NHS
Royal Berkshire
NHS Foundation Trust

Treating your kidney tumour by percutaneous cryotherapy tumour ablation

This leaflet tells you about the procedure known as "percutaneous cryotherapy tumour ablation" and explains what is involved, including the benefits and possible risks. It is not meant to replace informed discussion between you and your doctor but can act as a starting point for such a discussion. Further sources of information are suggested at the end of the leaflet. Your consultant will be happy to give you time to ask all the questions you need to. If you have any other queries please call the Radiology Department on 0118 322 8368.

Kidney tumours

There are many different types of kidney tumours. The most common type is called a renal cell carcinoma (RCC) and you will normally be offered percutaneous thermal tumour ablation treatment if this type of tumour is suspected. Most RCCs are slow growing. However, about 20% (1 in 5) are more aggressive, grow faster and will also spread to other areas of the body. As yet, we cannot reliably predict how a tumour will behave so treatment is offered when appropriate.

How are kidney tumours normally treated?

Treatment options for small renal tumours include surgery (removal) or thermal ablation (a minimally invasive procedure using cold to destroy cancer cells. Surgery can be performed by conventional open or keyhole (laparoscopic) surgery, where either the whole kidney is removed (total nephrectomy) or a portion of the kidney containing the tumour is cut out (partial nephrectomy). These procedures are not suitable for all patients.

Thermal ablation can be offered where patients wish to avoid surgery, are not fit for surgery or if they have poor kidney function, which can be made worse by surgery. Preserving kidney function is very important.

Other patients may not wish to undergo a procedure at all and may opt for a "watch and wait" approach. The doctors looking after you can discuss all these options with you and answer any questions you have.

What is percutaneous cryotherapy tumour ablation?

'Percutaneous' means through the skin and ablation means destruction (of tissue). 'Percutaneous cryotherapy tumour ablation' is therefore a technique where very low temperatures are used to freeze and destroy tumour cells. The energy to cool or freeze the tissue is delivered through thin needles called electrodes. These are inserted through the skin into the tumour under image guidance using a CT scanner and sometimes an ultrasound machine.

Cryotherapy

Cryotherapy (also called cryoablation) is a technique that destroys tumours by freezing the tissue. The tumour is rapidly frozen and destroyed at temperatures as low as –20 to –40°C.

There are several other types of ablation where tumours are heated instead of frozen. We currently use the freezing method for kidney tumours at this Trust, in line with many other large hospitals in the UK. Cryotherapy is safe and effective.

Why am I being offered percutaneous cryotherapy tumour ablation?

Percutaneous cryotherapy should be considered in patients who wish to avoid surgery, are high risk for surgery or have other complicating factors. Patients with chronic kidney failure, a single kidney, multiple kidney tumours, and those with previous kidney surgery or those who don't want surgery are all potential candidates. Cryotherapy is also being offered to patients who would traditionally be suitable for surgery but would prefer a less invasive procedure, as evidence shows that cryotherapy for smaller tumours is as effective at preventing the tumour from recurring as open or keyhole surgery, with better preservation of kidney function (see further information at the end of this leaflet).

Your consultant will be considering this procedure for you only after a detailed assessment. This will include a CT scan, discussion of your case at a multi-disciplinary meeting where consultants from several specialties meet, and, of course, discussion with you. Your consultant will also explain the alternatives, including surgery or simply monitoring the tumour ("watch and wait").

All treatment options have benefits and risks and these will be explained in detail before you give consent for the procedure.

This procedure is not suitable for everyone. The position and size of some tumours may make them unsuitable for cryotherapy.

Benefits of percutaneous cryotherapy

- Least invasive procedure, which avoids surgery.
- Shorter procedure time compared to surgery.
- Low rate of post-operative complications.
- Minimal blood loss, with a low likelihood of needing a blood transfusion.
- Less post-procedural pain compared to surgery.
- Shorter recovery period and hospital stay compared to surgery.
- Better preservation of kidney function compared to surgery.

Common risks of percutaneous cryotherapy

- Pain, bruising and blood in the urine.

Serious complications – 2% or less (less than 1 in 50)

- Bleeding requiring a blood transfusion.
- Injury to the urinary system requiring a stent (tube to allow urine to drain from the kidney to the bladder.
- Injury to the bowel requiring surgery.
- Damage to nearby organs (including the skin, which could require skin grafting).

- Nerve damage (resulting in numbness or pain, normally temporary).
- Pneumothorax (air leak in the lung).
- Lack of success at treating the whole tumour in one session leading to repeat treatment.
- Tumour recurrence that may require repeat treatment.

Who will be doing the percutaneous cryotherapy?

An interventional radiologist performs the procedure, and works closely with the urology doctors, both in ensuring your suitability and in assessing the results of treatment.

Where will the procedure take place?

The procedure is performed in the X-ray Department (Radiology) in the CT scanner room.

How do I prepare for percutaneous cryotherapy?

You will be given an appointment to attend a pre-procedural consultation and pre-assessment clinic. All preparation details will be discussed with you and you will be able to ask questions of your own. We will also carry out some blood tests.

What happens on the day of the percutaneous cryotherapy?

Most patients are admitted the night before and kept ‘nil by mouth’ from midnight, or you may be given an early breakfast, depending on the time of your procedure. The nurse will make sure you are in a hospital gown, will check your blood pressure and confirm your details. A cannula (plastic tube) will be inserted into your arm for the administration of fluids and drugs. Very occasionally, before the procedure, a tube (urinary catheter) is also passed into the bladder and up into the kidney being treated. Saline (a salt solution) is flushed through this during the procedure to protect the kidney from injury. We will let you know during your consultation if this is planned. You will be seen by your consultant and the anaesthetist just before the procedure. They will explain what happens during the procedure and will ask you to give your consent to go ahead. You will also have an opportunity to ask any questions.

What happens during the percutaneous cryotherapy procedure?

- Most kidney tumour cryotherapy procedures are performed under general anaesthesia (you will be asleep).
- Cryotherapy can also be performed under local anaesthetic with sedation (you are awake but drowsy and numb).
- We will then position you on the scanner, normally lying on your front.
- Your back and sides are cleaned with antiseptic and most of your body covered with sterile drapes.
- The CT scanner is then used to take pictures and decide on where the needles should be positioned.
- We sometimes give you contrast or dye through a vein when we perform the CT scan.
- Local anaesthetic is then injected into the skin and the needles are inserted through tiny incisions. The number of needles used depends on the size of the tumour.
- We normally also take a biopsy (tissue sample) of the tumour at this time if a sample has not already been taken.

- Needles may also be placed around the kidney in inject fluid to protect other structures such as the bowel. Once all the needles are correctly positioned, the tumour is then treated.
- How long treatment takes will depend on the size of the tumour. Once completed, all needles are removed and a plaster is placed over the small incisions.

Will it hurt?

Insertion of a cannula (plastic tube or drip) into a vein in the arm or hand before the procedure should be no more painful than an injection. As the procedure is normally performed under general anaesthetic, you will not be aware of anything during the treatment. If you have the procedure under local anaesthetic with sedation, you will be constantly monitored to ensure you are comfortable.

After the procedure, any soreness from the treatment in your back and sides can be treated with injections or tablets on the ward.

How long will it take?

Every patient's situation is different and it is not always easy to predict how complex or straight-forward the procedure will be. A typical case takes around 2 hours. Others will take longer.

What happens afterwards?

The general anaesthetic will be reversed in the CT room and you will be transferred to a recovery area. Most patients can then be transferred to the urology ward (Hopkins) for further observation. Rarely, patients are transferred to the Intensive Care Unit if more intensive monitoring is required. You will be assessed after the procedure and encouraged to mobilise the next day. Patients are normally discharged the next day.

A CT scan is performed 3 months after the procedure to assess the treatment and decide on whether further treatment is necessary.

Please remember that after cryotherapy you will be required to have long-term CT scan follow up (normally at 3 months, 1 year, 3 years and finally at 5 years).

How successful is percutaneous cryotherapy?

As yet, there are no studies that directly compare cryotherapy to surgery in the treatment of renal tumours. However, evidence from many published studies looking at thermal ablation including cryotherapy have shown similar successful results to surgery in terms of treating small tumours (less than 3-4cm).

The strength of evidence now means that cryotherapy is recommended by the National Institute for Clinical Excellence (NICE) in the treatment of small kidney tumours.

And finally

Some of your questions should have been answered by this leaflet but remember this is only a starting point for discussion about your treatment with the doctors looking after you.

Make sure that you are satisfied that you have received enough information about the procedure before you sign the consent form.

Further information

- National Institute for Health and Clinical Excellence (NICE) www.nice.org.uk/guidance/ipg402
- British Society of Interventional Radiology www.bsir.org/patients/kidney-tumour-ablation/
- Liu, Y., Wang, L., Bao, Eh. *et al.* Perioperative, functional, and oncological outcomes after cryoablation or partial nephrectomy for small renal masses in solitary kidneys: a systematic review and meta-analysis. *BMC Urol* **24**, 19 (2024).
- Royal College of Radiologists, www.rcr.ac.uk

To find out more about our Trust visit www.royalberkshire.nhs.uk

Please ask if you need this information in another language or format.

RAD_0139
RBFT Radiology, May 2025
Next review due: May 2027