Napata College

Medicine Program

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A thesis title:

Constituent of Renal Calculi in Sudanese Patients study in Ibnsina teaching hospital Khartoum Sudan 2021

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Dedication

With love and respect, We dedicate this research

To lovely people in our life

To our dear mothers and fathers,

And to our colleagues

Acknowledgement

Thanks to God who gave us the strength to accomplish this work.

Our deep thanks, gratitude and appreciation for our supervisor Dr. ?? for his kind.

Also, our respect and gratitude extend to our colleague in general health laboratory (Estak).

Thanks to everyone helped us during this study.

List of Abbreviations

CA	Calcium
OX	Oxalate
PHO	Phosphate
UA	Uric acid

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Abstract

Background: These may be found in any part of the urinary tract and always composed of substance normally excreted in urine, together with certain amount of protein material, including blood proteins.

Objective: to assay Constituent of Renal Calculi in Sudanese Patients study in Ibnsina teaching hospital Khartoum Sudan 2021

Method: This prospective study was done during the period December to 2021. It determine the chemical composition of the urinary stones, which was removed surgically from urinary system of fourteen patients, males and females, of ages between 5-65 years, Attended Ibn Sina hospital (Khartoum state). Blood samples also collected from those patients before surgical operation for determination of serum calcium levels. This study aim to analyze the urinary stones, for calcium, oxalate, phosphate, carbonate, uric acid, magnesium and cystine.

Results: Generally the result showed that 88% of the stone were found to contain calcium, 55% oxalate, 80% uric acid, 33% phosphate, 10% carbonate, and cystine cholesterol and magnesium and not deselected as constituent of stone in this study.

Serum calcium and urinate were found to be normal in all patients in this study (means, ± SD: 9.6 ± 0.4 and 5.8 ± 0.5 mg/dL respectively.

Conclusion: Most of the stone serum moved from kidneys were found to be small in size (less than1 cm diameter) those were found to be (less than 1cm - 2cm), while most of the urinary stone and uric acid in association with normal level of serum calcium and uric acid in association with normal level of serum calcium and urate, Urinary stone are more common in male compare to female. Most of the urinary stone were found in the young age group (20-40) .

Key words: Renal calculi, Renal stone, Stone analysis.

المستخلص

المقدمة: يمكن أن توجد الحصاوي في أي جزء من أجزاء الجهاز البولي ودائماً تحتوي علي مواد طبيعياً تفرز في البول مع كميات قليلة من البروتين والدم.

الأهداف: تحليل الكيفي لحصوات الجهاز البولي للمرضى السودانيين.

الطريقة: أجريت هذه الدراسة التوقعية خلال الفترة من ديسمبر 2021م حيث تم التحليل الكيميائى لمكونات الحصاوى البولية التى أزيلت جراحياً من الجهاز البولى لـ 40 مريض بمستشفي ابن سينا بالخرطوم. أيضاً أخذت عينات دم من هؤلاء المرضي لمعرفة مستوى كل من الكالسيوم وملح الحامض البولى.

النتائج: كان الغرض من هذه الدراسة هو تحليل مكونات الحصاوى البولية والتى تشمل الكالسيوم، الأكسلات، الفوسفات ، الكربونات، الحامض البولى، الماغنزيوم، السستين.

أوضحت النتائج أن 88% من الحصاوى تحتوى على الكالسيوم، الأكسلات 55% والفوسفات 33% وحمض البوليك 80% والكربونات 10% بينما لا يوجد كلسترول أو ماغنزيوم أو سستين كأحد مكونات الحصاوى البولية التى تم تحليلها. وجد أن الخصاوى البولية تتفاوت فى احجامها حيث أن معظم الحصاوى التى أزيلت من الكلى كانت صغيرة الحجم قطرها أقل من 1 سم والتى أزيلت من الحالب كانت صغيرة ومتوسطة الحجم قطرها (1–2سم) بينما التى أزيلت من المثانة البولية كانت معظمها كبيرة الحجم قطرها أكثر من 2 سم.

عند قياس مستوى الكالسيوم وملح الحامض البولى فى الدم عند هؤلاء المرضى وجد أنه فى المدى الطبيعي حيث كان المستوى المتوسط 9.6 + 0.4، 8ح.5+ 0.2 مجلدا، ديسيلتر، على التوالى.

الخاتمة: خلصت هذه الدراسة إلى أن الحصاوى البولية، تحتوى غالباً على الكالسيوم والأكسلات والحامض البولى فى وجود مستوى طبيعى الكالسيوم وملح الحامض البولى فى الدم وأنها أكثر عند الرجال من النساء وأن أغلب الحصاوى فى الفئه العمرية 20–40 عام.

الكلمات المفتاحية: حصوات الكلي، تحليل حصوات الكلي.

Chapter one
Introduction

Chapter one
Introduction

1.1 Background:

The urinary system includes all organs involved in the production of urine, and it's subsequent elimination from the body. It is the major excretory system of the body, and therefore plays an essential role in maintaining homeostasis. The primary structures of the urinary system are; two kidneys, two ureters, a bladder, and urethra. [1- 4]

The kidneys are paired bean-shaped located on the posterior abdominal wall between the level of the 12th thoracic and third lumber vertebrate. The left kidney is slightly larger than the right kidney, which is usually located a little lower than the left kidney, probably due to position of the liver above the right kidney. The average length of each kidney is 4 to 5 inches long, and weights approximately 150 grams, and surrounded by a heavy cushion of fat that serves to hold the kidney in place, and provide protection. [1,2,4]

Each kidney is connected to a ureter, a slender muscular tube that squirts urine by peristaltic action in to bladder; a single muscular sac located on the floor of pelvic cavity.

The bladder has the capacity to store up to approximately 400mL of urine, which is eliminated from the body through, the urethra, a muscular tube that opens to outside of the body-[1,2,4] .The kidney is made up of an outer portion, the cortex and an inner portion, the medulla. The cortex contains the glorneruli, which are the filtering system of the kidney, and medulla, in contrast, consists of numerous pyramids of renal tissue. A few channels called the papillae, open at the kidney are made up of an outer portion, which is called the cortex, and tip of each pyramid. Each papilla juts inward toward a calyx, the calyces are channels join together and empty the urine received from the cortex into the renal pelvis, which subsequently empties the urine into the corresponding ureter. [I,4]

The nephron is the functional unit of the kidney and is essentially a tiny funnel with a complex stem. There are approximately 1.2 million nephrons per kidney, every nephron consist of five distinct part, with structure related to a specific function, of either selectively reabsorbing or secreting various constituents from the body. [I,3]

The major components of a nephron include, the glomerulus, which is the filtering system of the kidney that located in the cortex, and consist of a tuft of capillaries surrounded by a membrane known as Bowman's capsule. The space between the two walls of the capsule connects the Lumen (space) of the first tubule, the proximal convoluted tubule, which travels through the cortex, toward the medulla, and receives filtrate from the glomerular spaces.

The lope of Henle are formed as tubules extend down, for variable distance, into the medulla. The distal convoluted tubules in the cortex are important for fine adjustment of luminal fluid, and lie near the afferent arterioles with the juxtaglomerular apparatus between them; the production of renin by the later is modified by the flow in these blood vessels. The collecting ducts start as the distal tubules turn down into medulla, and end by opening into the renal pelvis, and into the ureters.[I-4]

Functions of the urinary system:

The main functions of the urinary system include the following:

1) Regulation of water content of the body

When there is a shortage of water in the body, the kidney secretes a smaller volume of more concentrated urine, and when there is an abw1dance of water, a large volume of more diluted urine is secreted, this happens through excretion or reabsorption of water. The reabsorption of water take place in the proximal tubules, and lope of Henle, when water move passively, following active transport of Na^+, and further reabsorption of water which take place in the collecting ducts under control of aldosterone, and antiduretic hormone. [I,2,4]

2) Maintenance of the correct electrolyte balance in the body

Both calcium and phosphate are reabsorbed actively, mainly in the proximal convoluted tubules, and under control of parathyroid hormone (PTH) in the distal tubules, which increase reabsorption of calcium and excretion of phosphate. Both sodium and potassium are reabsorbed actively in the proximal tubules. Under control of reninangiotensin-aldosterone system in distal tubules and collecting duct, which lead to increase reabsorption of Na^+, and excretion of K^+.[I,2,4)]

3) Maintenance of the reactions of blood between pH 7.3 -7.45

By the ability of the renal tubules to secrete acid and reabsorb bicarbonate, in addition to excrete the waste products of metabolism including urea, creatinine, uric acid, and drug metabolites.[(I,-5)]

4) The kidney produces several substances

Which have endocrine-like action.e.g.: erythropoietin. Which is necessary for normal production of erythrocytes in addition to hydroxylation of 25-hydroxycholecalciferol to 1-25 dihydroxycholecalciferol which plays an important role in calcium and phosphate metabolism. [(I,2,4)]

5) The urinary system reabsorbs, filtrate compounds of value to the Body by active and passive transport like glucose, amino acid ... ect.[(I,2,5)]

2. Serum creatinine clearance as an index of renal function:

The serum creatinine concentration is widely interpreted as a measure of golmerular filtration rate (GFR) and is used as an index of renal function in clinical practice. Glomerular filtration of creatinine, however) is the only one of the variables that determines its concentration in the serum. Alterations in the renal handling and metabolism of creatinine and methodological interference in its measurement may have a profound impact on the serum concentration of creatinine. [(3,5,6)]

3. Chemical composition of Urine:

In a normal, health individual, the end result of tubular reabsorption and secretion is the excretion of urine composed of approximately 94% water and 6% dissolved substances. The major organic components of urine include nitrogenous waste, urea, creatinine, and uric acid. The major inorganic solutes in urine are sodium, chloride, potassium, calcium and ammonia. [1,7,8]

1.2 problem statement:

Renal stone and Recurrent of Renal stone considered to be big problem in Sudanese patients this days in Khartoum state.

1.3 Rationale:

Now days the urinery stone is very common in Sudanese patient , recurrent, we intend by our study to identify the main component of the stone and recommend the best prevention to avoid it.

1.4 Research Question

- What causes of urinary calculi ?
- What constituents of urinary calculi?
- What more type of urinary calculi?
- How to prevent urinary calculi?

1.5 Objectives

1.5.1 General Objective:

to assay Constituent of Renal Calculi in Sudanese Patients study in Ibnsina teaching hospital Khartoum Sudan 2021 .

1.5.2 Specific objective:

- To assess the chemical constituents of urinary system (kidneys ureters, bladders) stone.
- To identify the relationship between urinary calculi age and sex.
- To assess the factors contribute to urinary calculi .
- To compare between serum levels of urate and calcium and its reference values .

Chapter Two
Literature review

Chapter Two

Literature review

2.1 Urinary Calculi:

These may be found in any part of the urinary tract and always composed of substance normally excreted in urine, together with certain amount of protein material, including blood proteins. On rare occasions foreign bodies may be found, and may form the nucleus of the stone. Urinary calculi vary very considerable in sire from little more than pin head to size of an egg. The largest stone are found in the bladder, whilst stone from kidney, and renal pelvis are smaller and in some cases small enough to pass along the ureters to be passed in the urine, but large stones can be found in the kidneys, particularly in hydronephrosis. [5,9,10]

Renal Calculi:

Stones in the renal pelvis may be single or multiple. A single calculus may, however, grow to the size and shape of the dilated pelvis, the so-called stagnoron calculus. A small calculus may pass down the ureter to the bladder, giving rise to renal colic with haematuria, It may be arrested temporally, usually at the narrow lower end of the ureter to cause permanent impaction, usually at the upper or lower ends of the ureter or at the level of the pelvic brim to produce hydronephrosis. When the urine is infected with urea splitting bacteria (Proteus SPP) ammonia is produced and calculi or softer deposits composed of phosphates form in the alkaline urine, and suppuration (pyonephrosis) and ulceration may accompany this. The branching staghom calculi may be formed in the renal pelvis, and are composed largely of complex hydrated phosphates. A calculs in the renal pelvis, especially when it is movable may give rise to metaplasia of the lining of the pelvis to stratified squamous epithelium, and there is a risk of development of squamous -cell carcinoma. [7,10,11]

Bladder calculi

These may be single or multiple, they are sometimes numerous like coarse sand and they are now relatively uncommon in developed countries. In many case calculi form first in the renal pelvis especially uric acid, and oxalate calculi, and then pass to the bladder where they increase in size.

The large calculi vary greatly in composition and structure but as a rule there is a nucleus of primary stone surrounded by concentric laminae. [10,11]

Bladder stones sometimes grow to measure several centimeters, and may weight over 300 grams in extreme cases as in the renal pelvis squamous metaplasia. Stones may form without the presence of bacterial infection or inflammation, and lead to pain, and irritation with haematuria, intermittent obstruction; and damage to the bladder mucosa with ulceration, however, there is secondary bacterial infection, and ammoniacal decomposition of the urine, in many patients. [10,12]

Classification of urinary calculi:

1- Simple calculi

Which on examination are found to contain only a single urinary constituent, these ones are unusually found.

2- Mixed calculi.

Which contain two or more substances present in the urine, and they are the commonest type of urinary calculi.

3- Foreign body calculi

Composed either wholly or in part of some substances introduced in to the body from outside, and they are rare.[3,5,9]

Calcium containing stones:

Between 70-90% of all renal stones contain calcium. Precipitation is favoured by hypercalciuria, and the type of the salt depends on urinary pH and on the availability of the oxalate. Calcium containing calculi are usually hard, white and radiopaque. Calcium phosphate may form staghorn calculi in the renal

pelvis, while calcium oxalate stones tend to be smaller and to lodge in the ureters.[3,9,10]

Uric acid stones

About 10 percent of renal calculi contain uric acid; these are some time associates with hyperuricaemia, with or without clinical gout.

Uric acid stone are usually small, friable and yellowish - brown, but can occasionally be large enough to form staghorn calculi. They are radiotransluecent but may be visualized by ultrasound or by intravenous pyelogram .[3,9,10]

Cystine stone:

Cystine stones are rare. It is radio-opaque renal calculi.[3,9,10]

Xanrhine stones:

Xanthine stones are uncommon and may be result of the rare inborn..[3,9,10]

Conditons farouring caculus formation:

(i) A high urinary concentration of one or more constituents of glomerular filtrate due to low urinary volume with normal renal function, this occur due to restricted fluid intake or excessive fluid loss over a long period due to low urinary volume. People living or working in hot conditions are liable to become dehydrated, and show greater tendency to form renal stones.

(ii) Change in p 1-I of urine, often due to bacterial infection e.g. Proteus vulgaris which have an ability to spilt urea to form ammonium, so it raises the pH locally and favour precipitation of different salts at different hydrogen ion concentration.

(iii) Urinary stagnation, due to obstruction to urine out flow.

(iv) Lack of normal inhibitors: urine normally contains inhibitors, such as pyrophosphate and glycoproteins, which inhibit the growth of calcium phosphate and calcium oxalate crystals respectively.

(v) A high rate excretion of metabolic products, which forming the stone, due to either; a high plasma, and therefore filtrate levels, or to impairment of normal

tubular reabsorption from the filtrate.

e.g.: hyperoxaluria; due to primary hyperoxaluria which is rare condition in which there is increased excretion of oxalate and of glyoxylate, the latter due to deficiency or the enzyme responsible for converting glyoxylate to glycine, or secondary hyperoxaluria due to increase. absotion of dietary oxalate, which may found in patients with terminal ileum disease. (7,8) –e.g2: hypercalciuria(urine calcium more than 12 mmol/day) in patients taking their normal diet, causes include idiopathic hypercalciuria which is commonest single cause of renal stone, primary hyperparathyroidism, usually caused by a parathyroid adenoma, less often by multiple adenoma, diffuse hyperplasia or carcinoma. Excess intake o vitamin D due to self-medication or overdose, which lead to increase plasma calcium.

Drugs may promote the formation of kidney stone by increasing the excretion of lithogenic salts, by changing the urinary pH, or by precipitation of the drug or its metabolites in the urinary tract. They can form a stone de novo or the drug can precipitate on a pre-existing stone thereby increasing the stone mass, thus the composition of the stone may be predominantly calcium or uric acid or drug /drug metabolite. Analysis of stones may be useful in preventing future occurrence.

Many of carbonic anhydrase inhibitors are known to promote nephrol ithiasis. Acetazolamide or dichiorophenamide are frequently used in the treatment of glaucoma to reduce the intraocular pressure. However, these drugs increase the urinary pH, increase urinary excretion of calcium and phosphate, and decrease the urinary excretion of citrate. The serum concentration of uric acid is also increased. This creates an acquired form of renal tubular acidosis (RT A). These drugs can lead to the formation of calcium oxalate and calcium phosphate stones. Topiramate, used as an anticonvulsant, is also a carbonic anhydrase inhibitors and can promote nephrolithiasis.

Many people, self- prescribes over - the- counter antacids as means of relieving

of excess stomach acid, heartburn, esophageal reflux, and other stomach problems. However, some of the ingredients in various antagids encourage the formation of kidney stone when these drugs use chronically. Overuse of silicate-containing antacids, usually in the form of magnesium trisilicate, can lead to silicate stones. Most calculi contain small amounts of silicate. When there is an increase in the absorption and urinary excretion of silicate, the silicates polymerize spontaneously because of their concentration.

The polymerization, in turn overcomes the crystal - inhibiting effect of various urinary compounds and therefore, stones formation. Absorbable alkali such as sodium bicarbonate or calcium carbonate can produce apatite stones. Chronic use of either substance may induce milk -alkali syndrome. The calcium absorption is increased, and there is calcium deposition in the kidneys and various other tissues. The formation of these stones has decreased since the development of drug such as rantidine and farnotidine. Chronic use of antacids containing calci urn or phosphate may also promote hypercalciuria leading to nephrocalcinosis.

Nephrotoxic agents, such as mercury or amphotericin, may cause renal injury and lead to the deposition of calcium within the nephrons. Vitamin D toxicity leads to over- absorption of calcium, creating a hypercalciuric
state.

This may lead to nephrocalcinosis and calcium based stones. Other potential hypercalciuric drugs induce glucocorticoids, theophylline (a bronchodilator), and loop diuretics. Triamterenc, a potassium-sparing diuretic, and its metabolite, hydroxytriamterene, are found mixed in calcium oxalate and uric acid stones.

Ascobic acid plays a controversial role in the promotion of the kidney stones, It is normally metabolized, in part, to oxalate. Therefore, with large doses (>lg/day) there is an increase in urinary oxalate excretion. Ascorbic acid also decreases the urinary pH, which in turn decreases the urinary citrate, the previously mentioned natural stone inhibitor.

Regardless of whether ascorbic acid promotes nephrolithiasis, it aggravates the stone formation in calctilous-prone patients. Pirodoxine, used to treal conronary ischiemia, also increases oxalate excretion. Ibis ding coiitaiiis glyoxyltite, vlcli is metabolized to oxalate.

Acidifying regimens used to (lecrease the p11 ma induce the (lepj)sition of uric aci (l crystals or aggiegat ions, and the patients may develop rerial colic. Most clwmollierapetitic agents can induce marked hypertiiic suria, which in turn can induce intiarenal crystallization or formation of uric aci (I sludge in the i ireteis. I J ricosuric agents also increase the risk of uric acid crystallization

Any rapid weight loss drug can proniole stone formation because a state of ketosis is plo (lLae 1. Stored body fat is broken down into organic acids, which acci itnuhite and lower the urinary p 11 creating an ideal calculusfoimafion environment. I axati or enema abuse may also lead to k I (lliey stones, with bicarbonate less in 11 ic stool, which cause chronic acidosis and decreasing the urinary .

As indicated earlier, several of drugs used to treat kidney stones may cause reverse to occur. Allopurinol therapy uses, a xanthine oxidase inhibtor, prescribed for some cases of hypercalciuria and hyperuricosuria. However, some patients produce xanthine stones from it. Orthophposphates possibly augment the grow2th of struvitecalculi, Hydrochlorothiazide , which is used as a diuretic to decrease the amount of calcium released by the kidneys into the urine, may cause small uric acid stones to develop in some patients [(11)]

Sulfonamide antibiotics, with low urine flow rates and a low urine p 11, may lead to crystallization in the urinary tract as well. Current sulfa drugs, however, have a lower incidence rate of causing stone formation than the first generation sulfa drugs because they are much more soluble. Other phenazopyridine hydrochloride and nitrofurantion.

2.2 Previous study in Sudan:

It was reported that in 1977 fifty seven percent of urinary stone in Sudan contain uric Acid , 20 percent in the pure form , 37% mixed with other constituents mainly calcium oxalate. and predominant in male than in female.

Ballaetal in 1998 reported the constituent of urinarv calculi in 80 Sudanese patients and found calcium oxalate stone were the most frequent ,and there were no detection of cystine stone .

Other study done in western Sudan to study the pattern and demographic feature of patients of unitary bladder calculi, in Elobied Hospital , they found the male to female ratio 14: l and the majority of patients from rural area with feature of malnutrition and anemia (Doumi.2008).

Chapter three

Materials and Methods

Chapter three

Materials and Methods

3.1 Study Design:

This is a cross sectional hospital based study.

3.2 Study area:

Ibnsin hospital in Khartoum state in Sudan .

3.3 Study duration:

From November 2021 to December 2021.

3.4 Study population:

Patients from 5 years old to 65 years old, both Male and Female.

3.4.1 Inclusion criteria:

- Patient from 5 years old to 65 years old.
- Stone removed by surgical operation.

3.4.2 Exclusion criteria:

- Patients with anatomical abnormality.

3.5.1 Sample techniques:

Convenience sampling: testing and questionnaire

3.5.2 Sample size:

Fourty sample tested .

3.6 Data collection technique:

The stone were first washed with water, in incubator, grind in a morter to fine powder, with was used for organic and in organic constituents. analysis of stone using chemical reagent.

3.7 Data collection tools:

By questionnaire and analysis of stones.

3.8 Variable under study:

Dependent factor: renal stone

Independent factor: in fection dehydration diet contain uric acid and calcium

3.9 data analysis:

Statistical analysis was social science (SPSS version 26) pregame was used to compare between was using statistical package for mean & SD were obtained and test was used to compare between the patient results (s. calcium & s.urate) & the accepted reference values from the national health laboratory Sudan.

3.10 Ethical consideration:

- Take permission from patients.
- Protect the patient confidentiality.
- Benefit analysis the stone and give him the result.
- Give the patients advice regarding his stone constituent to avoid recurrent.

Chapter four

Results

Chapter four

Results

4.1 Results

Fourty urinary calculi had been collected from patients in Ibn sina hospital (Khartoum state), and analyzed to determine their chemical composition .

Blood sample were collected from those patients for determination of serum urate and calcium .

Table (4.1) Percentage of urinary stone constituents Ibnsina hospital in Sudanese 2020-2021

Stone constituent	Frequency	Percentage
Calcium	35	88%
Oxalate	22	55%
Uric acid	32	80%
Magnesium	0	0%
Phosphate	13	33%
Carbonate	4	10%
Cystine	0	%
Cholesterol	0	0%

Table (4-1) shows that 88% (n = 3 5) of the stone contain calcium, 5% (n = 22) contain oxalate, 80% (n = 32) contain uric (n = 13) contain phosphate, 10% (n+4) contain car sytine and cholesterol.

Figure (4.1) Percentage of disease in association with urinary calculi Ibnsina hospital in Sudanese 2020-2021

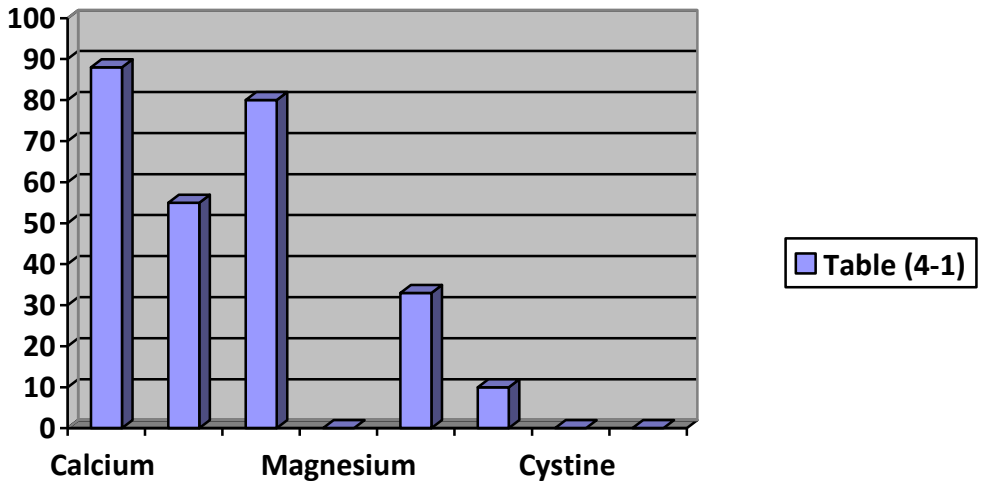

Table (4.2) Percentage of disease in association with urinary calculi Ibnsina hospital in Sudanese 2020-2021

Disease	Frequency	Percentage
Recurrent urinary tract infection	7	17.5%
Diabetes	1	2.9%
Hypertension	2	5.0%
Diabetes hypertension	2	5%
None	29	75%
Total	**40**	**100%**

Table (4-2) shows that 17.5% (n=7) of the urinary calculi were associated with recurrent urinary tract infection 2.5 (n= 1) with diabetes, 5% (n=2) with hypertension 67% (n=27) without any disease.

Figure (4.2) Constituent of renal stone according to sex Ibnsina hospital in Sudanese 2020-2021

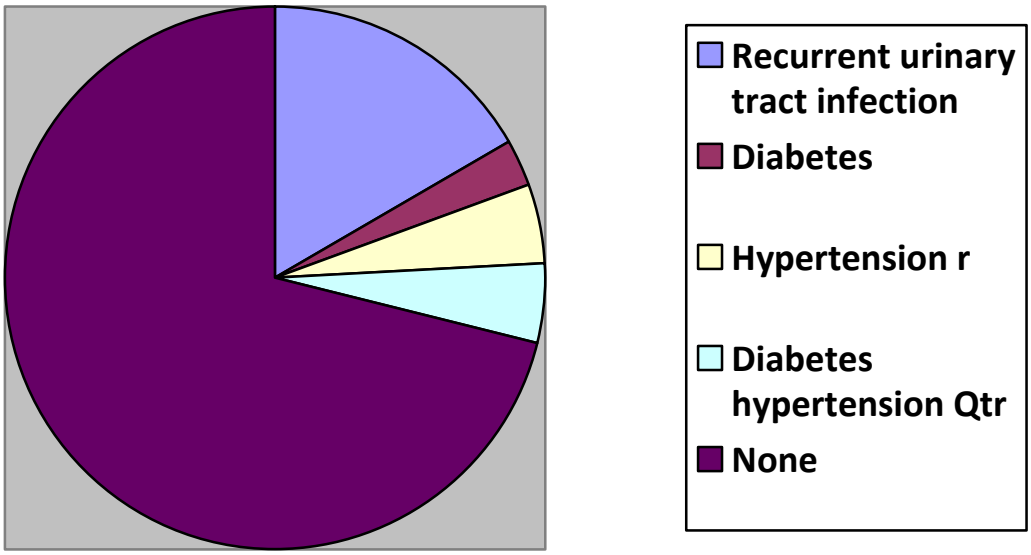

Table (4.3) Constituent of renal stone according to sex Ibnsina hospital in Sudanese 2020-2021

Sex	Ca ++%	Oxalate %	U.A%	Phosphate	carbonate	Cystine
Male N= 11	100%	58%	80%	30%	13%	0%
Female N= 10	90%	54%	82%	33%	1%	0%

Table (4-3) shows that male (11) is more than female (n =10) , Ca++ 100% in male and 90% in female ,oxalate 58% in male and 54% m female .uric acid 80% in male and 82% in female, phosphate 30% in male and 33% in female, carbonate 13°10 in male l % in female ,cystine and

cholesterol are not detected as constituent in renal stone, constituent of urinary stone according to sex.

Figure (4.3) Constituent of renal stone according to sex Ibnsina hospital in Sudanese 2020-2021

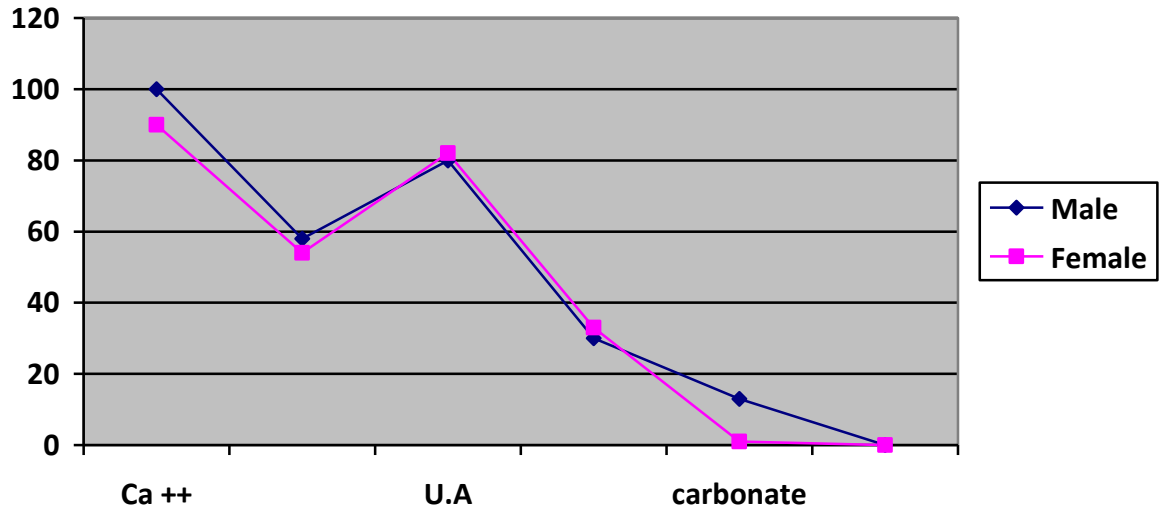

Table (4.4)Constituent of water stone according to sex Ibnsina hospital in Sudanese 2020-2021

Sex 100%	Ca++ %	Oxalate %	U.A %	Phosphate	Carbonate %	Cystine %	Magnesium %	Cholesterol %
Male N= 8	88%	50%	71%	30%	1%	0%	0%	%
Female N= 4	80%	54%	70%	29%	1%	0%	0%	0%

Table (4-4) shows that the male was (8) is more infected by ureter stone than female (n = 4) , the table shows 88% of male stone contained calcium, 50% contained oxalate, 7l % contained uric acid, 30% contain phosphate , 1% contained carbonate .

Also table (4-5) shows 80% of female stones contain and calcium 4% contained oxalate, 70% contained uric acid 29% contained phosphate , l% contained carbonate and cystine, magnesium, cholesterol were not detected as water stone constituent.

figure (4.4)Constituent of water stone according to sex Ibnsina hospital in Sudanese 2020-2021

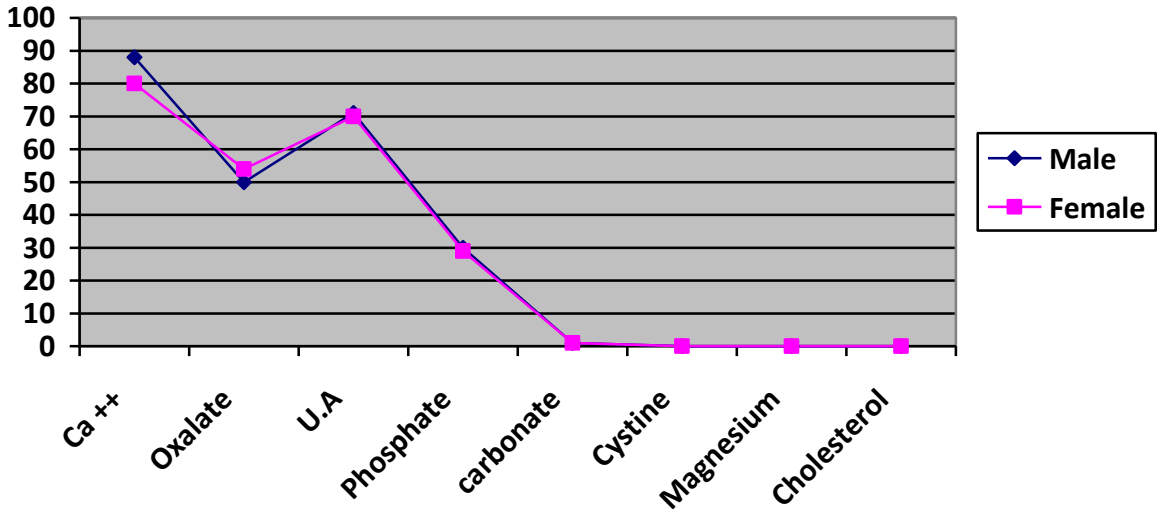

Table (4.5)Constituent of bladder stone according to sex Ibnsina hospital in Sudanese 2020-2021

Sex 100%	Ca++ %	Oxalate %	U.A %	Phosphate	Carbonate %	Cystine %	Magnesium %	Cholesterol %
Male N= 8	87%	55%	35%	8%	0%	0%	0%	%
Female N= 4	83%	54%	87%	41%	6%	0%	0%	0%

Table (4-5) shows that male (45) was more infected than female (n:2), the table shows that calcium detected in 87% o. 55% ,uric acid 90%, phosphate 35% ,carbonate 8% ,cystin, magnesium, cholesterol were not detected as constituent of bladder stone in male.

Also table (4-6) shows that calcium detected in 83% of stones in female oxalate 54% ,uric acid 87% , phosphate 41%, cystine magnums and cholesterol were not detected as constituent of bladder stone .

Constituent of urinary stone according to age group.

Figure (4.5)Constituent of bladder stone according to sex Ibnsina hospital in Sudanese 2020-2021

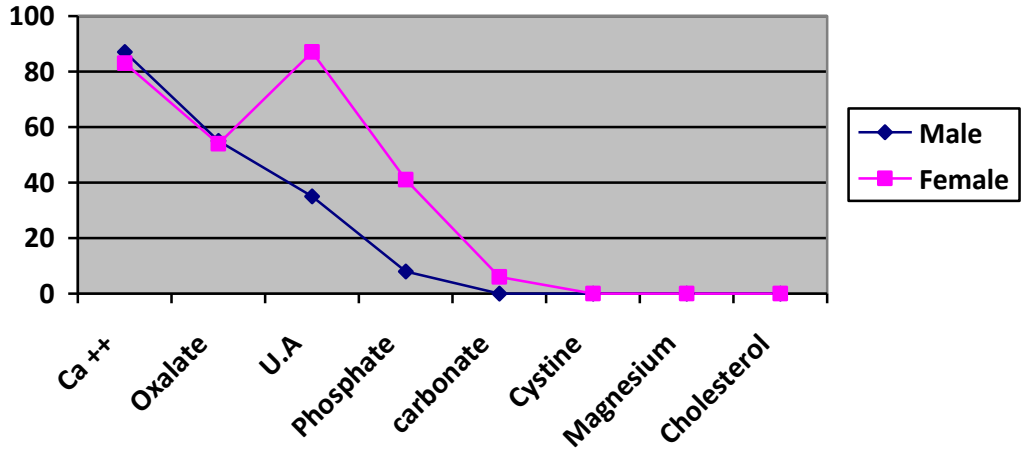

Table (4.6) Constituent of urinary stone according to the age group Ibnsina hospital in Sudanese 2020-2021

Age group	Calcium +ve	Oxalate +ve	Uric acid +ve	Phosphate +ve	Carbonate +ve
<20 N=9.22%	8 88%	5 55%	4 5%	3 33%	1 11%
20-40 N =14	15 87%	8 47%	15 90%	5 30%	2 9.7%
41-46 N= 14	13 89%	8 58%	14 100%	4 33%	1 9.3%

Table (4-6) shows that 22% (n: 9) of urinary calculi were found in patient age less than 20 years , 42% (n = 17) in patients age group between 20-40 , 36% (n = 14) in patient age group between (41-65) years.

In age less 20 years (n = a) , 88% (n = 8) of their stone found to contain calcium 55% (n = 5) found to con = 4), phosphate 33% (n= 3), Carbonate 11% (n = 1).

In age (20 - 40) (n =17) 87% (n =15) found to contain calcium, oxalate 47% (n= 8) , uric acid 90% (n = 15), phosphate 30% (n = 9) carbonate 9.3 (n = l).

In age group (41-65) (n= 14) shows that 89% (n = 13) of their stones were found to contain calcium , 85% (n = 8) oxalate, 100% (n = 14) uric acid, 33% (n = 4) phosphate, carbonate 9.3 (n = 1).

Table (4.7) Site and size of stone Ibnsina hospital in Sudanese 2020-2021

Site of stone	**Small < 1cmm diameter**	**Medium 1-2cmm diameter**	**Large > 2cmm**	**Total**
Kidney	18 45%	3 7%	-	21 53%
Ureter	9 22%	3 7.5%	-	12 29.5%
Urinarys bladder	-	5 12.5%	2 5%	7 17.5%
Total	**27** **67%**	**11** **27%**	**2** **5%**	**40** **100%**

Table (4-7) show that 45 % (n = 18) of urinary stones were removed from kidneys, 22% (n= g) from ureters, 175 (n = 7) from urinary bladder 67% (n= 27) (less than 1cm diameter) 45% (n = 18) were removed from kidney, 22% (n = a) were removed from kidney, 22% (n = a) were removed from ureter urinary bladder were urinary bladder were not contain stone less than 1 cmm.

7% (n = 3) were removed from kidney 7% (n = 3) were removed from urinary bladder. 5% (n= 2) more than 2 cm diameter, 5% (n = 2) were removed from urinary bladder, kidney and ureter were not found to contain stone more than ~cm in this study.

Serum calcium-patients with urinary stones compared with return stones compared with accepted reference value.

Table (4.8)Comparison of means of serum calcium in patient with urinary calculi versus accreted reference value Ibnsina hospital in Sudanese 2020-2021

Variable	Patient group	Accepted reference value	P value
Serum calcium Mg/dL	8.5 + 0.4 8.5 – 10.3	4.5 +5 8.5 – 10.5	>0.05

Table (4-8) shows no significant difference between the main of patients serum concentration and the accepted reference value (4.8+ 0.3 versus
2.0 - 7.0 .1 mg/dL).

Serum urate in-patient with urinary stones compared with the accepted reference value.

Table (4.9) Comparison of the means of serum urate in patients with urinary calculi versus accepted value Ibnsina hospital in Sudanese 2020-2021 .

Variable	Patient group	Accepted reference value	P value
Serum calcium Mg/dL	8.5 + 3 3.1 -6.7	2.6	>0.05

Table (4-10) show no significant difference between concentration and the accepted reference value 4.8 + 3 versus 2.0 -70 mg/dL.

Chapter five

Discussion

Chapter five

Discussion

5.1 Discussion:

Renal lithiasis is disease characterized by renal calculi formation.

The formation of stones in the kidney, ureters, or bladder, in addition to faus.ing excruciating pain, can reflect serious renal damage. Precipitation of renal stones, which can begin in the collecting ducts of the nephron, is favored by reduced urine flow, concentrated urine, excess excretion of calcium. Uric acid, cystine or xanthine, infection, and the presence of substance about which salts may precipitate. Protein core may constitute up to 60% of a store mass. Renal lithiasis accounts for 1 of every 1000 hospital admissions in the United States of America [14,15].

In Sudan due to absence of data concerning renal calculi we don't know them. size of the problem but think it is increasing, this could be reflected by the increasing number of patients operated upon in hospitals for removal of renal stones and those with complications of renal stones such as hydronephrosis, renal damage, and renal failure which is one of the main causes of death in Sudan nowadays.

In this study which was done in Khartoum state Sudan we try to throw some lights on the problem of the renal calculi In Sudan including the following aspects.

The study showed that most of the calculi were formed in the kidney, ureters, and rarely in the urinary bladder. Most of the kidney stones were of small size, and few patients with renal stones had stones of medium size .Both were associated with hydronephrosis.

Ureteric stones were small or medium size, and large stones were found in the urinary bladder, these findings agreed with previous reports by many authors.

In this study 30 % of the stones were found in the age group less than 20 years,

35 % in age 20-40 years, and 35 % in age 41-65 years.

This agrees with pervious study which showed that the peak incidence of urinary stones is in age group between 20-40 years.[2,3,4]

Also the study showed that75.5% of the urinary stones were formed in healthy patients, not suffering any disease (UTI, bvpertension, diabetes).

This could be explained by that; in summer season there is an increase sweating which may lead to dehydration resulting in increase concentration of the urinary constituents favoring stone formation, or it cloud be due to absence of urinary stones inhibitors in the urine of those patients as reported by many authors in different countries.[3,5]

This study showed that there was an association between recurrent urinary tract infection, and urinary calculi formation, which could be explained by the change in pH of the urine, that result from bacterial infection such as Protous vulgaris which has the ability to spilt urea to form ammonium, and change the urine pH to alkaline. Which favour precipitation of different salts.[3,5,6]

This study also showed that renal stones were found to be more common in diabetes and hypertensives as a result of gradual renal damage which Occur in association with these diseases, in addition, some Antihypertensive drugs (aldomate) may promote the formation of urinary calculi by increasing the excretion of lithogenic salts by changing the urinary pH or precipitating the drug or its metabolites in the urinary Tract.' [2,3,4]

Chapter six

Conclusions & Recommendation

6.1 Conclusion:

This study showed that:

- Most of the urinary stones contain calcium, uric acid in association with normal levels of serum calcium and urate .
- Urinary stones are more common in male than in female.
- Most of the urinary stones were found in the age group (21-40) compared to other age group .
- The most common site of urinary stones was the renal pelvis
- The levels of urate and calcium in the blood of patients that their states analyze have nothing to it with levels of these compare in the stones analyzer.

6.2 Recommendation:

For ministry of health give advice and recommendation to avoid a causes of Renal stones

For hospital assess ca++ and ua for all patient taken stone form hem in serum and urine:

- Urinary stones should be analyzed for determination of their chemical composition, so as to a device the patient to reduce dietary sources to prevent recurrent formation.
- Patients of hypertension are advice to avoid drugs that of a favour urinary stone formation.
- Patients with diabetes mellitus, have to be under a good glycemic, control, to minimize complication such as nephropthy, renal stones, and renal failure.
- Urinary tract infection should be treated seriously to prevent recurrent infection and urianry stone formation due to change of urinary pH.
- Clear water should be taken and increase drinking specially in summer.

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Annexes

Annexes (1): Questionnaire

A. General information:

1. Name ☐ Sample number: ☐
2. Sex: Male ☐ Female ☐
3. Age: ☐
4. Residence:

B. Clinical information:

1. Site of stone: Kidney ☐ Bladder ☐ Ureter ☐
2. Recurrent formation: Once Twice ☐ More ☐
3. Kidney disease: Yes ☐ No ☐
4. If yes in Q 3: type of disease……..……
5. Other disease (s) Diabetes Hypertension

C. Laboratory analysis:

1. Size of stone: Small ☐ Medium ☐ Large ☐
2. Qualitative analysis:

Carbonate	Calcium	Magne	Pho	Oxala	U.A	Cys	Chol	Other

Quantitative analysis:

Serum calcium: mg/dL

Serum urate: ☐ mg/dL

Annexes (2): Informed consent

Informed consent for stone analysis:

I consent to analyzed my urinary culcui

Name of patient ……..

Name of parents for child:

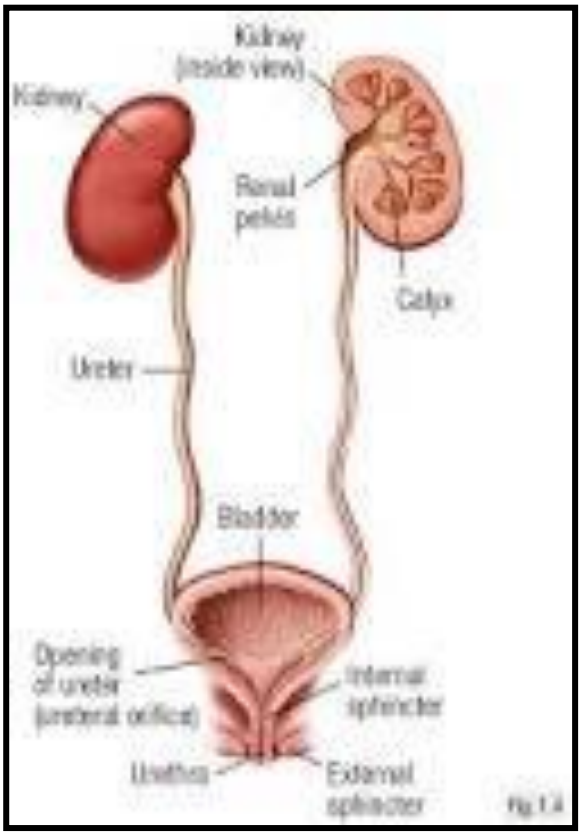
Mother name…….

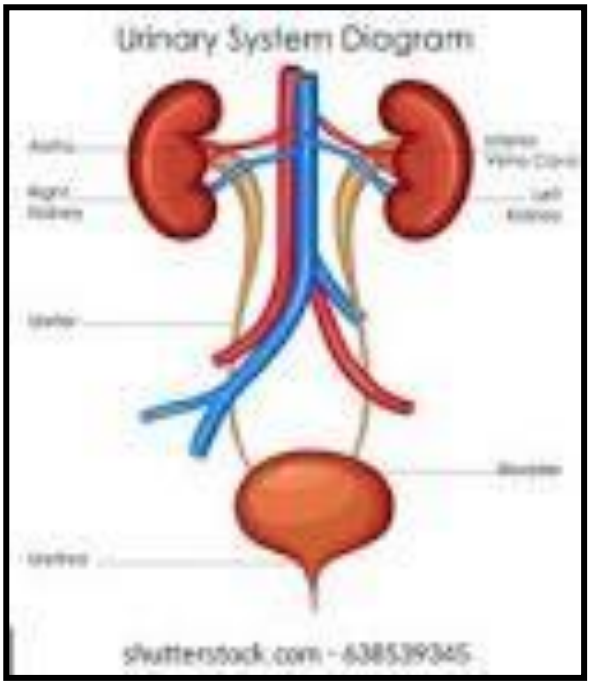
Father name ……..

For adult: himself and co - patient

Signature and date……

Urinary System





KUB (CT imagine)

Stones figures