ADH determines whether concentratedor dilute urine will be formed,waste products remain in the renal filtrate and areexcreted in urine(Hashemi et al., 2015).

The kidneyshave other functions, some of which are not directly related to the formation of urine. These functionsare secretion of rennin (which does

influenceurine formation), production of erythropoietin, andactivation of vitamin D(Smith et al., 1995).

2-4 Pathology of the kidney:

2-4-1 Acute pyelonephritis:

is a tubule interstitial inflammationof the kidney. Two routes may lead to inflammation: ascending infection (85%; e.g., *Escherichia coli*) andhematogenous seeding (15%; e.g., *Staphylococcus aureus*).Women age 15 to 35 years is most often affected;2%of pregnant women will develop acute pyelonephritis. Most adults present with flank pain and fever and can be diagnosed clinically with the aid of laboratory studies (bacteriuria, pyuria, and leukocytosis). With appropriateantibiotics, both clinical and laboratory findings showrapid improvement. Imaging is only necessary whensymptoms and laboratory abnormalities persist. Imagingis useful to identify potential causes of insufficientlytreated infection, including renal and perirenal abscesses, calculi, and urinary obstruction. The Society of Uroradiology Proposed using acute pyelonephritisto describeacutely infected kidneys, eliminating the need forterms such as bacterial nephritis, lobar nephronia, renalCellulitis, lobar nephritis, renal phlegm on, and renal carbuncle.

At ultrasound, the majority of kidneys with acutepyelonephritis appear normal. However, ultrasoundfindings of pyelonephritis include the following:

• Renal enlargement

• Compression of the renal sinus

• Decreased echogenicity (secondary to edema) orincreased echogenicity (potentially from hemorrhage)

• Loss of corticomedullary differentiationpoorlymarinatedmass (es)

• Gas within the renal parenchyma

• Focal or diffuse absence of color Doppler perfusioncorresponding to the swollen inflamed areas

If the pyelonephritis is focal, the poorly marinated masses may be echogenic, hypoechoic, or of mixed echogenicity. Echogenic masses may be the most commonAppearance of focal pyelonephritis(Tamm et al., 2003).

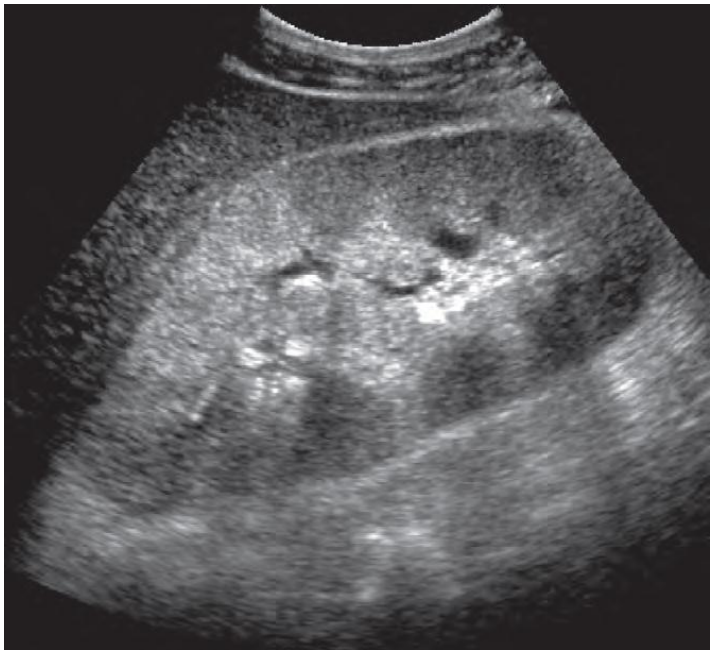

Figure 2-1Acute pyelonephritis

2-4-2 Chronic Pyelonephritis:

Chronic pyelonephritis is an interstitial nephritis oftenassociated with vesicoureteric reflux. Reflux nephropathyis believed to cause 10% to 30% of all cases of endstagerenal disease (ESRD). Chronicpyelonephritis usually begins in childhood and is morecommon in women. The renal changes may be unilateralor bilateral but usually are asymmetrical. Reflux into thecollecting tubules occurs when the papillary duct orificesare incompetent. This reflux occurs more often in com-pound papillae, which are typically found at the poles ofthe kidneys. Cortical scarring therefore tends to occurover polar calyces. There is associated papillary retractionwith caliceal clubbing. At ultrasound, a dilated blunt calyx is seen, associated with overlying cortical scar orcortical atrophy. These changes may bemulti centric and bilateral. If the disease is

unilateral, there may be compensatory hypertrophy of the contra lateral kidney. If the disease is multicentric, compensatoryhypertrophy of normal intervening parenchymamay create an island of normal tissue simulating a tumor.(M.RUMACK, 2011)

Figure 2-2 chronic pyelonephritis

2-4-3 Renal Calculi:

Renal stones are common, with a reported prevalence of12% in the general population.Stone disease increases with advancing age, and white men are most oftenaffected. From 60% to 80% of calculi are composed ofcalcium.Multiple predisposing conditions, includingdehydration, urinary stasis, hyperuricemia, hyperparathyroidism, and hypercalciuria may result in renalcalculi, but no cause is identified in most patients. Calicealcalculi that are noneobstructing are usually asymptomatic. Patients with smallcaliceal calculi may still havegross or microscopic heamaturia and may have colicsymptoms despite the lack of imaging findings suggestive of obstruction(Manappallil et al., 2018).

A calculus that migrates and causesinfundipular or UPJ obstruction often results in clinicalsigns and symptoms of flank pain. If a stone passes intothe ureter, the calculus may lodge in three areas of uretricnarrowing: just pastthe uteropelvic

junction (UPJ) where the ureter crosses the iliac vessels; and at theureterovesical junction (UVJ). The very small diameterof the UVJ (1-5 mm) accounts for the large percentageof calculi that lodge within the distal ureter.Approximately80% of stones smaller than 5 mm will passspontaneously(Scotland et al., 2018).

Operator technique clearly impacts the ability of ultrasound to depict renal calculi. On sonography, renalcalculi are seen as echogenic foci with sharp, distal acousticshadowing . Even in favorable locations, however, minute urinary tract calculi may be difficult todetect if they have a weak posterior acoustic shadow. Thetrade-off between tissue penetration and resolutionshould be considered when selecting probe frequency, with appropriate focal zones applied to maximize signatureshadowing. annular array transducers are able to demonstrate stone(Manappallil et al., 2018).

shadowing to better advantage than mechanical sectortransducers. Harmonic imaging should also be routinelyused, particularly in obese patients. The application ofcolor Doppler may also improve the detection of small, minimally shadowing calculi.that most urinary tract stones (83%) show colorand power Doppler sonographictwinkling artifacts, although the artifact at least partially depends on stonecomposition(Scotland et al., 2018).

Several features that mimic renal calculi at ultrasoundmay result in false-positive examinations, including intrarenalgas , renal artery calcification , calcified sloughed papilla, calcified transitional celltumor, alkaline-encrusted pyelitis, and encrusted ureteralStents. Although the ultrasound evaluation of the secondarymanifestation of an obstructing ureteral calculus—collecting system dilation—is usually straightforward, pitfalls include evaluation before hydronephrosisdevelops,leadingtoafalse-negativeresult,and mistakingparapelvic cysts and nonobstructivepyelocaliectasisashydronephrosis(M.RUMACK, 2011).

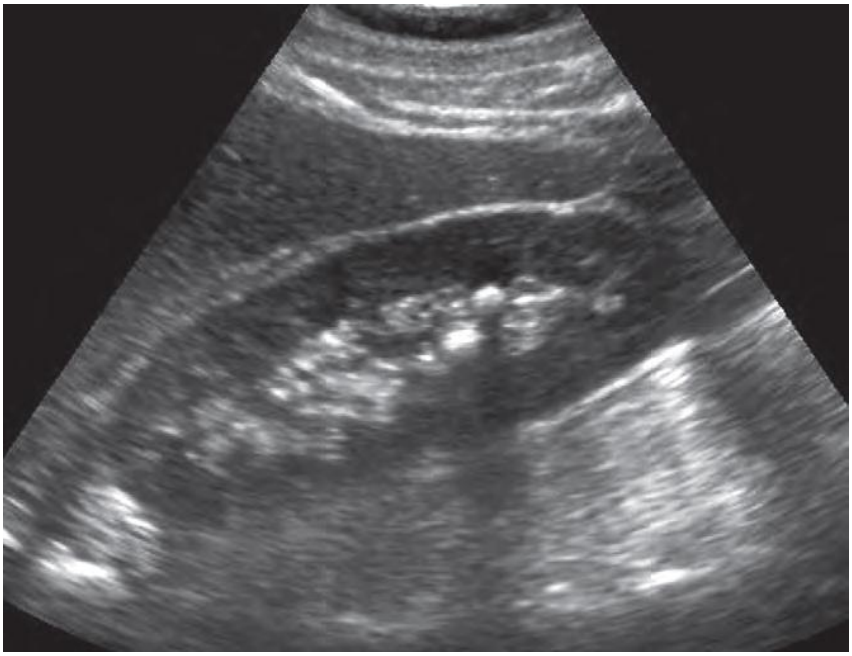

Figure 2-3 renal calculi

2-4-4 Renal cystic disease:

2-4-4-1 Cortical Cysts

Simple renal cysts are benign and fluid filled. Their exactpathogenesis is unknown; although they are probably acquired lesions. They likely originate from distal convolutedor collecting ducts.Incidence of simple increases with advancing age, and they are found in atleast 33% of persons over age 60(Maciejewski et al., 2018).

Most cysts are asymptomatic. Patients with large cysts, however, may presentwith flank pain or heamaturia. A cystisconfidentlycharacterizedat sonography when it is anechoic, has sharply defined, imperceptible back wall; is roundor ovoid; and enhances sound transmission. If all these sonographic criteria are met, further evaluationor follow-up of the cyst is not required .If a renal cyst is large and symptomatic, cyst puncture, aspiration, and sclerosis using a variety of agents may beperformed. Several simple cysts may be found in both

Kidneys, and rarely, several simple cysts may involve onlyone kidney or a localized portion of one kidney cysts(Parry et al., 2018).

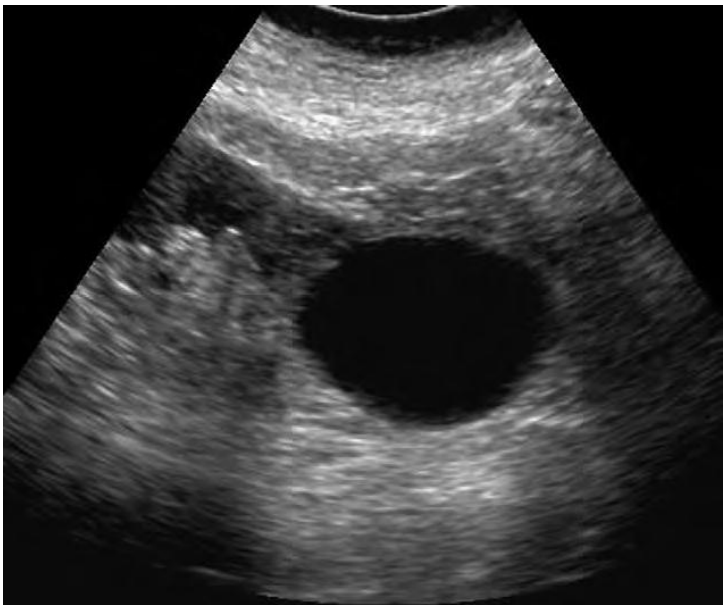

Figure 2-4 simple renal cyst

2-4-4-2 Complex renal cysts:

Do not meet the strict criteria ofa simple renal cyst and include cysts containing internalechoes, septations, calcifications, perceptible definedwalls, and mural modularity. Depending on the degree of abnormality, most complex renal cystsrequire further imaging with CT. A combination ofultrasound and contrast-enhanced CT (or MRI) helps determine whether a complex cystic lesion is more likelybenign or malignant(Ward et al., 2018).

2-4-4-3 Polycystic Kidney Disease:

Autosomal recessive polycystic kidney disease:

(ARPKD) is divided into four types—perinatal, neonatal, infantile, and juvenile—depending on the patient's age at the onset of clinical manifestations. ARPKD is characterized pathologically as a spectrum of dilatedrenal collecting tubules, hepatic cysts, and periportal fibrosis. Younger patients present predominantly withrenal insufficiency. Hepatic involvement is typicallydominant in older patients with ARPKD(Hempenstall et al., 2018).

Autosomal dominant polycystic kidney disease:

(ADPKD) results in a large number of bilateral corticaland medullary renal cysts. The cysts may vary in size andare often asymmetrical. ADPKD is the most commonhereditary renal disorder and has no gender predilection

Multicystic Dysplastic Kidney:

Multicystic dysplastic kidney (MCDK) is a nonhereditarydevelopmental anomaly also known as renal dysplasia, renaldysgenesis, and Multicystic kidney. Thekidney is small, malformed, and composed of multiplecysts with little, if any, normal renal parenchyma. Itfunctions poorly if at all. The dysplastic change is usually unilateral and involves the entire kidney, although rarelyit may be bilateral, segmental, or focal. If unilateral, MCDK is asymptomatic. If bilateral, it is incompatiblewith life. Men and women are equally affected, as areboth sides(M.RUMACK, 2011).

2-4-5 Genitourinary tumors:

Renal Cell Carcinoma

Renal cell carcinoma (RCC) accounts for approximately3% of all adult malignancies and 86% of all primarymalignant renal parenchymal tumors.There is a 2: 1male predominance, and peak age is 50 to 70 years.Theetiologyis unknown, althoughweakassociationswithsmoking, chemical exposure, asbestosis, obesity, andhypertension have been shown. The vast majority ofRCCs are sporadic, but an estimated 4% occur in thecontext of inherited syndromes.These "inherited"RCCs occur at an earlier age, are multifocal and bilateral, and affect men and women equally.Von Hippel–Lindau(VHL) disease is the most well-known inherited"RCCs syndrome; 24% to 45% of VHL patients willdevelop RCC (see later discussion)(Farhi et al., 2018).

Most of these lesionsare multicentre and bilateral, and all are clear cell carcinomas. Other inherited renal cancer syndromesinclude hereditary papillary renal cancer, Bart-Hogg-Dubé syndrome, hereditary leiomyoma RCC, familialrenal oncocytoma, hereditary nonpolyposis colon cancer, and medullary

RCC. An increased incidence of RCC inpatients with tuberous sclerosis has also been reported. Another important, but nonsyndromic risk factor for RCC is the acquired cystic kidney disease (ACKD) that occurs in patients receiving long-term hemodialysisor peritoneal dialysis. The RCCs in these patients aresmall and hypo vascular and tend to be relatively lessaggressive (M.RUMACK, 2011).

2-4-6 Urinary Tract Obstruction:

2-4-6-1 Determining the Level of Urinary Tract Obstruction::

To determine the level of urinary tract obstruction, one must have a fundamental understanding of the normal flow of urine from the kidneys to the external orifice of the urethra. Essentially, urine is created within the kidneys, travels down the ureter, collects in the bladder, and exits the urethra. Dilation of the urinary tract occurs proximal to the level of obstruction. Therefore, if there is distention of the ureter and dilation of the renal collecting system with a normal urinary bladder, the level of obstruction must be proximal to the urinary bladder, either within the ureter or at the level of the uretero vesicular junction. This is a simple concept and functional for both clinical practice and the registryexaminations(Masumori et al., 2018).

2-4-6-2Hydronephrosis and Renal Obstruction:

Hydronephrosis is a general term that is defined as thedilation of the renal collecting system secondary to theobstruction of normal urine flow. Accordingly, hydronephrosisis dilation of the calices, infundibula, and renal pelvis.Hydronephrosis may alsobereferred toaspyelocaliectasisas, and described more specificallyaccording to which part of the kidney is dilated It may also be describedas mild, moderate, and severe or marked. Mild hydronephrosis is noted asdistension of the renal pelvis, whereas moderatehydronephrosis is described as further progression ofdistension into the calices and medullary pyramids.Markrdhydronephrosis extends into the cortex andcauses severe thinning of the parenchyma(M.PENNY, 2011).

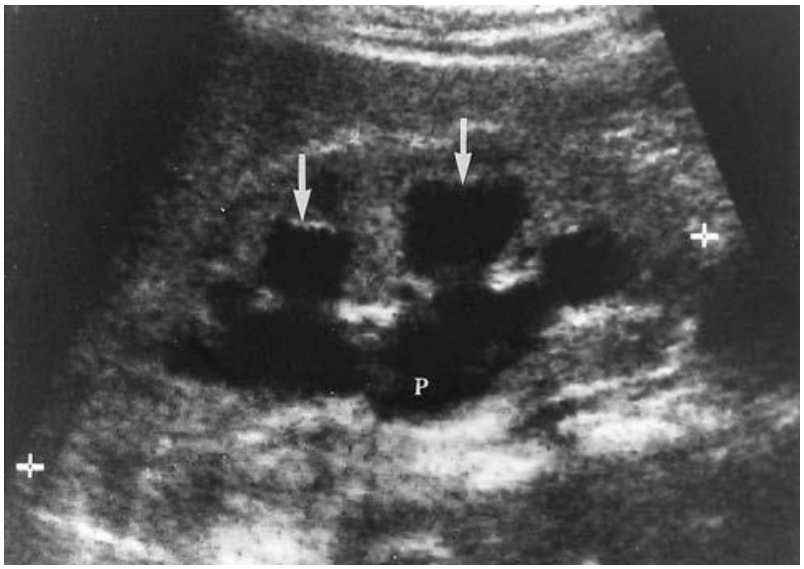

Figure 2-5 moderate hydronephrosis

2- 4- 7 Renal failure

2- 4- 7- 1 Acute renal failure:

A sudden decrease in renal function is termed acute renalfailure (ARF). The most common cause of ARF is acutetubular necrosis. With acute tubular necrosis, the kidneysuffers from ischemic damage and subsequent cell destruction. Other causes of ARF include renal arterystenosis, renal infection, urinary tract obstruction, polycystic kidney disease, and metabolic disorders. Clinicalfindings of ARF include elevated BUN, elevated creatinine, oliguria, hypertension,leukocytosis,heamaturia,edema, andhypovolemia.Sonographically, the kidneys may appear normal or the cortex may appear hyper echoic(M.PENNY, 2011).

2-4-7-2Chronic Renal Failure:

The gradual decrease in renal function over time is referredto as chronic renal failure (CRF). The most commoncause of CRF is diabetes mellitus. Other causes ofCRF include, but are not limited to, glomerulonephritis, chronic pyelonephritis, metabolic disorders, chronicurinary tract obstruction, and tuberculosis. CRF leadsto end-stage renal disease. Clinical findings includediabetes, malaise, elevated BUN, elevated creatinine, fatigue,

hypertension, and hyperkalemia.Patientsare typically placed on dialysis or a donor kidney maybe needed. Sonographically, the kidneys will appearsmall, echogenic, and may contain cysts There is also typically loss of normal corticomedullardifferentiation.-(M.PENNY, 2011)

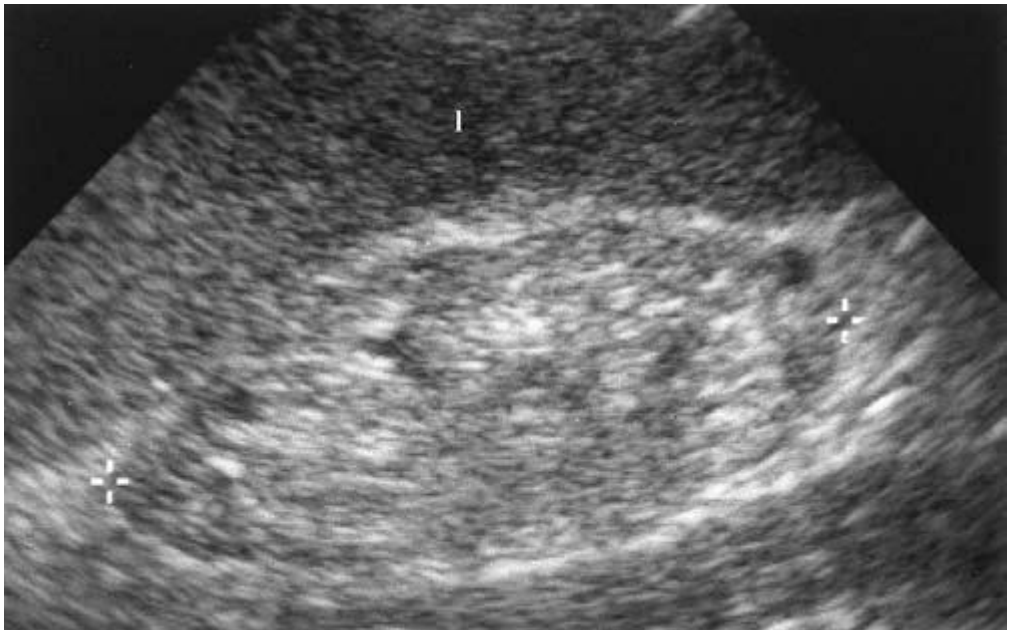

Figure 2-6 chronic renal failure

2-5 sonographic technique;

The ability to visualize organs of the genitourinary tractby ultrasound depends on the patient's body habitus, operator experience, and scanner platform. The patientshould fast a minimum of 6 hours before the examinationto limit bowel gas. High-frequency probes shouldbe used for patients with a favorable body habitus (Harmonic imaging is often useful for difficult to-scan patients (e.g., obese patients); additionalrecent software advances, including compound imagingand speckle reduction, may increase lesion conspicuityand decrease artifacts (M.RUMACK, 2011).

2-5-1 the Kidney:

The kidneys should be assessed in the transverse andcoronal plane. Optimal patient positioning varies; supineand lateral decubitus positions often suffice, althoughoblique and occasionally prone positioning may be necessary (e.g., obese patients). Usually, a combination of sub costal and intercostals approaches is required to evaluatethe kidneys fully; the upper pole of the left kidneymay be particularly difficult to image without a combinationof approaches(Greenwell et al., 2004).

2-5-2 the Ureter:

The proximal ureter is best visualized using a coronal oblique view with the kidney as an acoustic window. Theureter is followed to the bladder, maintaining the sameapproach. A nondilated ureter may be impossible tovisualize because of overlying bowel gas. Transverse scanningof the retroperitoneum often demonstrates a dilated ureter(Ellenbogen et al., 1978).

2-5-3 the liver:

Is best examined with real-time sonography, ideally after a 6-hour fast. Both supine and right anterior oblique views should be obtained. Sagital, transverse, coronal, and sub costal oblique views are suggested usingboth a standard abdominal transducer and a higherfrequencytransducer(christopher, 2012).

2-7 Previous studies:

(M Izumi etal., 1997) studieda case study of a young man with acute renal failure and severe loin pain,they reported The first case of exercise-induced acute renal failure (EIARF) measuring the blood flow and arterial resistance in the kidney by pulsed Doppler ultrasound. A 20-year-old Japanese male suffered from severe loin pain and non-oliguric acute renal failure after strenuous exercise. Serum myoglobin and creatine phosphokinase were normal and urinary myoglobin was not detectable. The Doppler pattern in several segmental arteries showed a slow end-diastolic velocity (EV) and a high resistance index

(RI), indicating increased renal vascular resistance, which suggested severe renal vasoconstriction. Three days later, the EV had apparently increased and the RI normalized in accordance with improvement of renal function.The result is, ultrasound Doppler technique is useful for the detection of a decrease in arterial blood flow on real time and for the diagnosis of EIARF(Izumi et al., 1997).

(Catalano et al., 2002)studied acute flank pain, comparison of unenhanced helical CT and ultrasonography in detecting causes other than ureterolithiasis,they assessed The accuracy of non-contrast-enhanced helical CT and of ultrasonography (US) in offering an alternative explanation for flank pain.In a 3-year period, 181 patients with acute flank pain underwent US and non-contrast-enhanced helical CT in a blinded sequence. Their efficacy in detecting both alternative causes of pain and additional findings unrelated to the pain was assessed in 160 cases with a confirmed diagnosis. An alternative cause was found in 23 cases (14%).US gave 4 false-negative results (1 acute appendicitis, 1 ovarian cyst torsion, 1 diverticulitis, and 1 papillary necrosis) and 2 false-positive results (1 acute pyelonephritis and 1 diverticulitis), with a 78% sensitivity and a 98% specificity for nonlithiasic causes. A wide spectrum of findings can be identified in subjects imaged for flank pain. Their conclusion is, Non-contrast-enhanced helical CT and US have comparable accuracy in diagnosing causes other than stone disease.(Catalano et al., 2002)

(Nargund et al., 1996)studiedUltrasoundinurologicalemergency, Results of self audit and implications for training. They assessedThe efficacy of ultrasound examination by the trainee urologists in the management of urological emergencies admitted in a district. General hospital was studied Fifty patients (100 kidney units) had renal ultrasound performed by urological trainees on acute admission. Clinical signs and symptoms of renal colic percent are unreliable and present potential diagnostic difficulties with acute loin pain.

Upper renal tract pathology, however, could be assessed using an admission ultrasound examination with a view to selection of patients likely to require subsequent intravenous urography. Such a selection procedure would reduce both the incidence of complications associated with intravenous contrast agents and unnecessary exposure to ionizing radiation.This study was specifically designed to audit the ability of urological trainees (Registrar and Senior Registrar) to detect upper-tract abnormalities in emergency urological referrals. The results were compared with subsequent definitive radiological investigations.The study shows that urological trainees can use ultrasound with high levels of accuracy improving patient management (Nargund et al., 1996).

(Webb, 2000)studiedUltrasonography and Doppler studies in the diagnosis of renal obstruction, he saidDoppler US techniqueshave been used to obtain functional information in suspected renal obstruction. In this review the current role of both US imaging and Doppler studies in the diagnosis of renal obstruction will beconsidered.US is a sensitive detectorofcollecting-system dilatation in patients with chronicobstruction and normal or impaired renal function. To achieve high sensitivity in a setting where obstruction is suspected, any visualization of the collecting system must be considered significant and evaluated further. This strategy is important to avoid overlooking patients with minor dilatation despite severe functional obstruction, a combination recognized particularly in patients with uretric obstruction by calculus and retroperitoneal fibrosis or malignancy The sensitivity of US in detecting collecting system dilatation caused by obstruction has led to its adoption as the first renal imaging method in a variety of clinical settings, particularly in patients with renal failure prostatism or pelvic tumours, and in transplanted kidneys (Webb, 2000).

Mohammad Kazemetalstudied urologist-operated ultrasound and its use in urological outpatient clinics. The efficacy of ultrasound examination by a trained urologist in the differentiation of urological emergencies admitted in a

district private clinic was studiedBetween April 2008 and April 2010, a total of 724 patients (1448 renal units) had renal ultrasound performed by a trained urologist on acute admission. The sonographic findings were compared with subsequent definitive radiological investigations performed as needed Patient satisfaction and permission for ultrasonography were evaluated by oral consent. Loin pain was the presenting symptom in 45% of the patients (n = 326 cases).diagnosis was achieved in 96% of patients. Further evaluations were requested as needed in suspicious cases. Abnormal findings were recorded in 184 cases (25.5%). Mild to moderate unilateral hydronephrosis with or without hydronephrosis was the most common finding observed sonographically. The sensitivity of our ultrasonography evaluation was 99.7%.concllusion. Our study shows that urological trainees can use ultrasound with high levels of accuracy, thereby improving patient management with a high level of patient satisfaction (Moslemi and Mahfoozi, 2011).

(Marzec et al., 2013)studied ultrasound detection of a renal mass in a patient with flank pain and heamaturia.This case study describes a patient who presented to the ED with a 1 week history of flank pain and heamaturia and was subsequently found to have a large renal mass on bedside ultrasound. A 45-year-old male with no previous medical history presented to the emergency department (ED) with 1 week of heamaturia and left flank pain. The patient had noted that over the preceding 4 days his urine had progressed from a pink color to dark red. He had also experienced left flank pain that was sharp, non-radiating, and increasing in severity over the week prior to presentation. He denied a history of renal calculi, weight loss, fevers, fatigue, or abdominal masses.cn this case study, EUS helped to identify a renal mass in a patient who presented with heamaturia and left flank pain, initially thought to be renal colic on clinical evaluation(Marzec et al., 2013).

(Sim, 2018)studied Ultrasonography of acute flank pain a focus on renal stones and acute pyelonephritis. They found thatUltrasonography is a useful tool for the differential diagnosis of acute flank pain. Renal stones appear as a focal area of echogenicity with acoustic shadowing on ultrasonography. In acute pyelonephritis (APN), the kidneys may be enlarged and have a hypoechoic parenchyma with loss of the normal corticomdullary junction. However, clinical and laboratory correlations are essential for the diagnosis of renal stones and APN through imaging studies.

This review describes the typical ultrasonography features of renal stones and APN. Moreover, in daily practice, cross-sectional imaging is essential and widely used to confirm renal stones and APN and to differentiate them from other diseases causing flank pain on conclusion Although US has several limitations in adults with acute flank pain, it is a useful modality to diagnose stones and to confirm the occurrence of complications of APN, so it is important to understand these characteristic findings and other diseases that mimic them. In addition, other imaging modalities such as CT can be recommended if the clinical or radiological diagnosis is ambiguous (Sim, 2018).

(Chen et al., 2005)studied left flank pain as the sole manifestation of acute pancreatitis;acute pancreatitis is not an uncommon disease in an emergency department (ED). It manifests as upper abdominal pain, sometimes with radiation of pain to the back and flank region. Isolated left flank pain being the sole manifestation of acute pancreatitis is very rare. A 63 year old female patient visited our ED with a complaint of back pain on her left side for 5 days. The patient had no fever, abdominal pain, chest pain, dyspnea, or symptoms related to the urinary system. No recent trauma was noted. A review of her medical history revealed that she had a 5 year history of hypertension and type 2 diabetes mellitus with regular treatment, but no history of cardiac disease, stroke, or renal disease (including urolithiasis). She did not smoke or consume

alcohol. A physical examination revealed prominent left flank pain with percussion, but was otherwise unremarkable. An ultrasound was performed to evaluate the left kidney or surrounding organs. The ultrasound report by radiology suggested there were no abnormal findings in the areas of the kidneys, spleen, pancreas, or hepato biliary system. Given this report, the on-duty senior resident decided to treat the patient in the ED-attached observation room. The CT showed abnormal fluid collection over the peri-renal space and pancreatic tail as well as necrotic changes and swelling of the pancreatic tail(Chen et al., 2005).

(Moore and Scoutt, 2012)studied sonography first for acute flank pain they found that Although CT is typically a first-line test in the United States and is very accurate, there is increasing awareness of the radiation risk associated with CT scanning. Sonography may directly visualize kidney stones and/or evidence of ureteral obstruction and may obviate the need for CT scanning. Sonography is typically the first-line test in Europe, even in a first episode of kidney sonography is typically the first-line test in Europe, even in a first episode of kidney stones. We submit that sonography as an initial imaging modality in suspected kidney stones should be considered more often, particularly in younger and female patients with classic symptoms on first presentation and in patients with symptoms consistent with their prior episodes of renal colic. Their case report isA 28-year-old woman presents to the emergency department (ED) at 4 am with acute onset of left flank pain. The pain is sharp and severe (“as bad as labor pains”) and awakened her abruptly from sleep 2 hours previously. She has nausea and has vomited once. She had been in good health before this episode and has no fever, no vaginal bleeding or discharge, and no urinary symptoms. She is sexually active with one partner, and her last menstrual period was normal 2 weeks previously. She is taking oral contraceptive pills but no other medications. She has a family history of kidney stones but has never had

one herself. She has no surgical history, has never been pregnant, and does not have a history of pelvic pain. Sonography is a widely available imaging modality that does not expose the patient to ionizing radiation and may diagnose kidney stones through direct visualization or by showing secondary signs of ureteral obstruction. The sensitivity of sonography for detecting kidney stones has been variably reported to be between 12% and 98%.40–43 this wide variation is likely due to both operator dependency as well as discrepancies in the literature between direct visualization of stones versus secondary signs that are treated as diagnostic. Sonography is highly effective in showing large stones (>5 mm) but poor at visualizing stones smaller than 3 mm.41,44 Additionally, although sonography can detect stones located at the uretero pelvic junction or distally at the ureterovesical junction stones located in the mid ureter are typically obscured by overlying bowel gas(Moore and Scoutt, 2012).

Mostbeack et al studied ultrasound of the kidney obstruction and medical disease, they said that Ultrasound has emerged as the primary imaging modality in conditions were either renal obstruction or renal medical disease is suspected on the basis of clinical and laboratory findings. In urinary tract obstruction, pathophysiologic changes affecting the pressure in the collecting system and kidney perfusion are well understood and form the basis for the correct interpretation of real-time US and color Doppler duplex sonography (CDDS). Ultrasound is very sensitive for the detection of collecting system dilatation ("hydronephrosis"); however, obstruction is not synonymous with dilatation, as either obstructive or nonobstructive dilatation may be present. To differentiate these conditions, CDDS with measurement of the resistive index (RI) in the intrarenal arteries is extremely helpful, as obstruction (except in the pre acute stage) leads to intrarenal vasoconstriction with a consecutive increase of the RI above the upper limit of 0.7, whereas nonobstructive dilatation does not. Diuretic challenge to the kidney may further enhance these differences in RI

between obstruction and dilatation. Based on these findings, the present value of US and CDDS in the assessment of the patient with flank pain or renal colic is suggested, especially with respect to promising results for spiral CT and based on cost analysis. In renal medical disease, distinguishing different pathologic conditions using gray-scale US and CDDS (RI) criteria is still very difficult. Nevertheless, US is the fist-line detecting of obstruction and renal medical disease(Mostbeck et al., 2001)

Abdel-Gawad (2014) Said thatdespite the routine use of helical CT in diagnosis of renalcolic, there are recent concerns regarding the radiation exposure, overuse and costs. Theyattempted in their retrospective study to evaluate the accuracy of ultrasound (gray-scale andcolor Doppler with twinkling), KUB and urinalysis in diagnosis of renal colic due to ureteralcalculi presented in Emergency Room. A total of 939 consecutive cases of renal colicpresented to ER have been managed and evaluated by ureteral ultrasound, KUB andurinalysis for the presence of ureteral stones. Non-confirmatory cases were subjected toHelical CT examination. Renal and ureteral ultrasound (gray-scale) alone detected ureteral Calculi in 615 cases (65.4%) and after utilizing Color Doppler Ultrasound with twinkling thediagnosis was made with confidence in 935 cases (99.6%) but 4 (0.4%). KUB showedradiopaque stones in 503 (53.6%) patients and no stones were detected in 436 (46.4%).

Microheamaturia presented in 835 (88.9%) cases while absent in 102 (10.9%). There were 190(20.3%), 77 (8.2%) and 671 (71.5%) patients with upper, middle and lower ureteral stonesrespectively. The simultaneous positive findings in US and KUB with microheamaturia werefound only in 453 (48.2%) cases. The use of Color Doppler ultrasound with twinklingincreased the detection rate of ureteral stones in acute renal colic patients presented to ERwith less radiation exposure. Ultrasound examination as a single modality is superior to KUBand urinalysis in initial diagnosis of renal colicSpontaneous rupture of a normal

renal collecting system during pregnancy is uncommon andall reported cases have occurred in right kidneys. We report a case of spontaneous rupture ofthe left renal collecting system during pregnancy. A 33-year-old pregnant woman presentedwith left loin and lower abdominal pain, and signs of preterm labour, at 32 weeks' gestation.

An emergency caesarean section was performed for fetal distress but the left loin pain did notsubside after delivery. Ultrasonography and a computed tomogram showed a left perinephriccollection and urine extravasations, compatible with rupture of the renal collecting system. Percutaneous nephrostomy was inserted and the symptoms subsided. A summary of theliterature discussing management of this clinical situation is provided (Abdel-Gawad et al., 2014).

Tripathi et al. (2011) stated that loin pain some time occurs as a result of spontaneous partialrupture of upper renal tract is rare and is usually associated with urolithiasis. Other causesinclude instrumentations, trauma, pelvic cancer, retroperitoneal fibrosis, fluid overload, andpregnancy.They report two cases (46-year-old and 41-year-old men) of upper renal tractrupture. The first case had rupture of the ureter proximal to stone impaction and the secondcase had fornicial rupture secondary to stone impaction at the uretero-vesical junction. Incontrast to ureteral rupture, fornicialextravasations' is more common and the symptoms arealways mild.The mechanism of ureteral rupture can be explained as either pressure aroundthe ureteral wall due to stone impaction, or a tear caused by pressure during the passage ofthe stone. Fornicial rupture occurs when intra-pelvic pressure is greater than 35cm H2O. It isimportant to distinguish true rupture of the ureter from fornicial tear with extravasations, because both the outcome and treatment are different The Page kidney phenomenon refers to hypertension resulting from any external compressionof a kidney by a hematoma, tumor, lymphocele or urinoma. Hypertension develops due toactivation of the renin-angiotensin-aldosterone system induced by renal

hypoperfusion andmicrovascular ischemia. As such, Page kidney is a rare cause of high renin,hypertension.Subcapsular or perinephric hematoma due to traumatic or iatrogenic hemorrhage accounts forthe majority of cases. The interval between injury and the development of hypertension mayvary from days to years. Presentation, however, may be acute to the point of a hypertensiveemergency. We report a patient who presented with repeated acute episodes of hypertensiveurgency/emergency secondary to Page kidney caused by a spontaneously recurring sub capsular renal hematoma. Between episodes, the hematoma was seen to completelyresolve. The possible etiology is discussed and a brief overview of Page kidney is given (Tripathi, 2011)

Chapter three

Material and method

3-1 Material:

3-1-1 Subjects:

This descriptivestudy conductrd in randomsample of sixty patients with loin pain who came to ultrasound department ofHajalsaffi hospital and Algireef garbcentrein order to assess their kidneys, all patient underwent abdominal ultrasound examination with inclusive criteria of adult patient with loin pain of unknown causes and exclusive criteria of pediatric patient andpatients with known current renal disease,37 patients are females while the others are males and their ages are ranged from 18 to 75 years.

3-1-2 Machines used:

The study was performed on gray scale real time scanners as the following

Mind ray ultrasound machine with followings:

Made in china.com

3Dmind ray trolley diagnostic ultrasound system DC-30-Display monitor 15-inch led monitor

Probe:

Three probes, linear, curvilinear, andtransvaginal.

Shimadzu ultrasound machine

Made in Japan

Black and white with one probe 3.5 MHz

3-2 Method:

3-2-1 Technique used:

The examination was begun with the patient in the supine position. Scans are performed in transverse and sagital planes from the anterior approach using the liver and spleen as acoustic windows. Various maneuvers may enhance demonstration of the kidneys.

Left lateral decubitus or lateral oblique positions for the right kidney and right lateral decubitus or lateral oblique positions for the left kidney was done, Coronal longitudinal and transverse scans may also be obtained and are recommended for evaluating the renal pelvis and proximal ureter in hydronrphrotic patients.The highest frequency transducer permitting adequate penetration was used. This is usually in the 3 to 5 MHz range. Doppler ultrasonography was done when needed

3-2-2 Measurement:

The length, width, andhighs of the kidneys are measured in all patients to assess the pathological changes in renal size.

3-2-3 data collection:

The data was collected by designed clinical data collection sheets which containing all the variables of the study and ultrasound finding and design especially for purpose of this study.

3- 2- 4Data analysis and presentation

Data was analyzed by computer soft ware program by using statistical package for social science [spss] and then presented in dummy tables and graphs

Figure 3-1 Shimadzu machine

Chapter four

Results

4-1 Results:

Table [4-1] frequency distribution of gender, patients whom gender male were most affected by loin pain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	37	61.7	61.7	61.7
	Female	23	38.3	38.3	100.0
	Total	60	100.0	100.0	

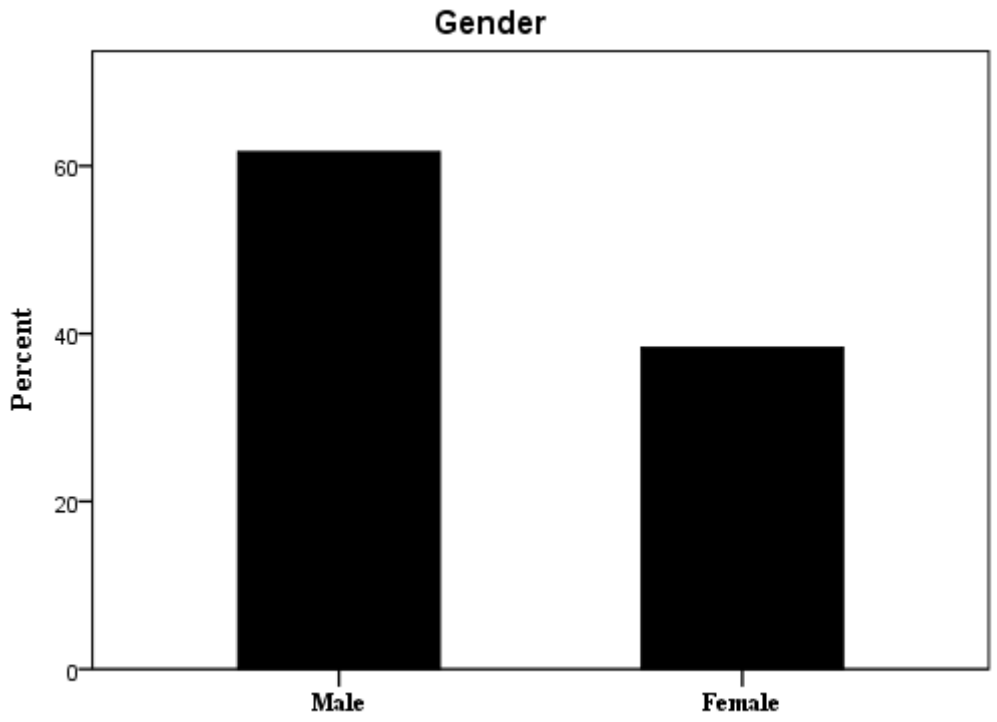

Figure [4-1] presentation of frequency distribution of gender

Table [4-2] frequency distribution of size changes of the kidney

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	53	88.3	88.3	88.3
	Decreased	2	3.3	3.3	91.7
	Increased	5	8.3	8.3	100.0
	Total	60	100.0	100.0	

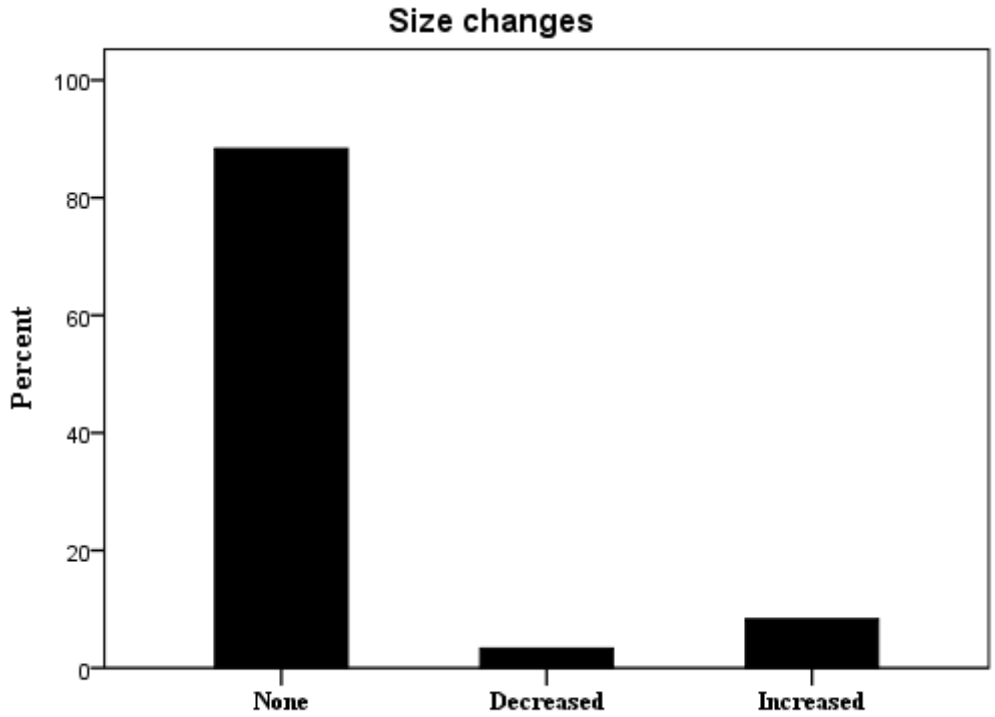

Figure [4-2] presentation of size changing of the kidney

Table [4-3] frequency distribution of echo pattern of the kidney

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	48	80.0	80.0	80.0
	Increased	3	5.0	5.0	85.0
	Shape Changes	8	13.3	13.3	98.3
	Decreased	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

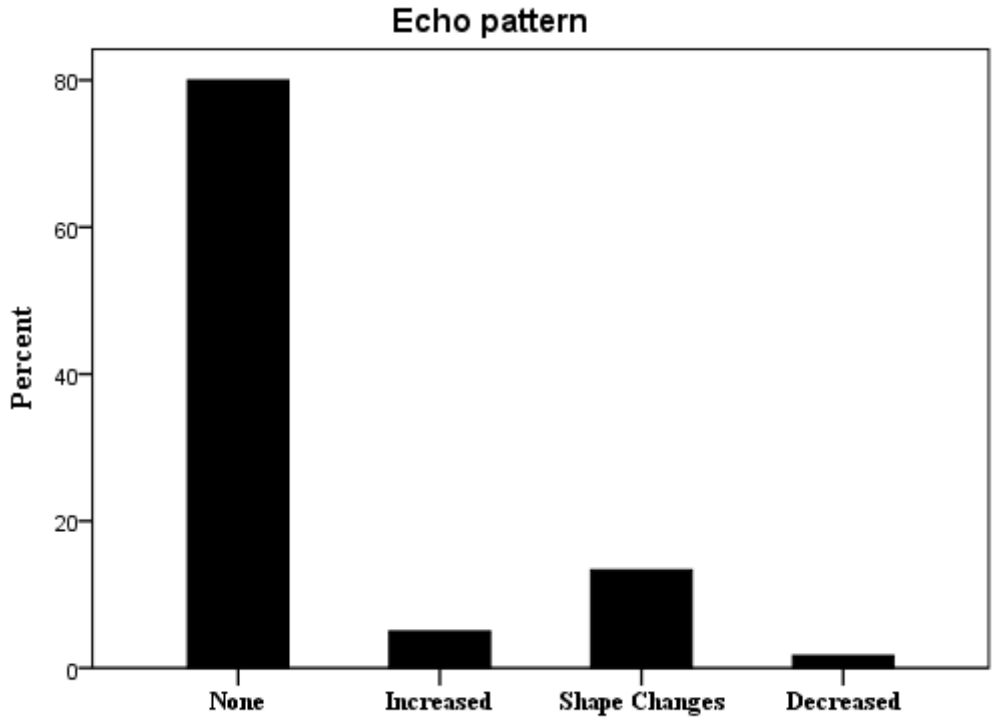

Figure 4-3 presentation offrequency distribution of echo pattern of the kidney

Table [4-4] frequency distribution of causes of loin pain, renal stone was the most common cause

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Gases	4	6.7	6.7	6.7
	Stone	36	60.0	60.0	66.7
	Hydronephrosis	4	6.7	6.7	73.3
	Atrophied Kidney	1	1.7	1.7	75.0
	Muscle Spasm	2	3.3	3.3	78.3
	Normal	2	3.3	3.3	81.7
	Cyst	5	8.3	8.3	90.0
	Pyelonephritis	1	1.7	1.7	91.7
	Colitis	4	6.7	6.7	98.3
	Absent Kidney	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

Table [4-5] frequency distribution of the complication of renal diseases, the most common complication was obstructive changes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	12	20.0	20.0	20.0
	Chronic	13	21.7	21.7	41.7
	Obstructive	32	53.3	53.3	95.0
	Renal Failure	1	1.7	1.7	96.7
	Autosomal	1	1.7	1.7	98.3
	Parenchymal Changes	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

Table [4-6] cross tabulation of causes and complication, the common cause which was renal stone has the most common complication

Causes * Complication Cross tabulation								
		Complication						Total
		No	Chronic	Obstructive	Renal Failure	Autosomal	Parenchymal Changes	
Gases	Count	4	0	0	0	0	0	4
	% within Causes	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Stone	Count	0	6	30	0	0	0	36
	% within Causes	0.0%	16.7%	83.3%	0.0%	0.0%	0.0%	100.0%
Hydronephrosis	Count	0	2	2	0	0	0	4
	% within Causes	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	100.0%
Atrophied Kidney	Count	0	0	0	1	0	0	1
	% within Causes	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
Muscle Spasm	Count	2	0	0	0	0	0	2
	% within Causes	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Normal	Count	2	0	0	0	0	0	2
	% within Causes	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Cyst	Count	0	3	0	0	1	1	5
	% within Causes	0.0%	60.0%	0.0%	0.0%	20.0%	20.0%	100.0%
Pyelonephritis	Count	0	1	0	0	0	0	1
	% within Causes	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Colitis	Count	4	0	0	0	0	0	4
	% within Causes	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Absent Kidney	Count	0	1	0	0	0	0	1
	% within Causes	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Total	Count	12	13	32	1	1	1	60
	% within Causes	20.0%	21.7%	53.3%	1.7%	1.7%	1.7%	100.0%

Table [4-7] cross tabulation of causes and gender, male was most affected by the common cause

Causes * Gender Cross tabulation					
			Gender		Total
			Male	Female	
Causes	Gases	Count	3	1	4
		% within Causes	75.0%	25.0%	100.0%
	Stone	Count	23	13	36
		% within Causes	63.9%	36.1%	100.0%
	Hydronephrosis	Count	2	2	4
		% within Causes	50.0%	50.0%	100.0%
	Atrophied Kidsney	Count	1	0	1
		% within Causes	100.0%	0.0%	100.0%
	Muscle Spasm	Count	0	2	2
		% within Causes	0.0%	100.0%	100.0%
	Normal	Count	2	0	2
		% within Causes	100.0%	0.0%	100.0%
	Cyst	Count	2	3	5
		% within Causes	40.0%	60.0%	100.0%
	Pyelonephritis	Count	0	1	1
		% within Causes	0.0%	100.0%	100.0%
	Collitis	Count	3	1	4
		% within Causes	75.0%	25.0%	100.0%
	Absent Kidney	Count	1	0	1
		% within Causes	100.0%	0.0%	100.0%
Total		Count	37	23	60
		% within Causes	61.7%	38.3%	100.0%

Chapter five

Discussion, conclusion and recommendation

5-1 Discussion:

This study was done on sixty adult patients with different gender and age sent to ultrasound department complaining of loin pain, the main objectives of this study was to determine the role of ultrasound examinations in assessing kidney in patients whom complain of loin pain and to identify the main causes of loin pain and their complications.In this study the researcher identified the causes of lion pain, determined the pathological changes of renal disease, and detected complications of renal diseases using abdominal ultrasound examinations. Sixty patients whom complain of lion pain were under go ultrasound examinations. The result of the study showed that male patients were more affected than female, this result was in line with previous studies (Eriksen and Ingebretsen, 2006). However, the effect of gender on the progression of chronic kidney disease (CKD) has been a matter of debate, where most of the evidence seems to point towards a negative effect of male gender.and(Chauhan et al., 2004) We conclude that higher ambient temperature, older age and male gender are associated with increased incidence of ED renal colic visits. Advice to patients, especially older males.

The causes of loin pain in the majority of patients were renal disease,exactly renal stones with percentage of 36 out of sixty 60% of cases this result was agree with previous studies(Hamm et al., 2002) In 80 of the 109 patients the flank pain was caused by a ureteral calculus,and(Tripathi, 2011)loin pain is usually associated with urolithiasis.

Causes such as muscle spam, colitis, and gases were detected,while two cases were diagmosed normal.

The most common complication of renal diseases was the obstruction of passage of urie,32 out of 60, 53,3% of cases.this result was agree with previous studies(Sun et al., 2010) Most of the calculi are located in the renal pelvis and calyces, and at the three stegnosis sites of the ureter: the pyeloureteric junction, the site where the ureter spans the iliac blood vessels and the site where the ureter attaches to the bladder.and causes an obstructive renal failure,and(Worcester and Coe, 2010) in particular those that result in urinary stasis (such as ureteropelvic junction obstruction, horseshoe kidney, or polycystic kidney), may precipitate or worsen stone formation. Patients with a single functioning kidney are at particular risk, since stone passage with ureteral obstruction can result in acute kidney failure,and(Goertz and Lotterman, 2010) Severity of hydronephrosis was determined by the performing physician. Ureteral stone size was grouped into 5 mm or less and larger than 5 mm based on likelihood of spontaneous passage.Renal failure and cystic diseases affect kidney size,i n 53 cases,88,3% there was no change in size of the kidney,2 cases 3.3% decreasein size,5 cases 8.3%increase in size,this agree with(Levey and Coresh, 2012)Chronic kidney disease is ageneral term for heterogeneous disorders affecting kidney structure and function.Some diseases affect enal echo pattern by increasing or decreasing echogenicity,in 48 cases,80.2% there was no changing in renal echopattern,3 cases 5.0% increased parenchyma density,1 case 1.7% decrease parenchyma density,8 cases 13.3% change parenchyma shape this result was in line with(Rosenfield and Siegel, 1981) focal interstitial diseases produced aminimal increased in cortical echogenicity agreater increased was produced by diffuse scanning,and the mosy intence echogenicity of the cortex was seen in the patients with active interstitial changes.

5-2 Conclusion:

The main objectives of this study was to assess the kidney in patients whom complaining of loin pain using ultrasonographyin order to find the most frequently cause the pain.This descriptive observational study was carried out in sixty patients referred to hajalsafi hospital and algrefgrb centre,all of them complain of loin pain in order to assess their kidney,the study was extended from july 2018 up to September 2018.the data was collected by using mind ray and shimadzu ultrasound machines.The results of this study was renal diseses were the most causes of loin pain and renal stones had the highest value of the causes with percentage of 60% of all causes,and male gender were most affected by renal stones with percentage of 63,9%.Other causes like colitis,gasses were detected.The most common complication of renal diseases was obstructive changes like renal failure and hydronephrosis,while previous studies detected other causes like pancreatitis,appendecitis,gall bladder diseases retroproteneal fibroid…etc,and many of them found that renal disorders were the most common causes of loin pain.In conclusion we can said that ultrasound has accuracy in detecting of renal disease as it is the first line in diagnosis of these disorders which are the common causes of loin pain, so when loin pain considered, kidney's diseases will be suspected, and all investigations will be done to avoid the complications of renal diseases and to differentiate other causes of loin pain.

5-3Recomendation:

- Ultrasound examination must be used as screening method for patients who complaining of lion pain
- Ultrasound machines must be available in all medical departments
- further study can be done with more data to relate the loin pain to gender and hence find the association of the pain in respect to gender

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