Kidney Stone Disease

ABOUT STONE DISEASE

A kidney stone is a hard, stone-like mass (also called a calculus) developed from tiny crystals that form in urine. Stones form from these small crystals, which attach to the inner surfaces of the kidney, grow into larger crystals and eventually become stones.

Stones can form in one or both kidneys and typically range from less than five millimeters in size to as large as 10 millimeters or more. The size of the stone, determined through imaging studies such as X-rays, indicates whether an individual can spontaneously pass the kidney stone through the urinary tract or if surgical intervention is required.

Kidney stones can be debilitating and painful, and recurrent stone formation may lead to a decreased quality of life, interruptions in work and social commitments, an increased need for medical care or hospitalization and even kidney damage. UW Health urologists are committed to helping patients improve their quality of life through medical treatment and preventive strategies to manage their disease.

HOW TO REACH US

If you suspect you have kidney stones, visit your primary care provider or urologist.

UW Health 1 S. Park Clinic
1 S. Park St., Madison, WI 53715
(608) 287-2000

If you’ve been diagnosed with stones and would like to be seen in the Metabolic Stone Clinic, please call (608) 263-4757.

UW Hospital and Clinics
600 Highland Ave., Madison, WI 53792
(608) 263-4757

For more information, visit uwhealth.org/urology


Our Department of Urology offers center-oriented specialty treatments and consultations in urologic cancers, stone disease, pediatric urology, voiding dysfunction and male sexual health.

TYPES OF KIDNEY STONES

The type of stone is determined by its composition.

- Calcium oxalate is the most common type of stone and represents about 70 percent of stone disease cases.
- Calcium phosphate and uric acid are two other common types of stones. Patients will commonly develop a combination of calcium oxalate, calcium phosphate and uric acid stones.
- Struvite is a less common type of stone.
- Rare stones include those induced by medications or caused by genetic disorders.

UW Health Urology and its nationally renowned stone disease program offer state-of-the-art therapy and preventive strategies in the diagnosis and treatment of kidney stone disease. Our urologists recognize that patients suffering from stone disease deserve compassionate, high-quality care that provides both practical and effective treatment. Their treatment approach includes both surgical and medical options as well as a nutritional program.

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SYMPTOMS
Sometimes there are no symptoms associated with the presence of kidney stones. These may not require surgical intervention if they remain small and asymptomatic.

SYMPTOMS MAY INCLUDE:
- Pain, which can be dull or excruciating, in the flank area and may come in spasms and may radiate to other areas
- Fever
- Burning during urination
- Nausea and vomiting

There may also be blood and bacteria in the urine. Kidney infections and possible long-term kidney damage may result.

CAUSES
- Genetic Heritability: Approximately 40 percent of people who form kidney stones have a positive family history for stones. People with this inherited trait often begin forming stones early in life.
- Disease-Related Contributors: Some diseases associated with kidney stones include hypercalcemia, hyperparathyroidism, Crohn’s and other bowel diseases, insulin resistance, gout, obesity, hypertension or being bedridden. Though not everyone with these diseases will develop kidney stones, they may benefit from preventive strategies.
- Environmental Contributors: Certain environmental factors including level of physical activity, work environment, nutrition, body mass, gender, age and ethnicity may affect one’s risk for kidney stones.
- Anatomical Abnormalities: Certain conditions such as caliceal diverticulum, ureteropelvic junction (UPJ) obstruction and ureteral strictures may contribute to an increased risk of kidney stones.

- Medication Contributors: Certain medications such as decongestants, diuretics, heart medications, calcium channel blockers, Vitamin C and steroids may increase risk for developing kidney stones.

DIAGNOSIS
The presence of kidney stones is confirmed with imaging studies that may be used as part of the diagnostic process, such as CT scans, ultrasounds and X-rays.

TREATMENT
Medical management is an effective means by which to reduce the risk of future stone formation. Medical management incorporates observation, medication therapy, nutrition therapy, surgery or a combination of all of them.

Treatment for confirmed kidney stones differs depending on:
- The patient’s symptoms
- The size and location of the stone
- The patient’s medical history, including the existence of any anatomic abnormalities or diseases

Common treatments for stones that are not severe include:
- Drinking lots of fluids (100 ounces per day or more) to pass the kidney stone
- Medications which may be prescribed to help patients tolerate pain that may be associated with stone passage
- Exercise which may be helpful in the passage of a kidney stone

Other treatment options may include the following:
- Nutrition therapy
- Medications
- Surgical techniques

NUTRITION AND KIDNEY STONES
The UW Health Stone Disease Program is committed to providing nutrition therapy for patients and unlike most other centers, has had a clinical nutritionist on staff since the program’s inception in 1995. Nutrition therapy is highly personalized and implemented based on an individual’s 24-hour urine biochemistry, blood chemistry, stone type and other medical considerations, such as medications and other diseases. A comprehensive dietary assessment helps determine if there are dietary contributors to the patient’s stone disease. The following are some common elements of nutrition therapy for kidney stones:
- Fluids
- Sodium
- Oxalate
- Calcium
- Fruits and vegetables
- Lemon juice
- Sugar and carbohydrates

MEDICATIONS
Medicine is prescribed based on a patient’s specific risk factors, using urine and blood biochemistries as well as the person’s medical history. They may include:
- Diuretics
- Potassium citrate
- Allopurinol
- Antibiotics
- Cystine-lowering drugs
- Cholestyramine

SURGICAL TECHNIQUES
Surgical treatment may include the following:
- Extracorporeal Shock Wave Lithotripsy (ESWL): This technique uses sound waves (also called shock waves) to break a kidney stone into very small pieces that can more easily travel through the urinary tract and out of the body.
- Ureteroscopy (URS): URS is the removal of a kidney stone through the urethra without making an incision. The URS may be done if the kidney stone is too large for ESWL or has become lodged in the ureter. The URS is considered for individuals who have previously had ESWL but whose stones were not completely removed.
- Percutaneous Nephrolithotomy or Nephrolithotomy (PCNL): This approach is an alternative to a ureteroscopy. With a PCNL procedure, the urologist makes a one-centimeter incision in the back or side of the abdomen. A nephroscope is passed through the incision to the stone location and the stone is removed.