

**A KIDNEY STONE** normally begins as a tiny speck of solid material deposited in the middle of one or both kidneys. As more material clings to the first speck, it gradually builds into a solid object.

Certain chemicals, such as excessive amounts of calcium, can form small calcifications, or "stones" in the kidneys, which can cause severe pain and lead to possible kidney failure.

Kidney stone types typically fall into two categories, calcium-related kidney stones and non-calcium kidney stones. Calcium-related kidney stones are the most common form of stones and are sometimes the result of a genetic trait which causes a person to over-absorb calcium from their diet or to leak calcium from the kidneys into the urine. Another common cause of calcium stone formation is decreased excretion of citrate, a natural stone inhibitor. Genetic alterations in Tamm-Horsfall protein - another natural stone inhibitor - can cause stone formation. An excess amount of oxalates or uric acid in the body can also contribute to the forming of calcium kidney stones. Non-calcium kidney stones are less common and are usually linked to other inherited factors or repeated kidney infections.

Recently, a study showed that the incidence of kidney stones has increased by 37% during the past 20 years. The southern United States comprised what has been known as the "Stone Belt." Kidney stones occur at a higher rate in this area of the country as compared to other areas in the country. A combination of the hot weather, high salt and high meat diet may contribute to the increased incidence of kidney stones throughout the "Stone Belt." However, there is a strong genetic contribution to the etiology of kidney stones. If weather and diet were the only causes of kidney stones, everyone in the South would suffer from stones. Therefore, as explained above, the lack of adequate citrate or immeasurable inhibitors excreted in the urine also contribute to kidney stones. The bottom line is that each human creates crystals in their urine but not every human creates a stone. The difference between a stone former and a non stone former is that in a stone former the crystals stick together and this is caused by decreased inhibitor excretion in the urine.

## **EVALUATION**

The New Orleans Nephrology Associates Metabolic Kidney Stone Clinic treats patients who experience recurring kidney stone problems. The Clinic evaluates these patients in an outpatient setting.

A patient's 24-hour urine output is analyzed for chemical contents such as calcium, uric acid, oxalate, citrate, sulfate and sodium. A small amount of blood is drawn to evaluate the levels of calcium, uric acid, bicarbonate, magnesium, and creatinine (measures kidney function) in the blood. In addition, certain bone/stone related hormones are sometimes checked by obtaining a blood sample. A urinalysis is performed in order to evaluate any evidence of infection in the urinary tract.

Your physicians will also evaluate the number and size of stones present by using a non-contrast CT scan of the kidneys. This CT scan can measure kidney stones that are only 1mm in size. A serial (every 3-6 months depending on the severity of stone disease), CT scan is followed to determine the effect of treatment on stone burden. This is definitely helpful in our management of our patients as the goal in our Clinic is to decrease the size of kidney stones and prevent formation of new stones. Occasionally, an ultrasound of your kidneys will be utilized if you cannot receive radiation (i.e. if you are pregnant) or we need close evaluation of a renal cyst (these are not dangerous but very common in many stone patients' kidneys).

Studies have revealed that very often, patients who form kidney stones have a higher risk for bone loss, i.e., osteoporosis. Due to this, your physician may order a DEXA (Dual Energy X-Ray Absorptiometry) which is an approximately five minute test that involves 1/10<sup>th</sup> the radiation of a chest x-ray and evaluates the thickness of your bone and any risk that you might have for osteoporosis and fracture.

In addition, a very careful family history and medical history is taken from the patient.

## **TREATMENT / PREVENTION**

It is important to understand that obtaining the “right recipe” for the prevention and treatment of kidney stones may take up to 12 to 18 months. This is a process during which the physician will be prescribing appropriate preventive medications as directed by new stone formation, growth of stones and changes in the patient’s 24-hour urine chemistries. A prescribed yet “natural” therapy, called potassium citrate, is often used to prevent stone formation. There are also other medications used to prevent stone formation and these will be explained to you by your physician. In addition, large amounts of fluid intake are very important in the prevention of stones.

## **UROLOGIC TREATMENT**

- A cystoscopy uses specially, designed instruments and anesthesia to remove stones trapped between the kidney and the bladder.
- Often stones become too large to pass. Sometimes stones must be “broken up: by a technique called Extracorporeal Shockwave Lithotripsy (ESWL). This is a procedure that is conducted by the urologist. It allows the use of ultrasound to fragment the stones into a powder that can be passed out of the body into the urine.
- It is important to note that if you are in severe pain and are passing a kidney stone, that you must be evaluated either in the Emergency Room setting or by your urologist. The Metabolic Kidney Stone Clinic is for prevention of stones. The doctors who work there are not surgeons and cannot emergently remove a stone that has blocked the ureter from the kidney. At this stage, you need help from a urologist or an Emergency Room physician.

The New Orleans Nephrology Associates Metabolic Stone Clinic specifically treats patients with active long-standing kidney stone disease. These are usually people who have a metabolic problem and need monitoring, lifestyle recommendations and medication to prevent further stone formation.

