

Healthy Kidneys 14



Cystine & Struvite Stones

This booklet will specifically tell you about Cystine & Struvite stones, their symptoms, causes, detection & prevention.

The urinary system is made up of the kidneys, the ureters, the bladder, and the urethra. Each plays an important role in helping your body to eliminate waste products in the form of urine.

A kidney stone can develop when certain chemicals in your urine form crystals those stick together. The crystals may grow into a stone ranging in size from a grain of sand to a golf ball. Small stones can pass through the urinary system without causing problems. However, larger stones might block the flow of urine or irritate the lining of the urinary tract.

Kidney stones are one of the most painful disorders to afflict humans. This ancient health problem has tormented people for thousands of years. Evidence of kidney stones have found in an Egyptian mummy. Although men tend to be affected more frequently than women, the male to female ratio is approximately 3:1, with women having a higher incidence of infectious stones. Most kidney stones pass out of the body without any intervention by a physician.

Cystine stones

An inherited condition can cause too much cystine (produced by the breakdown of protein from your diet) to collect in the urine. The cystine tends to form crystals that develop into cystine stones. These stones are relatively rare, accounting for only about 1% to 3% of all kidney stones.

Overview, Causes, & Risk Factors

Cystinuria is an inherited autosomal recessive disorder. The kidneys do not adequately reabsorb certain amino acids during the filtering process, thus resulting in excess excretion of these amino acids. The amino acids may precipitate and form crystals or stones in the kidneys, ureters, or bladder.

The disorder is usually diagnosed after an episode of stones, where analysis of the composition of the stones indicates cystine. Less than 3% of known urinary tract stones are cystine stones. Cystinuria affects approximately 1 out of 10,000 people. Cystine stones are most common in young adults under age 40.



Cystinuria Symptoms & Signs

Flank pain or pain in the loin

- *On one side only (unilateral) or -- rarely, both sides*
- Often severe
- May be progressive, getting increasingly worse over days
- May travel or radiate to lower flank, pelvis, groin, genitals
- Blood in the urine

Cystinuria Prevention

There is no known prevention for cystinuria. Any person with a known history of stones in the urinary tract should drink enough fluids to maintain a high urinary output by day and by night, allowing stones and crystals to be excreted before they become large enough to cause symptoms. Keeping the urine alkaline diminishes the risk of cystine stones.

Cystinuria Diagnosis & Tests

A urinalysis may show sediment and cystine crystals. A 24-hour urine collection shows an excess of cystine.

An abdominal CT scan, abdominal MRI, or abdominal ultrasound may show a presence of stones in the urinary tract. An IVP may show stones in the urinary tract.

Cystinuria Treatment

Treatment goals include relief of symptoms and preventing the development of further stones. Hospitalization may be required if symptoms are severe.

Stones are usually passed spontaneously. The urine should be strained, and the stone saved for analysis of the type of stone. The patient should drink enough fluid to produce large amounts of urine. Water is encouraged, at least 5 litres per day. Consistently high liquid intake is the mainstay of treatment. Intravenous fluids may be required.

Cystine is more soluble in alkaline solution, so sodium bicarbonate or sodium citrate (or similar medications) may be used to alkalinize the urine. Other medications may be used to increase the solubility of cystine. Analgesics may be needed to control renal or ureteric pain. If the stone is not excreted spontaneously, surgical removal may be necessary.

How to prevent recurrence?

- Keep urine output of more than 3 litres/day by drinking plenty of liquids.
- Urinary alkalizers - available as balanced citrate solution
- Avoid methionine containing diet as per dietician.

Struvite stones

Struvite stones are often called infection stones. They form in the presence of long standing infection with certain bacteria that are able to split the urea in urine into ammonium. This allows ammonium to complex with magnesium and phosphate in the urine to form stones. As the stones form bacteria are trapped within them. This ensures that more ammonium is made and the stones are able to grow. They continue growing, like coral, until the inside of the kidney is filled with stone. This is called a staghorn calculus because it looks like the antler of a deer on x-ray. With time infection can damage the kidney and even induce cancer.

How are struvite stones different from other stones?

Struvite stones are different in the way they present and in their treatment. These stones rarely cause renal colic due to their size. Even though they are associated with infection, they may not cause the typical symptoms of cystitis such as frequent urination or burning. More commonly they can cause tiredness, weight loss, loss of appetite and some discoloration of the urine. Occasionally they may cause kidney infection with back pain, high fevers and offensive cloudy urine. Because of their non specific symptoms these stones may be found by a chance ultrasound or x-ray for another problem.

As bacteria form a part of the stone it is essential that whole stone be removed. If even a small amount remains it can start rebuilding itself. The choices for treatment depend upon how much kidney damage has been done. If the kidney is almost destroyed, then removing it with a nephrectomy may be the best option. If the kidney is worth preserving then PCNL or ESWL can be used to clear the stone. A combination of the two is often applied.

How can you prevent the recurrence ?

Once the stone has been cleared it is essential that the urine is kept free of infection. If this is achieved the stone will not return. You will need to take antibiotics for at least a month after any stone procedure to keep the urine sterile.

Points to remember

- Drink plenty of water every day
- Urinate when you feel the need; don't resist the urge to urinate.
- Wipe from front to back to prevent bacteria around the anus from entering the vagina or urethra. This is specially in case of females.
- Take showers instead of tub baths.
- Cleanse the genital area before & after sexual intercourse. Urinate after the intercourse.
- Avoid using feminine hygiene sprays and scented douches, which may irritate the urethra.

Please also refer the following information booklets from India Renal Foundation for more information.

1. Choosing Your Treatment
2. Haemodialysis
3. Peritoneal Dialysis
4. Transplantation
5. Diabetes & Kidney Failure
6. High Blood Pressure & Kidney Failure
7. Kidney Failure & Anaemia
8. Kidney Stones & Kidney Failure
9. Benign Prostate Disease (BPH)
10. Prostate Cancer
11. Urinary Tract Infection (UTI)
12. Polycystic Kidney Disease (PKD)
13. Urinary system & Kidney Stones
14. Cystine & Struvite Stones
15. Calcium & Uric Acid Stones
16. Treatment of Kidney Stones



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