Kidney Stones (Renal Calculi)

What are kidney stones (renal calculi)?

Kidney stones, also called renal calculi, are solid pieces of material that form in the kidneys from substances in the urine. Stones can occur in any part of the urinary system from the kidneys to the bladder. They may be small or large. You may have just one stone or many.

There are several types of kidney stones, but most stones are calcium stones. They happen when there is too much calcium in the urine. Some calcium stones are caused by too much of a chemical called oxalate that is found in many foods. Oxalate binds easily with calcium to form a stone.

A second type of kidney stone happens because you have too much uric acid in your urine. Uric acid stones might start if you become dehydrated, such as during strenuous exercise on a hot day or during an illness. Uric acid stones are common in people who have gout, a disease that causes high uric acid levels in the blood.

Struvite stones are a third type. They are also called infection stones because they form in urine that is infected with bacteria. Finally, a rare type of kidney stone is a cystine stone. Cystine is a type of amino acid that helps your body make proteins. When your kidneys allow too much cystine into the urine it forms cystine stones.

What can I expect in the hospital?

You may need to stay in the hospital if:

- Pain cannot be controlled by oral medicines
- You are vomiting too much to drink liquids
- You have signs of infection, such as fever, chills or a high white blood cell count
- You need surgery to remove a stone that is not passing and is causing severe problems

Several things may be done while you are in the hospital to monitor, test, and treat your condition. They include:

Monitoring

- You will be checked often by the hospital staff.
- Your heart rate, blood pressure, and temperature will be checked regularly.
- Your blood oxygen level may be monitored by a sensor that is attached to your finger or earlobe.
- You may be asked to collect and strain your urine. This will allow your provider to check the size and type of stones that you have.
- You may have a small tube (catheter) placed into your bladder through the urethra (the opening from the bladder to the outside of the body) to drain and measure urine from the bladder.

Testing

Your healthcare provider will ask about your medical history and symptoms, and perform a physical exam. Testing may include:

- Blood tests to check for infections
- Urine tests to check for blood, stones, or infections
- Tests to look for the position of any stones and abnormalities of the urinary tract, which may include:
  - Computed tomography (CT) scan: A series of X-rays taken from different angles and arranged by a computer to show thin cross sections of the kidneys and urinary structures
  - X-rays: Pictures of the inside of the kidneys and urinary structures to check for stones, blockages, or other abnormalities
  - Intravenous pyelography (IVP): An X-ray taken after an injection of a special dye into a vein to help your provider see the location of stones or blockages as the dye moves through the kidneys and urinary structures
  - Ultrasound scan: Sound waves and their echoes are passed through the body from a small device (called a transducer) that is held against your skin to create pictures of the inside of the kidneys and urinary structures

Treatment

Treatment depends on the size and location of the stone(s), whether the urine flow out of a kidney is blocked, and whether there are signs of infection. Treatment may include:

- You will have a small tube (IV catheter) inserted into a vein in your hand or arm. This will allow for medicine to be given into your blood system and to give you fluids, if needed.
- Your provider may prescribe medicine to:
  - Treat pain
  - Treat or prevent an infection
  - Reduce swelling in the urinary tract
  - Prevent nausea
- Your healthcare provider may recommend that you drink larger quantities of fluids to help you pass kidney stones and change your diet to help prevent future stones
- Extracorporeal shock wave lithotripsy (ESWL): A procedure in which ultrasound shockwaves are used to break the stones into small pieces. It's then possible to pass the smaller pieces of the stones in your urine. In most cases, you will be given anesthesia to prevent pain during the procedure.
- You may need surgery to remove a kidney stone if it is large, blocking the flow of urine, or causing an infection. This may include:
  - Ureteroscopy: A procedure in which a thin, lighted, usually flexible tube called an ureteroscope is passed through the urethra into the urinary tract. Tools can be passed through the scope to trap and remove the stone using

special baskets. This may be done with shock wave or laser lithotripsy to break up larger stones and make them easier to remove.

- Percutaneous nephrolithotomy or nephrolithotripsy (PNL): A procedure in which your healthcare provider makes a small cut in your back and a narrow tunnel through the skin into the kidney. With a scope that goes through the tunnel, your provider can find and remove the stone or break it into small pieces using either laser or ultrasound lithotripsy.

What can I do to help?

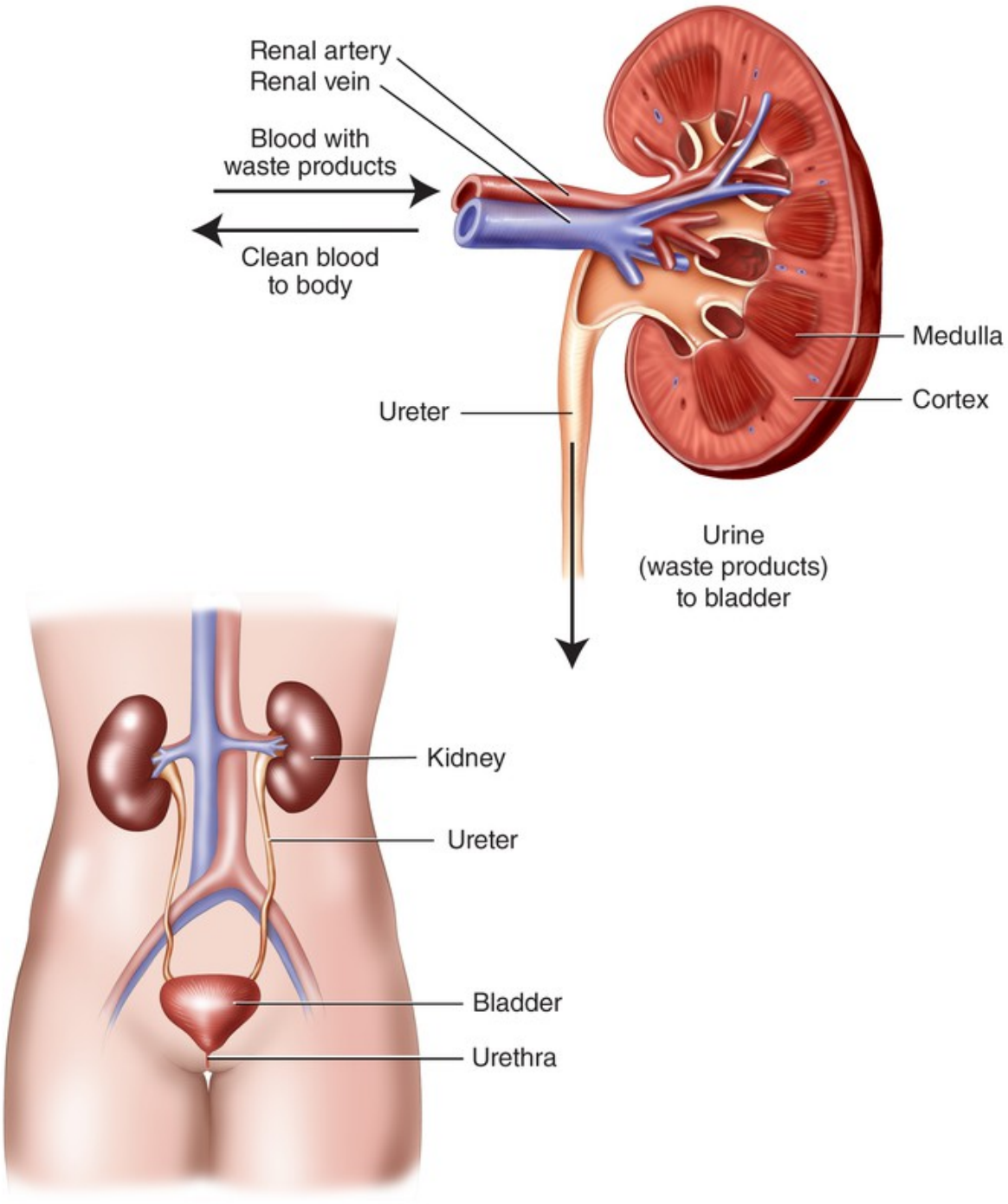
- You will need to tell your healthcare team if you have new or worsening:
  - Back pain
  - Abdominal cramps or pain
  - Burning with urination
  - Blood in your urine
  - Passing gravel-like or sand-like stones in the urine
  - Nausea or vomiting
  - Signs of infection around your surgical wound if you had surgery. These include:
    - The area around your wound is more red or painful
    - The wound area is very warm to touch
    - You have blood, pus, or other fluid coming from your wound area
    - You have chills or muscle aches
- Ask questions about any medicine or treatment or information that you do not understand.

How long will I be in the hospital?

How long you are in the hospital depends on many factors. The average amount of time to stay in the hospital with kidney stones is 2 to 3 days.

Developed by RelayHealth.

Kidney



Urinary System