

A Dissertation on
“CALCULOUS DISEASE OF THE URINARY
TRACT” - A CLINICAL AND EPIDEMIOLOGICAL
STUDY AT CHENGALPATTU MEDICAL COLLEGE

Dissertation submitted to
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of the degree of
M.S. (General Surgery) Branch – I
Reg No: 221711257



CHENGALPATTU MEDICAL COLLEGE,
CHENGALPATTU.

MAY 2020

DECLARATION

I solemnly declare that the dissertation titled “**CALCULOUS DISEASE OF THE URINARY TRACT - A CLINICAL AND EPIDEMIOLOGICAL STUDY at CHENGALPATTU MEDICAL COLLEGE**” is done by me at Chengalpattu Medical College and Hospital, Chengalpattu during the period of April 2018-April 2019 under the guidance and supervision of **Prof. Dr. V. T. Arasu MS**, Professor, Department of General Surgery, Chengalpattu Medical college and Hospital. This dissertation is submitted to **The Tamilnadu Dr. M.G.R Medical University, Chennai** towards the partial fulfilment of the requirements for the award of **M.S Degree in General Surgery**.

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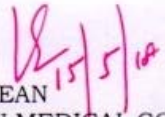
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INTRODUCTION

Urolithiasis is one of the most common clinical conditions, a clinician is likely to encounter in his/her practice. The Urolithiasis patient may test the diagnostic skill of a practitioner and the subsequent evaluation of the patient may be a very tough test for his/her knowledge and experience.

Though the composition of the calculus and treatment protocols might have changed recently, archaeological studies show the urinary tract stone disease was always a problem for humans earlier than 4600 B.C.

This is a study of 162 patients with calculous disease of the urinary tract seen during the period of 1 year, from April 2018 to April 2019 with reference to epidemiological workup and the clinical evaluation, along with complete and thorough clinical examination, plain X-ray KUB, Ultrasound KUB, Intra Venous Urethrogram, Blood investigations, Stone analysis and urine examination which includes both urine routine and urine culture and sensitivity.

The present study deals with epidemiology of urolithiasis, their distribution along urinary tract along with the supporting Investigations to confirm the diagnosis and then later to arrive at a decision-making process for the treatment modality at different levels.

AIM AND OBJECTIVES

- ✓ To evaluate all these patients with calculous disease of the urinary tract with reference to its clinical epidemiology including:
 - i. Age and Sex
 - ii. Hereditary / Metabolic diseases if any
 - iii. Environmental factors
 - iv. Urinary tract infection
 - v. Dietary factors if any
 - vi. Distribution of calculi within the urinary tract
- ✓ To clinically evaluate all patients with complete and thorough clinical examination, their usual modes of presentation, along with associated urological problems and other comorbidities if any and then thoroughly investigating them to arrive at a decision as to how to treat them.
- ✓ To study various modalities of treatment offered at different levels of calculous impaction and finally the stone analysis of the stones retrieved by medical as well as surgical management.

REVIEW OF LITERATURE

EPIDEMIOLOGY

The prevalence of urinary calculi is approximately 2.2% in the general population and the estimated life time risk of developing a urinary stone is approximately around 12% for Indians.

Approximately 55% of patients with previous history of urinary calculi have a high chance of recurrence within 10 years.

INTRINSIC FACTORS

Genetics

Urinary stones require a polygenic effect. However, genetics do play an important role in increasing the chances of an individual having urolithiasis.

The hereditary diseases identified to be associated with stone disease usually are Cystinuria, Renal Tubular Acidosis and Familial Idiopathic Hypercalciuria.

Age & Sex

The peak age of incidence usually occurs during 3rd to 6th decade. About 3 males are affected for every female. However, in cases of genetic disorders like cystinuria and hyperparathyroidism, increased frequency in females have been noticed.

EXTRINSIC FACTORS

Geographical factors

There was increased risk observed in people who were living at mountain regions and in those living in tropical areas.

Climatic factors

Acid stones are more common during summer due to dehydration and infection stones (struvite) are more common during winter due to decreased water intake. Also the Increase in mean environmental temperature leads to increase in the incidence of urinary stones.

Water intake

Risk factors which promote crystallization of salts in a patient with stone disease includes all of the following:

- Low urinary volume
- Low levels of zinc
- Excessive water hardness.
- Decreased water intake.

Diet

There are several studies which have shown that high protein intake increases urinary oxalate, calcium and uric acid excretion also excess intake of Vitamin C, produces oxalate and therefore increases the risk of stone production.

There is also evidence which suggests that lack of fibre diet also contributes for stone formation.

Occupation

It was noted that there is Increased risk of urinary stones in persons who have a sedentary lifestyle like working professionals and people working in IT industry.

INHIBITORS OF CRYSTALLIZATION

Organic

- Peptide,
- Alanine,
- Nephrocalcin
- Tomm Horsfall protein
- Citrate.

Inorganic

- Phosphates
- Zinc
- Magnesium

PATHOPHYSIOLOGY

The pathophysiology of urinary stones is due to a very complex mechanism which includes several individual causative/promotive factors

- Presence of substances that increases the rate of crystallization.
- Relative absence of substances that decreases the rate of crystallization.
- Increase in excretion or concentration of salts in the urine, which then leads to supersaturation of the crystallizing salt.
- The greater the rate of supersaturation, the greater the rate of growth of the calculi.

HYPERCALCIURIA

Accounts for 75 - 80% of urinary calculi. Approximately around half of calcium stones are made up of calcium phosphate and calcium oxalate and thus, it demonstrates intermediate fragility to ESWL.

Seven out of eight calcium stones retrieved contain calcium oxalate dihydrate. They may be dotted, spiculated, jack stone or mulberry appearance.

The remaining are composed of calcium phosphate (apatite) and calcium oxalate monohydrate. These stones are usually denser and therefore least responsive to management by ESWL.

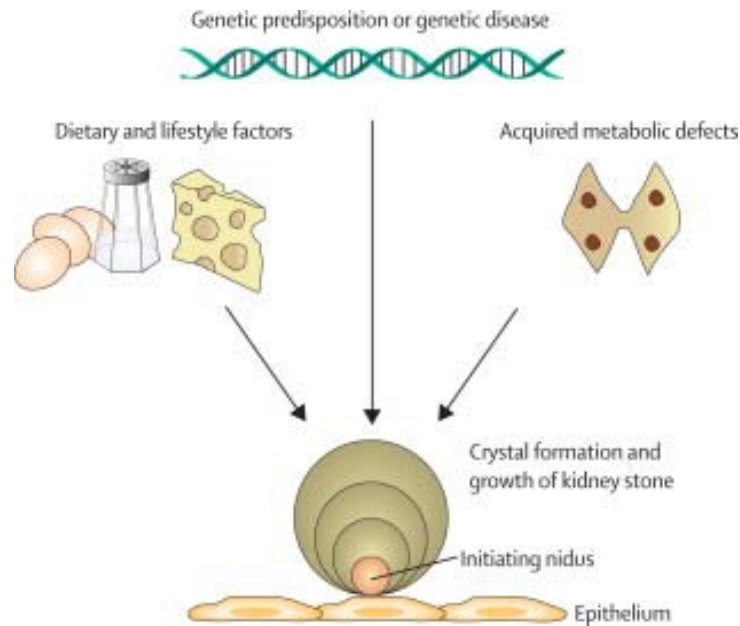
CAUSES

More than half of calcium stones are due to idiopathic hypercalciuria of unknown origin and occurs in more than 50% patients having calcium oxalate stones. Hypercalciuria may be due to absorptive, renal or resorptive.

Rest of the calcium stones are due to Hypercalcemic Nephrolithiasis.

The causes usually include the following:

- ✓ Hyperparathyroidism (5-10%)
- ✓ Renal Tubular Acidosis
- ✓ Malignancy Associated Hypercalcaemia
- ✓ Sarcoidosis (increased production of vit-D)
- ✓ Immobilization (fractures, CVA)
- ✓ Glucocorticoid induced hypercalcemia
- ✓ Pheochromocytoma
- ✓ Familial Hypocalciuria.



RENAL TUBULAR ACIDOSIS: (RTA)

Type I (Distal Renal Tubular Acidosis) is usually associated with stone disease whereas Type II (Proximal Renal Tubular Acidosis) and Type IV RTA does not predispose to stone formation.

In Type I (Distal) RTA, there is decreased ability to lower urinary pH levels ($\text{pH} > 6$) and thus leads to alkaline urine, hypercalciuria, phosphaturia.

HYPOCITRATURIA

Citrate complexes along with calcium and inhibits spontaneous nucleation and aggregation of calcium oxalate thus decreasing stone formation.

Acidosis is an important risk factor for hypocitraturia and thus stone formation and occurs in the following:

- Distal RTA
- Thiazide diuretics
- Inflammatory bowel disease, (IBD)
- Chronic diarrhoea, etc.

HYPEROXALURIA

Most commonly occurs along with malabsorption due to any causes, usually with GI surgeries like small bowel resection, jejunum - ileal bypass, Vitamin-c overdose or Chronic renal failure.

Idiopathic hyperoxaluria however is a rare disease.

HYPOMAGNESIURIA

Inflammatory Bowel Disease which is usually associated with malabsorption causes Hypomagnesiuria which can cause stone formation.

TRIPLE PHOSPHATE (STRUVITE) STONES

Constitutes 10 - 20% of urinary calculi. They usually enlarge and branch into the calyces to form staghorn calculus.

They are caused by urea splitting bacteria like Proteus, Klebsiella, Pseudomonas which potentially can lead to progressive decrease in renal function and can eventually lead to renal failure.

HYPERURICOSURIA

Uric acid stones are rare and usually constitute 5 - 10% of renal stones. These are generally smooth radiolucent stones on X-rays but are opaque on CT scan.

It is usually caused due to small bowel resection, Gout, increased cell lysis due to leukemia, starvation etc.

CYSTINE STONES

Cystinuria is an Autosomal Recessive (AR) disorder with defect in the transmembrane cystine transport leading to increased urinary excretion of Cystine, Ornithine, Arginine and Lysine. (COAL) amino acids.

Diagnosis is by Cyanide Nitroprusside Calorimetric test.

CLINICAL PRESENTATION

ACUTE STONE EPISODE

A Patient with a urinary stone usually presents with an acute episode of renal or ureteric colic. Urinary stones create symptoms only when they are trapped in the urinary tract which usually in most cases is the upper urinary tract.

Urinary stones may get impacted in any of the following sites/places in the urinary tract:

First, urinary stones may get impacted in any of the calyces of the upper urinary tract. Individual calyces may then become distended and painful and cause hematuria.

Second area in which a calculus may get impacted is usually at the PUJ (Pelviureteric junction). Here it gets impacted because the relatively larger diameter of the renal pelvis (1 cm) suddenly decreases to that of ureter (2 - 3mm)

Third area of impaction is usually at the pelvic brim. Here the ureter arches over the iliac vessels posteriorly into the true pelvis.

Fourth area, especially in females, is usually the posterior pelvis. Here the Pelvic blood vessels and the broad ligament of the uterus crosses the ureter anteriorly.

Finally, the most common and the most constricted area through which the urinary calculus gets impacted is the UreteroVesical junction (VUJ).

To become impacted, the urinary stone should have any one diameter more than 2mm. If the smaller diameter is less than 4 mm, spontaneous stone passage is likely through urine.

PHYSICAL SIGNS

The patient almost always presents with moving radiating pain and burning micturition. The patient rarely finds comfort in any given position.

Fever is rare unless there is underlying urinary tract infection occurring along with the calculus.

Acute hydronephrotic kidney may sometimes rarely be palpable.

Microscopic or gross haematuria is frequently present in patients with acute ureteric colic. Around 80% of patients do not demonstrate haematuria more so if the calculus has caused complete obstruction.

Fever is usually present if there is a significant amount of pus cells in the urine.

PATIENT EVALUATION

URINALYSIS

Urine is examined for all patients to look for hematuria and pyuria.

Urine crystals if found may reveal the type of calculus.

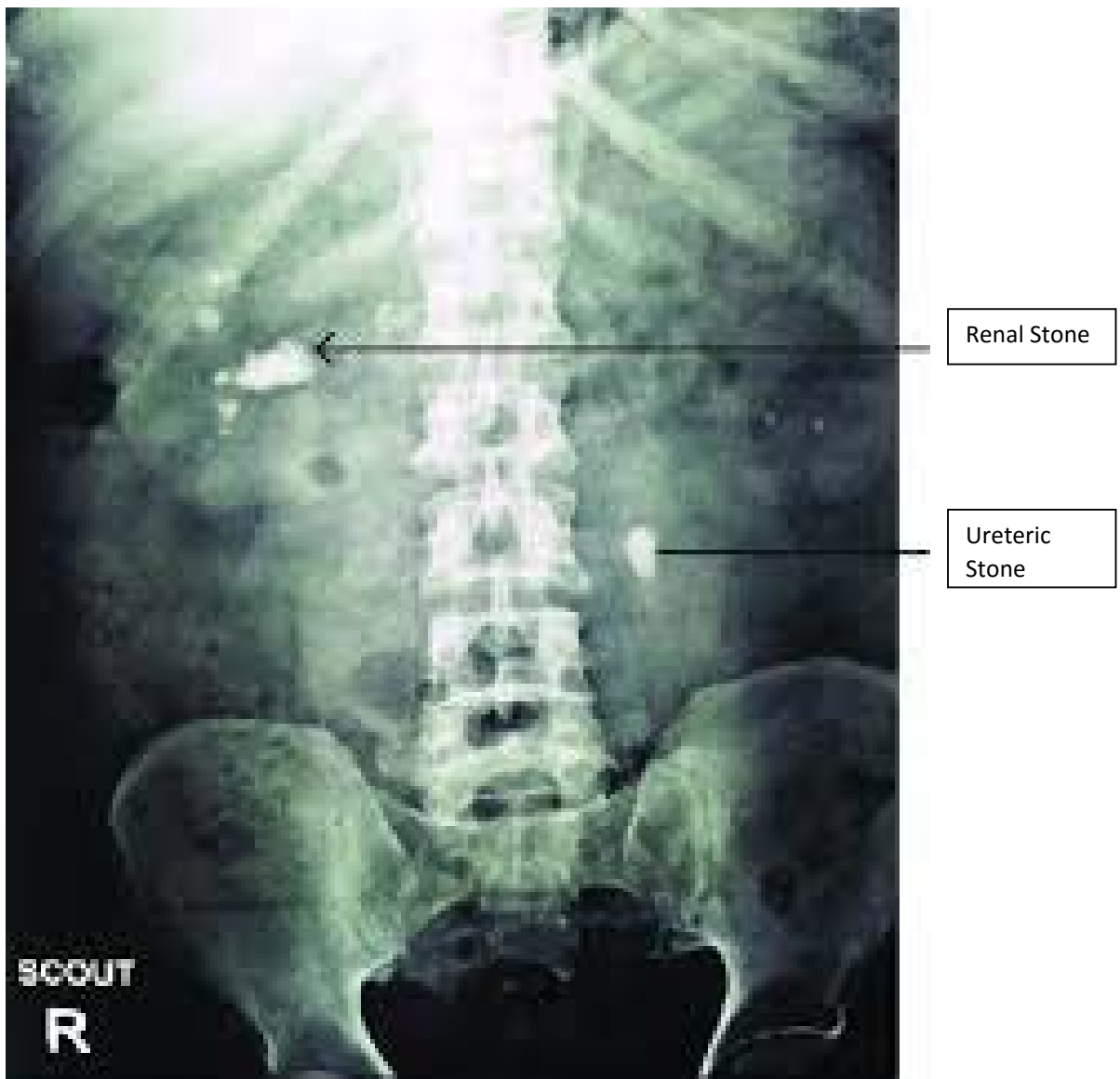
Sl no	Crystal	Shape under optical microscope
1.	Calcium Oxalate Monohydrate	Dumbbell or hourglass
2.	Ca Phosphate (apatite)	Amorphous
3.	Ca oxalate dihydrate	Bipyramidal
4.	Brushite	Needle Shaped
5.	Cystine	Benzene ring
6.	Struvite	Coffin lid

PLAIN X-RAY (KUB)

90% of the stones in the urinary tract are radiopaque. The order of radiopacity varies from one stone to another. Calcium phosphate being the most radiopaque, then comes calcium oxalate followed by magnesium-ammonium phosphate which is the least radiopaque type of stone found.

Cystine calculi are found to be radiodense because of the presence of sulfur in the stones found. Only pure uric acid or xanthine stones are found to be radiolucent.

X rays have a low specificity because of the fact that a small ureteric calculus may be difficult to interpret due to gas, faeces or due to confusion with other opacities such as arterial calcification and phleboliths.



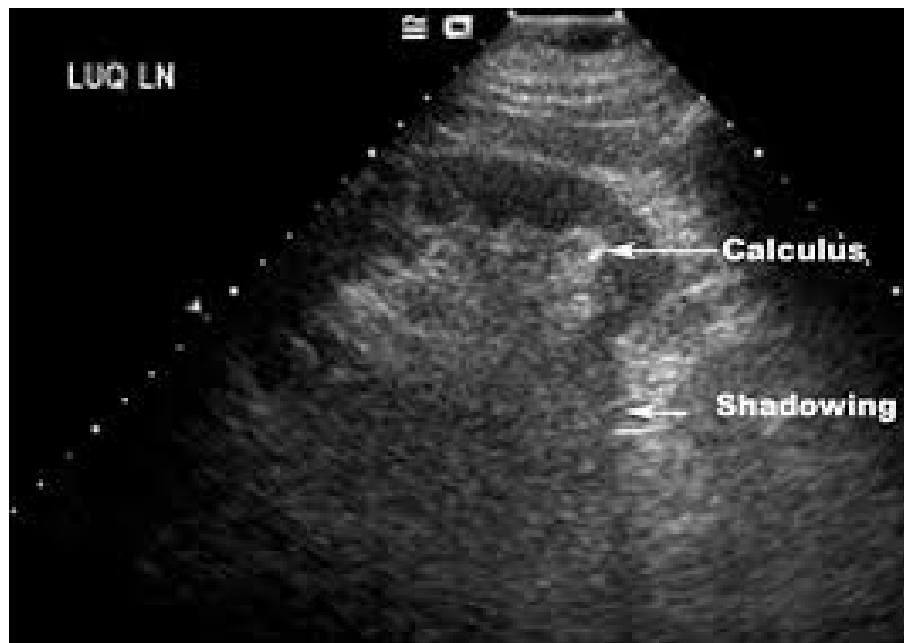


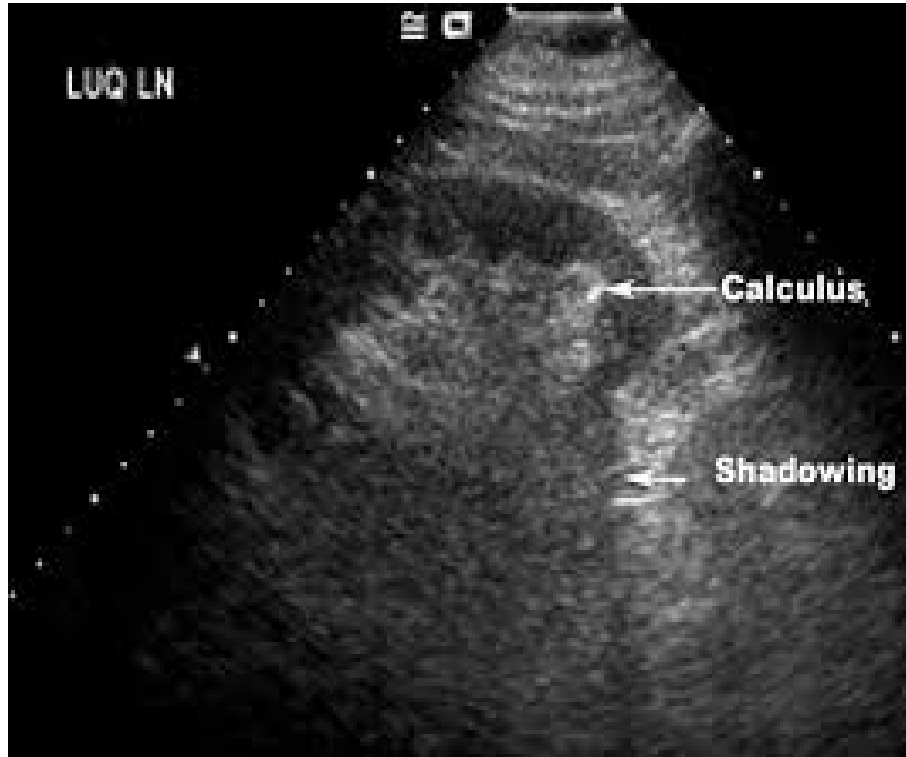
Pictures showing urinary stones in X ray KUB

ULTRASOUND (KUB)

Upto twenty five percent of patients with ureteric stones have normal ultrasound. Appearances and hence can be missed in a routine ultrasound. The sensitivity of Ultrasound (KUB) in diagnosing a ureteric calculus is only around 43%.

Other than delineating the location, presence and size of the calculus, this USG(KUB) also shows the state of renal substance, corticomedullary differentiation and also an obstructed, hydronephrotic kidney.





Pictures showing Stones in USG KUB

INTRAVENOUS UROGRAPHY

The presence of urolithiasis is indicated by a delay in the appearance of contrast medium in the nephrogram following its administration. X ray Films at twenty, thirty and sixty min shows better localisation and presence of calculus.

It is essential to ensure that renal function is not impaired (by serum creatinine concentration) before doing urogram as it may worsen it. If there is no visualisation then retrograde pyelography may be indicated.

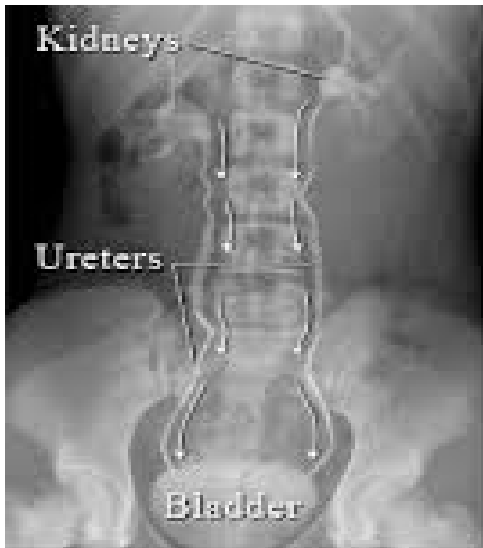


Figure 1

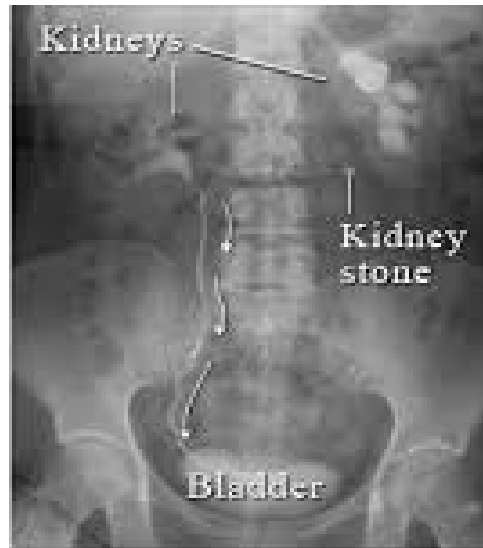
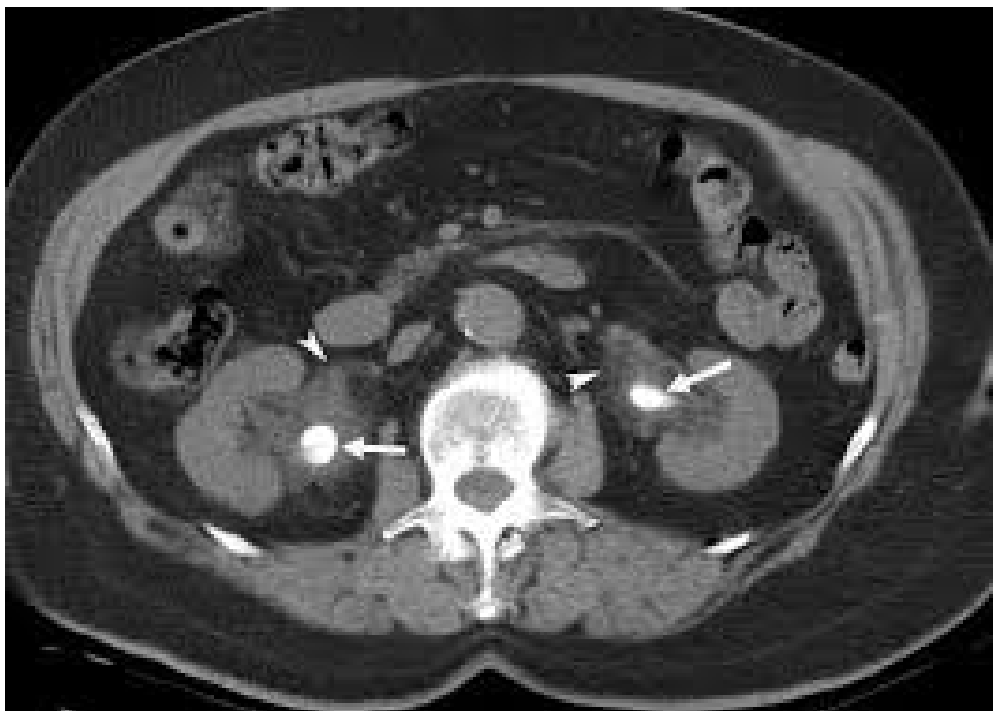


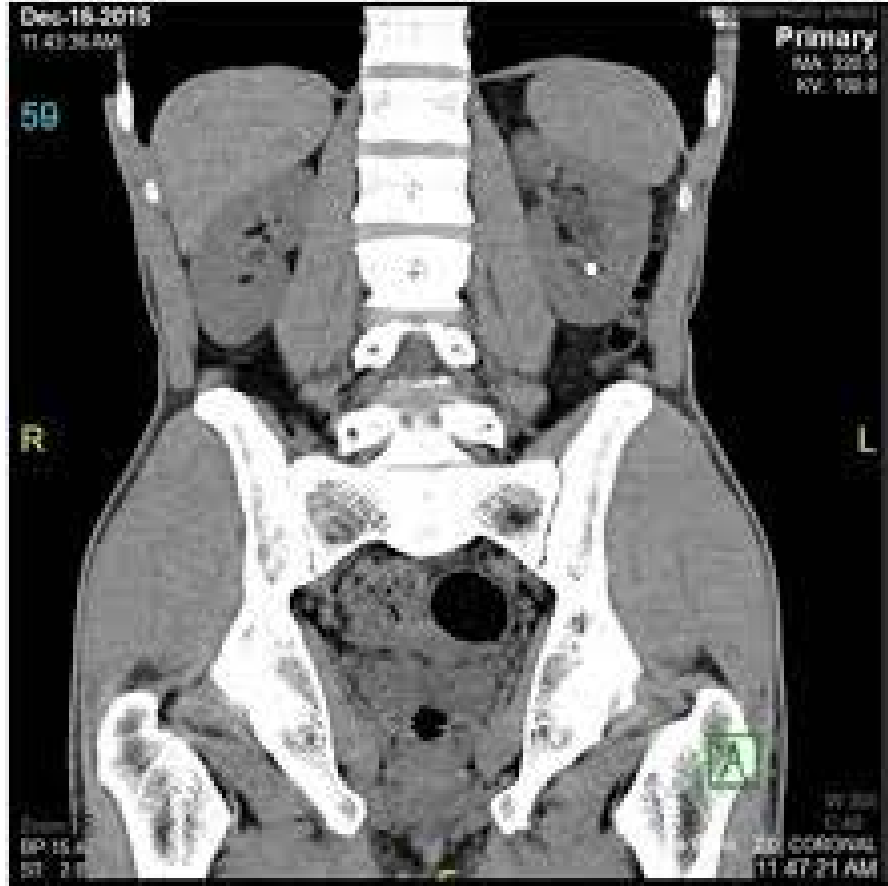
Figure 2

IVU SCAN

CT SCAN

Plain Helical / spiral CT gains more importance in detecting radiolucent stones. All stones, regardless of composition, location is usually visualised on CT scans with the exception of small percentage of Indinavir stones from patients under Antiretroviral treatment for HIV.





CT Scans showing stones

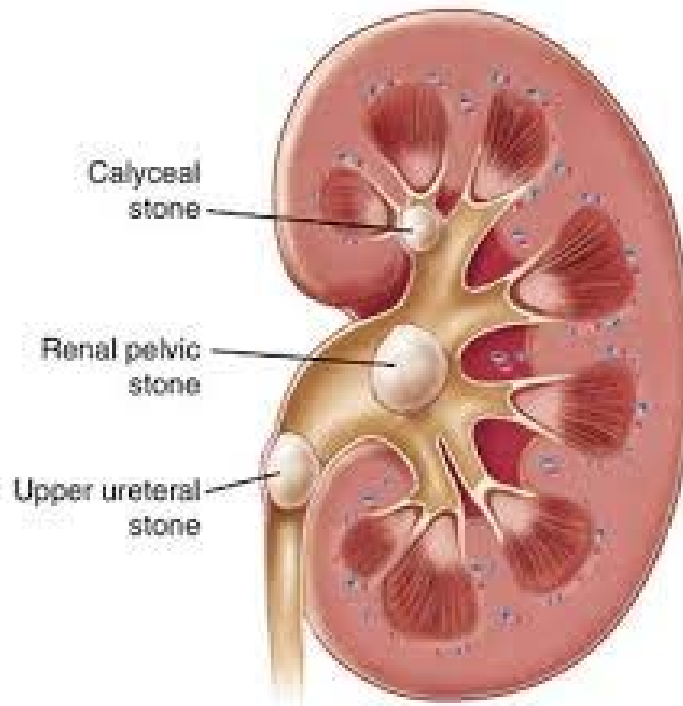
RETROGRADE PYELOGRAPHY

Where other techniques fail to locate a urinary stone, this method is used, especially for radiolucent calculi. They are also occasionally needed when there is no residual function in the affected kidney.

SPECIFIC LOCATION OF CALCULI

Renal calculi

Stones more than 1 cm do not pass spontaneously and therefore usually occupy the renal pelvis and calyces, and finally gets impacted at the Pelvic ureteric junction. When all renal stones are considered, the incidence in both men and women are usually equal, but calcium containing stones three times more common in occur in men than in women.



Renal stones

Ureteral calculi

a. Site of Origin

It usually originates from the kidney and then passes into the ureter. Primary ureteral stones are rare because of the smooth mucosal lining of the ureter and is constantly full with urine, they may be formed primarily in association with neoplasms, ureterocele, ectopic ureter, saculations etc.

b. Site of impaction

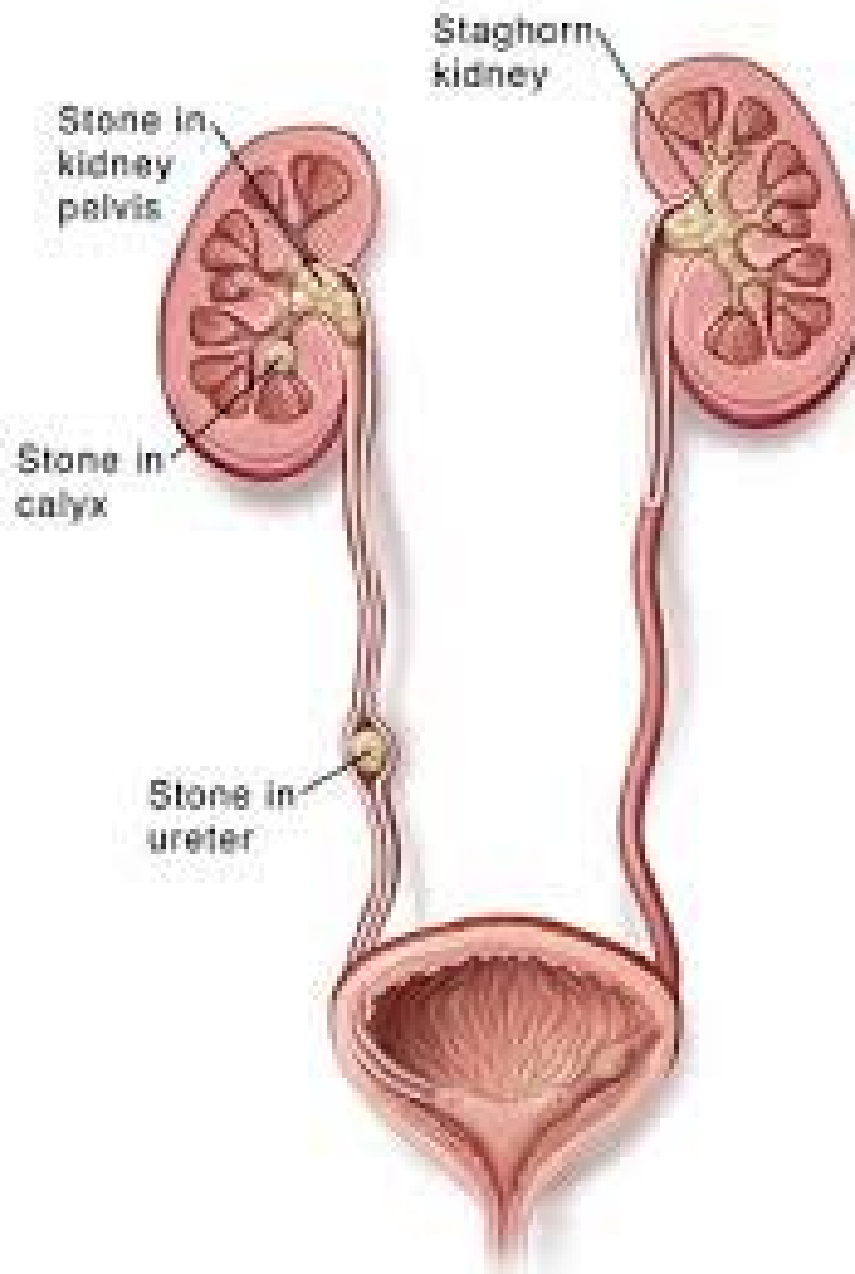
Most common site of impaction is usually the vesico ureteric junction (VUJ) followed by pelvi ureteric junction (PUJ). Other places are usually rare.

c. Size, weight and shape

Ureteric Calculi ranges in size from a few mm to 10 cm in length and width. Stone that weigh more than 0.1 gm or those which have a diameter of more than 1 cm and associated with urinary tract infection are thus not as likely to pass spontaneously.

d. Laterality

Ureteral calculi are equally common on both the left and right sides, although in certain patient's stone formation seems to be limited to one side (ie left). There are several comparative studies done which shows that there is a slightly more incidence on the left side.



Ureteral stone

VESICAL CALCULI

a. Age

A nonspecific etiological factor, incidence in calculi of the bladder varies in different parts of the world. Previously believed that the disease was largely present and limited to children, but now there is increasing evidence that there is increased incidence in adults also.

b. Sex

Vesical calculus is usually a disease of males of all ages and in all races. There is an increasing incidence noticed in men more than 50 years.

Factors that predispose to retention of urine are the following:

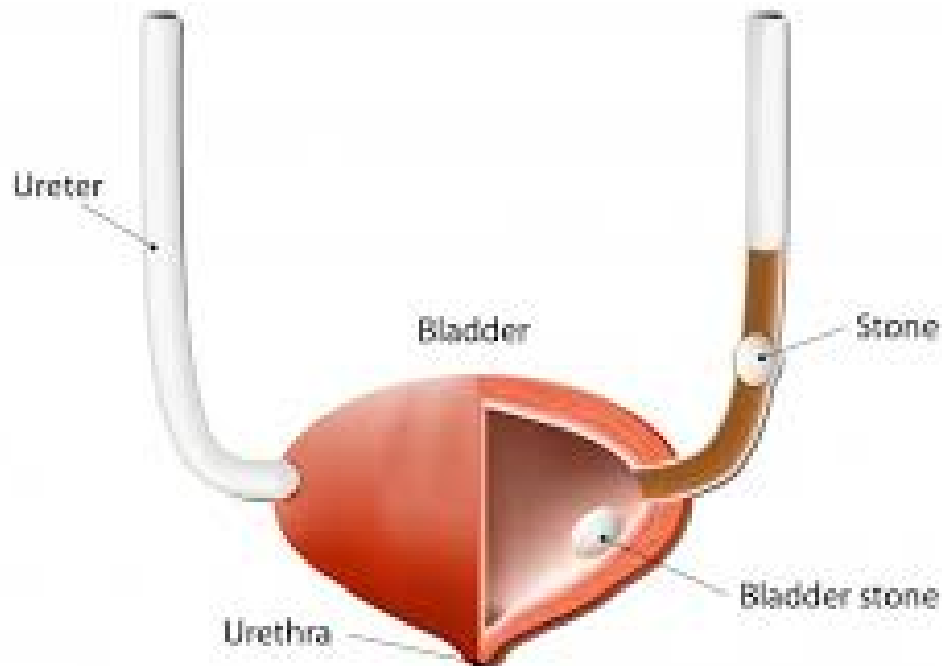
- stricture urethra
- prostatic hypertrophy
- diverticulum of the bladder
- cystoceles
- neurogenic bladder

All the above factors are associated with formation of struvite stones.

Other bladder stones are formed on foreign bodies such as sutures or catheters.

Usually a single stone is observed in the bladder, but in the presence of an underlying urological disease, multiple stones, 2 or 3 to 100 may be formed. Multiple stones are common when there is a diverticulum of the bladder.

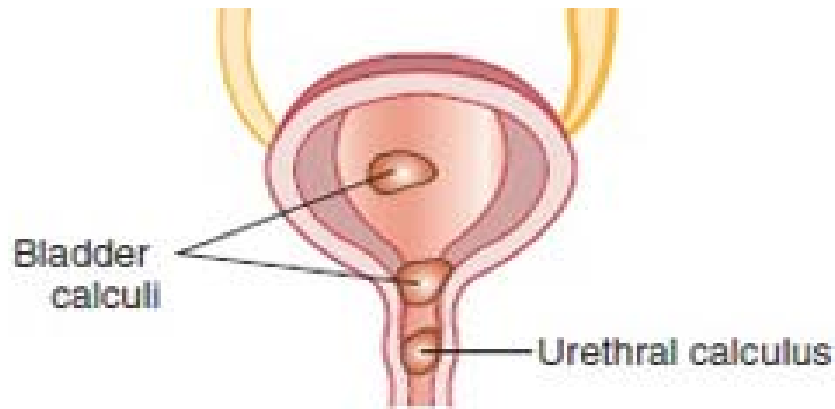
BLADDER STONE



URETHRAL CALCULI

It is relatively very rare and constitutes less than 1% of all urinary stone disease. Majority of the urethral calculi in the male are stones that are expelled from the bladder into the urethra. Very Rarely primary urethral stones are formed when stricture or diverticulum is present in the urethra.

A stone that progresses through the normal urethra may get arrested anywhere in prostatic urethra, the bulb, fossa navicularis or the external meatus.



Urethral calculi

DIAGNOSTIC AND TREATMENT DECISION PROCESS

After diagnosing a urinary stone, first assessment is of the degree of seriousness of the disease process.

INDICATIONS FOR HOSPITALISATION

- In patients with symptoms who have failed conservative management with oral medications.
- In the presence of calculus anuria, very rare and usually seen in patients with solitary kidney.
- In patients with obstructing stone and UTI with fever.

ANALYSIS OF URINARY STONES

Following treatment of acute painful phase, stone recovery is of paramount importance. Most medical treatment for stone disease is now based on stone analysis. Decisions about proper procedures for treatment requires sound knowledge of stone composition.



Urinary calculi

METHODS OF STONE ANALYSIS

1. Chemical

- Qualitative spot test
- Quantitative analysis
- Chromatographic and auto analysed methods

2. Optical

Binocular dissection microscopy with petrography (Polarisation)

3. Instrumental

- Radiographic crystallography
- Thermo analytic
- Scanning Electron Microscopy
- Transmission Electron Microscopy

Although many types of stone analysis have been proposed, the most practical and the most followed type is the chemical analysis. For the surgeon without access to large analytic laboratories, the most useful methods, are chemical analysis and petrographic methods done with the help of the polarising microscope.

Because it is a relatively easy and simple technique, almost any small hospital laboratory or large clinic have the ability to analyse the calculi.



Stone analysis Equipment

NORMAL 24 hrs URINE VALUE (mgm)

Bio chem Component	Males	Females
Oxalate	<50	<50
Calcium	<300	<250
Citrate	450-600	650-800
Uric acid	<800	<750

NORMAL SERUM LEVELS (mg/dl)

Biochem component	Values
Calcium	8.5 - 10.3
Phosphorus	3 - 4.5
Uric acid	
Males	4 - 7.0
Females	2.5 - 6.0

TREATMENT OF UROLITHIASIS

Treatment of urinary calculi can be divided into the following:

- Treatment of acute presentation
- Interval treatment
- Prevention of recurrences or new stone formation.

TREATMENT OF THE ACUTE EPISODE

EXPECTANT TREATMENT

If the greatest diameter of the stone is less than 4 mm, spontaneous passage is likely, but the surface characteristics of the calculi may be important as size.

The first priority for the patient is to relieve pain, so NSAID's is most commonly used where morphine is the choice when contraindications to NSAID's are present like, pregnancy, Asthma and peptic ulcer.

The common knowledge of forced diuresis especially in the acute situation may be unhelpful, as an increase in diuresis may cause decrease in peristalsis and therefore hinder the passage of stones which can worsen the situation.

Indications for Emergency intervention are the following:

1. Pyelonephritis
2. Significant obstruction with infection
3. Irretractable pain
4. Progressive worsening of renal function
5. Anuria with complete obstruction

THE OPTIONS FOR EMERGENCY TREATMENT ARE:

1. Stenting
2. Nephrostomy
3. Utereroscopic stone removal
4. ESWL, if on site.

INTERVAL TREATMENT

a. Surgical Treatment

Surgery forms the mainstay of treatment of urinary calculi both in the acute phase and as interval treatment, after an acute episode.

Various options of surgical treatment include, extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), reterorenoscopy stone removal (URS) and open stone surgeries

1. Extracorpororeal Shockwave Lithotripsy (ESWL)

Indications ESWL include the following:

1. Renal Calculi

Stones less than 2 cm in diameter. They have 90% chances of fragmentation and clearance. However, the disadvantage of ESWL in Renal stones is that Stones in the lower pole / calyceal diverticular region give lower success rate.

2. Ureteral calculi

ESWL is the most common modality used and therefore recommended as the first line of treatment for patients with urinary stones 1 cm or less in the proximal ureter. ESWL and ureterorenoscopy are both equally acceptable treatment choices for stone of this size in the distal ureter.

3. Bladder Calculi

Can be treated with the patient prone.

CONTRAINDICATIONS TO ESWL:

Contraindications for ESWL can be broadly classified into Absolute and relative.

Absolute contraindications are the following:

- ✓ Pregnancy
- ✓ Uncontrolled coagulopathy
- ✓ Uncontrolled hypertension
- ✓ Urinary tract obstruction distal to the stone
- ✓ Urinary tract infection with fever.

Relative contraindications are the following:

- ✓ Urinary tract infection
- ✓ Distal ureteric calculi in women of child – bearing age.

Complications of ESWL:

1. Stein strasse "stone street".
2. Haemorrhage
3. Gastrointestinal side-effects, like pancreatitis, elevation of hepatic enzymes, incidental fragmentation of GB stones, causing biliary colic.
4. Hypertension (Controversial)



ESWL

2. Ureterorenoscopy (URS):

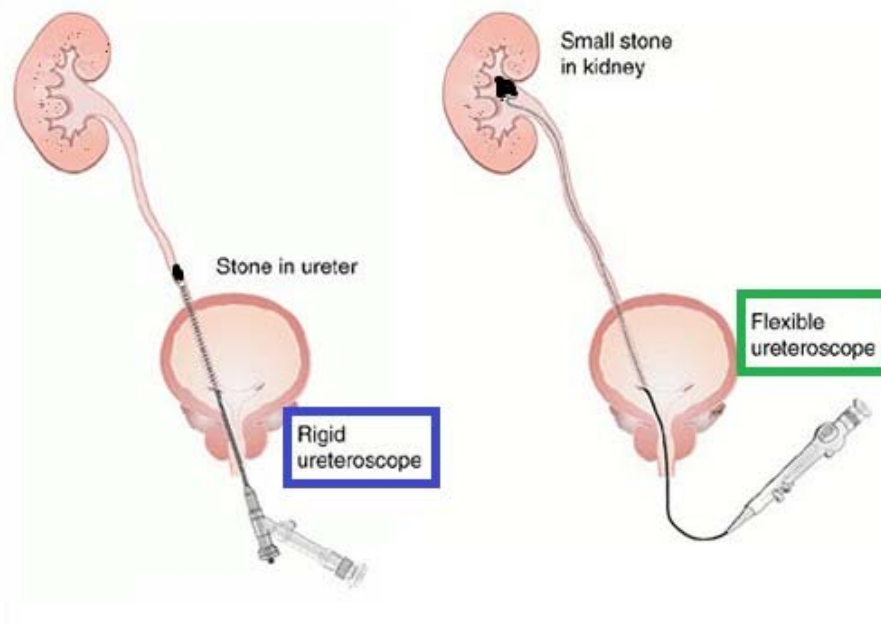
The indications for URS are the following:

- Ureteric calculi that cannot be visualised for ESWL or which have not responded to ESWL.
- Renal calculi not responding to ESWL or residual stones after percutaneous treatment.
- Radiolucent stones or filling defects which need to be inspected.

Stenting with a double pigtail (JJ) stent is generally recommended after ureteroscopic treatment.



Ureterorenoscope



3. Percutaneous Nephrolithotomy (Pcnl):

PCNL was the first key hole introduced surgery.

The Absolute Indication Following Are:

- Staghorn calculi and large (> 3 cm) renal calculi
- Failed ESWL for stones < 3 cm
- Cystine stones which are refractory to ESWL
- An infected obstructed system - PCNL is done in two stages
insertion of a nephrostomy followed by nephrolithotomy
after 1-3 days.

The Relative Indications for PCNL:

- In Horse shoe kidney where imaging is difficult.
- Morbidly obese patients where stone imaging and the weight of the patient may be practical problems.
- Upper and mid ureteric calculi - with a dilated system above the urinary stone.

Complications of Access for PCNL include:

- Haemorrhage
- Pneumothorax,
- Hydrothorax
- Injury to the neighbouring viscera.

The risk of fluid absorption and sepsis increases after PCNL.

Mortality rate following PCNL is around 0.1 - 0.7%.



PCNL forceps

4. Open Stone surgery

In most of the developing countries, open stone surgery still plays a significant role.

The procedures usually performed are the following:

- Pyelolithotomy
- Anatomic and radial nephrolithotomy
- Partial nephrectomy.

b. Non - Surgical Treatment

- Uric acid stones can be dissolved usually by a high fluid intake with alkalinisation of the urine. Allopurinol, an uricosuric agent prevents reformation of uric acid stones.
- Cystine stones are usually dissolved by alkalization and with cysteine competing agents, such as D-penicillamine and α - mercaptopyroionyl glycine (MPG).
- Struvite stones may undergo partial or complete dissolution after a course of antibiotics.

Prevention of Recurrences

Almost 50 - 75% of patients have recurrences within the first ten years. Ideally, prevention of stone formation requires analysis of the chemical composition of the stone and diagnosis of the cause and correction measures to prevent it.

DIETARY ADVICE

1. An Increase in the fluid intake to produce at least 2 lts. of urine output per day decreases the risk of stone formation significantly.
2. Restriction of calcium is usually not advised as it increases oxalate absorption.
3. High levels of dietary protein and sodium increases the incidence of calcium oxalate and uric acid stone recurrence.
4. Citric acid (lemon, orange) and dietary fibres reduces the risk of stone formation.

MATERIALS AND METHODS

The present study involves a total of 162 patients with calculous disease to the urinary tract observed during the period of 1 year, from April 2018 to April 2019.

The study was conducted both by prospective as well as by retrospective methods, by analysing the case sheets on a random basis.

All patients of prospective study were followed up in speciality department, where they were subjected to a detailed clinical and epidemiological workup. Complete Blood count, urinalysis, urine culture, serum biochemistry, X ray KUB were performed in all cases.

Chemical analysis of stones was performed in 39 cases postoperatively after stone retrieval by surgeries.

Radiological investigations included plain x-ray KUB, ultrasound IVU series, CT if needed, depending on clinical situation were done. Ultrasound KUB was performed while endoscopic procedures were usually undertaken for therapeutic reasons.

EXCLUSION CRITERIA

- Paediatric age group was excluded as they were referred directly to childrens hospital from the OPD/ER.
- Cases directly attending to the speciality outpatient department Could not be included in the present study.

OBSERVATIONS

1. AGE AND SEX INCIDENCE

1a. UPPER URINARY TRACT STONE DISEASE:

(Renal, Ureteral, Multiple Stones)

AGE

- Maximum Age Incidence (33%) for upper urinary tract stone disease was observed in patients between 30 - 40 years.
- 65% of the total cases studied were found during 2nd and 5th decade.
- Only 2 cases were found less than 20 years.

SEX

- Male: Female ratio observed is 1.3 :1.
- Hence Almost Equal Sex Incidence Noticed.

UPPER URINARY TRACT CALCULI – AGE/SEX INCIDENCE

AGE	MALE (NUMBER)	%	FEMALE (NUMBER)	%	TOTAL (NUMBER)	%
11-20	-	-	-	-	-	-
21-30	11	16.1	8	14.6	19	15.5
31-40	20	29.4	21	38.1	41	33.3
41-50	12	17.7	10	18.1	22	17.9
51-60	14	20.6	6	10.9	20	16.2
61-70	9	13.2	9	16.4	18	14.7
>70	2	2.9	1	1.8	3	2.4
TOTAL	68		55		123	

1b. LOWER URINARY TRACT STONE DISEASE

(Vesical, Urethral Stones)

AGE

* Max. Age Incidence (63%) for vesical and urethral stones was observed to be within 40 - 60 years.

* 20% of cases were found in between 20 - 30 years.

SEX

* Of the 39 cases of lower urinary stones, only seven female patients were found to have lower urinary stone.

* 82% male predominance observed

LOWER URINARY TRACT CALCULI – AGE/SEX INCIDENCE

AGE	MALE (NUMBER)	%	FEMALE (NUMBER)	%	TOTAL (NUMBER)	%
11-20	-	-	-	-	-	-
21-30	1	3.1	-	-	1	2.6
31-40	6	18.8	1	14.3	7	17.9
41-50	6	18.8	-	-	6	15.4
51-60	4	12.5	1	14.3	5	12.8
61-70	15	46.8	5	62.4	20	51.3
>70	-	-	-	-	-	-
TOTAL	32		7		39	

2. DISTRIBUTION OF CALCULI

- Of the 162 cases studied, it was found that ureteral stones were the commonest accounting to around 67 cases.
- 34 cases of Renal stones and 33 cases of bladder stones observed.
- 6 cases of urethral stones found.
- Stones at multiple sites accounted to around 22 cases.

SITE OF CALCULI

SITE	NUMBER	%
RENAL	34	20.9
URETERAL	67	41.3
VESICAL	33	20.4
URETHRAL	6	3.7
MULTIPLE SITES	22	13.6
TOTAL	162	

2a. DISTRIBUTION OF RENAL CALCULI

- Most common site of stone impaction was the renal pelvis (61%).
- Stones on right kidney were found to be slightly more frequent (58%) than the left.
- B/L renal stones were found not found in any patients studied.

RENAL CALCULI SITE

SITE	NUMBER	%
RENAL PELVIS	21	61.8
LOWER CALYX	5	14.7
MIDDLE CALYX	4	11.7
UPPER CALYX	4	11.7
TOTAL	34	

LATERALITY OF RENAL CALCULI	NUMBER	%
RIGHT	20	58.8
LEFT	14	41.1
BILATERAL	-	-

2b. DISTRIBUTION OF URETERAL CALCULUS

- It was observed that urinary stones in the lower third of ureter and vesico ureteric junction were more common than upper ureteric stones.
- Stones Above pelvic brim constitutes 60% and Below pelvic brim constitutes 40%.
- Ureteral stones were found to be more common on the right side (47%) than on the left side (15%). However, this was insignificant.
- B/L ureteral stones found in 25 cases of 67.

SITE OF URETERAL CALCULI

SITE	NUMBER	%
UPPER URETER	40	59.7
LOWER URETER	27	40.3
TOTAL	67	

LATERALITY OF URETERAL CALCULI	NUMBER	%
RIGHT	32	47.8
LEFT	10	14.9
BILATERAL	25	37.3

2c. DISTRIBUTION OF CALCULI

- 5 cases of male urethral calculi observed during the study where the site of blockage was three at fossa navicularis and the other 2 at posterior urethra.
- Stones at multiple sites observed includes either B/L renal or B/L ureteral or multiple renal on the same side or renal with ureteral or vesical with urethral stones.
- Two cases of post ESWL steinstrasse was observed.

3. EPIDEMIOLOGY

- Only two cases with metabolic disorders was found. Both these cases have primary hyperoxaluria.
- Climatic influence on stone disease found in majority of the cases. However, since this region has a tropical/summer throughout the year the statistical data obtained is not significant.
- Urinary infection was observed in 21% of cases. Patients with multiple stones and Bladder stones were usually found to have urinary infection.
- The most common organism in urine c/s was E.Coli followed by Klebsiella.
- Pseudomonas was found in two patients.

FACTORS INFLUENCING CALCULI FORMATION

FACTORS	NUMBER	%
HOT CLIMATE	129	79.6
DECREASED WATER INTAKE	79	48.8
MIXED DIET	96	59.2
METABOLIC - HYPEROXALURIA	2	1.2

ORGANISM IN URINE C/S

ORGANISM	NUMBER	%
E. coli	20	57.1
Klebsiella sps	10	28.6
Proteus sps	3	8.6
Pseudomonas sps	2	5.7
TOTAL	35	

4. CLINICAL PRESENTATION

- Pain was the commonest symptom observed 68% of the patients.
- Upper urinary stone disease presented with colic either renal or ureteric as the most common symptom (82%).
- Lower urinary stone disease presented with either one or more symptoms of LUTS like dysuria, hesitancy, terminal hematuria and dribbling. And was observed in around 6% of the patients.
- Hematuria noticed in 8% cases more in lower urinary calculi patients and positive urine culture found in 35 cases (21%).
- Palpable mass was found in 6 patients. Hydronephrosis (3 cases) and pyonephrosis (3 cases).

CLINICAL PRESENTATION

FEATURE	UPPER UT CALCULI	%	LOWER UT CALCULI	%	TOTAL	%
PAIN/ COLIC	108	87.8	26	66.7	134	82.7
FEVER	14	11.4	7	17.9	21	13.0
HEMATURIA	6	4.9	5	12.8	11	6.8
PALPABLE MASS	3	2.4	3	7.7	6	3.7
LUTS	6	4.9	5	12.8	11	6.8
+ VE URINE C/S	19	15.4	16	41.0	35	21.6

5. ASSOCIATED UROLOGICAL PROBLEM

- Hydroureteronephrosis was found in 36 cases and were more frequently found in multiple site stones/lower ureteric stones.
- Pyonephrosis found in 15 cases, of which 1 had staghorn calculus.
- BPH was the most common associated urological problem with lower urinary stones and was found in 15 cases.
- Two cases of genitourinary tuberculosis with stone disease noticed.
- 17 cases of stricture urethra associated with urethral and bladder stones observed.

ASSOCIATED UROLOGICAL PROBLEM

UROLOGICAL PROBLEM	NUMBER	%
HUN/ PUJ OBSTRUCTION	36	22.2
PYONEPHROSIS	15	9.2
BPH	12	7.4
GENITO URINARY TB	2	1.2
STRICTURE URETHRA	17	10.5
TOTAL	82	50.5

6. METHOD OF DIAGNOSIS

- USG (KUB) and x-ray (KUB) were done in almost all patients and constitutes 44% and 84% respectively as a diagnostic tool for stone disease.
- CT (Scan) helped in 29 cases of doubtful diagnosis and planning treatment and had a diagnostic accuracy of over 95%.
- IVU was done in 71 cases with normal renal function tests.
- Ascending urethrogram (AUG) was done in 10 cases of stricture associated with vesical and urethral stones.
- Serum biochemistry for renal parameters showed increased levels in 10 cases (obstructive uropathy).
- Sr. Biochemistry and 24 hours urine for calcium, phosphorus and oxalate showed 2 cases of primary hyperoxaluria.
- Urinalysis for crystals was not done in any case.

INVESTIGATIONS

INVESTIGATION	NUMBER	%
X RAY KUB	162	84
USG KUB	111	44
IVU	71	29
CT	29	96
AUG	-	-
URINALYSIS FOR CRYSTALS	-	-

7. TREATMENT MODALITY

7a. RENAL CALCULUS

- Three cases of renal stones were managed conservatively during this study.
- Pyelolithotomy was the most common procedure done for renal stone obstructing at pelvis (70%).
- 3 cases of nephrectomy done for obstructed and infected system with non-functioning kidney (with opposite side normal functioning kidney).
- ESWL / PCNL was done in 4 cases of renal stones.

RENAL CALCULI – TREATMENT

<u>MODALITY</u>	<u>NUMBER</u>	<u>%</u>
CONSERVATIVE	3	8.8
PYELOLITHOTOMY	24	70.6
NEPHROLITHOTOMY ANL	-	-
ESWL/PCNL	4	11.8
NEPHRECTOMY	3	8.8
TOTAL	34	

7b. URETERAL STONES

- Ureterorenoscopy (URS) with lithotripsy and DJ stenting was the most common procedure and was done in 52% cases of ureteral stones.
- Meatotomy was done in stones at VUJ (14%).
- Open stone surgery for larger (more than 1cm) ureteral stones, ie. uretero lithotomy was done in 18 cases.
- Conservative treatment was observed in 4 cases only as most patients were symptomatic.

URETERAL CALCULI – TREATMENT

MODALITY	NUMBER	%
CONSERVATIVE	4	5.9
URS/STENTING	35	52.2
MEATOTOMY	10	14.9
URETEROLITHOTOMY	18	26.9
TOTAL	67	

7c. MULTIPLE SITE STONE DISEASE

- Obstructive uropathy and infection were more frequently observed in multiple stone disease.
- URS / DJ stenting was observed in 40% and ureterolithotomy was done in 3 cases (14%).
- URS / DJ stenting was done in 9 cases.
- One case of nephrectomy done for non-functioning calculous pyonephrotic kidney.

MULTIPLE SITES – TREATMENT

MODALITY	NUMBER	%
CONSERVATIVE	3	13.6
URS/ STENTING	9	40.9
CYSTOSCOPY/ VESICOLITHOTRIPTY/ OIU	5	22.8
PYELOLITHOTOMY	1	4.5
NEPHRECTOMY	1	4.5
URETEROLITHOTOMY	3	13.6
TOTAL	22	

In patients with B/L stone disease treatment was done according to the site, side of obstruction and clinical presentation (symptomatic side).

7d. VESICAL AND URETHRAL CALCULUS

- Cystoscopy and vesicolithotripsy was most commonly done for bladder stones (60%).
- Vesicolithotripsy with TURP was done in 5 cases of bladder stones associated with Benign Prostatic hyperplasia.
- Vesicolithotomy was done in 6 cases.
- Urethral stones at posterior and bulbar urethra for 4 cases were retrieved by (O.I.U) optical internal urethrotomy to relieve stricture and lithotripsy.
- Two case of fossa navicularis stone was retrieved by Meatotomy

VESICAL CALCULI – TREATMENT

MODALITY	NUMBER	%
CONSERVATIVE	2	6.1
VESICOLITHOTRIPSY	20	60.6
VESICOLITHOTOMY	6	18.1
VESICOLITHOTRIPSY / TURP	5	15.1
TOTAL	33	

URETHRAL CALCULI – TREATMENT

MODALITY	NUMBER	%
OIU/ LITHOTRIPSY	4	66.7
MEATOTOMY	2	33.3
TOTAL	6	

8. STONE ANALYSIS

- Of the 162 cases studied, stone analysis was performed in 44 cases after postoperative stone retrieval.
- Done in,
 - Renal stones - 22 cases
 - Ureteral stones - 14 cases
 - Vesical stones - 6 cases
- The most common stone was found to be calcium oxalate with phosphate (75%)
- Struvite stones found in 5 cases of staghorn calculus.

COMPOSITION OF CALCULI

COMPOSITION	NUMBER	%
PURE CALCIUM OXALATE	6	13.6
CALCIUM OXALATE AND PHOSPHATE	33	75
STRUVITE	5	11.3
URIC ACID	-	-
CYSTINE	-	-
	44	

DISCUSSION

- The observed age and sex incidence from the present study and the review of literature is shown below.

	UPPER		LOWER	
	OBSERVED	LITERATURE	OBSERVED	LITERATURE
AGE -peak incidence	20-40yrs	3 rd to 5 th decade	40-60 yrs	More than 50 yrs
SEX	1.3:1	3:1	95% males	Male predominance

- Peak age incidence for urinary stones observed were in accordance with literature, both for upper and lower urinary calculi disease.
- Sex preponderance was in accordance with the literature available for vesical stones whereas increasing female preponderance was observed for renal and ureteral stones.
- Of the 162 cases studied, only 2 cases had primary hyperoxaluria (metabolic cause), as paediatric urolithiasis was excluded from the study.
- The incidence of calculi was definitely high during hot environment, as their presentation was high during summer season (80% of cases)

- The role of fluid intake / dietary influence on urinary calculus disease could not be evaluated as history of many Patients were highly unreliable however with the history provided there was a high correlation of urinary stones with decreased fluid intake.
- 21% cases had clinical evidence of urinary tract infection and the most common organism grown in culture was E.coli. Those patients with multiple site stones and bladder stones mostly had urinary infection.
- Regarding distribution of calculi along the urinary tract, ureteral calculus was most common (67 cases) than renal calculus. Vesical calculus (33cases) showed almost the same incidence as renal stones (34 cases) and 6 cases of urethral stones were found during the study.
- Among the renal stones, renal pelvis was the commonest site of stone impaction. 82% had single stone and 16% had multiple stones.
- There was a slight preponderance on right side both for both renal stones 20 cases as well as ureteral stones 32 cases. However, Literature says several of the comparative study shows left sided preponderance of ureteral calculi.
- The site of stone impaction for ureteral stones was found to be below the pelvic brim (60%) more often than above pelvic brim (40%).
- Pain was the most common clinical presentation, although small minority of patients presented with hematuria (6%) and fever (13%). 6

patients had palpable mass due to hydronephrosis. LUTS were the most common presentation of vesical calculus.

- Hydroureteronephrosis was commonly associated with upper urinary stones where as BPH (7%) and stricture urethra (10%) were commonly associated with vesical / urethral stones. Two cases of GUTB was observed during the study.
- Although the sensitivity of USG (KUB) is 44%, it was observed that USG (KUB) was the most common method of stone diagnosis when it was performed along with X-ray (KUB) in almost all cases. IVP was done in 29 cases and AUG was not done in any case as it was not needed. It was the combined methods of investigations that helped rather than a single investigation in not only in diagnosing the calculus but also to plan for treatment process.
- Regarding the treatment, pyelolithotomy was the common procedure done for renal stones obstructing the pelvis and was the most common procedure done for around 70% cases. Nephrectomy was performed in 3 cases for obstructed and infected system with a non-functioning kidney.
- Patients with renal stones <1cm and symptoms not subsided by conservative/medical methods were referred to higher centres for ESWL.

- URS (Ureterorenoscopy) / lithotripsy / DJ stenting was done in more than 50% of the patients and thus it is the most common procedure performed for ureteral stones <1cm size
- Open stone surgery for ureteral stone (uretero lithotomy) was done in 18 cases with larger stones ie stones more than 1 cm.
- Meatotomy was done for stones at VUJ for 10 patients.
- Conservative treatment for ureteric colic was observed only in 4 patients as op cases were excluded in this study.
- The treatment for multiple site stones was planned depending on the side/ site of obstruction and the clinical presentation (symptoms). It was observed that obstructive uropathy and the urinary tract infection were more common in patients with multiple site stones.
- Cystoscopy and vesicolithotripsy was the most commonly done procedure for vesical stones (60%). Open stone surgery for bladder stones were done only in 6 patients with Larger stones. TURP was done along with vesicolithotripsy in cases associated with BPH.
- Urethral stones were treated with O.I.U (Optical Internal Urethrotomy) for relieving stricture and lithotripsy for posterior urethral stones and stone at fossa navicularis was treated by meatotomy.
- Of the 162 cases studied, stone analysis was performed in around 44 cases after post-operative stone retrieval.

- Calcium oxalate and phosphate stones were major constituents of stones which accounted for around 75% and the comparative study also supported this observation. 5 cases of staghorn calculi had struvite stones.

CONCLUSION

- ✚ Urolithiasis is predominantly a disease of males of predominantly 20-40 years of age decade.
- ✚ Increasing incidence in female has been noted with upper urinary stones.
- ✚ 2 cases of metabolic disorder (Hyperoxaluria) were found observed.
- ✚ There was a definite association of stone disease with hot environment and people with decreased fluid intake. However, the observation was insignificant as the history was unreliable.
- ✚ Risk of Urinary tract infection increased inpatients with multiple stones and vesical stones.
- ✚ The most common organism in urine culture was E.Coli in the present study.
- ✚ Ureteral stones were found more commonly than renal / vesical stones with slight predominance on the right side and mostly obstructing below the pelvic brim.
- ✚ Renal stones also show a predominance towards right side with mostly obstructing at Renal pelvis. 83% had single stone whereas 17% had multiple stones.
- ✚ Pain was the commonest presentation although hematuria, fever and palpable mass were found in many cases with upper urinary stones. Vesical calculus mostly presents with LUTS.

- ✚ BPH and stricture urethra were most commonly associated with patients having lower urinary tract stones.
- ✚ USG (KUB) and X-ray (KUB) were performed in almost all cases which diagnosed calculus disease in majority of patients.
- ✚ In patients with renal stones, open stone surgeries (Pyelolithotomy / nephrolithotomy) still have a significant role than endoscopic treatment (PCNL). Cases with smaller stones were referred to higher centre for ESWL.
- ✚ However, In patients with ureteral and vesical stones, endoscopic stone retrieval by ureterorenoscopy (URS) and cystoscopy respectively showed promising results than with open stone surgeries.
- ✚ Calcium oxalate and phosphate were the major constituents of stones.

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PROFORMA UNDER STUDY

Name : Age :
Sex : IP No :
Occupation : Address :

Epidemiological Factors :

1. Heredity : Yes / No
2. Metabolic : Yes / No
3. Climatic Influence : Mar to Jul Aug to Jan
4. Dietary factors : Low fluid intake Less fibre diet
5. Urinary infection : +/- Organism on C/S.

Distribution of Calculi:

1. Upper urinary tract / lower urinary tract
2. Site / Side of Stone impaction

Clinical Presentation:

Pain (Colic), Palpable mass, Hematuria, Fever, LUTS.

Associated Urological problem:

HUN / BPH / GUTB / Stricture Urethra

Method of Diagnosis:

Ultrasound KUB, X-ray (KUB), Intravenous Urogram, Ascending Urethrogram, CT Scan, Serum Biochemistry and 24hrs urine analysis.

Mode of Treatment:

Endoscopic / open stone surgery

Stone Analysis:

ABBREVIATIONS

- RTA - Renal Tubular Acidosis
- IBD - Inflammatory Bowel Disease
- PUJ -Pelvi Ureteric Junction
- VUJ - Vesico Ureteric Junction
- U/3,M/3,L/3 - Upper Third, Middle Third, Lower Third
- IVU - Intra venous urography
- AUG - Ascending Urethrography
- KUB - Kidney, Ureter, Bladder
- LUTS - Lower urinary Tract Symptom
- HUN - Hydro Uretero Nephrosis
- BPH - Benign Prostatic Hyperplasia
- GUTB- Genito Urinary Tuberculosis
- ANL - Anatomic Nephro Lithotomy
- PCNL - Percutaneous Nephro Lithotripsy
- ESWL- Extracorporeal shock wave Lithotripsy
- OIU - Optical Internal Urethrotomy

SI NO	Name	IP No.	Age	Sex	Clinical Presentat ion	Locatio n	Durati on in days	Occupat ion	Metabo lic disease s	Co-morbidit ies	Associated Urological	Seasonal	Water intake	Dietary type	S.Calcium	S.Phosphate	Uric Acid	Lateral ity	Urine R/E	Range	Urine C/S	Xray (KUB)	USG(KUB)	IVU	CT (KUB)	Diag nose d In	Genera l Site	Location of calculi	Calculi type	Treatment
1	Arumugam	15432	45	M	Pain	Upper	3	coolie	N/A	None	None	Summer	Decreas	Mixed	10.3	3.6	3.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Calcium Oxalate and Phosphate	Pyelolithotomy
2	Palanisamy	15672	46	M	Pain	Upper	2	coolie	N/A	None	None	Summer	Decreas	Mixed	9.8	3.7	5.7	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	PCNL
3	Govindaraj	17892	24	M	Pain	Upper	4	coolie	N/A	None	None	Summer	Decreas	Mixed	10.6	4.3	4.7	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Pure calcium oxalate	Pyelolithotomy
4	Neela	12278	45	F	Pain	Upper	5	coolie	N/A	None	None	Summer	Decreas	Mixed	9.6	4.1	3.7	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
5	Vinayagam	13697	76	M	Pain	Upper	6	coolie	N/A	DM	BPH	Summer	Decreas	Mixed	10.1	3.5	3.6	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Calcium Oxalate and Phosphate	Nephrectomy
6	Selvi	17489	34	F	Pain	Upper	3	coolie	N/A	None	None	Summer	Decreas	Mixed	9.4	4.3	5.8	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
7	Manikandan	16324	45	M	LUTS	Upper	5	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Decreas	Mixed	9	4.5	3.7	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Struvite	Pyelolithotomy
8	Govindammal	24758	23	F	Pain	Upper	3	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Mixed	10.2	3.8	2.6	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
9	Janaki	21468	25	F	Pain	Upper	1	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Decreas	Mixed	9.2	4.1	2.7	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
10	Kanimozhi	28745	47	F	Pain	Upper	4	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Mixed	10	4.1	5.7	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Struvite (Mg-ammonium phosphate)	Pyelolithotomy
11	Kumari	23698	40	F	Pain	Upper	5	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Mixed	9.3	4.5	3.4	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
12	Manohar	23465	26	M	Pain	Upper	6	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Mixed	9.9	4.4	4.2	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
13	Arulselvan	28965	35	M	Pain	Upper	5	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Decreas	Mixed	9.5	3.8	5.1	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Nephrectomy
14	Shakthi	21475	37	M	LUTS	Upper	7	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Mixed	9.8	4.4	4.3	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	PCNL
15	Parathi	23145	39	M	Pain	Upper	8	coolie	N/A	None	None	Summer	Normal	Mixed	9.5	4.2	6.1	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
16	Sharath	23645	74	M	Pain	Upper	4	coolie	N/A	None	BPH	Summer	Decreas	Vegeteri	9.2	3.4	3.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
17	Palanivel	27896	41	M	Pain	Upper	5	coolie	N/A	None	None	Summer	Normal	Mixed	10.6	4.2	3.4	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Nephrectomy
18	Natarajan	37498	43	M	Pain	Upper	3	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Mixed	9.5	4	5.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
19	Madan	45789	36	M	Pain	Upper	2	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Vegeteri	10.9	4.3	4.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
20	Kiran	36214	26	M	Pain	Upper	5	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Decreas	Mixed	11	3.7	6.7	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
21	Kumar	27895	23	M	LUTS	Upper	6	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Vegeteri	9.4	4	4.3	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Pelvis	Not Done	Pyelolithotomy
22	Joseph	26899	29	M	Pain	Upper	6	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Normal	Vegeteri	11	3.6	6.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Middle	Struvite	Pyelolithotomy
23	Rakesh	42157	68	M	Pain	Upper	2	coolie	N/A	None	BPH	Summer	Normal	Mixed	10.2	4.2	2.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Middle	Not Done	PCNL
24	Revathi	21456	45	F	Pain	Upper	1	coolie	N/A	None	None	Summer	Decreas	Vegeteri	9	4.5	3	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Lower	Not Done	Pyelolithotomy
25	Vinod	35645	69	M	Pain	Upper	4	coolie	N/A	HTN	BPH	Summer	Normal	Vegeteri	10	3.8	2.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Lower	Pure calcium oxalate	Pyelolithotomy
26	Mariamma	37898	45	F	Pain	Upper	5	coolie	N/A	None	None	Summer	Normal	Mixed	10.9	4	2.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Lower	Not Done	Conservative
27	Kannammal	24568	56	F	Pain	Upper	6	coolie	N/A	None	HUN / PUJ Obstructio n	Summer	Decreas	Mixed	11	3.9	4.2	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Lower	Not Done	Conservative
28	Ayyasamy	45788	51	M	Pain	Upper	7	coolie	N/A	HTN	HUN / PUJ Obstructio n	Summer	Normal	Vegeteri	10.2	4.3	6.4	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	YES	CT	Renal	Renal Lower	Not Done	Pyelolithotomy
29	Velmurugan	12457	30	M	Pain	Upper	5	coolie	N/A	None	None	Summer	Normal	Vegeteri	9.1	4.4	5.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Renal	Renal Upper	Not Done	Pyelolithotomy
30	Balasubramanian	34561	37	M	Pain	Upper	4	coolie	N/A	None	None	Summer	Decreas	Mixed	10.7	4.2	3.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Renal	Renal Upper	Struvite	Pyelolithotomy
31	Kavitha	31245	39	F	Pain	Upper	6	coolie	N/A	None	None	Summer	Normal	Vegeteri	9	4.1	4.2	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Renal	Renal Upper	Not Done	Pyelolithotomy
32	Narisamma	14567	61	M	Pain	Upper	3	coolie	N/A	DM	None	Summer	Normal	Vegeteri	9.7	3.9	4.1	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Renal	Renal Upper	Not Done	Pyelolithotomy
33	Ismail	19878	23	M	Pain	Upper	2	coolie	N/A	None	None	Summer	Normal	Vegeteri	9.3	4.3	4.4	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Renal	Renal Middle	Not Done	Conservative
34	Gokul	31247	24	M	Pain	Upper	6	coolie	N/A	None	None	Summer	Decreas	Mixed	10.3	4.3	5.3	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Renal	Renal Middle	Calcium Oxalate and Phosphate	PCNL
35	Prabhu	12698	27	M	Pain	Upper	7	coolie	N/A	None	None	Summer	Decreas	Vegeteri	9.4	3.7	6.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Calcium Oxalate and Phosphate	URS / Stenting

36	Ganesh	13457	63	M	Pain	Upper	8	coolie	N/A	DM	HUN / PUJ Obstruction	Summer	Decreas	Vegeteri	9.8	3.7	3.4	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Calcium Oxalate and Phosphate	URS / Stenting
37	Sathish	13457	34	M	Pain	Upper	1	coolie	N/A	None	HUN / PUJ Obstruction	Summer	Decreas	Mixed	9.1	4.4	4.6	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	URS / Stenting
38	Kannan	16324	39	M	Pain	Upper	5	coolie	N/A	None	HUN / PUJ Obstruction	Summer	Decreas	Vegeteri	9.7	4	5.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	Uretero lithotomy
39	Pranathi	14587	37	F	Pain	Upper	6	coolie	N/A	None	None	Summer	Decreas	Vegeteri	9.9	3.7	4.7	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	Conservative
40	Vidya	16898	29	F	LUTS	Upper	4	coolie	N/A	None	None	Summer	Normal	Mixed	10.3	4.3	3.2	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	Uretero lithotomy
41	Sagar	17458	43	M	Pain	Upper	7	coolie	N/A	None	None	Summer	Normal	Vegeteri	9.9	4.4	4.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	URS / Stenting
42	Manikandan	18774	46	M	Pain	Upper	3	coolie	Hypero xaluria	HTN	None	Summer	Normal	Mixed	9.7	3.6	6.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Pure calcium oxalate	URS / Stenting
43	Sidharth	17489	47	M	Pain	Upper	6	coolie	N/A	HTN	None	Summer	Normal	Vegeteri	10.9	4	5.3	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	URS / Stenting
44	Deepak	13698	29	M	LUTS	Upper	7	coolie	N/A	None	None	Summer	Decreas	Mixed	10	3.8	6.1	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	URS / Stenting
45	Siva	24568	36	M	Pain	Upper	8	coolie	N/A	None	None	Summer	Normal	Vegeteri	10.9	3.8	4.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	Conservative
46	Bhavani	19877	32	F	Pain	Upper	1	coolie	N/A	None	None	Summer	Normal	Vegeteri	10	3.8	4.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	Uretero lithotomy
47	Deepika	12348	39	F	Pain	Upper	3	coolie	N/A	None	None	Summer	Decreas	Mixed	9.3	3.4	5.1	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	Uretero lithotomy
48	Hamsika	21548	30	F	Pain	Upper	4	coolie	N/A	None	None	Summer	Normal	Mixed	10.5	4.4	3.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	URS / Stenting
49	Sethu	21578	67	M	Pain	Upper	2	coolie	N/A	DM	BPH	Summer	Normal	Vegeteri	9.2	3.9	2.9	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	No	IVU	Uretera	UUC	Not Done	URS / Stenting
50	Suresh	26587	69	M	Pain	Upper	5	coolie	N/A	DM	BPH	Summer	Decreas	Vegeteri	10.8	4	6.4	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
51	Krishnan	21365	60	M	Pain	Upper	2	coolie	N/A	DM	None	Summer	Normal	Mixed	9.6	3.7	3.7	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
52	Rajendran	22365	50	M	Pain	Upper	4	coolie	N/A	HTN	None	Summer	Normal	Vegeteri	9	3.6	3.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
53	Sivakumar	23145	58	M	LUTS	Upper	3	coolie	N/A	DM	None	Summer	Decreas	Vegeteri	9.1	3.9	6.7	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
54	Vadivel	12121	43	M	Pain	Upper	2	coolie	N/A	None	None	Summer	Normal	Mixed	10.3	4.2	6.1	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	Uretero lithotomy
55	Rani	13135	29	F	Pain	Upper	7	coolie	N/A	None	None	Summer	Normal	Vegeteri	9.9	3.9	4.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	Uretero lithotomy
56	Ravi	12478	27	M	Pain	Upper	2	coolie	N/A	None	None	Summer	Decreas	Vegeteri	11	4.4	3.6	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	Uretero lithotomy
57	Ramesh	14556	58	M	Pain	Upper	3	coolie	N/A	DM	None	Summer	Decreas	Mixed	9.9	3.8	6.1	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	Uretero lithotomy
58	Anbalagan	13664	59	M	Pain	Upper	4	coolie	N/A	DM	None	Summer	Decreas	Vegeteri	9.3	4.5	6.2	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Struvite	URS / Stenting
59	Venkateshan	19899	52	M	Pain	Upper	6	coolie	N/A	HTN	None	Summer	Decreas	Vegeteri	10.3	4.3	4.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
60	Kaliyappan	11236	65	M	Pain	Upper	5	coolie	N/A	DM	None	Summer	Normal	Mixed	9	4.4	3.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
61	Mari	17895	64	M	Pain	Upper	4	coolie	N/A	DM	None	Summer	Decreas	Vegeteri	9.3	3.4	6.7	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
62	Paneerselvam	17787	60	M	Pain	Upper	3	coolie	N/A	DM	None	Summer	Normal	Vegeteri	10.2	4	5.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
63	Selvam	16645	39	M	Pain	Upper	4	coolie	N/A	None	None	Summer	Decreas	Mixed	10.5	4.3	4.4	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
64	Sudha	12664	32	F	Pain	Upper	5	coolie	N/A	None	None	Summer	Normal	Vegeteri	11	4.2	5.5	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	Conservative
65	Uma	32221	40	F	Pain	Upper	4	coolie	N/A	None	None	Summer	Normal	Vegeteri	10	4.2	6	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	Uretero lithotomy
66	Chandra	12224	32	F	Pain	Upper	3	coolie	N/A	None	None	Summer	Decreas	Mixed	9.2	3.8	2.8	Right	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	Uretero lithotomy
67	Bose	11145	74	M	Pain	Upper	4	coolie	N/A	DM	BPH	Summer	Normal	Vegeteri	9.7	3.6	5	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
68	Ram	12312	32	M	Pain	Upper	5	coolie	N/A	None	None	Summer	Normal	Vegeteri	10.2	3.4	3.7	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
69	Poovarsu	12457	65	M	Pain	Upper	3	coolie	N/A	HTN	None	Summer	Decreas	Mixed	9.3	3.6	6.9	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
70	Ragul	12589	63	M	Pain	Upper	4	coolie	N/A	HTN	None	Summer	Normal	Mixed	10.3	4.3	5.9	Left	Yes	2-3 pus c	Not Done	yes	yes	yes	NO	IVU	Uretera	UUC	Not Done	URS / Stenting
71	Balachander	13871	62	M	Pain	Upper	5	coolie	N/A	HTN	None	Summer	Decreas	Mixed	9.1	4	6.6	Left	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	UUC	Calcium Oxalate and Phosphate	URS / Stenting
72	Vaithee	13547	65	M	Pain	Upper	6	coolie	N/A	HTN	None	Summer	Normal	Mixed	9.9	3.6	5	Left	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	UUC	Calcium Oxalate and Phosphate	URS / Stenting
73	Baby	12364	39	F	Pain	Upper	7	coolie	N/A	None	None	Summer	Normal	Mixed	9.3	4.5	2.4	Left	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	UUC	Not Done	Uretero lithotomy
74	Chinnarasu	12369	66	M	Pain	Upper	8	coolie	N/A	HTN	BPH	Summer	Decreas	Mixed	9.7	3.4	2.8	Left	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	UUC	Not Done	Uretero lithotomy
75	Latha	32465	65	F	Pain	Upper	9	coolie	N/A	HTN	None	Summer	Normal	Mixed	9.1	4.1	3.1	Left	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	UUC	Not Done	Meatotomy
76	Vedha	13578	60	F	Pain	Upper	2	coolie	N/A	HTN	None	Summer	Decreas	Mixed	9.6	4.4	4.9	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Conservative
77	Kumaresan	12358	50	M	Pain	Upper	4	coolie	N/A	HTN	HUN / PUJ Obstruction	Summer	Normal	Mixed	9.3	4.2	6.1	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
78	Balaji	13584	59	M	Pain	Upper	5	coolie	N/A	HTN	HUN / PUJ Obstruction	Summer	Normal	Mixed	10.6	3.6	4.4	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	URS / Stenting
79	Krishniah	31581	57	M	Pain	Upper	3	coolie	N/A	HTN	HUN / PUJ Obstruction	Summer	Decreas	Vegeteri	10.5	4.4	5.8	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	URS / Stenting
80	Vignesh	35431	53	M	Fever / Pa	Upper	2	coolie	N/A	HTN	HUN / PUJ Obstruction	Summer	Decreas	Vegeteri	10.8	3.6	3.4	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
81	Kumarasamy	21581	59	M	Pain	Upper	3	coolie	N/A	HTN	HUN / PUJ Obstruction	Summer	Normal	Mixed	9.9	3.6	4.8	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy

82	Vimala	24456	50	F	Pain	Upper	4	coolie	N/A	HTN	HUN / PUJ Obstruction	Summer	Decreases	Vegeteri	9.5	3.4	4.5	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Calcium Oxalate and Phosphate	URS / Stenting
83	Nirmala	21561	63	F	Pain	Upper	6	coolie	N/A	HTN	None	Summer	Normal	Mixed	10.7	3.6	3.5	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Calcium Oxalate and Phosphate	URS / Stenting
84	Ranjanishree	21562	54	F	Pain	Upper	3	coolie	N/A	HTN	None	Summer	Normal	Vegeteri	9.1	4.2	3.1	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Calcium Oxalate and Phosphate	URS / Stenting
85	Lalitha	21684	59	F	Fever / Pa	Upper	2	coolie	N/A	HTN	None	Summer	Decreases	Vegeteri	9.7	3.6	3.7	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
86	Gayathri	45641	53	F	Fever / Pa	Upper	2	coolie	N/A	HTN	None	Summer	Normal	Mixed	11	3.4	4.3	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Uretero lithotomy
87	Gopal	45681	57	M	Fever / Pa	Upper	3	coolie	N/A	None	None	Summer	Decreases	Vegeteri	10.9	4.3	3.5	Bilatera	Yes	4-6 pus c	No Growth	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Uretero lithotomy
88	Gopu	46454	56	M	Fever / Pa	Upper	4	coolie	N/A	None	Pyelonephr	Summer	Normal	Vegeteri	9.8	4.2	6.6	Bilatera	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Uretero lithotomy
89	Sivachandran	45784	36	M	Fever / Pa	Upper	5	coolie	N/A	None	None	Summer	Decreases	Mixed	10.8	4.3	6.8	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
90	Elumalai	47554	37	M	Fever / Pa	Upper	6	coolie	N/A	None	None	Summer	Normal	Vegeteri	9.9	3.4	6.2	Bilatera	Yes	4-6 pus c	No Growth	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
91	Sathya	41111	38	F	Pain	Upper	5	coolie	N/A	None	GUTB	Summer	Decreases	Mixed	10.9	4.2	4.9	Bilatera	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
92	Saraswathy	41235	39	F	Pain	Upper	4	coolie	N/A	None	None	Winter	Normal	Vegeteri	9.4	4.4	3.7	Bilatera	Yes	4-6 pus c	No Growth	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Uretero lithotomy
93	Lakshmi	41385	61	F	Pain	Upper	6	coolie	N/A	None	None	Summer	Decreases	Vegeteri	10.9	4.4	2.6	Bilatera	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Uretero lithotomy
94	Monica	43548	64	F	Pain	Upper	7	coolie	N/A	None	None	Summer	Decreases	Mixed	9.1	4.4	5.6	Bilatera	Yes	4-6 pus c	No Growth	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
95	Chelladurai	21560	58	M	Pain	Upper	3	coolie	N/A	None	None	Summer	Normal	Vegeteri	11	4.2	4.5	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Meatotomy
96	Chellamalla	36414	46	F	Pain	Upper	2	coolie	N/A	None	GUTB	Winter	Normal	Mixed	9.8	4.2	4.1	Bilatera	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	Uretero lithotomy
97	Alex	16554	42	M	Pain	Upper	1	coolie	N/A	None	Pyelonephr itis	Summer	Decreases	Vegeteri	9.4	3.5	4.5	Bilatera	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	URS / Stenting
98	Mary	48646	47	F	Pain	Upper	4	coolie	N/A	None	None	Winter	Decreases	Mixed	9.3	3.7	5.3	Bilatera	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	URS / Stenting
99	Jayanthi	16452	36	F	Pain	Upper	5	coolie	N/A	None	Pyelonephr itis	Summer	Decreases	Vegeteri	10.6	3.9	5	Bilatera	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	URS / Stenting
100	Elangovan	23158	39	M	Pain	Upper	6	coolie	N/A	None	None	Summer	Decreases	Mixed	11	4.5	6.2	Bilatera	Yes	4-6 pus c	No Growth	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	URS / Stenting
101	Illango	35451	37	M	Pain	Upper	7	coolie	N/A	None	Pyelonephr itis	Summer	Decreases	Mixed	9	4	5.4	Left	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Uretera	LUC	Not Done	URS / Stenting
102	Babu	32155	60	M	Pain	Lower	4	coolie	Hypero xaluria	None	None	Summer	Decreases	Mixed	9.8	4.2	6.6	NA	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Vesical	NA	Pure calcium oxalate	Vesicolithotripsy
103	Sivaranjani	11511	68	F	Pain	Lower	3	coolie	N/A	None	Pyelonephr itis	Summer	Decreases	Mixed	9.7	3.6	3	NA	Yes	7-9 pus c	E-Coli	yes	yes	NO	NO	Ultra	Vesical	NA	Not Done	Vesicolithotripsy
104	Wilson	13132	69	M	Pain	Lower	2	coolie	N/A	None	Pyelonephr itis	Winter	Normal	Mixed	10.3	4	4.1	NA	Yes	8-10 pus c	E-Coli	yes	yes	NO	NO	Ultra	Vesical	NA	Not Done	Vesicolithotripsy
105	Aruldas	35410	63	M	LUTS	Lower	5	coolie	N/A	None	None	Summer	Normal	Mixed	10.6	3.8	6.2	NA	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
106	Prakash	16451	61	M	Pain	Lower	6	coolie	N/A	None	Pyelonephr itis	Summer	Decreases	Mixed	9.8	3.7	3.9	NA	Yes	8-10 pus c	E-Coli	yes	yes	NO	NO	Ultra	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
107	Mohan	15432	60	M	Pain	Lower	7	coolie	N/A	None	Stricture urethra	Winter	Normal	Mixed	9.1	4.1	6.9	NA	Yes	4-6 pus c	No Growth	yes	yes	NO	NO	Ultra	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
108	Vincent	23111	53	M	LUTS	Lower	8	coolie	N/A	None	Stricture urethra	Summer	Normal	Mixed	10.3	4	7	NA	Yes	4-6 pus c	No Growth	yes	yes	NO	NO	Ultra	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
109	Veeriah	41244	59	M	Pain	Lower	7	coolie	N/A	None	Stricture urethra	Winter	Normal	Vegeteri	11	3.7	5.4	NA	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
110	Eswari	32154	57	F	Pain	Lower	6	coolie	N/A	DM	None	Winter	Decreases	Mixed	9.2	4	3.2	NA	Yes	2-3 pus c	Not Done	yes	yes	NO	NO	Ultra	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
111	Caroline	32464	38	F	LUTS	Lower	5	coolie	N/A	None	Pyelonephr	Summer	Normal	Vegeteri	9.4	3.7	4.6	NA	Yes	7-9 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
112	Chandran	32132	36	M	Pain	Lower	2	coolie	N/A	None	None	Winter	Normal	Mixed	10.8	3.8	4.1	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
113	Rajan	35133	31	M	Pain	Lower	3	coolie	N/A	None	Stricture ur	Summer	Decreases	Vegeteri	9	3.7	5.8	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
114	Ramamoorthy	31253	37	M	Pain	Lower	5	coolie	N/A	None	Stricture ur	Summer	Normal	Mixed	9.4	3.6	3.4	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
115	Moorthy	32103	29	M	LUTS	Lower	6	coolie	N/A	None	None	Winter	Normal	Vegeteri	9.5	3.4	4.5	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Calcium Oxalate and Phosphate	Vesicolithotripsy
116	Anandhan	32158	36	M	Pain	Lower	3	coolie	N/A	None	Stricture ur	Winter	Decreases	Mixed	9	4.2	5.6	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy
117	Shanmugam	32456	37	M	Pain	Lower	2	coolie	N/A	None	None	Summer	Normal	Vegeteri	9.7	4.5	6.3	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy
118	Sundaram	35132	36	M	Pain	Lower	1	coolie	N/A	None	Pyelonephr itis	Summer	Decreases	Vegeteri	9.1	3.8	3.4	NA	Yes	7-9 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy
119	Narayanasamy	13584	65	M	Pain/ Feve	Lower	5	coolie	N/A	DM	Stricture urethra	Summer	Normal	Mixed	10.6	3.4	4.2	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy
120	Saamy	35122	62	M	Pain/ Feve	Lower	6	coolie	N/A	DM	Stricture urethra	Summer	Normal	Vegeteri	11	3.8	4	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy
121	Guru	32124	64	M	Pain	Lower	7	coolie	N/A	DM	Stricture urethra	Winter	Decreases	Mixed	10	4.1	3.9	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy
122	Gurumoorthy	32154	45	M	Pain	Lower	5	coolie	N/A	None	None	Summer	Normal	Mixed	10.3	3.6	5.9	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotomomy
123	Harish	12354	43	M	Pain	Lower	6	coolie	N/A	None	None	Summer	Normal	Mixed	10.4	4.4	5	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotomomy
124	Anbu	45641	42	M	LUTS	Lower	4	coolie	N/A	None	None	Summer	Decreases	Mixed	9.4	3.4	6.7	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotomomy
125	Selvaraj	35123	41	M	Pain	Lower	5	coolie	N/A	None	None	Summer	Normal	Mixed	10.7	3.4	3.4	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotomomy
126	Raja	13234	47	M	Pain	Lower	3	coolie	N/A	None	Stricture urethra	Winter	Decreases	Vegeteri	10.5	3.9	5	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotomomy
127	Muthu	12345	48	M	Pain	Lower	2	coolie	N/A	None	Stricture urethra	Winter	Normal	Mixed	9.6	3.7	5.3	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotomomy

128	Sivakumaran	32453	61	M	Pain/ Fever	Lower	5	coolie	N/A	DM	Stricture urethra	Summer	Normal	Vegeteri	9.7	3.9	6.5	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy / TURP
129	Kumaran	35132	62	M	Pain/ Fever	Lower	4	coolie	N/A	DM	Stricture urethra	Summer	Normal	Mixed	9.8	4.3	3.9	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy / TURP
130	Lingam	32135	69	M	Pain/ Fever	Lower	3	coolie	N/A	DM	BPH	Winter	Decreases	Mixed	10	4	6.8	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy / TURP
131	Kartick	35132	63	M	Pain/ Fever	Lower	2	coolie	N/A	DM/ HTN	Stricture urethra	Winter	Decreases	Mixed	10.7	4.1	4.2	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy / TURP
132	Sankar	32132	62	M	Hematuria	Lower	1	coolie	N/A	DM/ HTN	Stricture urethra	Summer	Decreases	Mixed	9.6	3.7	4.1	NA	Yes	4-6 pus c	E-Coli	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Vesicolithotripsy / TURP
133	Karnam	31237	67	M	Pain/ Fever	Lower	2	coolie	N/A	DM/ HTN	BPH	Summer	Decreases	Mixed	10.8	4.3	4	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Conservative
134	Prem	12354	68	M	Hematuria	Lower	4	coolie	N/A	None	BPH	Winter	Decreases	Mixed	9.3	4	3.6	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Vesical	NA	Not Done	Conservative
135	Arivazhagan	32413	62	M	Hematuria	Lower	5	coolie	N/A	None	Stricture urethra	Summer	Decreases	Mixed	10.8	3.5	3.9	NA	Yes	4-6 pus c	Klebsiella	yes	NO	NO	NO	Xray	Urethra	NA	Not Done	O.I.U / Lithotripsy
136	Subramani	13848	62	M	Palpable N	Lower	3	coolie	N/A	None	None	Summer	Decreases	Mixed	10.5	4.2	5.2	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Urethra	NA	Pure calcium oxalate	O.I.U / Lithotripsy
137	Manimaran	18794	63	M	Hematuria	Lower	3	coolie	N/A	None	None	Summer	Decreases	Mixed	9	3.9	4.7	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Urethra	NA	Not Done	O.I.U / Lithotripsy
138	Maran	19788	62	M	Hematuria	Lower	2	coolie	N/A	None	None	Winter	Decreases	Mixed	10.8	4.1	6.3	NA	Yes	4-6 pus c	Klebsiella	yes	NO	NO	NO	Xray	Urethra	NA	Calcium Oxalate and Phosphate	O.I.U / Lithotripsy
139	Jeevak	16877	68	M	Palpable N	Lower	2	coolie	N/A	DM/ HTN	BPH	Summer	Normal	Mixed	9	4.1	4.4	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Urethra	NA	Calcium Oxalate and Phosphate	Meatotomy
140	Jyothi	19875	62	F	Palpable N	Lower	4	coolie	N/A	DM	None	Summer	Normal	Mixed	10.9	3.8	5.4	NA	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Urethra	NA	Not Done	Meatotomy
141	Xavier	29876	35	M	Pain	Upper	5	coolie	N/A	None	None	Winter	Normal	Vegeteri	10.5	4.1	4.1	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	Conservative
142	Santhanam	29879	32	M	Pain	Upper	6	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Decreases	Vegeteri	10.2	3.7	4.4	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	Conservative
143	Prasath	39874	36	M	Pain	Upper	7	coolie	N/A	None	HUN / PUJ Obstruction	Summer	Normal	Mixed	9.8	3.9	6.5	Left	Yes	4-6 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	Conservative
144	Gopi	46877	31	M	Pain	Upper	8	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Normal	Vegeteri	9.4	4	6.2	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	URS / Stenting
145	Gopinath	39877	37	M	Pain	Upper	9	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Decreases	Mixed	10.8	4.2	6.1	Left	Yes	4-6 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	URS / Stenting
146	Kalyani	27984	34	F	Pain	Upper	9	coolie	N/A	None	HUN / PUJ Obstruction	Summer	Normal	Vegeteri	10.8	4.4	4.2	Left	Yes	4-6 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	URS / Stenting
147	Lavanya	17987	35	F	Fever / Pain	Upper	6	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Decreases	Vegeteri	10.8	3.9	5.7	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	URS / Stenting
148	Nandhini	16598	32	F	Fever / Pain	Upper	7	coolie	N/A	None	HUN / PUJ Obstruction	Summer	Normal	Mixed	10.4	4.3	5	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	URS / Stenting
149	Guru	18794	39	M	Fever / Pain	Upper	5	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Decreases	Mixed	9.1	4.2	4.8	Left	Yes	4-6 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	URS / Stenting
150	Sweta	13669	36	F	Fever / Pain	Upper	4	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Decreases	Vegeteri	9.1	4.5	4.7	Left	Yes	4-6 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	URS / Stenting
151	Tamilselvi	19875	46	F	Fever / Pain	Upper	3	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Normal	Vegeteri	9.1	4.2	3.1	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	URS / Stenting
152	Kamatchi	24788	49	F	Fever / Pain	Upper	2	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Decreases	Mixed	9.6	3.5	5	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	URS / Stenting
153	Durai	32477	43	F	Fever / Pain	Upper	4	coolie	N/A	None	HUN / PUJ Obstruction	Winter	Normal	Vegeteri	11	3.5	5.5	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	Cystoscopy / vesicolithotripsy / O.I.U
154	Thenmozhi	35455	29	F	Palpable N	Upper	5	coolie	N/A	None	None	Winter	Decreases	Vegeteri	9.3	4.3	4.1	Left	Yes	2-3 pus c	Not Done	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	Pyelolithotomy
155	Thenammai	32485	26	F	Hematuria	Upper	6	coolie	N/A	None	Pyelonephritis	Winter	Normal	Mixed	10.3	3.7	2.6	Left	Yes	7-9 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	Nephrectomy
156	Niveditha	39878	61	F	Hematuria	Upper	7	coolie	N/A	DM	Pyelonephritis	Winter	Decreases	Vegeteri	9.8	3.8	5.6	Left	Yes	7-9 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	Cystoscopy / vesicolithotripsy / O.I.U
157	Sundari	36478	37	F	Hematuria	Upper	8	coolie	N/A	None	Pyelonephritis	Winter	Normal	Vegeteri	10.6	4.5	2.4	Left	Yes	8-10 pus c	Klebsiella	yes	NO	NO	NO	Xray	Multiple	NA	Calcium Oxalate and Phosphate	Ureterolithotomy

158	Chellammal	36987	38	F	Hematuria	Upper	9	coolie	N/A	None	Pyelonephritis	Winter	Normal	Mixed	9.9	4.5	3	Left	Yes	7-9 pus c	Proteus	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	Ureterolithotomy
159	Deepikashree	32455	32	F	Hematuria	Upper	8	coolie	N/A	None	Pyelonephritis	Winter	Decreas	Vegeteri	9.5	4.4	3.6	Left	Yes	7-9 pus c	Proteus	yes	NO	NO	NO	Xray	Multiple	NA	Pure calcium oxalate	Ureterolithotomy
160	Aishwarya	32186	60	F	Hematuria	Upper	5	coolie	N/A	DM	Stricture urethra	Winter	Normal	Mixed	10.1	4.4	5.3	Left	Yes	4-6 pus c	Proteus	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	Cystoscopy / vesicolithotripsy / O.I.U
161	Poovizhi	36524	32	F	Palpable N	Upper	4	coolie	N/A	None	None	Summer	Decreas	Vegeteri	9.6	4.3	5.3	Left	Yes	4-6 pus c	Pseudomo	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	Cystoscopy / vesicolithotripsy / O.I.U
162	Aarthi	37654	29	F	Palpable N	Upper	3	coolie	N/A	None	Pyelonephritis	Summer	Decreas	Mixed	9.2	4.3	4.2	Left	Yes	7-9 pus c	Pseudomo	yes	NO	NO	NO	Xray	Multiple	NA	Not Done	Cystoscopy / vesicolithotripsy / O.I.U