

Healthy Kidneys 13



Urinary system & Kidney Stones

This booklet will help you to know more about symptom, reasons, diagnosis & diet restrictions in case of Kidney stones.

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.

Kidney stones are one of the most painful disorders. This ancient health problem has tormented people for thousands of years. 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 of the small kidney stones (2-3 mm) pass out of the body without any intervention by a physician. Approximately 10-15% of all individuals will experience stone disease especially in a stone belt area.

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. However, larger stones might block the flow of urine or damage the lining of the urinary tract.

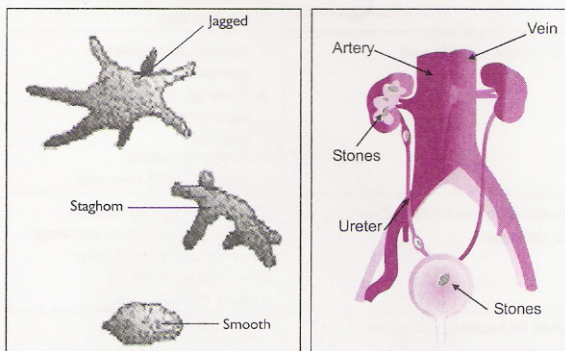
Specific Stone Incidence:	
Stone Type	Approximate incidence
Calcium Oxalate	33%
Mixed Stones	33%
Calcium Phosphate	5%
Uric Acid	5-10%
Struvite Stones (Magnesium Ammonia Phosphate)	20%
Cystine	2%

Formation of kidney stones

The theories are complex and incomplete. Medical researchers believe that stones are the result of mineral supersaturating and crystallization in the urine. The primary known causes are:

- Dehydration and lack of sufficient fluid ingestion
- Foreign bodies in the urinary tract
- Diet with excess oxalates, calcium, and vitamin abnormalities
- Urinary infections
- Metabolic diseases (e.g. gout, intestinal)
- Use of certain medication

Stone formation requires supersaturated urine (very strong), which in turn is dependent on urinary pH (acidity level), solute concentration, and the presence of various aggregators and inhibitors of crystallization.



Signs and symptoms of specific stones (Location wise)

Location of Stone	Stone size	Signs/Symptoms
In Kidney	Small up to 5mm.	Pain at night or early in the morning a dose not change it's location .
	Large > 5 mm	Blocks the flow of urine and pain associated with nausea, vomiting and restlessness
Ureteric stone		Severe urinary frequency & pain starts at flank area and moves downw along with radiation path of ureter with nausea, vomiting and restlessness
Bladder stone		Severe irritative bladder symptoms and pain radiating to the tip of urethra or

How are kidney stones diagnosed?

Sometimes "silent" stones—those that do not cause symptoms—are these stones would likely pass out of the body unnoticed. Only radio can detect radiolucent stones also.

More often, kidney stones are found on an X-ray or sonogram taken o diagnostic images give the doctor valuable information about the stone substance that might promote stone formation.

For deciding treatment modality in a given pateint doctors usually ask f ureters and bladder are outlined and function is judged. **OR** Kidney funct will decide best treatment modality. Doctors ask for IVU - a procedure of

Factors influencing stone formation:

- 1. Genetic** - Various rare enzymatic disorders can cause stone formation. These include cystinuria, renal tubular acidosis, abnormal purine metabolism etc.
- 2. Diet** - It is thought in patients predisposed to stone formation, that low fluid intake, or more specifically, production of concentrated urine is more likely to result in stone formation. Specific excesses of animal fat may predispose to uric acid stones, and leafy vegetables possibly to oxalate stones.
- 3. Environmental** - Some studies show that temperature and dehydration increases the chances of having stones. Studies have been conflicting on the relationship of minerals in water to kidney stones.
- 4. Idiopathic** - Where no cause can be found. (80% in Indian sub-continent).

	Complications	Treatment
nd	No problem or Blood in urine	Not required
	Back pressure swelling of affected kidney Risk of kidney damage, bleeding and infection	Extracorporeal shock wave lithotripsy (ESWL), or shock wave treatment. For large (>2 cm) stone in lower part of the kidney: (PCNL) Percutaneous nephrolithotomy
ards th	Blood in urine & may get fever	For Upper ureteral stone : ESWL For mid- and lower-ureteral stones: Ureteroscopy
d penis	Pain associated with inability to urinate at times	Cystolitholapexy (Endoscopic removal of stone)

found on X-rays taken during a general health exam. If they are small, opaque stones are seen on X-rays. Sonography is more important as it

in someone who complains of blood in the urine or sudden pain. These stone's size and location. Blood and urine tests help detect any abnormal

or IVP. This test is performed by injecting radio opaque contrast. Kidney, location and anatomy of urinary tract along with the situation and size of stone is seen. Opacification of urinary system after injecting radio opaque contrast.

Different type of stone, their occurrence, causes & diet

Material of Stone	Occurrence	Characteristic of stones
Calcium	More frequent in men ratio is 3:1	Present as small densely radio opaque objects
Uric Acid	More frequent in hot and dry areas	Non radio opaque hence can not be seen in x-ray
Cystine	Equal frequency in both sexes Not common in India	Slightly less radio opaque and have 'soft' edges
Struvite	More frequent in women	Form laminated branching 'staghorn' calculi

It is important that the stone, if passed, be saved, so that it can be seen. Plans depend on the type & position of the stone. Between 70% to 80% start of the symptoms. To catch a stone, patients are asked to urinate in

Points to remember

- Take as much fluid as possible.
- Prevent urinary tract infections.
- Diet forms an important part in the prevention & recurrence of kidney stones.
- Take treatment as early as possible. Almost 70% of stones are removed without surgery.
- Proper and timely evaluation help saving kidneys, money and time.

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

restriction

Causes	Diet Restriction
Over excretion of calcium oxalate	1. Low calcium intake 2. Reduction in protein intake 3. Low fat diet
Over excretion of Uric acid	1. Reduction in dietary protein intake 2. Through oral alkali supplementation, raise urine pH 3. Drugs to reduce blood level of Uric acid
Cystenuria is due to inherited renal tubular disorder	Sufficient water to dissolve the amount of cystine excreted. Keeping the urine alkaline diminishes the risk of cystine stones
Produced by bacteria that possess the enzyme urease.	Drink plenty of water

nt to a laboratory for evaluation. Long term treatment & prevention
% stones pass on their own in the urine, usually within 48 hours of the
to a container.

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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