

Surgery for kidney cancer



Making treatment decisions

This guide outlines the surgical treatments that are proven to be the best available (standard of care) for kidney cancer. Your surgeon (or urologist) will discuss with you the treatments they think would be best for you. Sometimes they may offer you a choice of surgical treatments. In any case, you should be sure you are part of the decision-making process and that your views and preferences have been taken into account. You should be sure you have been given enough information and you understand all the options before you give permission for the treatment. Don't be embarrassed about asking your surgeon to explain things again and remember to ask about anything that is worrying you.

You should be told:

- The type of surgical treatment that is recommended for you
- How and when this will be carried out
- The advantages and disadvantages of this type of treatment
- Any possible other treatments that might be available

- Any significant risks or side effects of the treatment.

When making treatment decisions, you might also be encouraged to consider a clinical trial as an option. A clinical trial is a research study to test a new treatment or procedure to evaluate whether it is safe, effective, and possibly better than the standard of care (normal treatment).

Treatment options depend on several factors, including the type and stage of your cancer (see *Essential guide: Kidney cancer – Renal cell carcinoma (RCC)* and *Essential guide: Staging and grading of kidney cancer*), possible side effects to the treatment, your preferences and your overall health (see below).

Before your operation, you will have a talk with your surgeon about what treatment options are available for you. You might like to ask:

- Will I need a partial or complete (radical) nephrectomy?
- Can I have keyhole surgery (laparoscopic or robotic surgery)?
- What are the chances that I might need a complete nephrectomy even if a partial nephrectomy is planned?

- Is this surgery curative?
- What other related procedures or treatments might I need?

How do I prepare for an operation?

To assess your health and whether you can have surgery, you may need a pre-operative assessment a couple of days before your planned operation. This could be an appointment with your surgeon or a nurse, a telephone assessment or an email assessment. Depending on what type of operation you are having, and the kind of anaesthetic, you might also need to have some tests, such as a physical examination, and blood and urine tests (see *Essential guide: Diagnosis and tests for kidney cancer*). You might also be tested for methicillin-resistant *Staphylococcus aureus* (MRSA), severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 or COVID-19) and, depending on your medical history, you might have your heart and blood pressure checked (with an ECG).

These tests are to check if you have any medical problems that might need to be treated before your operation, or if you'll need special care during or after the surgery. You will need to tell your surgeon or nurse about any medications, vitamins, or herbal supplements that you are taking for any pre-existing health conditions. You should also be given clear information on:

- When to stop eating and drinking before your operation
- Whether you should stop taking your usual medications before going into hospital
- What to pack to bring with you into hospital
- How long you will need to stay in hospital and whether you will need to stay overnight.

More information about preparing for an operation can be found on the [NHS website](#). See also the Help Sheet [Going into hospital](#) for surgery on the Action Kidney Cancer website for tips and suggestions for items you might like to take into hospital.

What is a nephrectomy?

Nephrectomy is the name of the operation to remove the kidney or part of the kidney along with the tumour. This operation, when possible, is the best treatment for kidney cancer. This will be carried out under a general anaesthetic.

Radical nephrectomy

Radical nephrectomy is the removal of the whole kidney containing the tumour. If the cancer has not spread, this operation could cure your kidney cancer. Sometimes it is necessary to also remove some of the surrounding fatty

tissues and a portion of the tube connecting the kidney to the bladder (called the ureter). The surgeon may also remove the adrenal gland that sits on top the kidney if a tumour is close to the adrenal gland or has spread to the adrenal gland. In some cases, lymph nodes or other tissues are removed if the cancer has spread into these areas.

Radical nephrectomy can be carried out as an 'open' nephrectomy or using keyhole (laparoscopic or robotic) surgery.

Open radical nephrectomy

For an open radical nephrectomy, the surgeon will make a relatively large cut (incision) along your side or on your abdomen on the side of the affected kidney in order to carry out this operation. This helps the surgeon see the kidney and operate directly on it.

Laparoscopic nephrectomy

For keyhole or laparoscopic nephrectomy, the surgeon makes several small cuts and uses a thin tube with a light and a



magnifier at one end (called a laparoscope) to see inside your tummy and perform the operation. Your tummy will be filled with carbon dioxide gas to extend the walls of your abdomen and give the surgeon room to carry out the operation. This can leave you feeling distended and uncomfortable for a few hours after the operation. Some patients also experience pain in their shoulders following this operation. Again, this lasts a few hours and goes away without leaving any lasting effects. You may feel bloated for some days following surgery. Talk to your nurse or surgeon if this continues for longer than a week.

Robot-assisted laparoscopic surgery

Sometimes a robot is used to help with a laparoscopic nephrectomy (robot-assisted laparoscopic surgery). The surgeon uses a robotic system to perform the operation. Robotic tools need very small cuts, provide better 3-D images during the operation, and can make fine or complex motions that are similar to what a surgeon's hand can do in open surgery. As for laparoscopic surgery, your tummy will be filled with carbon dioxide gas to extend the walls of your abdomen and give the surgeon room to carry out the operation. This can leave you feeling distended and uncomfortable for a few hours after the operations. Some patients also experience pain in their shoulders following this operation. Again, this lasts a few hours and goes away without leaving any lasting effects. You may feel bloated for some days following surgery. Talk to your nurse or surgeon if this continues for longer than a week.

Partial nephrectomy (nephron-sparing surgery)

After radical nephrectomy one kidney can usually do all the work and people can live a normal life with one kidney. Blood and urine tests can be used to monitor your kidney function, if necessary. However, some people with pre-existing conditions may benefit from having only the tumour removed from the kidney, thereby saving some of the kidney. This is called a partial nephrectomy (sometimes called nephron-sparing surgery). Also, depending on the size and location of the tumour, a partial nephrectomy can be a better option than removal of a whole kidney.

This surgery removes only the area of the kidney affected by the tumour so that the rest of the kidney can still function to clean the blood and regulate the body. Partial nephrectomy can be a good option for patients with a tumour of less than 4 cm that has not spread. It may be offered as a treatment option if there are concerns about the future function of the remaining kidney.

In partial nephrectomy only the actual tumour and a margin of the surrounding kidney tissue is removed, keeping as much of the healthy kidney tissue as possible. Usually, the adrenal gland is spared unless the cancer is very close to it and there is a risk it has spread into this gland.

This type of surgery has been found to be similar in effectiveness to radical nephrectomy. It is only suitable for certain patients and depends a lot on the size and position of the tumour within the kidney. Some surgeons are more experienced at this type of surgery. There are guidelines for surgeons as to which type of

surgery to use for different stages of renal cancer ¹. Long-term kidney function is better after partial nephrectomy. However, this surgery can be more complex and has slightly more side effects or complications after the operation (e.g., bleeding) compared with radical nephrectomy.

Partial nephrectomy can be carried out as an open or laparoscopic or robot-assisted operation.

What to expect after a nephrectomy?

After your nephrectomy, your ward nurse or physiotherapist will encourage you to start walking about as soon as possible. If you are not able to walk, they will encourage you to do deep breathing exercises and leg movements in the bed. Getting active again helps recovery.

You may have a drip to put fluid into your blood stream, a catheter to drain urine from your bladder and drains to remove any excess fluid or blood from your wound when you return to the ward. The catheter and drains are usually only needed for a couple of days and the drip can be removed as soon as you are able to eat and drink normally.

You will be given pain relief while you recover from your operation. At first you will require strong painkillers such as opiates (e.g., morphine). These can be given as injections from the ward nurse or by a patient-controlled pump attached to your arm. Some people have an epidural method of pain relief instead. This uses a local anaesthetic to numb the area where the operation took place and uses a tube into your back to deliver the local anaesthetic to the area.

You should expect to be in hospital for anything up to 10 days after your operation. Ask your surgeon or ward nurse how long you should rest at home before getting back into daily activities, such as driving, shopping, exercise, gardening, housework and returning to work.

You should get a follow-up outpatient appointment to check your recovery six weeks after your operation. During this visit your oncologist should discuss your pathology report, test results and outlook (prognosis), as well as any further treatment options and follow-up schedule with you. If you are concerned about anything during your recovery from surgery, please talk to your nurse or a member of your hospital team who will be happy to offer advice.

What is ablation for kidney cancer?

Ablation is the selective destruction of cancer cells by heating them or freezing them.

If your tumour is 4 cm or smaller and you are not able to have surgery, or you don't want to have surgery, you could have ablation therapy instead. Ablation therapies kill the

cancer cells using heat or cold and are often better tolerated than operations. Also, recovery time is shorter.

Because ablation destroys the tumour, you might be offered a biopsy of your tumour before ablation. A biopsy is the removal of a small piece of the tumour to look at the cells under a microscope. A biopsy will be able to tell you if the tumour is cancer or not. A biopsy will also be able to let you know the type of kidney cancer you have and the grade of the cancer (see Essential guide: Staging and grading of kidney cancer). Knowing the type and grade of your kidney cancer will help when choosing treatment options if your cancer comes back after ablation.

There are several ablation therapies for kidney cancer:

Radiofrequency ablation (RFA) is a heat treatment that is used to kill the cancer. Needle-like electrodes are passed through the skin (percutaneous) into the tumour to kill the cancer cells with heat. Image-guided percutaneous radiofrequency ablation (RFA) uses ultrasound pictures to guide the surgeon as he inserts the electrodes into the tumour. You will usually be given a general anaesthetic for this procedure.

Side effects and complications are usually less than from an operation and include pain, bleeding and infection. Rarely there may be damage to the tube connecting the kidney and bladder (the ureter) or the bowel. The treatment may need to be repeated.

Cryoablation is the use of freezing temperatures to kill the cancer. In this procedure the surgeon places probes in the centre of the tumour. A general anaesthetic is usually given. A coolant is then passed into the probes and this freezes the cancer cells and kills them. Some of the tissue surrounding the cancer is also destroyed.

The side effects and complications from this procedure are usually less than for an operation and include pain, bleeding and infection. Rarely there may be damage to the ureter or bowel. Cryotherapy may need to be repeated.

Microwave ablation is like radiofrequency ablation and uses heat to kill the cancer. **Laser ablation** uses laser light treatment to kill the cancer. It can be used to treat brain metastases or remove abnormal tissue from the bladder in a procedure called transurethral laser ablation (TULA).

High-intensity focused ultrasound ablation (HIFU) is the use of high-energy, high frequency sound waves to produce a high temperature inside the tumour cells to kill them. This procedure is experimental, and only offered as part of a clinical trial.





What are the risks of my operation?

Nephrectomy is generally a safe procedure. But as with any operation, nephrectomy carries a potential risk of complications, such as:

- Bleeding
- Infection
- Injury to nearby organs
- Rarely, other serious problems

Long-term complications from a nephrectomy relate to potential problems of living with less than two complete, fully functioning kidneys. Although overall kidney function decreases after a nephrectomy, the remaining kidney tissue usually works well enough for a healthy life.

Problems that may occur with long-term reduced kidney function include:

- High blood pressure (hypertension)
- Chronic kidney disease

Potential risks and complications depend on the type of surgery, reasons for surgery, your overall health and many other issues, including the expertise and experience of your surgeon. It is important that you discuss these issues with your surgeon to give you a better understanding of your potential risk.

What is surveillance?

Surveillance is the term used for follow-up after initial treatment for kidney cancer. Your surgeon or oncologist will want to see you at regular time points to check for complications, to monitor kidney function, to check for a return or recurrence of your cancer, to check your remaining kidney for disease, or to monitor you for spread of your cancer.

The frequency of your follow-up visits are generally every 6 months during the first year and every year thereafter for the first 3 years. After this, follow-up visits will be every 1-2 years¹. However, this schedule will be adapted according to your risk of tumour recurrence and any subsequent treatment (if any). The length of your follow-up will be determined based on the risk of your cancer coming back and your specific clinical needs.

It might be useful to get a copy of your pathology report at your first follow-up visit so you are aware of the need for surveillance. Sometimes scores are used to help predict your outlook (prognosis) and the need for greater surveillance (see the *Essential guide: Treatment for advanced renal cell carcinoma* for more information about prognostic and performance scores).

Most people can function well with only one kidney or with one whole kidney and part of the second. During your regular follow-up visits, the following will be monitored to keep an eye on your kidney function:

- **Blood pressure.** You'll need careful monitoring of your blood pressure because decreased kidney function can increase blood pressure. High blood pressure can, in turn, damage your kidney.
- **Protein urine levels.** High levels of protein in your urine (proteinuria) may indicate kidney damage and poor kidney function.
- **Waste filtration.** Glomerular filtration rate is a measure of how efficiently your kidney filters waste. The test is usually performed with a sample of blood to measure the creatinine level. A reduced filtration rate indicates decreased kidney function.

How do I take care of my remaining kidney?

After a nephrectomy or partial nephrectomy, you may have normal kidney function. To preserve normal kidney function, your doctor may recommend that you eat a healthy diet, stay hydrated by drinking water, keep active by taking part in daily exercise and attend regular check-ups to monitor the health of your remaining kidney.

If you develop chronic kidney disease (reduced kidney function) after complete or partial nephrectomy, your doctor may recommend additional lifestyle changes, including possible dietary changes and being careful about prescription and over-the-counter medicines.

What happens if my cancer comes back?

When your treatment has been completed and you are in remission (your cancer and symptoms have gone away), talk with your surgeon about what happens next and how you will be monitored for possible recurrence of the cancer. Many patients feel worried or anxious that the cancer will return.

If the cancer does return, you will undergo further tests to learn as much as possible about the recurrence. You and your surgeon will then talk about your treatment options which may involve further surgery or discussion with an oncologist about drug treatments.

People with recurrent cancer often experience emotions such as disbelief, confusion and fear. Patients are encouraged to talk with their healthcare team about these feelings and ask about support services to help them cope.

What if my cancer has already spread?

If your kidney cancer has already spread to other parts of the body, a nephrectomy may still be useful to relieve symptoms such as pain and bleeding. Nephrectomy after the cancer has spread does not usually cure the cancer, so it is important to think carefully about the risks and benefits it may bring.

Sometimes, if there is metastatic spread to other organs such as the lung or the adrenal gland, the metastases can be removed by surgery as well. Surgical removal of metastatic tumours may improve your overall survival.

For more information about the treatment of kidney cancer that has spread, please see the *Essential guide: Treatment for advanced renal cell carcinoma* about drug treatment for advanced kidney cancer.

Further reading

- **Action Kidney Cancer:**
<https://www.kcsn.org.uk/information-hub/faqs/>
- **Cancer Research UK:**
<https://www.cancerresearchuk.org/about-cancer/kidney-cancer/treatment>
- **Macmillan:**
<https://www.macmillan.org.uk/cancer-information-and-support/kidney-cancer>
- **NHS:**
<http://www.nhs.uk/conditions/kidney-cancer/treatment/>
- **NHS:**
Having an operation, Before Surgery: <https://www.nhs.uk/conditions/having-surgery/preparation/>

¹European Association of Urology (EAU) Renal Cell Carcinoma guidelines, <https://uroweb.org/guideline/renal-cell-carcinoma/>



Please see the Action Kidney Cancer glossary for definitions of the medical and scientific terms used in this Action Kidney Cancer Essential Guide: <https://actionkidneycancer.org/glossary/>

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