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# Renal Calculi a Cause of Concern for Early Identification of Symptoms



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### ABSTRACT

**Objective:** This study was conducted as there is a need for creating awareness in the people for early detection of symptoms of renal calculi and to prevent complications and for easy manifestation in the treatment. **Methods:** A prospective, observational, descriptive study was conducted on renal calculi patients in the hospital from June 2015 to June 2016. **Results:** The study included 126 cases of renal calculus, in which males were 81(64%) and females were 45(36%). Patients with 41-60 years old were higher 63(50%). Most of the patients presented with the symptom of back pain 121 (96%). Early detection of symptoms was observed in only 20(16%) patients, majorly reported calculus size was 3.1-7.0 i.e. in 62(49%) patients and majorly reported stones were calcium stones in 59(47%) patients. Treatment was majorly provided with medication 84(67%). **Conclusion:** Patients with early detection of symptoms were treated with simple drugs and also recommended them to follow proper lifestyle modifications, which made them providing better treatment without any surgeries. Hence awareness is needed for the people about the kidney stone symptoms for early identification rather than leading to complications as in the case of misassumption of symptoms.

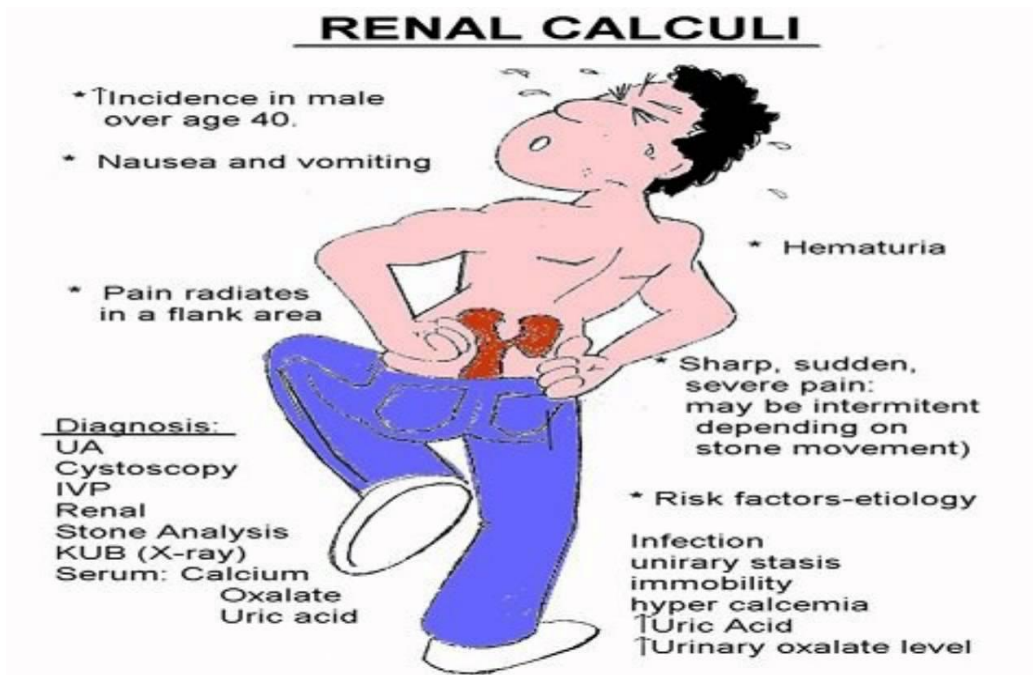
## INTRODUCTION

Kidney stones are the solid masses made up of crystals that usually originate in kidneys and can develop anywhere along the urinary tract. Stone formation begins when the urine becomes supersaturated with the insoluble components due to low volume, excess excretion of selected compounds and/or other factors like urinary pH that reduces the solubility. Kidney stones or renal calculi are most commonly seen now a day's presenting in emergency departments and the prevalence and incidence rates greatly varies between the geographic locations. It is affecting approximately 1% of population and recurrent in more than half of the patients. About 5% of the population may develop these kidney stones in their lifetime. Recognizing the symptoms and signs of a kidney stone is very important for an early manifestation of the treatment without the delay that causes further complications like a blockage, infections, and kidney damage. [1-3]

### Symptoms

Kidney stones can cause severe pain which can also be called as renal colic that may not occur until the stone begins to move down the ureters. It may have pain on one side of the back or abdomen and may radiate to the groin area. The pain of renal colic may come and go, but can be intense and tends to be restless. The pain circumstances can occur mostly at night due to kidney stones or during urination.

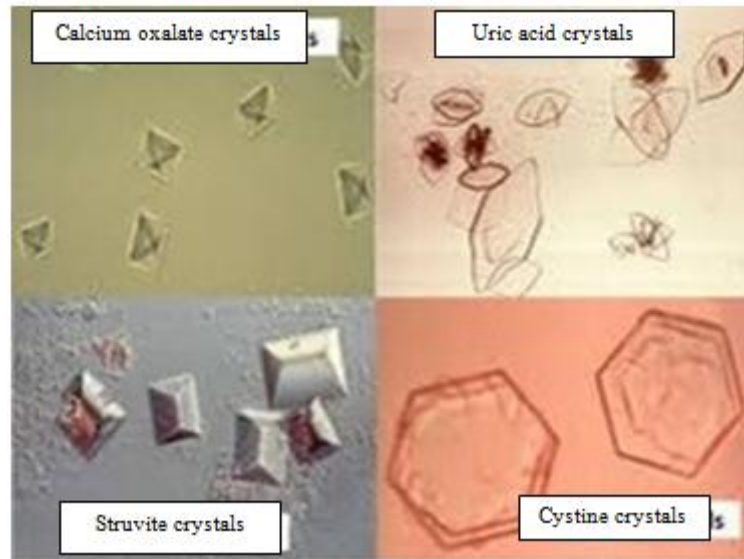
Other symptoms may include hematuria (red, pink, or brown urine), nausea and vomiting, discolored or foul-smelling urine, chills & fever, frequent need to urinate, urinating small amounts of urine. If it is a small kidney stone, it may not have any pain or symptoms as the stone passes through your urinary tract. [4]



**Figure 1: Renal calculi symptoms, risk factors and diagnosis**

### **Types of kidney stones**

Kidney stones are of different types and are as follows: Calcium stones account for 80 % of all the kidney stones - Calcium oxalate (monohydrate and dihydrate) are the most commonly seen - Calcium phosphate. Uric acid stones are more common in men than women. Acidic urine may develop this type of stone. They are seen in people with gout and who are on chemotherapy, a purine rich diet may increase the urine acid levels. Struvite stones (composed of magnesium, ammonium, calcium, and phosphate), this type of stone is mostly seen in women suffering from urinary tract infections than in males and are large which obstructs the urine flow. This is also caused due to infection of kidney and this can be prevented by treating the underlying infections. Cystine stones are rare and can occur in both men and women who are having genetic cystinuria. In this situation the Cystine which naturally occurs in the body can leak into the urine from the kidneys. Indinavir stones (patients with HIV who take Indinavir medication as a treatment may develop this type of stones). [4]



**Figure 2: Types of kidney stones**

### **Complications**

Complications of renal stones may include sepsis (an infection that spreads through the blood and causes symptoms throughout the whole body), blocked ureter (caused by stone fragments) can lead to kidney infections because of accumulation of waste products that could not pass the blockage, injury to the ureter, urinary tract infection, bleeding during surgery, pain & kidney damage.[4]

### **Diagnosis**

Along with signs and symptoms that are physical examination diagnostics tests and procedures are included, they are

- Blood test: Calcium and uric acid levels in the blood are known through this testing. This helps in monitoring condition of the kidney that may lead to check any other medical conditions.
- Urine test: The 24hr urine sample collection will reveal the amount of stone forming minerals and preventing substances.
- Images: Imaging tests may involve both abdominal X-ray and computed tomography (CT), among them CT scan may reveal even tiny stones which can be missed by simple abdominal X-rays. Other imaging tests include ultrasound and intravenous urography.
- Passed stones analysis: collecting the stone that passes through urine can be given for lab analysis that reveals the formation of kidney stones.[5]

## **Treatment**

Early identification of symptoms is necessary to prevent the complications and based on the severity, cause and type of the renal stone the treatment is provided. The treatment for small stones and minimal symptoms include drinking water as much as possible i.e. approximately 2 to 3 liters a day to flush out the urine along with the stone may pass, pain relievers like ibuprofen, acetaminophen, naproxen to give relief from pain, medical therapy may include the drugs like alpha blocker which helps to pass the kidney stone. And the treatment for large stones that cause symptoms include ultrasound waves that break up the stones, surgery to remove the large stones, using a ureteroscope to remove the kidney stone, parathyroid gland surgery if the causation of renal stones is due to hyperparathyroidism that increases the calcium levels in the blood.[5]

## **Prevention**

Prevention of the kidney stones includes a combination of both lifestyle changes and medications. Lifestyle changes include frequent drinking of water, reducing oxalate and calcium rich foods intake, choosing a diet low in salts and animal protein. Medications are given based on the type of stone which is forming for example for calcium stones, thiazide diuretics are given and for uric acid stones, allopurinol and alkalizing agents are given.[5]

This study is here because the early symptoms of renal calculus are not identified as specific symptoms of it but are rather assumed as a backache due to stress, weakness, and urinary infections. Because of this misassumption, it may raise the complications of the renal stones. Hence this is to create awareness of the symptoms of renal calculi that helps in identification of symptoms and early manifestations for treatment. This may lead to reducing the further complications in patient condition, preventing the reoccurrence of the renal stones by proper management of treatment and by providing proper counseling in lifestyle changes.

## **MATERIALS AND METHODS**

### **Study design, Setting and Study population**

The present study was observational, Prospective and descriptive and was carried out in Narayana Hrudayalaya-Malla Reddy Hospital in Hyderabad, Telangana, India and the study was conducted in between June 2015 and June 2016. One hundred and twenty-six patients

[126] were collected who were suffering from renal calculus. All necessary permissions for were attained from the hospital organization for conducting the study.

### **Ethical considerations**

The study was done using WHO guidelines only after obtaining approval from institutional research and ethics committee.

### **Inclusion criteria**

All the patients were considered based on their disease condition that is renal calculus. The patients were kept on medication therapy and strict lifestyle changes that mostly include the food and water intake, they were advised to come after one month to know their condition of kidney stones and when reoccurrence of symptoms are seen.

### **Exclusion criteria**

Gynecology was excluded in this study.

### **Data collection**

Medical case sheets, drug charts, and their laboratory investigations were recorded and were analyzed. Demographics [Age, Sex], Chief complaints, Medical History, Medication prescribed [Dose, Route of administration, Frequency, Indication, Therapy duration, Marketing categories [Generic/Branded] were collected.

## **RESULTS**

**Table No.1: Gender distribution**

| <b>Gender</b> | <b>Number of patients</b> | <b>Percentage</b> |
|---------------|---------------------------|-------------------|
| Male          | 81                        | 64%               |
| Female        | 45                        | 36%               |
| Total         | 126                       | 100%              |

**Table No.2: Age distribution**

| <b>Age (years)</b> | <b>Number of patients</b> | <b>Percentage</b> |
|--------------------|---------------------------|-------------------|
| <20                | 11                        | 9%                |
| 21-40              | 38                        | 30%               |
| 41-60              | 63                        | 50%               |
| >60                | 14                        | 11%               |

**Table No.3: Symptoms**

| Symptoms                     | Number of patients | Percentage |
|------------------------------|--------------------|------------|
| Back pain                    | 121                | 96%        |
| Flank pain                   | 116                | 92%        |
| Pain radiating towards groin | 52                 | 41%        |
| Lower abdominal pain         | 23                 | 18%        |
| Nausea & Vomiting            | 46                 | 37%        |
| Dysuria                      | 32                 | 25%        |
| Gross hematuria              | 13                 | 10%        |
| Chills and fever             | 14                 | 11%        |

**Table No.4: Detection of symptoms**

| Detection   | Number of patients | Percentage |
|---|--------------------|------------|
| Early detection of symptoms as renal stones                                     | 20                 | 16%        |
| Miss assumed as normal backache and later detection of symptoms as renal stones | 116                | 92%        |

**Table No.5: Calculus size**

| Calculus size (mm) at the US | Number of patients | Percentage |
|------------------------------|--------------------|------------|
| 0-3.0                        | 17                 | 14%        |
| 3.1-7.0                      | 62                 | 49%        |
| >7.0                         | 47                 | 37%        |

**Table No.6: Types of stones reported**

| Stone type       | Number of patients | Percentage |
|------------------|--------------------|------------|
| Calcium stones   | 59                 | 47%        |
| Uric acid stones | 43                 | 34%        |
| Struvite         | 24                 | 19%        |

**Table No.7: Treatment procedures**

| Procedures   | Number of patients | Percentage |
|--|--------------------|------------|
| Flushed with fluid intake and little food restrictions | 14                 | 11%        |
| Medication provided                                    | 84                 | 67%        |
| Surgeries done   | 28                 | 22%        |

Percentage variations may occur due to rounding of decimals

## DISCUSSION

- In our study number of male patients (64%) was high compared to female patients (36%) who are similar to the study of Charles D. Scales & Jeong JY. The patients with ages between 41-60 years old were higher (50%) were as it is higher in 30-50 years age group according to Jeong JY study. Among 126 patients, a major number of patients were diagnosed with the presence of calcium stones (47%) which is similar to that of Jeong JY's study. The sizes of the stones were found to be in between 0-3mm (14%), 3.1-7.0mm (14%) and >7.0mm (37%)
- Patients with calcium stones with higher risks were treated with thiazide diuretic to decrease hypercalciuria and painkillers like NSAIDS were given. They were advised to increase fluid intake and decrease dietary protein & sodium salts. Patients who are at low risk of calcium disposition were treated with high water intake and other clinical symptoms were treated. This is similar to the treatment provided in the Manjunath A's study.
- The patients with uric acid stone accumulation were treated with allopurinol and were advised to decrease purine diet and increase fluid intake.
- Patients diagnosed with Struvite stone were treated with antibiotic & acetohydroxamic acid (AHA) to prevent infections.
- Surgical treatment was done only to those patients/cases that were followed for a period of time and were advised to come if the pain persists for a longer time even after the medication therapy was provided.
- Reoccurrence was seen in 26 members i.e. having past medical history with renal calculi & who were recommended earlier with only lifestyle modifications. This is similar to the study of Macneil F. who stated that 50% of the population may have the reoccurrence of renal calculi.



## CONCLUSION

According to this study, only 16% of the patients identified the symptoms and assumed as kidney stones, whereas remaining 92% of the patients assumed those symptoms as normal back ache due to stress and weakness. Patients with early detection of symptoms were treated with simple drugs and also recommending them to follow proper lifestyle changes like heavy fluid intake, restrictions in intake of calcium rich food along with diet low in animal protein and sodium salts, which made them providing better treatment without any surgeries. And those patients who came later even after the symptoms persist long back were diagnosed with larger sized stones which were removed by surgery. Hence awareness is needed to the people about the renal calculi and its symptoms for early identification and betterment in the treatment provided without any complications in the condition and in the treatment.

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