

A Clinico Pathological Study on Urolithiasis in a Tertiary Care Hospital

Srinivas Rao¹, Nagaraju Raveender^{2*}

¹Associate Professor, Department of Surgery, LNCT Medical College, Indore, Madhya Pradesh, India.

²Professor, Department of Surgery, Mallareddy Medical College for Women, Quthbullapur, Hyderabad, Telangana, India.

ABSTRACT

Background: Urolithiasis or Nephrolithiasis is a process of forming stones in the urinary bladder, kidney and urethra and the Mechanism is not understood, it may be due to dietary factors, Metabolic disturbances and hormonal influences. The stone forming components are calcium, carbonate, phosphate, magnesium and urate. Nephrolithiasis is a global disease data suggests an increasing prevalence, likely due to western rising gates of lifestyle habits. According to international survey 18% of men and 8% of females will develop at least one stone during their lifetime.

Aim of the Study: To know the prevalence, clinical presentation of urolithiasis in a teaching hospital.

Materials and Methods: This study has been conducted in LNCT Medical college, Indore in the department of General Surgery. We have included 220 patients out of these 220, Males were 130 and Females were 90. The age group involved is between 20 years 60 years.

Results: We have included 220 patients in the study out of these 220 patients' males were 130 and Females were 90. The age group involved is between 20 years and 60 years. The commonest types of stones are calcium oxalates, calcium phosphate and uric acid and some stones are in mixed type also.

Conclusion: Urolithiasis is very common surgical conditions in India. Dietary factors play important role young age people are commonly affected. Infectious stones may lead to chronic renal failure. The common stones are calcium oxalates which can be prevented easily.

Key words: Kidney, Calculi, Urinary Bladder, Hematuria, Infection, Calcium Stones.

*Correspondence to:

Dr. Nagaraju Raveender,
Professor,
Department of Surgery,
Mallareddy Medical College for Women,
Quthbullapur, Hyderabad, Telangana, India.

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INTRODUCTION

Urolithiasis or Nephrolithiasis is a process of forming stones in the urinary bladder, kidney and urethra. It is a global problem. Increasing in prevalence is due to dietary habits and obesity, kidney stones are many types. Common stones in order of frequency are calcium oxalates (70%) calcium phosphate (>12%) uric acid (>9%) calcium phosphate (>12%) and others (1%).¹

Stones may form due to lithogenic Factors in the upper urinary tract it can be subsequently move into the ureter and cause renal colic 18% of men and 8% of women will develop at least one stone during their lifetime. The incidence of urolithiasis varies by age, sex: urolithiasis is a systemic disorder. Several conditions predispose to stone formation includes hyper parathyroidism, obesity, type 2 Diabetes Mellitus Malabsorption syndrome.² Vesicle stones in children continue to occur endemically in many developing countries. The common dietary factors which are associated with increased risk of renal stones includes animal protein, sodium, sucrose oxalate, dietary factors associated with lower risk includes potassium, calcium.³ Non dietary risk factors

include age, race, body mass index (BMI) and environment are important for urolithiasis The incidence of renal stones are highest in 3rd and 4th decade of life. Lower urine volume also associated with increased concentration factors. The major clinical feature is Renal colic and gross hematuria which is pain less. primitive vesicle stones are fairly widespread in Asia with calcium composed of ammonium urate and calcium oxalate. These types of stones seen in Turkey, India, Indonesia and Sri Lanka. The medical disorders like Hypertension, Osteoporosis, Cholelithiasis are likely to be present in the patients with urolithiasis. In medullary spongy kidney higher levels of urinary calcium and lower levels of urinary citrate more likely to form calcium phosphate stones.

MATERIALS AND METHODS

This study has been conducted in the department of General Surgery in LNCT Medical College, Indore, we have included 220 patients in this study out of these 220, Males are 130 and Female

patients are 90. The age group involved in this study is between 20 years and 60 years. The common age group is 30 years. The most common kidney stones noticed in our study are calcium oxalate. We have obtained informed consent by giving consent forms in their local language. After taking clinical history we have examined all the patients in detail. The investigations advised are complete blood picture random blood sugar, blood urea, serum creatinine, complete urine analysis and analysis of stones, X-ray KUB, IVP and ultrasound abdomen scan. And serum calcium, Serum creatinine and uric acid, and others. and examined the passed stones to determine their type, 24 hours urine collection also done to identify the types of stones. After collecting the data, computerized systemically by using MS Office.



Fig 1: X.Ray. KUB. Showing renal calculi



Fig 2: X.Ray. KUB. with rt.renal stone

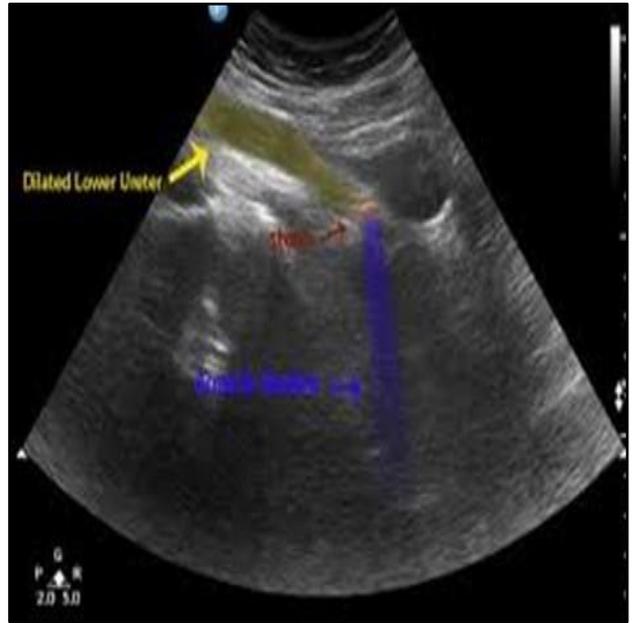


Fig 3: Lower ureter stone on ultrasound scan



Fig 4: Vesicoureteric junction stone on ultrasound scan

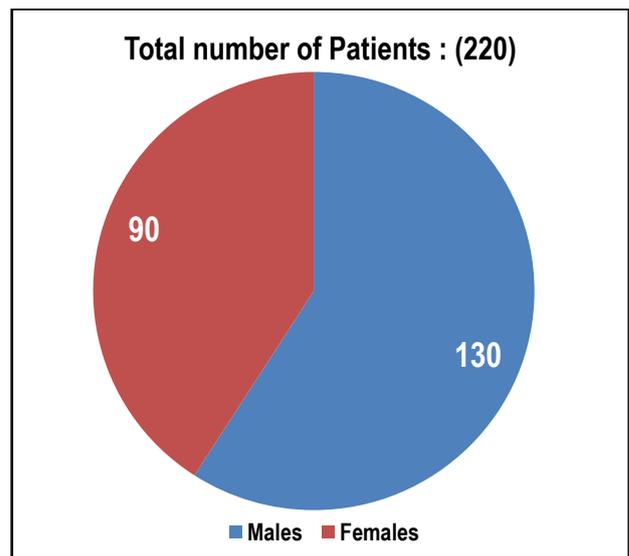


Fig 5: Genderwise distribution of Patients

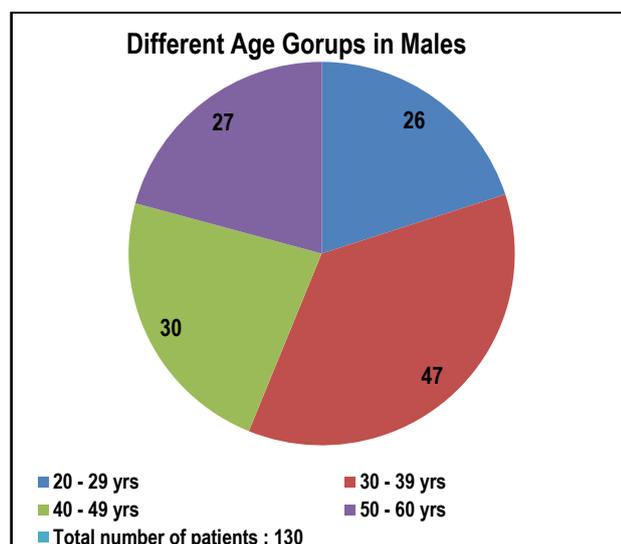


Fig 6: Agewise distribution of Males

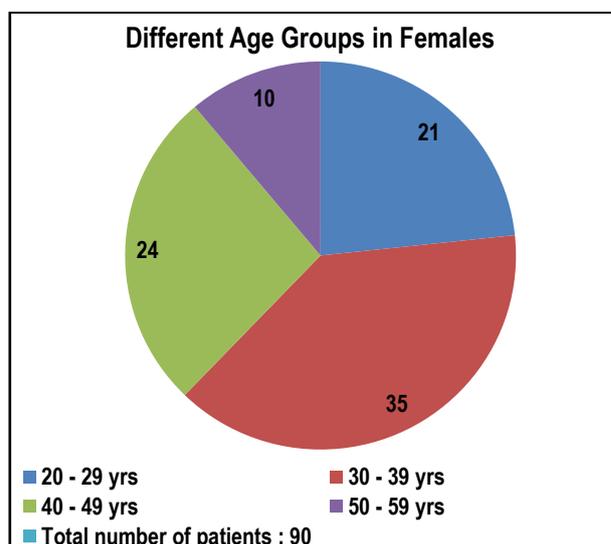


Fig 7: Agewise distribution of Females

Table I: Different age groups

Sl.No.	Age in Years	No. of Pts. (M) 130	(%)	No. of Pts. F (90)	Percentage
1	20-29 y	26	20%	21	23.15%
2	30-39 y	47	36.15%	35	38.88%
3	40-49 y	30	23.07%	24	26.65%
4	50-60 y	27	20.76%	10	11.25%

Table II: Clinical Features

Sl.No.	Symptoms	No. of Pts. (M) 130	No. of Pts. F (90)
1	Pain	125 (96.7%)	83 (92.5%)
2	Vomiting's	120 (92.5%)	81 (90.3%)
3	Hematuria	32 (23.7%)	18 (20.5%)
4	Fever	25 (19.3%)	15 (16.5%)

Table III: Different Sites

Sl.No.	Anatomical Sites	No. of Pts. (M) 130	No. of Pts. F (90)
1	Kidney	32%	28%
2	Ureter	59%	43%
3	Urethra	29%	12%
4	Urinary bladder	10%	17%

Table IV: Different Types of Stones

Sl.No.	Type of stones	No. of Pts. (M) 130	No. of Pts. F (90)
1	Calcium	97 (74.6%)	68 (95.5%)
2	Urate	22 (16.5%)	17 (18.5%)
3	Others	11 (8.5%)	5 (5.9%)

RESULTS AND DISCUSSION

We have included 220 patients in our study out of these 220, Males are 130 and Females patients are 90. The age group involved is between 20 years and 60 years. The common age group having kidney stones are 3rd decade. The study conducted by Kroovar RH et al shows that 2nd decade is most common age group involved.⁴ In our study 36.18% of Males and 38.88% of Females had Renal stones. The common clinical features noticed in our study are pain, hematuria, vomiting, fever. Pain mostly in Loin region severe agonizing sometimes radiates to thigh depending on location of stones in males observed in 96.7% patients and in Females 92.5% patients.

Hematuria is usually pain less in 23.7% of Males and 20.5% of Females. Vomiting's are seen in 92.5% of Males & 90.3% of

Females. Fever is usually associated, and it indicates infections. The study conducted by Trienchain A et al shows pain observed in 93.5% of patients and hematuria in 32.6% of patients.⁵ The anatomical sites kidney, ureter, and bladder and urethra are affected with stones. In our study approximately 48% of stones are in ureters only, and 36% are in kidneys nearly 18% stones are seen in urinary bladder. According to observations made by Roberston et al, the prevalence of ureteric stones is nearly 56% and Renal stones are 31.5%.⁶ The types of stones noticed in our study are calcium oxalates 74.5% and urate stones 16.5% and others are 8.5%. Calcium oxalate stones are formed when calcium combines with oxalates in the urine. Inadequate calcium and fluid intake as well other conditions may contribute their formation. The observations made by Teotia M et al shows almost same results.⁷

Urolithiasis is a process of forming stones in the kidneys, ureters. It is a global health problem more common in whites than blacks. Men are more commonly affected major predisposing factors are decreased calcium in diet higher intake of animal protein decreased urine volume, age race, obesity medical disorders like out cholelithiasis, chronic, renal failure and hypertension. Pathogenesis involved in crystal formation. One of the main concepts is super saturation with respects to one or more types of crystals, the presence of inhibitors of crystallization prevents the majority of population from continuously forming stones. The most clinically important inhibitor of calcium containing stone is urine citrate. Some renal biopsies showed calcium phosphate in the renal interstitium. The majority of calcium oxalate stones grow on calcium phosphate at the tip of the renal papillae.⁸ The Urinary Risk Factors include decreased urine volume, higher urinary calcium excretion. Higher urinary oxalate excretion and increased urinary excretion of cystine leads to cystine stone formation.

Dietary Factors associated with increased risk of urolithiasis are animal protein, oxalate sodium, sucrose and fructose, and the factors associated with lower risk includes calcium, potassium, phytates. The Reduction in the risk associated with higher calcium intake may be due to reduction in intestinal absorption of dietary oxalate that results in lower urine oxalate.

Lower calcium intake is contraindicated as it increases the risk of stone formation and contribute to lower bone density in stone formers.⁹ The Major clinical features include renal colic and painless gross hematuria. The pain is severe and varies in intensity when stone moves into the ureter, the discomfort often begins with sudden onset of unilateral flank pain. Pain may be associated with nausea, vomiting.

In case of females the symptoms may mimic cystitis. The diagnosis is made by history, clinical examination, urine analysis and x-ray KUB and ultrasound scan and finally CT abdomen. CT also diagnose acid stones which are called as Radiolucent stones. Sometimes x-ray KUB (kidney ureter bladder) misses the radio opaque stones in such condition's ultrasound scan is useful.

Finally with 24 hours urinary collection the following factors should be measured. Total volume, calcium oxalate, citrate, uric acid, sodium, potassium, phosphorus, PH and creatinine. Higher urine calcium increases the risk of calcium oxalate and calcium phosphate stones.

Higher urinary oxalate excretion increases calcium oxalate stone formation. Higher dietary calcium intake reduces gastrointestinal oxalate absorption and thereby reduces urine oxalates. Urine citrate is natural inhibitor of calcium containing stones. The risk factors for uric acid stones are low urine pH and higher uric acid excretion. Struvite stones are formed only when upper urinary tract is infected with bacteria like, proteus mirabilis, Klebsiella pneumoniae, struvite stones also called as infected stones. They grow quickly and fill the renal pelvis (stag horn calculus).¹⁰ In our study most common type stones are calcium oxalate stones. The size varies from 12 gram to 165 grams. Mostly located in urethra. The study conducted by Fleish et al shows that size varies from 9 gms to 180 gms and mostly mixed stones.¹¹ The calcium stones causing ureteric obstruction occurred more commonly in males may be due to smaller diameter and increased length of urethra. In the study conducted by P.P.Singh et al shows that calcium and oxalates were passed in all the stones.¹² The stone problem in the tropics was compounded by low urine volumes of poor drinking.

CONCLUSION

Urolithiasis is very common surgical problem. Dietary habits play major role in the stone formation. 3rd decade is most common age group involved. Urinary obstruction is commonly seen in Males than Females.

Recurrence of stone diseases is very common. Infections due to stone disease to be treated aggressively. Calcium oxalate stones are most common. The diagnosis is easily made and easily preventable also. Some types of stones may lead to end stage renal disease.

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