

What I need to know about Kidney Stones



NATIONAL INSTITUTES OF HEALTH
National Kidney and Urologic Diseases Information Clearinghouse



U.S. Department
of Health and
Human Services

What I need to know about Kidney Stones



NATIONAL INSTITUTES OF HEALTH
National Kidney and Urologic Diseases Information Clearinghouse

Contents

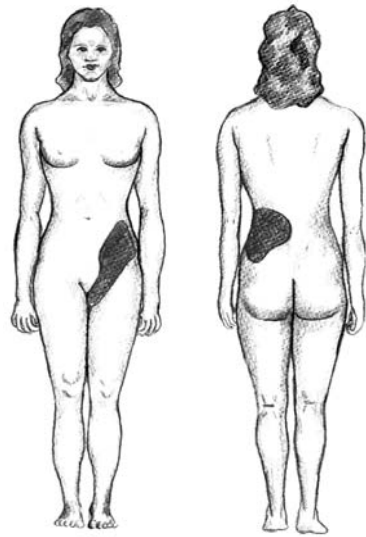
When should I call a doctor?	1
What do my kidneys do?	2
What is a kidney stone?	3
Are all kidney stones alike?	4
What do kidney stones look like?	5
What can my doctor do about a problem stone?	6
How will my doctor find out what kind of stone I have?	8
Why do I need to know the kind of stone?	8
What can I do to avoid more stones?	9
Points to Remember	10
For More Information.....	11
Acknowledgments	12

When should I call a doctor?

If you have a kidney stone, you may already know how painful it can be. Most kidney stones pass out of the body without help from a doctor. But sometimes a stone will not pass. It may even get larger. Your doctor can help.

You should call a doctor if you have any of the following signs:

- extreme pain in your back or side that will not go away
- blood in your urine
- fever and chills
- vomiting
- urine that smells bad or looks cloudy
- a burning feeling when you urinate

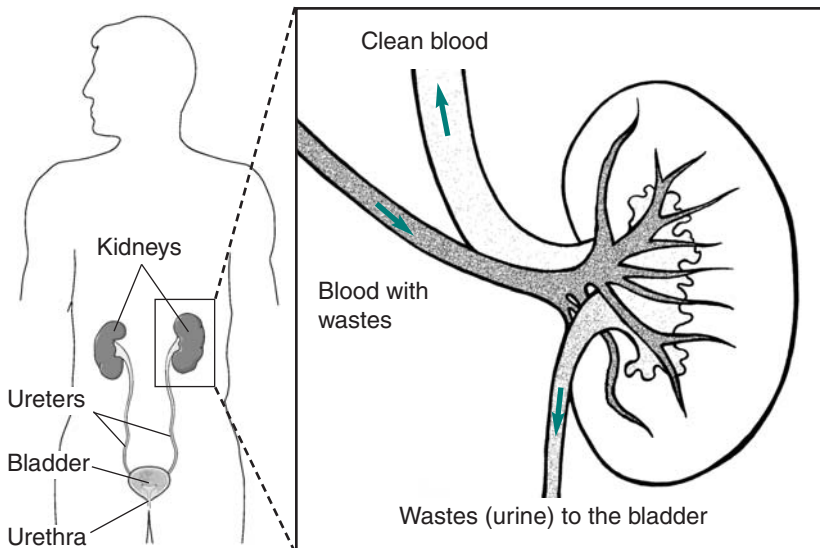


These may be signs of a kidney stone that needs a doctor's care.

Pain in the shaded areas may be caused by a kidney stone.

What do my kidneys do?

Your kidneys are bean-shaped organs, each about the size of your fist. They are located near the middle of your back, just below the rib cage, one on each side of the spine. The kidneys are sophisticated trash collectors. Every day, your kidneys process about 200 quarts of blood to sift out about 2 quarts of waste products and extra water. The wastes and extra water become urine, which flows to your bladder through tubes called ureters. Your bladder stores urine until you go to the bathroom.



Wastes removed from the blood go to the bladder.

The wastes in your blood come from the normal breakdown of active muscle and from the food you eat. Your body uses the food for energy and self-repair. After your body has taken what it needs from the food, wastes are sent to the blood. If your kidneys did not remove these wastes, they would build up in the blood and damage your body.

In addition to removing wastes, your kidneys help control blood pressure. They also help make red blood cells and keep your bones strong.

What is a kidney stone?

A kidney stone is a solid piece of material that forms in a kidney out of substances in the urine.

A stone may stay in the kidney or break loose and travel down the urinary tract. A small stone may pass all the way out of the body without causing too much pain.

A larger stone may get stuck in a ureter, the bladder, or the urethra. A problem stone can block the flow of urine and cause great pain.

Are all kidney stones alike?

No. Doctors have found four major types of kidney stones.

- The most common type of stone contains **calcium**. Calcium is a normal part of a healthy diet.

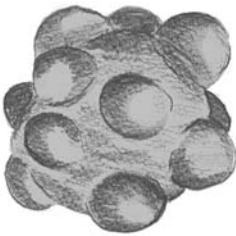
Calcium that is not used by the bones and muscles goes to the kidneys. In most people, the kidneys flush out the extra calcium with the rest of the urine. People who have calcium stones keep the calcium in their kidneys.

The calcium that stays behind joins with other waste products to form a stone. The most common combination is called calcium oxalate.

- A **struvite** stone may form after an infection in the urinary system. These stones contain the mineral magnesium and the waste product ammonia.
- A **uric acid** stone may form when the urine contains too much acid. If you tend to form uric acid stones, you may need to cut back on the amount of meat you eat.
- **Cystine** stones are rare. Cystine is one of the building blocks that make up muscles, nerves, and other parts of the body. Cystine can build up in the urine to form a stone. The disease that causes cystine stones runs in families.

What do kidney stones look like?

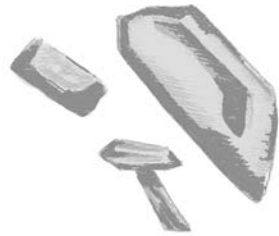
Kidney stones may be as small as a grain of sand or as large as a pearl. Some stones are even as big as golf balls. Stones may be smooth or jagged. They are usually yellow or brown.



Golf-ball-sized
and brown



Small and smooth



Jagged and yellow

Kidney stones vary in size and shape. These are not actual size.

What can my doctor do about a problem stone?

If you have a stone that will not pass by itself, your doctor may need to take steps to get rid of it. In the past, the only way to remove a problem stone was through surgery.

Now, doctors have new ways to remove problem stones. The following sections describe a few of these methods.

Shock Waves

Your doctor can use a machine to send shock waves directly to the kidney stone. The shock waves break a large stone into small stones that will pass through your urinary system with your urine. The full name for this method is extracorporeal shock wave lithotripsy. Doctors often call it ESWL for short. Lithotripsy is a Greek word that means stone crushing.

Two types of shock wave machines exist. With one machine, you sit in a tub of water. With most newer machines, you lie on a table. A health technician will use ultrasound or x-ray images to direct the sound waves to the stone.

Tunnel Surgery

In tunnel surgery, the doctor makes a small cut into the patient's back and makes a narrow tunnel through the skin to the stone inside the kidney.

With a special instrument that goes through the tunnel, the doctor can find the stone and remove it. The technical name for this method is percutaneous nephrolithotomy.

Ureteroscope

A ureteroscope looks like a long wire. The doctor inserts it into the patient's urethra, passes it up through the bladder, and directs it to the ureter where the stone is located. The ureteroscope has a camera that allows the doctor to see the stone. A cage is used to catch the stone and pull it out, or the doctor may destroy it with a device inserted through the ureteroscope.

Ask your doctor which method is right for you.

How will my doctor find out what kind of stone I have?

The best way for your doctor to find out what kind of stone you have is to test the stone itself. If you know that you are passing a stone, try to catch it in a strainer.

Your doctor may ask for a urine sample or take blood to find out what caused your stone. You may need to collect your urine for a 24-hour period. These tests will help your doctor find ways for you to avoid stones in the future.



Try to catch a stone in a strainer.

Why do I need to know the kind of stone?

The therapy your doctor gives you depends on the type of stone you have. For example, a medicine that helps prevent calcium stones will not work if you have a struvite stone. The diet changes that help prevent uric acid stones may not work to prevent calcium stones. Therefore, careful analysis of the stone will help guide your treatment.

What can I do to avoid more stones?

Drink more water. Try to drink 12 full glasses of water a day. Drinking lots of water helps to flush away the substances that form stones in the kidneys.

You can also drink ginger ale, lemon-lime sodas, and fruit juices. But water is best. Limit your coffee, tea, and cola to 1 or 2 cups a day because the caffeine may cause you to lose fluid too quickly.

Your doctor may ask you to eat more of some foods and to cut back on other foods. For example, if you have a uric acid stone, your doctor may ask you to eat less meat, because meat breaks down to make uric acid.

If you are prone to forming calcium oxalate stones, you may need to limit foods that are high in oxalate. These foods include rhubarb, beets, spinach, and chocolate.

The doctor may give you medicines to prevent calcium and uric acid stones.



Try to drink 12 full glasses of water every day.

Points to Remember

- Most stones will pass out of the body without a doctor's help.
- See your doctor if you have severe pain in your back or side that will not go away.
- See your doctor if you have blood in your urine—urine will appear pink.
- When you pass a stone, try to catch it in a strainer to show your doctor.
- Drink lots of water to prevent more kidney stones from forming.
- Talk with your doctor about other ways to avoid more stones.

For More Information

American Urological Association Foundation

1000 Corporate Boulevard, Suite 410

Linthicum, MD 21090

Phone: 1-866-RING-AUA (746-4282)

Email: patienteducation@auafoundation.org

Internet: www.auafoundation.org

www.UrologyHealth.org

National Kidney Foundation, Inc.

30 East 33rd Street

New York, NY 10016

Phone: 1-800-622-9010 or 212-889-2210

Internet: www.kidney.org

Oxalosis and Hyperoxaluria Foundation

201 East 19th Street, Suite 12E

New York, NY 10003

Phone: 1-800-OHF-8699 (643-8699)

or 212-777-0470

Fax: 212-777-0471

Email: execdirector@ohf.org

Internet: www.ohf.org

Acknowledgments

The National Kidney and Urologic Diseases Information Clearinghouse would like to thank the following individuals for assisting with scientific and editorial review of this publication.

John Asplin, M.D.

The University of Chicago Hospitals
Chicago, IL

Anne Gaddy

Zacchaeus Free Clinic
Washington, DC

Pamela Grigsby, P.A.

Washington Nephrology Associates
Bethesda, MD

Charlotte Szromba, M.S.N., R.N., C.N.N.

The University of Chicago Hospitals
Chicago, IL

Judith Thomas

American Society of Nephrology
Washington, DC

Gail Wick, R.N., B.S.N.

American Nephrology Nurses' Association
Atlanta, GA

National Kidney and Urologic Diseases Information Clearinghouse

3 Information Way
Bethesda, MD 20892-3580
Phone: 1-800-891-5390
Fax: 703-738-4929
Email: nkudic@info.niddk.nih.gov
Internet: www.kidney.niddk.nih.gov

The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health of the U.S. Department of Health and Human Services. Established in 1987, the Clearinghouse provides information about diseases of the kidneys and urologic system to people with kidney and urologic disorders and to their families, health care professionals, and the public. The NKUDIC answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about kidney and urologic diseases.

Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts.

This publication is not copyrighted. The Clearinghouse encourages users of this booklet to duplicate and distribute as many copies as desired.

This booklet is also available at www.kidney.niddk.nih.gov.



U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
National Institutes of Health



National Institute of Diabetes and
Digestive and Kidney Diseases

NIH Publication No. 07-4154
April 2007