

KIDNEY CANCER

WHAT IS KIDNEY CANCER?

Kidney or Renal cell cancer (also called cancer of the kidney, renal adenocarcinoma, clear-cell cancer, or hypernephroma) is a disease in which cancer (malignant) cells are found in certain tissues of the kidney. Kidney cancer is one of the less common kinds of cancer. It occurs more often in men than in women and accounts for only 3% of all adult cancers. There will be over 30,000 new cases of kidney cancer every year in the United States.

WHAT ARE THE KIDNEYS?

The kidneys are a "matched" pair of organs found on either side of your backbone. The kidneys of an adult are about 5 inches long and 3 inches wide and are shaped like a kidney bean. Inside each kidney are tiny tubules that filter and clean your blood, taking out waste products, and making urine. The urine made by each kidney passes through a tube called a ureter into the bladder where it is held until it is passed from your body.

WHAT IS KIDNEY CANCER?

Renal cell cancer is a cancer of the lining of the tubules in the kidney. A cancer in the part of the kidney that collects urine and drains it to the ureters (the renal pelvis) is not considered 'kidney cancer' and is treated somewhat differently. Like most cancers, renal cell cancer is best treated when it is found (diagnosed) early.

HOW DOES KIDNEY CANCER PRESENT?

You should see your doctor if you have one or more of the following: blood in your urine, a lump (mass) in your abdomen, or a pain in your side that doesn't go away. If you have cancer of the kidney, you may also feel very tired or have loss of appetite, weight loss without dieting, or anemia (too few red blood cells).

WHAT TESTS AND PROCEDURES WILL THE DOCTOR DO TO SEE IF YOU HAVE A KIDNEY CANCER?

If you have signs of cancer, your doctor will usually feel your abdomen for lumps.

Your doctor may order a special x-ray called an intravenous pyelogram (IVP). During this test, a dye containing iodine is injected into your bloodstream. This allows your doctor to see the kidney more clearly on the x-ray.

Your doctor may also do an ultrasound, which uses sound waves to find tumors, or a

special x-ray called a CT or CAT scan to look for lumps in the kidney. CT scan also involves injection of the same dye as used in IVPs. CT scans are used to confirm the findings of the IVP and also to help determine the extent or spread of the cancer in and around the kidney. A special scan called magnetic resonance imaging (MRI), which uses magnetic waves to find tumors, may also be done.

On rare occasions, we will ask the radiologist to do a needle biopsy of a suspected kidney tumor to find out if the lump or mass or cyst seen on the other tests is benign or malignant. We do very few needle biopsies of kidney tumors because of the danger of bleeding and other problems. The diagnosis can usually be made with the X-rays and other tests mentioned above.

STAGING INFORMATION

Once the diagnosis of kidney cancer is made, your chance of recovery (prognosis) and choice of treatment depend on the stage of your cancer (whether it is just in the kidney or has spread to other places in the body) and your general state of health.

The staging system for renal cell cancer is based upon the degree of tumor spread beyond the kidney. This will be determined by the various tests that will give us some idea of the spread of the tumor before most therapy is offered. These tests may include some, although not necessarily all of the following:

1. CT or MRI scans of abdomen, chest and head
2. Bone scans
3. Chest X-ray or chest tomograms (special X-ray type)
4. Arteriogram or venacavagram (X-rays of arteries and veins to and from the kidney)
5. Blood tests

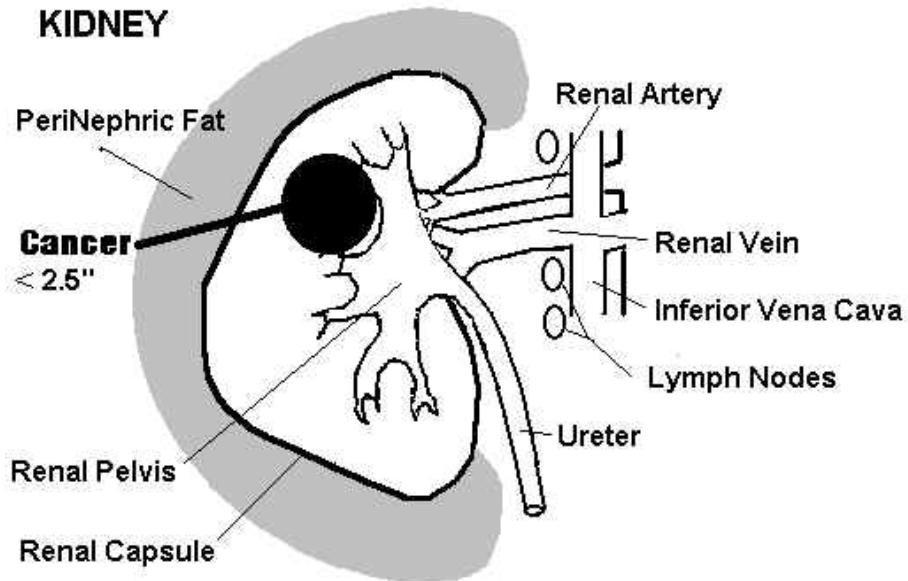
When all staging information that is necessary is available, a stage of the cancer will be given.

STAGE EXPLANATION

Stages of renal cell cancer

The following stages are used for renal cell cancer:

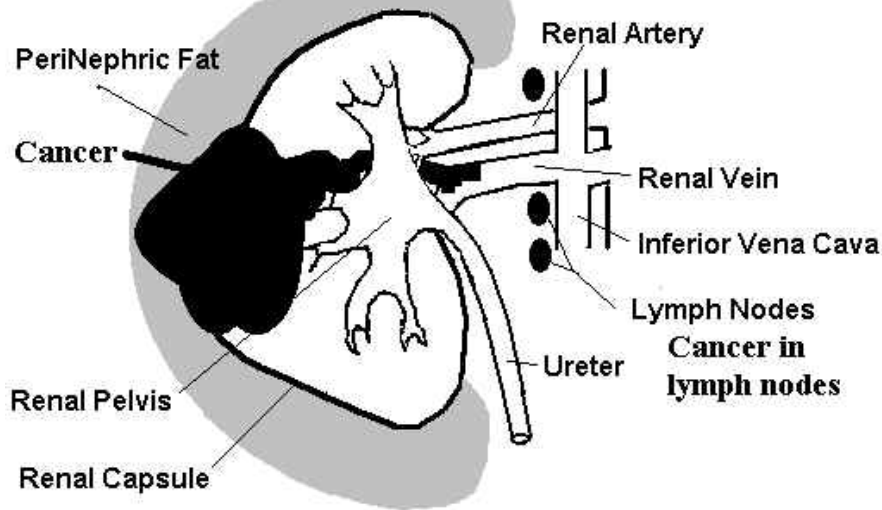
Stage I -- Cancer is found only in the kidney and is less than 2.5 inches or 7 cms in diameter.



Stage II -- Cancer is larger than 2.5 inches or 7 cms and has not spread beyond the outer covering or capsule that surrounds the kidney.

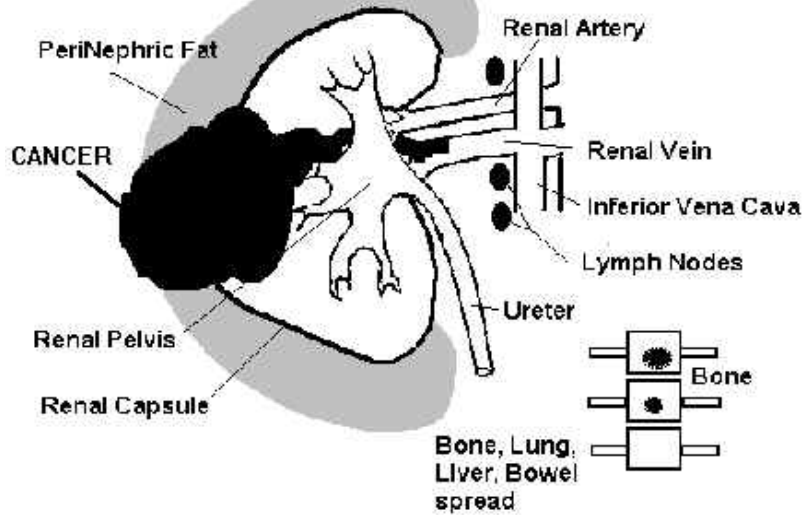
Stage III -- Cancer has spread to the main blood vessel that carries blood from the kidney (renal vein), to the blood vessel that carries blood from the lower part of the body to the heart (inferior vena cava), or to lymph nodes around the kidney. (Lymph nodes are small, bean-shaped structures that are found throughout the body; they produce and store infection-fighting cells.)

KIDNEY



Stage IV -- Cancer has spread to nearby organs such as the bowel or pancreas or has spread to other places in the body such as the lungs or brain.

KIDNEY



Recurrent -- Recurrent disease means that the cancer has come back (recurred) after it has been treated. It may come back in the original area or in another part of the body.

How is renal cell cancer treated?

There are treatments for most patients with renal cell cancer. Five kinds of treatment are used:

1. Surgery (taking out the cancer in an operation).
2. Chemotherapy (using drugs to kill cancer cells).
3. Radiation therapy (using high-dose x-rays or other high-energy rays to kill cancer cells).
4. Hormone therapy (using hormones to stop cancer cells from growing)
5. Biological therapy (using your body's immune system to fight cancer).

SURGERY

Surgery is a common treatment for renal cell cancer. Your doctor may take out the cancer using one of the following procedures: Radical nephrectomy removes the kidney with the tissues around it. Some lymph nodes in the area may also be removed.

Partial nephrectomy removes the cancer and part of the kidney around the cancer. This is usually done only in special cases, such as when the other kidney is damaged or has already been removed. In some very small cancers that are located at the very top or bottom of the kidney, we also can remove just the cancer in some cases leaving the rest of the kidney behind.

CHEMOTHERAPY

Chemotherapy uses drugs to kill cancer cells. Chemotherapy may be taken by pill, or it may be put into the body by a needle in a vein or muscle.

Chemotherapy is called a systemic treatment because the drugs enter the bloodstream, travel through the body, and can kill cancer cells throughout the body. Unfortunately, our success using chemotherapy for kidney cancer has been limited, but new drugs are being tested actively around the country.

RADIATION THERAPY

Radiation therapy uses x-rays or other high-energy rays to kill cancer cells and shrink tumors.

Radiation may come from a machine outside the body (external radiation therapy) or from putting materials that contain radiation through thin plastic tubes (internal radiation therapy) in the area where the cancer cells are found. Radiation can be used alone, before or after surgery and/or chemotherapy.

Radiation as primary treatment for kidney cancer has not met with great success. Radiation's most common uses are to treat areas of cancer spread, such as to bone or brain. On occasion we will treat the kidney directly if the cancer cannot be removed and is causing symptoms such as pain or bleeding.

HORMONE THERAPY

Hormone therapy uses hormones (taken by pill or injected with a needle) to stop cancer cells from growing. We are not sure why hormones work on some rare kidney cancers, but there does appear to be some limited action against the cancers in some patients.

BIOLOGICAL THERAPY

Biological therapy tries to get your own body to fight cancer. It uses materials made by your own body or made in a laboratory to boost, direct, or restore your body's natural defenses against disease.

Biological therapy is sometimes called biological response modifier (BRM) therapy or immunotherapy. That is, we use the body's own immune system to fight the kidney cancer like it would fight an infection.

OTHER TREATMENT OPTIONS

Sometimes a special treatment called arterial embolization is used to treat renal cell cancer. A narrow tube (catheter) is used to inject small pieces of a special gelatin sponge into the main blood vessel that flows into the kidney to block the blood cells that feed the tumor. This prevents the cancer cells from getting oxygen or other substances they need to grow.

HOW WILL WE TREAT A SPECIFIC CANCER?

Treatments for renal cell cancer depend on the type and stage of your disease, your age, and your general health.

You may receive treatment that is considered standard based on its effectiveness in a

number of patients in past studies, or you may choose to go into a clinical trial. Not all patients are cured with standard therapy and some standard treatments may have more side effects than are desired. For these reasons, clinical trials are designed to find better ways to treat cancer patients and are based on the most up-to-date information.

TREATMENT OPTIONS

Stage I and II renal cell cancer (Cancer is limited to the kidney)

Your treatment may be one of the following:

1. Surgery to remove the kidney and the tissues around it (radical nephrectomy). Lymph nodes in the area may also be removed. This is the most common treatment for early or Stage I renal cancer
2. Surgery to remove the part of the kidney where the cancer is found (partial nephrectomy).
3. External beam radiation therapy to relieve symptoms in patients who cannot have surgery.
4. Injection of small pieces of a special gelatin sponge into the main artery that flows to the kidney to block blood flow to the cancer cells (arterial embolization). This is usually done only in patients who cannot have surgery.

STAGE I and II OVERVIEW

Stage I and II renal cell cancers: Surgical resection is the accepted, often curative therapy for stage I and II renal cell cancer. Resection may be simple or radical. The latter operation includes removal of the kidney, adrenal gland, and perirenal fat with or without a regional lymph node dissection. Some, but not all, surgeons believe the radical operation yields superior results. In patients who are not candidates for surgery, external radiation therapy or arterial embolization can provide palliation. In those patients with stage I cancers of both kidneys (rare, less than 5%), partial nephrectomy when technically feasible may be a preferred alternative to bilateral nephrectomy with dialysis or transplantation.

Stage III renal cell cancer

Your treatment may be one of the following:

1. Surgery to remove the kidney and the tissues around it (radical nephrectomy). Lymph nodes in the area may also be removed. If the cancer has spread to the main blood vessels that carry blood to and from the kidney (the renal vein or vena cava), part of the blood vessel may also be removed. Follow up treatments with chemotherapy, immunotherapy or radiation may be used in select circumstances or in special studies.
2. Injection of small pieces of a special gelatin sponge into the main artery that flows to the kidney to block blood flow to the cancer cells (arterial embolization). This may allow the cancer to shrink and is usually followed by radical nephrectomy.
3. External beam radiation therapy to relieve symptoms for those patients that cannot tolerate surgery.

STAGE III CANCER OVERVIEW

A surgical resection is the accepted, often curative therapy for this stage of renal cell cancer. Resection should be radical. The operation includes removal of the kidney, adrenal gland, and perirenal fat. Lymph node removal is commonly employed, but its effectiveness has not been definitively proven. Surgery is extended to remove the entire renal vein. If the renal vein is involved then a portion of the vena cava is removed as necessary.

External-beam irradiation has been given before or after nephrectomy in Stage III without conclusive evidence that this improves survival compared with results of surgery alone, but may be of benefit in selected patients with more extensive tumors. In patients who are not candidates for surgery, arterial embolization can provide palliation.

In patients with stage III kidney cancer in the contralateral kidney, a partial nephrectomy when technically feasible may be a preferred alternative to bilateral nephrectomy with dialysis or transplantation.

Stage IV kidney cancer

Your treatment may be one of the following:

1. Biological therapy.
2. External radiation therapy to relieve symptoms.
3. Surgery to remove the kidney (nephrectomy) to relieve symptoms.

4. If cancer has spread only to the area around the kidney, surgery to remove the kidney and the tissue around it (radical nephrectomy).

5. If the cancer has spread to a limited area, surgery to remove the cancer where it has spread (metastasized) in addition to radical nephrectomy. A solitary or single area of spread to the lung or liver might be handled this way.

Recurrent kidney cancer (assuming that original kidney cancer has been removed)

Your treatment may be one of the following:

1. If cancer has spread only to one or a few areas in the body, surgery to remove the cancer.
2. Radiation therapy to relieve symptoms.
3. Biological therapy.
4. Chemotherapy.

OVERVIEW OF STAGE IV or RECURRENT KIDNEY CANCER

Unfortunately, most of these patients are difficult to treat effectively.

Tumor embolization, irradiation, and nephrectomy can aid in the palliation of symptoms due to the primary tumor. There is minimal evidence that nephrectomy induces regression of distant metastases. Hence, nephrectomy, in the hope that it will be followed by spontaneous regression of metastases is not advised unless it is part of a special study that is testing a new drug.

Responses to standard chemotherapy generally do not exceed 10% for any regimen that has been studied in adequate numbers of patients. Because of early reports of success, hormonal drugs have been administered to patients with metastatic kidney cancer, but the frequency of response is disappointingly low, and there is no rationale for their use as anticancer therapy. They may offer subjective palliation, however.

Various biologic therapies have been evaluated. Alpha interferons have approximately a 15% objective response rate in appropriately selected individuals. Some of the immunological therapies that are being investigated at this time include interleukin-2, interferon, autolympocyte therapy, LAK cells, and TIL cells and tumor vaccines. In general, these patients have small lung or tissue metastases and are in excellent health.

Administration of interleukin-2 (IL-2), with or without lymphokine-activated killer (LAK) lymphocytes, appears to have a similar overall response rate to alpha interferon, but with approximately 5% of the appropriately selected patients having remissions. IL-2 was approved for use in kidney cancer in 1992 by the FDA. Combinations of interleukin-2 and interferon have been studied but have not been shown to be better than high-dose interleukin-2 alone. However, these are toxic and complex therapies. IL-12, a new interleukin is now being studied and some very early studies are promising.

Another new drug is GM-CSF, or Granulocyte Macrophage Colony Stimulating Factor, which has been used in bone marrow transplants. GM-CSF is used in conjunction with other chemotherapy programs to help restore and build up a patient's immune system.

Another new drug that is about to be investigated is Capecitabine. Capecitabine comes in pill form and is activated by the enzymes found only in kidney tumors so that side effects, such as diarrhea or bone marrow problems, can be kept to a minimum. There is no current information on how effective Capecitabine might be.

Another group of anti-cancer treatments being tested are called angiogenesis inhibitors. These include such proteins as angiogenin, epidermal growth factor, estrogen, fibroblast growth factors, interleukin-8, prostaglandin, tumor necrosis factor, vascular endothelial growth factor, TNP-40, and thalidomide.

We expect to have information on some of these agents by the end of 1999.

Unfortunately, these therapies are still unproven and have not been successful in most of the case in which they are tried. We are hopeful that combinations of these treatments may have better success.

OVERALL PROGNOSIS

Kidney cancer can often be cured if it is diagnosed and treated when still localized to the kidney and to immediately surrounding tissue. The probability of cure is directly related to the stage or degree of tumor dissemination. Even when regional lymphatics or blood vessels are involved with tumor, a significant number of patients can achieve prolonged survival and probable cure. When distant metastases are present, disease-free survival is poor, although occasional selected patients will survive after surgical resection of all known tumor.

Because a majority of patients are diagnosed when the tumor is still relatively localized and amenable to surgical removal, approximately 40% of all patients with renal cancer survive five years.

Occasional patients with locally advanced or metastatic disease may exhibit indolent courses lasting several years. Late tumor recurrence many years after initial treatment occasionally occurs.

Kidney cancer is one of the few tumors in which well-documented cases of spontaneous tumor regression in the absence of therapy exist, but this occurs very rarely and may not lead to long-term survival.

Surgical resection is the mainstay of treatment of this disease. However, even in patients with disseminated tumor, regional forms of therapy may play an important role in palliating symptoms of the primary tumor or of ectopic hormone production. Systemic therapy has demonstrated only limited effectiveness.