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Renal Calculus: A Brief Review

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Review Article

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ABSTRACT

Most of the human beings will develop a kidney stone at some time in their life. Kidney stones are the most commonly seen in both males and females. Majority of the stones is composed of calcium oxalate and very less percent of remaining stones are diagnosed. These stones are hard and crystalline in nature raised in the kidneys or urinary tract by taking the minerals from urine. This article came up from my personal experience. I have discussed in brief about the different types of kidney stones, symptoms, risk factors, diagnosis and treatment.

INTRODUCTION

The medical terms for kidney stones are renal calculus/Nephrolithiasis. In renal calculi calcium is the major portion. Kidney stones happen in 1 in 10 individuals in their lifetime. Numerous reasons are there for the formation of kidney stones which can affect any part of the urinary tract from the kidneys to the bladder. Kidney stones are passing out from the body by urine stream, and a very small stone may not show any symptoms. Kidney stones vary greatly in size. The risk factors of the kidney stones are depending on their size [1-5].

TYPES OF KIDNEY STONES

Kidney stones can form when the stone forming substances are more amounts in urine such as calcium, oxalate, and phosphorus. The kidney stones are classified depending on the mineral/ crystalline substances in the stone [5-12].

Four major types of kidney stones can form:

Calcium stones: These stones are the most common type which occurs in two forms: calcium oxalate and calcium phosphate. In this calcium oxalate stones are mostly seen.

Uric acid stones: The more amount of uric acid in the urine promotes the formation of uric acid stones. The concentrated uric acid in the urine settles down and forms a stone by itself or with calcium.

Struvite stones: Staghorn calculi is the another term. The mineral Struvite is the major portion in this stone.

Cystine stones: Genetic disorder is the major cause for the formation of cystine stones. It causes the leakage of cystine into kidneys and urine, forming crystals that may promote stones growth.

SYMPTOMS

The people having Kidney stones may experience sudden, intense pain. The pain occurs when the stone travels down the ureter, it might stick at several points [13-21]. The pain causes are on one side of the back, however

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it may move to the stomach or to the groin where you bear a colicky pain. The same pain also feels at the time of bleeding or infection in the urinary system.

The major symptoms include

- Mild to severe flank pain at the time of urination
- Blood in your urine
- Feel a sharp pain in your back or lower abdomen
- Nausea and vomiting
- Increase urinary frequency or urgency
- Urine infections which may cause fever

If you have a small stone it can be either asymptomatic or only cause mild symptoms. Hydronephrosis is a condition occurs when the stone is too large and it is difficult to move, might cause a blockage which may lead to kidney swelling from a backup of urine [22-29].

RISK FACTORS

Dietary factors are playing a major role to promote or inhibit kidney stone formation. Other factors for stone formation include genes, environment, body weight, and fluid intake [30-36].

The following are some factors which increase the risk of promoting kidney stones

- Dehydration is one of the major factors for stone formation.
- Kidney stones may occurs through hereditary
- Eating a diet having rich in protein, sodium and sugar may increase your risk of some types of kidney stones
- Cystinuria a genetic disorder which promotes cystine stones
- People (especially women) having kidney infections and urinary tract infections (UTIs) can develop struvite stones
- Metabolic disorders may promotes stones
- Being obese may increase risk of kidney stones.

DIAGNOSIS

Blood test: Blood test reveals the calcium or uric acid level in the blood. Health of the kidneys also monitored by this test [37-41].

Urine tests: This test gives the information about any urine infections or urine contains any substances that form stones [42].

Imaging tests: These tests show the location of kidney stones in the urinary tract.

Some of the tests include Abdominal X-rays, computerized tomography (CT), ultrasound, and intravenous urography, retrograde pyelogram, abdomen and kidneys MRI. CT is one of the advanced tests which even reveal tiny stones in the UT [43-45].

TREATMENT

Depending on the type and size of kidney stone, treatment may vary.

Small Stones

- Small stones usually get off from the body without much treatment [46-55].
- Drinking plenty of water (04-05lts) a day may help flush out the stone through urine.

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- Pain relievers are used to relieve the pain at the time of stone moving.
- Medical therapy: Usually doctors suggest an alpha blocker, which relaxes the muscles in the ureter, helps to pass the kidney stone more quickly and with less pain.
- Diuretics which increase the urine flow may also chance to pull out the stone.

Large stones

Large stones cannot pass out from the body by their own because of too large. They also cause bleeding, damage in kidneys (loss of nephrons) or ongoing urinary tract infections [56-60].

Extracorporeal shock wave lithotripsy: In this kidney stones are broken into small pieces by using sound waves or shock waves to create strong vibrations. The tiny pieces can be flushed out of the body through urine.

Nephrolithotomy: The doctors generally go for Nephrolithotomy if they find large stones in or near the kidneys. During surgery the patient receives general anesthesia, removes the kidney stones by using the thin telescopic instrument.

Ureteroscopy: Ureteroscopy is suggested when a stone gets stuck in the ureter or bladder. Ureteroscopy is a small wire having a camera at the end is inserted into the urethra and passed into the bladder. A small cage is used to snag the stone and remove from the body.

PREVENTION

- Drinking plenty of water is one of the best ways of preventing kidney stones. Formation of cleared urine is a sign of getting enough fluids to the body.
- Proper life style and medication may prevent the reformation of kidney stones
- Restrict the oxalate-rich foods like spinach, rhubarb, okra, sweet potatoes, tea and soy products.
- Reduce the salt intake in diet [61-70].
- Keep on eating calcium-rich nourishments. Abstains from diet low in calcium can build kidney stone development in a few people
- Follow the medication prescribed by the doctor
- The minerals and acid levels in the urine are controlled by medication which may useful in people who is having certain kinds of stones.

CONCLUSION

Kidney stones are most commonly occurred in the people irrespective of their age and gender. We have to prevent recurrence with proper consultation of a physician.

If people are having stones, but lack of awareness of the symptoms and not taken proper medication and lifestyle, there may be a chance to increase the size of kidney stones which may lead to urinary tract infection, organ damage/failure may also associate with other chronic diseases [71-81].

The risk factors can be reduced by strictly following dietary recommendations and drink plenty of fluids.

Adequate fluids, especially water intake is cost-effective and can help reduce the economic burden of kidney stones.

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