



Renal cell cancer is a disease in which malignant (cancer) cells form in tubules of the kidney.

Renal cell cancer (also called *kidney cancer* or *renal adenocarcinoma*) is a disease in which malignant (cancer) cells are found in the lining of tubules (very small tubes) in the kidney. There are 2 kidneys, one on each side of the backbone, above the waist. The tiny tubules in the kidneys filter and clean the blood, taking out waste products and making urine. The urine passes from each kidney into the bladder through a long tube called a ureter. The bladder stores the urine until it is passed from the body.

Cancer that starts in the ureters or the renal pelvis (the part of the kidney that collects urine and drains it to the ureters) is different from renal cell cancer. Refer to the PDQ summary on Transitional Cell Cancer of the Renal Pelvis and Ureter Treatment for more information).

Smoking and misuse of certain pain medicines can affect the risk of developing renal cell cancer.

Risk factors include the following:

Smoking.

Misusing certain pain medicines, including over-the-counter pain medicines, for a long time.

Having certain genetic conditions, such as von Hippel-Lindau disease or hereditary papillary renal cell carcinoma.

Possible signs of renal cell cancer include blood in the urine and a lump in the abdomen.

These and other symptoms may be caused by renal cell cancer. Other conditions may cause the same symptoms. There may be no symptoms in the early stages. Symptoms may appear as the tumor grows. A doctor should be consulted if any of the following problems occur:

Blood in the urine.

A lump in the abdomen.

A pain in the side that doesn't go away.

Loss of appetite.

Weight loss for no known reason.

Anemia.

Tests that examine the abdomen and kidneys are used to detect (find) and diagnose renal cell cancer.

The following tests and procedures may be used:

Physical exam and history: An exam of the body to check general signs of health, including checking for signs of disease, such as lumps or anything else that seems unusual. A history of the patient's health habits and past illnesses and treatments will also be taken.

Blood chemistry studies: A procedure in which a blood sample is checked to measure the amounts of certain substances released into the blood by organs and tissues in the body. An unusual (higher or lower than normal) amount of a substance can be a sign of disease in the organ or tissue that makes it.

Urinalysis: A test to check the color of urine and its contents, such as sugar, protein, red blood cells, and white blood cells.

Liver function test: A procedure in which a sample of blood is checked to measure the amounts of enzymes released into it by the liver. An abnormal amount of an enzyme can be a sign that cancer has spread to the liver. Certain conditions that are not cancer may also increase liver enzyme levels.

Intravenous pyelogram (IVP): A series of x-rays of the kidneys, ureters, and bladder to find out if cancer is present in these organs. A contrast dye is injected into a vein. As the contrast dye moves through the kidneys, ureters, and bladder, x-rays are taken to see if there are any blockages.

Ultrasound exam: A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram.

CT scan (CAT scan): A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.

MRI (magnetic resonance imaging): A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body. This procedure is also called nuclear magnetic resonance imaging (NMRI).

Biopsy: The removal of cells or tissues so they can be viewed under a microscope by a pathologist to check for signs of cancer. To do a biopsy for renal cell cancer, a thin needle is inserted into the tumor and a sample of tissue is withdrawn.

Certain factors affect prognosis (chance of recovery) and treatment options.

The prognosis (chance of recovery) and treatment options depend on the following:

The stage of the disease.

The patient's age and general health.

After renal cell cancer has been diagnosed, tests are done to find out if cancer cells have spread within the kidney or to other parts of the body.

The process used to find out if cancer has spread within the kidney or to other parts of the body is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment. The following tests and procedures may be used in the staging process:

CT scan (CAT scan): A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.

MRI (magnetic resonance imaging): A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body. This procedure is also called nuclear magnetic resonance imaging (NMRI).

Chest x-ray: An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.

Bone scan: A procedure to check if there are rapidly dividing cells, such as cancer cells, in the bone. A very small amount of radioactive material is injected into a vein and travels through the bloodstream. The radioactive material collects in the bones and is detected by a scanner.

The following stages are used for renal cell cancer:

Stage I

In stage I, the tumor is 7 centimeters or smaller and is found only in the kidney.

Stage II

In stage II, the tumor is larger than 7 centimeters and is found only in the kidney.

Stage III

In stage III, cancer is found: in the kidney and in 1 nearby lymph node; or in an adrenal gland or in the layer of fatty tissue around the kidney, and may be found in 1 nearby lymph node; or in the main blood vessels of the kidney and may be found in 1 nearby lymph node.

Stage IV

In stage IV, cancer has spread: beyond the layer of fatty tissue around the kidney and may be found in 1 nearby lymph node; or to 2 or more nearby lymph nodes; or to other organs, such as the bowel, pancreas, or lungs, and may be found in nearby lymph nodes.

Recurrent renal cell cancer is cancer that has recurred (come back) after it has been treated. The cancer may come back many years after initial treatment, in the kidney or in other parts of the body.

There are different types of treatment for patients with renal cell cancer.

Different types of treatments are available for patients with *renal cell cancer*. Some treatments are *standard* (the currently used treatment), and some are being tested in *clinical trials*. Before starting treatment, patients may want to think about taking part in a clinical trial. A treatment clinical trial is a research study meant to help improve current treatments or obtain information on new treatments for patients with cancer. When clinical trials show that a new treatment is better than the standard treatment, the new treatment may become the standard treatment.

Clinical trials are taking place in many parts of the country. Information about ongoing clinical trials is available from the *NCI Web site*. Choosing the most appropriate cancer treatment is a decision that ideally involves the patient, family, and health care team.

Five types of standard treatment are used:

Surgery

Surgery to remove part or all of the *kidney* is often used to treat renal cell cancer. The following types of surgery may be used:

Partial nephrectomy: A surgical procedure to remove the cancer within the kidney and some of the *tissue* around it. A partial nephrectomy may be done to prevent loss of kidney function when the other kidney is damaged or has already been removed.

***Simple nephrectomy*: A surgical procedure to remove the kidney only.**

***Radical nephrectomy*: A surgical procedure to remove the kidney, the *adrenal gland*, surrounding tissue, and, usually, nearby *lymph nodes*.**

A person can live with part of 1 working kidney, but if both kidneys are removed or not working, the person will need *dialysis* (a procedure to clean the *blood* using a machine outside of the body) or a kidney *transplant* (replacement with a healthy donated kidney). A kidney transplant may be done when the disease is in the kidney only and a donated kidney can be found. If the patient has to wait for a donated kidney, other treatment is given as needed.

When surgery to remove the cancer is not possible, a treatment called *arterial embolization* may be used to shrink the *tumor*. A small *incision* is made and a *catheter* (thin tube) is inserted into the main *blood vessel* that flows to the kidney. Small pieces of a special gelatin sponge are *injected* through the catheter into the blood vessel. The sponges block the blood flow to the kidney and prevent the cancer *cells* from getting oxygen and other substances they need to grow.

Even if the doctor removes all the cancer that can be seen at the time of the surgery, some patients may be given *chemotherapy* or *radiation therapy* after surgery to kill any cancer cells that are left. Treatment given after the surgery, to increase the chances of a cure, is called *adjuvant therapy*.

Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy *x-rays* or other types of *radiation* to kill cancer cells or keep them from growing. There are two types of radiation therapy.

External radiation therapy uses a machine outside the body to send radiation toward the cancer. *Internal radiation therapy* uses a *radioactive* substance sealed in needles, *seeds*, wires, or catheters that are placed directly into or near the cancer. The way the radiation therapy is given depends on the type and *stage* of the cancer being treated.

Chemotherapy

Chemotherapy is a cancer treatment that uses *drugs* to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (*systemic chemotherapy*). When chemotherapy is placed directly into the *spinal column*, an *organ*, or a body cavity such as the *abdomen*, the drugs mainly affect cancer cells in those areas (*regional chemotherapy*). The way the chemotherapy is given depends on the type and stage of the cancer being treated.

Biologic therapy

Biologic therapy is a treatment that uses the patient's *immune system* to fight cancer. Substances made by the body or made in a laboratory are used to boost, direct, or restore the body's natural defenses against cancer. This type of cancer treatment is also called *biotherapy* or *immunotherapy*.

Targeted therapy

Targeted therapy uses drugs or other substances that can find and attack specific cancer cells without harming normal cells. *Antiangiogenic* agents are a type of targeted therapy that may be used to treat *advanced* renal cell cancer. They keep *blood vessels* from forming in a tumor, causing the tumor to starve and stop growing or to shrink.

