

Diagnosis and tests for kidney cancer



Going to see your GP

If you notice a change in your body that isn't normal for you or if you have any of the possible signs and symptoms of kidney cancer, such as blood in your urine, a pain in your back below your ribs or a lump in your tummy, you should make an appointment to see your GP.

Please don't delay seeing your GP if you are worried about your symptoms. These symptoms might not be due to cancer, but the earlier cancer is picked up, the easier it is to treat and the higher your chance of successful treatment.

Depending on your symptoms, your GP might do a general physical examination, especially of the areas where you have pain or a lump. They might also listen to your heart and arrange for you to give blood and urine samples (see below).

After your examination, your GP might refer you to hospital for further tests (see below) or to see a surgeon or oncologist. If your GP doesn't refer you for further tests, they might ask you to return for a check-up in a week or two if your symptoms continue or get

worse. Please go back to see your GP if you are still concerned and/or your symptoms get worse.

If your symptoms are very bad and you are in a lot of pain or discomfort you might need to ring NHS 111 or go to A&E. In this case, you will be examined by an A&E doctor and referred for further tests or to see a specialist doctor (see below).

Around half of all cases of kidney cancer are detected incidentally when someone is being checked for a different medical problem, such as a urine infection, liver problems or gut problems. In these cases, the tests detailed below will be followed.

Diagnostic tests for kidney cancer

If you have blood in your urine and you do not have a urine infection, your GP will arrange for an urgent referral. You will be referred to the hospital to see a urologist (a doctor who specialises in diagnosing and treating urinary, bladder and kidney problems). Urologists use the following tests to diagnose kidney cancer¹. Some of these tests are also used during follow-up after treatment to check if the treatment is working:

Physical examination

A physical examination will be carried out by the urologist to check for any lumps or swelling in the area of the kidneys, the tummy (abdomen) and bladder. The urologist will also ask you about your general health. You will be asked for blood and urine samples to check that your liver and kidneys are working properly.

If you have blood in your urine, you might have procedure called a cystoscopy. This is where a tiny camera on the end of a very thin tube is inserted into the bladder through the urethra to see if there is any bleeding from inside the bladder (see ureteroscopy below).

Laboratory tests

Your blood and urine samples will be sent to the laboratory for testing to check your general health and whether your liver and kidneys are working properly. Blood may also be tested to count the number of blood cells in your blood (full blood count, FBC). If your tumour is located near the centre of the kidney and the urine collecting system, or it is suspected that you have a urothelial cancer (transitional cell cancer (TCC) of the ureter or renal pelvis or bladder cancer), the urine sample may also be checked for the presence of cancer cells.

Chest X-ray

You might have an X-ray taken of your chest to check that your heart and lungs are working properly. An X-ray should never be used for the diagnosis of kidney cancer.

CT scan

A CT scan (or computerised tomography) is a special type of X-ray examination and is conducted in the hospital X-ray department. A CT scan is used to check the size of the tumour and whether it has spread to other organs. The CT machine is shaped like a donut and you lie on a couch, which slides backwards and forwards through the hole.

The CT scanning machine takes a series of X-ray pictures of your body from different angles. A computer puts these images together to give a detailed image of the inside of your body. Sometimes, a special dye called a contrast agent is injected into a vein in your arm to provide better detail.

A CT scan is painless but takes longer than an X-ray. The length of the whole procedure depends on how many pictures are taken but expect to be on the couch for about 30 minutes. Some people feel a little claustrophobic during a CT scan. If you think you might feel claustrophobic during your scan, please tell the radiographer before your appointment.

Ultrasound scan

An ultrasound scan is a real-time, moving test used to look for tumours and cysts in the kidneys. This is a painless procedure, which is done in the hospital scanning department and only takes a few minutes to perform. A small probe, which produces sound waves is rubbed over your tummy. The sound wave echoes are detected by the probe and turned into a picture of the organs and structures inside your body by a computer. You will usually be asked to drink plenty of fluids before the scan so that your bladder is full and can be seen clearly.

MRI (magnetic resonance imaging) scan

MRI uses magnetic fields instead of X-rays to produce detailed pictures of the inside of the body. MRI is used to check the size and extent of a tumour, and to determine whether or not the cancer has spread to other organs of the body. MRI can also be used to look at the fine structure of the kidney or the tumour to see if you are suitable for a partial nephrectomy. You may be given an injection of special dye or contrast agent into a vein to help the tumour show up more clearly on the MRI scan picture.



Similar to the CT machine, the MRI machine is shaped like a long tube and you lie on a couch, which slides backwards and forwards through the hole. The radiographer watches you on a screen and can talk with you through an intercom.

During the test you have to lie very still on the couch inside the tube for about 30 minutes. It is painless but very noisy, so you might need to wear headphones. It can also make you feel a little claustrophobic and it can make your body feel warm. If you think you might feel claustrophobic during your scan, please tell the radiographer before your appointment. You should be given earplugs or headphones through which you can listen to music and you will be able to hear the radiographer.

To find out more information about your cancer, you might have some of the following tests:

Bone scan

You might have a bone scan to see if there is any damage to your bones. A bone scan is a series of X-rays of all the important bones in your body. A radioactive material is injected into your vein and after a few hours this marks areas of damaged bone in your body. Further tests are then used such as an MRI, an X-ray or a biopsy to work out if this damage is cancer or a different condition such as arthritis. This test is only done if you go to A&E with a broken bone or if other tests, such as blood tests, indicate it should be.

Brain scan

If you are having severe headaches, disturbed vision or problems with your balance, you might have a brain CT or MRI scan to check to see if your cancer has spread to your brain.

Biopsy

Biopsy is the removal of a small amount of tissue for examination under a microscope to check for signs of cancer.

If your tumour is relatively small, you might have a biopsy to see if it is malignant or not. First, some local anaesthetic will be given to numb the skin. A fine needle is inserted through the skin (percutaneous biopsy) to remove a small piece of the tumour, which is then looked at under the microscope.

Biopsies are usually taken while having an ultrasound or CT scan to guide the surgeon. Some pain relief might be needed, and you are usually kept in the department for a few hours after the procedure and monitored for bleeding from the kidneys. Sometimes, a piece of tumour can be removed during a uroscopy procedure (see below).

If your tumour is removed during an operation, a biopsy of the tissue sample might be done to find out more about the type of cancer that you have (see Essential guide: Kidney Cancer – Renal cell carcinoma for more details).

The tissue sample will be analysed by a pathologist (a doctor who specialises in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease). Other tests can suggest that cancer is present, but only a biopsy can make a definite diagnosis. Further tests may be required to determine the position of the cancer and how far it has spread.

Tests for urothelial cancers

(TCC of the ureter or renal pelvis or bladder cancer):

Ureteroscopy

Ureteroscopy is a procedure used to examine the inside of the ureters and renal pelvis with a tiny camera on the end of a very thin tube or ureteroscope. The ureteroscope is inserted through the urethra into the bladder, and from there into the ureter and renal pelvis. Through the ureteroscope, the doctor can see inside the bladder, the ureters and renal pelvis and check for any abnormalities. This procedure is usually done under general anaesthetic. Some people experience burning or mild pain when passing urine for the first few days after the test, but this should clear up in a week or so. You will be asked to drink a lot of water after the test to help flush out your bladder. If you have a high temperature and the burning sensation does not go away, you need to visit your doctor because you might have an infection. If the test shows you have a tumour in your ureter or renal pelvis, the tumour will be removed.

Retrograde pyelography

Retrograde pyelography is similar to an X-ray and is used to show any abnormalities in your ureters. During a ureteroscopy examination a catheter is inserted into the ureter and a special dye is injected into the ureter. The doctor watches on a screen as the dye travels through your ureters and into the renal pelvis and can identify any problems.

When the diagnostic tests are complete you will be asked to go back to the hospital and your urologist will explain and discuss the results of the tests with you. If the diagnosis is cancer, these results will help the urologist to stage your disease (see Essential guide: Kidney cancer – Transitional cell carcinoma (TCC) for more information about staging) and decide on your course of treatment.

Screening for kidney cancer

Currently there are no reliable screening tests to check for kidney cancer in the general population. Screening is currently only used for people with an established genetic risk. A blood test exists that can check for von Hippel Lindau (VHL) syndrome (a risk factor for clear cell renal cell carcinoma, RCC). If people have a genetic risk of kidney cancer in their family history, they may be screened for the

early stages of kidney cancer using an ultrasound or CT scan on a yearly basis.

Research is ongoing to identify a biomarker for the diagnosis of kidney cancer that could be used in a simple screening test. A biomarker is a measurable indicator of some biological state, disease or condition, such as a naturally occurring substance, gene, or characteristic (e.g., blood pressure) by which a particular disease can be identified. So far, the search for a reliable biomarker for a screening test has not been successful due to the diverse nature (heterogeneity) of kidney tumours.

Further reading

- **Action Kidney Cancer:**
<https://www.actionkidneycancer.org>
- **Cancer Research UK:**
<https://www.cancerresearchuk.org/about-cancer/kidney-cancer>
- **Macmillan:**
<https://www.cancerresearchuk.org/about-cancer/kidney-cancer>
- **NHS:**
<https://www.nhs.uk/conditions/kidney-cancer/diagnosis/>

¹European Association of Urology (EAU) Guidelines: Renal cell carcinoma. 5. Diagnostic evaluation. <https://uroweb.org/guideline/renal-cell-carcinoma/#5>

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