Kidney Stones: Why Patients End Up in the ER

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As painful afflictions go, kidney stones may rank among the worst—including childbirth, some say. Only it strikes men and women alike. Stones are composed of minerals our kidneys normally filter into the urine. Under certain conditions—if the urine becomes too concentrated, for instance—the minerals crystalize and stick together, forming hard deposits that grow over time. Stones can be painless and remain "silent" for months, or years. Pain is triggered, often suddenly, when the stone moves out of the kidney and blocks the flow of urine in the ureter, the muscular "tube" that drains each kidney. The onset of pain typically occurs in the upper back or flank, migrates down the body to the abdomen and groin (called renal colic), and can become so acute that many people are rushed to the ER for immediate medical attention. Nausea and fever often accompany the pain.

Not all stones, however, are defined by pain. Some are asymptomatic and non-obstructing, and found only because a doctor notices trace amounts of blood in the urine. In other patients, frequent urinary infections may be a warning of stone formation. In fact, it is not uncommon for people to have stones found incidentally, when they have had an x-ray or CAT scan for other unrelated medical problems.

Scoping It Out

Once a kidney stone is passed, and makes its way out of the ureter and into the bladder, most patients feel instant relief. But stones can take days, even weeks, to pass. Often, through non-invasive interventions, urologists can "unblock" the obstructing stone. Extracorporeal shockwave lithotripsy (ESWL) is a common treatment in which a precise sound wave is aimed at the stone and breaks it up from outside the body. Another common technique (requiring anesthesia) involves a thin tube (ureteroscope) attached to a small camera, which is guided into the ureter or kidney, where a laser breaks up the stone. For very large stones, surgery may be performed by making a small incision in the patient's back.

Perhaps the most important part of the treatment of stones is learning why patients develop them in the first place. A full metabolic evaluation starts with analyzing the stone itself. Further workup might involve obtaining a 24-hour urine sample and a blood test. Stone prevention, though, is not a "one-size-fits-all" approach. For each of the four major types of stones, there is a range of customized prevention. Patients must be aware of their unique risk factors. For instance, persistent urinary tract infections may indicate struvite stones; uric acid stones often occur from dietary habits; and cystine stones are known to occur in many members of the same family, suggesting a genetic predisposition.

Do Stones Dissolve?

Unfortunately, the most common stone types (calcium oxalate and calcium phosphate, accounting for 80 percent of all stones) cannot be dissolved with medications. In patients with uric acid stones, however, which account for five to seven percent of stones, potassium citrate can be successful, and may prevent stones from recurring. Patients with cystine-type stones may also benefit from potassium citrate or sodium bicarbonate to help prevent their stones. In addition, cystine stones can be prevented with D-penicillamine or a-mercaptopropionylglycine.

Prevention Is the Best Medicine

Drink plenty of fluids: Drinking eight to 10 glasses of liquid each day keeps urine diluted, which reduces the concentration of stone-forming minerals in the urine. Half the liquid should be water.

Reduce salt intake: Reducing sodium in the diet helps reduce the amount of calcium in the urine, which in turn, reduces calcium stone formation. Avoid high-sodium foods, like processed meats, salty fast food (boxed or canned soups, and noodle or rice mixes), and salty snacks.

Be sure your diet contains adequate amounts of calcium: Two scientific studies have shown that including at least two servings of high-calcium foods per day may actually reduce the rate at which calcium-containing kidney stones form.

Avoid foods that can increase the amount of oxalate or uric acid in the urine, if you are at higher risk for stones: chocolate, anchovies, rhubarb, caviar, greens, herring, berries, scallops, peanuts, mussels, asparagus, organ meats, tea, meat, extracts, broth, and bouillon.

Reducing Recurrence with Medication

Medications may be prescribed by your physician, but only after the cause of kidney stones is determined.

- **Hydrochlorothiazide** is a diuretic effective in reducing calcium in the urine.
- **Potassium citrate**, taken orally, makes the urine less acidic and more alkaline, which decreases the amount of uric acid and cystine in the urine. Additionally, citrate is a stone inhibitor.
- **Penicillamine** and/or **captopril** are two drugs that may help reduce the excretion of cystine.
- **Antibiotics**: In those patients with struvite (infection) stones, preventing or controlling urinary infection is important.
- **Allopurinol** reduces the amount of uric acid excretion.