



Care of the Patient with Kidney Stones

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After reading the newsletter, the nursing assistant should be able to:

1. Describe the basic structure and function of the renal system.
2. Identify risk factors for kidney stones and their signs and symptoms.
3. Discuss treatment and care of the patient with kidney stones.

Over a million Americans develop kidney stones each year, at a total cost of \$5.3 billion annually. This condition can result in severe pain, bleeding and serious complications for those affected, and requires prompt medical attention.

This newsletter will present an overview of kidney stones, including the basics of renal function, effects of kidney stones on the body, signs and symptoms, and common medical treatment. The role of the nursing assistant in caring for patients with kidney stones will also be covered.

The Kidneys

The kidneys are vital organs that help to keep the body in a balanced and healthy state. The main roles of the kidneys are to remove waste products from the blood and to regulate the fluid balance in the body. Other important functions include regulation of blood pressure and acid-base balance in the body, as well as stimulation of red blood cell production.

In the normal body, there are two kidneys, located behind the abdominal cavity. Within each kidney are about one million nephrons, tiny units that contain tubes to filter the blood. As blood enters the kidneys during normal circulation, the nephrons remove excess fluid and waste products to form urine. This urine drains from each kidney through long tubes called ureters. The ureters connect to the bladder, the hollow structure that



collects urine. When the bladder fills, urine flows through the urethra and is eliminated from the body. Normal urine production usually measures 1—3 liters or quarts per day.



Kidney Stones

Kidney stones, also called renal calculi or nephrolithiasis, are hard, pebble-like structures that form in the kidneys or urinary tract. They form from the minerals normally present in urine, especially concentrated urine.

This condition is fairly common in the US. In the most recent study conducted by the National Health and Nutrition Examination Survey (NHANES), close to 9% of those surveyed, or 1 in 11, had experienced kidney stones. These figures are over 70% higher than the numbers reported in 1994, indicating that the occurrence of kidney stones has increased dramatically in the US population. This increase is likely due to dietary and lifestyle factors, such as the increasing rates of obesity, diabetes and sedentary lifestyles.

While both males and females may develop kidney stones, they occur most commonly in men. They tend to occur most often in middle to late adulthood, ages 40-70, but can also occur in teens and young children.

There are several types of kidney stones, depending upon which substances form them. Most common is the calcium stone, accounting for 80% of kidney stones. Others include stones formed from uric acid, struvite

or cystine. The size and shape of stones can vary greatly, from small and smooth to large and jagged.

There are a number of risk factors that increase the likelihood of developing kidney stones. These include low fluid intake/dehydration, obesity, type 2 diabetes, high urine calcium, gout, taking diuretics or calcium supplements, and a family history of kidney stones. People who have had kidney stones are also at high risk for having them again.

Clinical Signs and Diagnosis

If kidney stones are small and pass easily down the urinary tract, they may flow out in the urine without symptoms, and may not even be noticed. Kidney stones produce symptoms when one or more stones irritates or becomes trapped in a structure of the urinary tract, commonly one of the ureters. Typical symptoms include sudden, sharp, severe pain in the abdomen or back that comes in waves. This type of pain is commonly referred to as renal colic. This may be accompanied by nausea, vomiting, fever, chills and blood in the urine.

Diagnostic tests may include X-rays or a CT scan to see if stones are present, and to determine their size and location. Blood and urine tests are also done to look for high levels of substances that may cause stones to form.

Treatment and Care

While they can cause extreme discomfort for the affected person, kidney stones do not cause serious problems or permanent damage in the majority of cases. Rarely, stones may cause kidney damage due to infection or blockage of urine. If the stone is small and not causing extreme symptoms, initial treatment may include only medication for pain and nausea, and waiting for the stone to pass. An increase in fluid intake may be ordered to help the stone pass. If your patient is waiting for a stone to pass, all urine must be strained to catch any stones. It is important that stones are retrieved and tested to determine their type, since actions to prevent future stones depend on how they formed.



If further medical care is needed, there are several procedures used to remove kidney stones:

Shock-wave lithotripsy: A machine is used to deliver a shock wave to the kidney stone, which breaks up the stone and allows it to pass. This is a non-invasive procedure that does not usually require an overnight hospital stay. The urine should be strained after the procedure to capture the pieces of stone.

Ureteroscopy: A scope is inserted through the

urethra and bladder and into the ureter. The scope may also be extended up into the kidney to remove stones there. Through this scope, tools can be used to grasp and remove the stone. If the stone is large, it can be broken up using a laser and then removed. This procedure is usually done on an outpatient basis, with the patient returning home the same day.

Nephrolithotomy: A small incision is made over the kidney and a nephrostomy tube is inserted into the kidney. Through this tube, a thin scope is inserted to remove the stone from the kidney, or it may be broken up using a laser and the pieces removed. The nephrostomy tube may remain in place for several days to drain urine directly out of the kidney into a collection bag. Hospitalization is usually required for 1-3 days.

Open surgery: A large incision is made in the abdomen or side to expose the kidney, and the kidney is surgically opened to remove the stone. Hospitalization for a week or more may be needed. This procedure is rarely required today.

When caring for patients after these procedures, keep these needs in mind:

Promotion of comfort: Patients who are in the process of passing kidney stones, or had procedures to remove them, may have severe pain and nausea. Let the nurse know promptly of any complaints, so that ordered medication can be given.

Prevention of infection: If the patient had an invasive procedure, he is at increased risk for infection. As always, wash your hands thoroughly before and after each contact with the patient. As you provide care, take note of the patient's dressing or incision. Notify the nurse of any odor, drainage, increased redness, or increased pain at the site. Do not wash the area or give the patient a shower or tub bath until instructed to do so. Watch for and report signs of urinary tract infection, such as foul-smelling or cloudy urine. And remember that many elderly patients may show non-specific signs of urinary tract infection, such as confusion or falls.

Promotion of urinary elimination: For patients whose fluid intake is not limited, encourage an intake of at least 6-8 glasses of fluid per day, or as ordered. This helps to keep bacteria flushed out of the urinary tract and keep the urine dilute to help prevent stones. The thirst mechanism is often impaired in elderly patients, so you may need to remind them frequently to take a drink. The urine should normally be clear and straw-colored, although blood in the urine is common after these procedures to remove kidney stones.

Your expert observations and care of the patient who has had kidney stones can help the patient toward a faster recovery and improved quality of life.