

Hematuria



**BLOOD
IN THE
URINE**

WHAT IS HEMATURIA?

The presence of blood in the urine, called hematuria, can be an important sign of serious disease in the urinary tract. It can be characterized as either “gross” (visible to the naked eye) or “microscopic” (visible only under a microscope). Even one episode of “gross” hematuria warrants a visit to a health care provider’s office for further investigation. Unfortunately, many patients do not seek medical attention when they see or think they see blood in their urine. A full medical history and assessment of the nature of an individual’s complaint are the first steps in determining the cause of blood in the urine.

Although a family doctor would normally be consulted for finding blood in the urine, persistent problems and further testing are best handled by a **urologist**.

A urologist is a doctor who treats the diseases and conditions of the urinary tract in men, women and children (pediatric urologist) and the male reproductive system.

Liquid waste leaves your body as urine through the urinary tract. The urinary tract includes the kidneys and ureters (upper urinary tract), and the bladder and urethra (lower urinary tract). Urine is typically

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yellow in color, but can have a different color for many reasons. Blood can make the urine look red or pinkish.

A patient's history of kidney or bladder stones, urinary infection, or bladder tumors may indicate that the problem has returned and is the source of the bleeding. In some cases, certain medicines, such as anticoagulants that thin the blood or aspirin, can cause bleeding either from an underlying medical condition or from the upper or lower urinary tract. It is important to note that the amount of bleeding does not necessarily have a relationship to the seriousness of its cause.

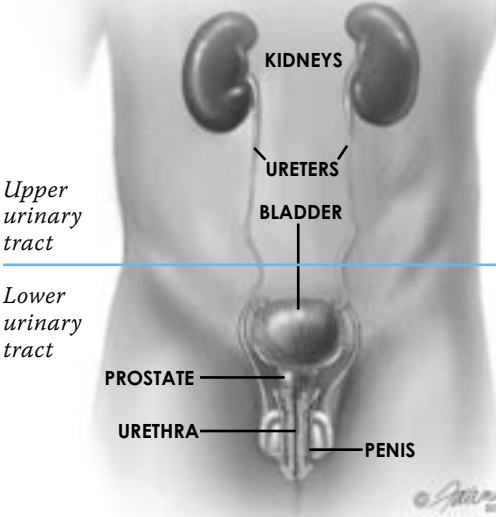
CAUSES OF HEMATURIA FROM THE UPPER URINARY TRACT (KIDNEY OR URETER)

The most common causes of hematuria from the upper urinary tract are:

- kidney disease
- abnormal blood coagulation
- sickle cell disease
- infection
- kidney stones
- obstruction, blockage or injury of the kidney or ureter

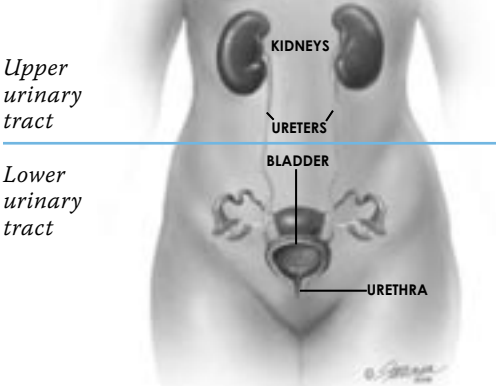
MALE

*Front view,
interior of urinary system,
upper and lower tract*



FEMALE

*Front view,
interior of urinary system,
upper and lower tract*



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- cancer of kidney or ureter
- benign kidney tumor (noncancerous)
- kidney (renal) vascular disease

Kidney (renal or glomerular) disease is a common benign (non-cancerous) cause of hematuria, which can lead to kidney failure in some patients. Abnormal findings in these patients often include unusually high protein levels and “casts” (groups of cells clustered together in the urine and visible under the microscope). However, most other tests, including X-rays of the upper urinary tract and cystoscopy, are typically normal and microscopic examination of the urine will show no signs of infection or malignant (cancerous) cells.

Hematuria from the upper urinary tract may occur suddenly in patients with abnormal blood clotting caused by a specific disease (e.g., hemophilia), or certain medications (e.g., anticoagulant drugs such as aspirin, ibuprofen, heparin or coumadin).

Sickle cell disease is a common cause of hematuria in African Americans. In some patients this can lead to loss of internal tissue from the kidneys into the ureters (termed “papillary necrosis”), which causes both urinary blockage and bleeding.

Infection can also cause upper urinary tract hematuria. Infection is diagnosed by the presence of white blood cells and bacteria in the urine.

Hematuria accompanied by severe side (flank) and abdominal pain usually suggests a kidney or ureteral stone causing blockage in the upper urinary tract. In some patients, kidney stones may be present for a long time before causing any symptoms. Doctors can diagnose upper urinary tract stones by obtaining one or more appropriate X-ray studies such as a CT scan, an ultrasound study, an intravenous pyelogram (IVP) or a retrograde pyelogram.

Other upper urinary tract obstructions or blockages can also cause blood to be present in the urine.

Tumors of the kidneys are other causes of upper urinary tract hematuria. The most common cancer of the kidney is renal cell carcinoma, which can cause hematuria and abdominal pain. Yet most small kidney tumors do not cause any bleeding, and in recent years, a growing number of kidney cancers have been diagnosed in patients without any urinary symptoms who undergo abdominal X-rays for other, unrelated reasons. Transitional cell carcinoma is a less common type of cancer involving the kidneys or ureters. Hematuria, pain and obstruction are more common with this type of cancer, and special

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microscopic examination of the urine often shows the malignant or cancerous cells. Less common causes of upper urinary tract hematuria include benign tumors, such as angiomyolipoma or oncocytoma.

Polycystic kidney disease is a disorder of both kidneys in which multiple benign cysts can enlarge over time to produce hematuria, obstruction, or kidney failure. This disorder is hereditary (passed down genetically from family members).

Renal circulatory or vascular diseases are an unusual cause of upper urinary tract hematuria and are related to the flow of blood in and around the kidney. These include obstruction of the renal vein or artery or vascular malformations of the kidney such as aneurysm or arteriovenous fistula. X-ray studies that show the blood flow in and around the kidney are needed to establish these diagnoses.

CAUSES OF HEMATURIA IN THE LOWER URINARY TRACT (BLADDER, PROSTATE, URETHRA)

Blood in the urine may indicate problems involving the lower urinary tract (bladder, prostate or urethra). The appearance of blood, as red or rust in color, whether visible to the naked eye (gross hematuria) or only under the microscope (microscopic hematuria), may be accompanied by other urinary symptoms such as increased frequency of urination, discomfort or burning during urination, increased urge to urinate, or a sense of incomplete emptying of the bladder. With or without any of these other symptoms, the cause of the hematuria may be serious and require prompt evaluation by a doctor. The most common causes of hematuria from the lower urinary tract are:

- inflammation (prostatitis, cystitis, urethritis)
- urinary tract infection
- bladder stone
- bladder cancer
- urethral cancer
- prostate cancer
- benign prostatic hyperplasia (enlargement of the prostate)
- trauma (injury)

Inflammation of the urinary tract can occur without infection and produce symptoms of urinary irritability and bleeding.

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Infection of the bladder (cystitis), of the prostate (prostatitis) or of the urethra (urethritis) may produce discomfort or burning on urination (dysuria), increased urinary frequency and increased urge to urinate.

Stones in the bladder or in the lower ureter may also create a sense of irritability on urination with increased frequency and urgency. Although less common, these symptoms can occur in some forms of bladder cancer. Remember however, that bladder cancer can often cause hematuria with no other symptoms.

Blood in the urine may also be noted in men who have benign prostatic hyperplasia (BPH) and in some men who have prostate cancer.

However, hematuria in men does not always indicate either prostate cancer or benign enlargement of the prostate. Blood may also be seen if there has been prior instrumentation of the lower urinary tract (e.g., cystoscopy, needle biopsy of the prostate). Here, blood vessels may have become fragile and prone to bleed with pelvic pressure induced by vigorous activity.

It is not uncommon for men to find blood in their ejaculate or semen. Most often, this is not accompanied by blood in the urine or other urinary symptoms and generally does not reflect a serious condition. Although a medical evaluation to exclude other conditions should be conducted.

MICROSCOPIC HEMATURIA

Insist on a urinalysis during a “routine” checkup by your health care provider.

A few red blood cells in the urine (microscopic hematuria) can be considered normal. In some people who have larger amounts of microscopic hematuria, an abnormality may be found. It is important to note that although a finding of many red blood cells in the urine seen only through a microscope should always be evaluated, an abnormality is not always found.

HEMATURIA IN INFANTS AND CHILDREN

As with adults, hematuria in children is abnormal and may be serious, so it is important to try to find the cause. At times, blood in the urine in children may be associated with pain, frequency or difficulty urinating. Unfortunately, there is not necessarily a connection between the seriousness of the cause and whether or not symptoms exist.

Bleeding without any other signs or symptoms (which is called asymptomatic hematuria) can be just as serious as symptomatic hematuria, which is hematuria with symptoms. Just as with adults, even one episode of hematuria in children means a doctor should evaluate the child, even if the blood disappears prior to the visit. While certain

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foods or medicines cause red discoloration of the urine, it is usually difficult to tell that this is the reason for the discoloration and, therefore, a urinalysis should be performed.

There are many reasons for blood in the urine in children, and the blood may come from any part of the urinary tract (upper and lower). In children, kidney disease (nephritis) is a common cause of hematuria, but urinary infection, stones, hypercalciuria (high urinary calcium), cystic kidney disease, injury (trauma), blockage of the urinary tract or urinary tract birth defects may also be responsible for the bleeding. Although tumors or cancer are much more common in adults, in rare instances tumors or cancers may be the cause of blood in the urine of children. In some cases, the cause of the hematuria cannot be determined.

If you suspect that your child has had blood in the urine, the doctor will ask you further questions about the episode and about your child's health. In trying to find the cause of hematuria in children, it is important to inform your doctor of other family members who may have urinary tract abnormalities. A full physical examination will be performed. Usually, the doctor will want to see if the blood is still present at the time of the examination and will conduct further testing to seek a cause.

EVALUATION OF HEMATURIA

Pain or urination problems such as frequency in urination, urgency or burning can accompany hematuria. Symptoms such as these may indicate a urinary infection. The urine may be looked at under a microscope so the doctor can see the cells and bacteria in the urine that cannot be seen with the naked eye. This testing and evaluation of urine to show white blood cells (or pus) and bacteria that may require treatment with medication (usually antibiotics) is called urinalysis. Some urinary diseases have no symptoms that can be seen or detected and sometimes blood in the urine will be the only finding and may be a sign of a more serious disease such as malignancy of the bladder or kidneys.

The evaluation of hematuria should include a complete medical history, physical examination and microscopic urinalysis. Once the nature of the hematuria and any accompanying symptoms are established, further evaluation may consist of a cystoscopy (a lighted telescope placed into the bladder) for direct internal examination, appropriate X-ray studies, a CT scan, intravenous pyelogram (IVP) or ultrasound.

Even if an abnormality has been discovered in the kidneys or upper urinary tracts, the lower urinary tract should also be evaluated. The results of these tests will determine if additional testing is required.

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If a woman is having her menstrual period, blood seen in the urine may be an external contaminant and therefore may not be blood in the urine. In about 5 to 10 percent of cases, no definitive cause of the hematuria can be determined. A woman should return to her doctor to be retested after her menstrual period is over.

Urine should be evaluated for the presence of any abnormal cells suggestive of malignancy/cancer (this is called urinary cytology). Such cells may come from the lining of the bladder, urethra, or upper urinary tract. If any abnormal cells are found, further testing should be done.

Several new tests have been developed to detect the presence of a number of substances in the urine that may act as “markers” for urinary malignancy/cancer. These substances or “markers” are produced by cancer cells, are present as a result of the activity of these cells, or are a reaction to them. They can be detected in the urine. Although these tests have shown greater sensitivity than urinary cytology in detecting low-grade malignancies, they are limited because inflammatory conditions interfere with their detection. At the present time, they still require further study and evaluation.

When the possibility of infection as the cause of bleeding has been excluded, a cystoscopy is performed. Stones and bladder tumors as well as areas of inflammation can be identified and

evaluated by the cystoscope. The appearance of any abnormality in the lining of the bladder indicates the need for biopsies (tissue studies) to observe the microscopic appearance of the abnormality. If a tumor is present it must be removed, which can be done under anesthesia and usually through a cystoscope. What type of cancer is present and what further treatment is appropriate can be determined by microscopic examination of the removed tissue. If a stone is present, it can be broken up and the fragments removed through the cystoscope.

If the doctor does not find upper tract lesions, bladder tumors, bladder stones, infection, or an identifiable bleeding vessel, hematuria may be characterized as having an unknown cause. This means that the source of the bleeding cannot be determined. However, if bleeding is persistent it may indicate the development of an internal abnormality that can only be identified at a later time. Further testing and evaluation in this setting may be necessary.

A ureteroscopy may be performed to diagnose or treat a cause of hematuria. A thin flexible surgical scope is passed into the bladder and through the opening of the ureter up to the kidney. The interior of the ureter and kidney can be studied.

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SCREENING AND DIAGNOSIS

Reading this brochure is an important first step in educating yourself about hematuria. If you experience signs of symptoms associated with this condition, talk to your doctor about an evaluation and possible treatment.

A urologist is the best specialist to help evaluate and treat this condition.

TREATMENT

Treatment of hematuria depends upon the cause. If the cause is a kidney disease, treatment of the disease or recovery from the disease will probably stop the bleeding. If the cause is an infection, treatment of the infection will probably solve the bleeding problem. In other cases the abnormality may need to be repaired or the stone or tumor removed.

To find a urologist in your area visit
http://www.urologyhealth.org/find_urologist/

GLOSSARY

asymptomatic hematuria: blood in the urine without any other signs or symptoms (such as pain or burning).

benign prostatic hyperplasia (BPH): a noncancerous (benign) growth of the cells within the prostate gland.

bladder: the hollow, balloon-shaped organ in which urine is temporarily stored before being discharged through the urethra.

cancer: an uncontrolled growth of cells originating in an organ (e.g., kidney, bladder, urethra, or prostate in the urinary tract).

CT SCAN: diagnostic imaging procedure that uses a combination of X-rays and computer technology to produce cross-sectional images of the body to show detailed images.

cystoscopy: examination with a narrow, tube-like instrument passed through the urethra to look inside the bladder.

glomerular disease: disease of the kidney.

hematuria: blood in the urine.

idiopathic: without known cause.

inflammation: swelling, redness, heat and/or pain produced in an area of the body as a result of irritation, injury or infection.

intravenous pyelography (IVP): a succession of X-ray films of the urinary tract following the injection into a vein of a contrast medium. An IVP tests kidney function and reveals the presence of stones, tumors, or obstruction in the urinary tract.

kidney biopsy: sampling kidney tissue if the kidney is thought to be the cause of the bleeding.

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kidneys: two large, bean-shaped structures that remove waste from the blood.

lower urinary tract: bladder, prostate (in men), urethra.

magnetic resonance imaging (MRI): diagnostic procedure that uses a combination of large magnets, radio frequencies and a computer to produce detailed images of organs and structures within the body without radiation.

red blood cells: cells in the blood that carry oxygen and are recognized by their red color.

transitional cell epithelium: the layer of cells that line the kidney, pelvis, ureters, bladder and initial part of the urethra.

ultrasound: also referred to as a sonogram, a technique that bounces painless sound waves off organs to create an image of their structure to detect abnormalities.

upper urinary tract: kidneys, ureters.

ureters: two thin tubes that carry urine downward from the kidneys to the bladder.

ureteroscopy: a method to examine the ureter and kidney with a scope.

urethra: a thin tube that carries urine from the bladder out of the body.

urinalysis: test of a urine sample under a microscope to show any problems of the urinary system and other body systems; the sample may be observed for physical characteristics, chemistry, presence of drugs, germs or other signs of disease.

urinary cytology: inspection of cells found in the urine under a microscope.

urinary tract: the system that takes wastes from the blood and carries them out of the body in the form of urine. Passageway from the kidneys to the ureters, bladder and urethra.

urinary tract imaging: techniques for examining the urinary tract usually by ultrasonography, intravenous pyelography (IVP), computerized tomography (CT) or magnetic resonance imaging (MRI).

urine culture and sensitivity: testing the urine for bacterial growth and, if bacteria is found, which antibiotic can be used to treat it.

urologist: a doctor who specializes in diseases of the male and female urinary tracts and the male reproductive system.

void: urinate.

voiding cystourethrogram (VCUG): catheter is placed in the urethra and the bladder is filled with a contrast dye; X-ray images are taken as the bladder fills and empties to show any blockage or reverse urine flow.

white blood cells: cells in the blood that are made by bone marrow and help the body fight infection and other diseases, as part of the immune system.

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TALKING WITH YOUR DOCTOR ABOUT HEMATURIA

- * I notice blood in my urine
every time I urinate / every day / once a
week.

- * When I urinate, blood comes out at the
beginning / end / throughout my stream.

- * I recently had this medical procedure
performed: _____

- * I have a history of the following urologic
problems
1) _____
2) _____
3) _____

- * These are the medications I take:
1) _____
2) _____
3) _____
4) _____

- * I take this many aspirin a week ____

- * I exercised last on this date _____ doing
this exercise _____ for ____ minutes.

The American Urological Association Foundation was established to support and promote research, patient/public education and advocacy to improve the prevention, detection, treatment and cure of urologic disease.

The American Urological Association Foundation provides this information based on current medical and scientific knowledge. This information is not a tool for self-diagnosis or a substitute for professional medical advice. It is not to be used or relied on for that purpose. Please see your urologist or other health care provider regarding any health concerns and always consult a health care professional before you start or stop any treatments, including medications.

To obtain multiple copies of this brochure or others in our patient information library, please call 410-689-3990.

Single copies of these booklets are available free of charge by calling or writing:



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