

Hematuria: Blood in the Urine

National Kidney and Urologic Diseases Information Clearinghouse



U.S. Department
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**ADULT
PEDIATRIC
UROLOGY &
UROGYNECOLOGY**

What is hematuria?

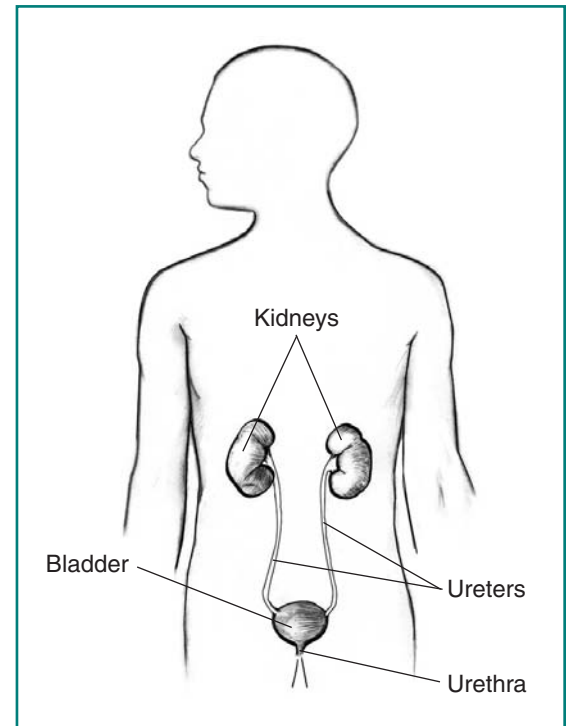
Hematuria is blood in the urine. Two types of blood in the urine exist. Blood that can be seen in the urine is called gross hematuria. Blood that cannot be seen in the urine, except when examined with a microscope, is called microscopic hematuria.

What are the symptoms of hematuria?

Most people with microscopic hematuria do not have symptoms. People with gross hematuria have urine that is pink, red, or cola-colored due to the presence of red blood cells (RBCs). Even a small amount of blood in the urine can cause urine to change color. In most cases, people with gross hematuria do not have other symptoms. However, people with gross hematuria that includes blood clots in the urine may have pain.

What is the urinary tract?

The urinary tract is the body's drainage system for removing wastes and extra water. The urinary tract includes two kidneys, two ureters, a bladder, and a urethra. The kidneys are two bean-shaped organs, each about the size of a fist. They are located near the middle of the back, just below the rib cage, one on each side of the spine. Every day,



The urinary tract

the two kidneys process about 200 quarts of blood to produce about 1 to 2 quarts of urine, composed of wastes and extra water. The urine flows from the kidneys to the bladder through tubes called ureters. The bladder stores urine until releasing it through urination. When the bladder empties, urine flows out of the body through a tube called the urethra at the bottom of the bladder.

What causes hematuria?

Hematuria can be caused by menstruation, vigorous exercise, sexual activity, viral illness, trauma, or infection, such as a urinary tract infection (UTI). More serious causes of hematuria include

- cancer of the kidney or bladder
- inflammation of the kidney, urethra, bladder, or prostate—a walnut-shaped gland in men that surrounds the urethra at the neck of the bladder and supplies fluid that goes into semen
- polycystic kidney disease—an inherited disorder characterized by many grape-like clusters of fluid-filled cysts that make both kidneys larger over time, taking over and destroying working kidney tissue
- blood clots
- blood clotting disorders, such as hemophilia
- sickle cell disease—an inherited disorder in which RBCs form an abnormal crescent shape, resulting in less oxygen delivered to the body's tissues, clogging of small blood vessels, and disruption of healthy blood flow

Who is at risk for hematuria?

Almost anyone, including children and teens, can have hematuria. Factors that increase the chance a person will have hematuria include

- a family history of kidney disease
- an enlarged prostate, which typically occurs in men age 50 or older
- urinary stone disease
- certain medications including aspirin and other pain relievers, blood thinners, and antibiotics
- strenuous exercise such as long-distance running
- a recent bacterial or viral infection

How is hematuria diagnosed?

Hematuria is diagnosed with urinalysis, which is testing of a urine sample. The urine sample is collected in a special container in a health care provider's office or commercial facility and can be tested in the same location or sent to a lab for analysis. For the test, a nurse or technician places a strip of chemically treated paper, called a dipstick, into the urine. Patches on the dipstick change color when RBCs are present in urine. When blood is visible in the urine or a dipstick test of the urine indicates the presence of RBCs, a health care provider examines the urine with a microscope to make an initial diagnosis of hematuria. The next step is to diagnose the cause of the hematuria.

The health care provider will take a thorough medical history. If the history suggests a cause that does not require treatment, the urine should be tested again after 48 hours for the presence of RBCs. If two of three urine samples show too many RBCs when viewed with a microscope, more serious causes should be explored. The health care provider may order one or more of the following tests:

- **Urinalysis.** Further testing of the urine may be done to check for problems that can cause hematuria, such as infection, kidney disease, and cancer. The presence of white blood cells signals a UTI. RBCs that are misshapen or clumped together to form little tubes, called casts, may indicate kidney disease. Large amounts of protein in the urine, called proteinuria, may also indicate kidney disease. The urine can also be tested for the presence of cancer cells.
- **Blood test.** A blood test involves drawing blood at a health care provider's office or commercial facility and sending the sample to a lab for analysis. A blood test can show the presence of high levels of creatinine, a waste product of normal muscle breakdown, which may indicate kidney disease.
- **Biopsy.** A biopsy is a procedure that involves taking a piece of kidney tissue for examination with a microscope. The biopsy is performed by a health care provider in a hospital with light sedation and local anesthetic. The health care provider uses imaging techniques such as ultrasound or a computerized tomography (CT) scan to guide the biopsy needle into the kidney. The kidney tissue is examined in a lab by a pathologist—a doctor who specializes in diagnosing diseases. The test helps diagnose the type of kidney disease causing hematuria.
- **Cystoscopy.** Cystoscopy is a procedure that uses a tubelike instrument to look inside the urethra and bladder. Cystoscopy is performed by a health care provider in the office, an outpatient facility, or a hospital with local anesthesia. However, in some cases, sedation and regional or general anesthesia are needed. Cystoscopy may be used to look for cancer cells in the bladder, particularly if cancer cells are found with urinalysis. For more information about cystoscopy, see the National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) fact sheet *Cystoscopy and Ureteroscopy* at www.urologic.niddk.nih.gov.
- **Kidney imaging tests.** Intravenous pyelogram (IVP) is an x ray of the urinary tract. A special dye, called contrast medium, is injected into a vein in the person's arm, travels through the body to the kidneys, and makes urine visible on the x ray. The contrast medium also shows any blockage in the urinary tract. When a small mass is found with IVP, another imaging test, such as an ultrasound, CT scan, or magnetic resonance imaging (MRI), can be used to further study the mass. Imaging tests are performed in an outpatient center or hospital by a specially trained technician, and the images are interpreted by a radiologist—a doctor who specializes in medical imaging. Anesthesia is not needed, though light sedation may be used in some cases. Imaging tests may show a tumor, a kidney or bladder stone, an enlarged prostate, or other blockage of the normal flow of urine. For more information about imaging tests used to examine the urinary tract, see the NKUDIC fact sheet *Imaging of the Urinary Tract* at www.urologic.niddk.nih.gov.

How is hematuria treated?

Hematuria is treated by treating its underlying cause. If no serious condition is causing hematuria, no treatment is needed. Hematuria caused by a UTI is treated with antibiotics; urinalysis should be repeated 6 weeks after antibiotic treatment ends to be sure the infection has resolved.

Eating, Diet, and Nutrition

Eating, diet, and nutrition have not been shown to play a role in causing or preventing hematuria.

Points to Remember

- Hematuria is blood in the urine.
 - Most people with microscopic hematuria do not have symptoms. People with gross hematuria have urine that is pink, red, or cola-colored due to the presence of red blood cells (RBCs).
 - Hematuria can be caused by menstruation, vigorous exercise, sexual activity, viral illness, trauma, or infection, such as a urinary tract infection (UTI). More serious causes of hematuria include
 - cancer of the kidney or bladder
 - inflammation of the kidney, urethra, bladder, or prostate
 - polycystic kidney disease
 - blood clots
 - blood clotting disorders, such as hemophilia
 - sickle cell disease
- When blood is visible in the urine or a dipstick test of the urine indicates the presence of RBCs, the urine is examined with a microscope to make an initial diagnosis of hematuria. The next step is to diagnose the cause of the hematuria.
 - If a thorough medical history suggests a cause that does not require treatment, the urine should be tested again after 48 hours for the presence of RBCs. If two of three urine samples show too many RBCs when viewed with a microscope, more serious causes should be explored.
 - One or more of the following tests may be ordered: urinalysis, blood test, biopsy, cystoscopy, and kidney imaging tests.
 - Hematuria is treated by treating its underlying cause.

Hope through Research

In recent years, researchers have learned a great deal about kidney disease. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) sponsors several programs aimed at understanding kidney and urologic problems that can lead to hematuria. The NIDDK's Division of Kidney, Urologic, and Hematologic Diseases supports basic research into normal kidney function and the diseases that impair normal function at the cellular and molecular levels, including diabetes, high blood pressure, glomerulonephritis, and cystic kidney diseases.

Participants in clinical trials can play a more active role in their own health care, gain access to new research treatments before they are widely available, and help others by contributing to medical research. For information about current studies, visit www.ClinicalTrials.gov.

For More Information

American Kidney Fund

6110 Executive Boulevard, Suite 1010
Rockville, MD 20852
Phone: 1-800-638-8299, 1-866-300-2900,
or 301-881-3052
Email: helpline@kidneyfund.org
Internet: www.kidneyfund.org

American Urological Association

1000 Corporate Boulevard
Linthicum, MD 21090
Phone: 1-866-RING-AUA
(1-866-746-4282) or 410-689-3700
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Email: aua@auanet.org
Internet: www.auanet.org

National Kidney Foundation

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Fax: 212-689-9261
Internet: www.kidney.org

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You may also find additional information about this topic by visiting MedlinePlus at www.medlineplus.gov.

This publication may contain information about medications. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (1-888-463-6332) or visit www.fda.gov. Consult your health care provider for more information.

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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.

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www.urologic.niddk.nih.gov.



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