

## **Information for Patients Undergoing Thermal Ablation of Liver Tumours**

### **Department of Radiology**

### **What is Thermal Ablation of Liver Tumours?**

Thermal ablation is a minimally invasive treatment for cancer. It is an image-guided technique that heats and destroys cancer cells.

In thermal ablation, imaging techniques such as ultrasound, computed tomography (CT) or magnetic resonance imaging (MRI) are used to help guide a needle electrode into a cancerous tumour. Energy is then passed through the electrode, creating heat that destroys the abnormal cells.

### **What are some common uses of the procedure?**

Thermal ablation is used to treat two types of liver cancer:-

- hepatocellular carcinoma, which is a primary liver cancer (meaning it begins in the liver).
- colon cancer that metastasizes or spreads from the colon to the liver.

In general, thermal ablation is most effective treating tumours that are less than one and a half inches in diameter. It may be used in addition to chemotherapy or radiation therapy or as an alternative to surgical treatment.

Thermal ablation is a viable and effective treatment option if you:-

- are not a good candidate for surgery because your tumour is difficult to reach.
- have other medical conditions that make surgery especially risky.
- would not have enough liver tissue left for the organ to function adequately following the surgical removal of a tumour.
- have liver tumours that have not responded to chemotherapy or that have recurred after being removed surgically.
- you have several small liver tumours that are too spread out to be removed surgically.

## **How should I prepare?**

Your doctor may advise you to stop taking aspirin, non-steroidal anti-inflammatory drugs (NSAIDs) or a blood thinner for a specified period of time before your procedure.

Prior to your procedure, your blood may be tested to determine how well your liver and kidneys are functioning and whether your blood clots normally.

You must tell the doctor about:-

- All medication that you are taking
- Any allergies which you may have - especially to local anaesthetic, general anaesthetic or to contrast materials (x-ray dye).
- Women should always inform their doctor if there is any possibility that they are pregnant.

You may be instructed not to eat or drink anything after midnight before your procedure.

Your doctor will tell you which medications you may take in the morning.

You will be asked to wear a gown during the procedure.

## **What does the equipment look like?**

The equipment used in this procedure depends on the type of imaging used—magnetic resonance (MR), computed tomography (CT), or ultrasound. Other equipment such as needle electrodes, an electrical generator and grounding pads may also be used.

### **Ablation equipment**

There are two types of needle electrodes: simple straight needles and a straight, hollow needle that contains several retractable electrodes that extend when needed.

The generator produces energy to convert to heat. It is connected by insulated wires to the needle electrodes and, sometimes, to grounding pads that are placed on the patient's back or thigh.

### **Computed Tomography (CT)**

The CT scanner is typically a large, box like machine with a hole in the centre. You will lie on a narrow examination table that slides into and out of this hole. Rotating around you, the x-ray tube and electronic x-ray detectors are located opposite each other in a ring, called a gantry.

The computer workstation that processes the imaging information is located in a separate room, where the radiographer operates the scanner and monitors your examination

## **Ultrasound equipment**

Ultrasound scanners consist of a console containing a computer and electronics, a video display screen and a transducer that is used to scan the body and blood vessels. The transducer is a small hand-held device that resembles a microphone, attached to the scanner by a cord.

### **How does the procedure work?**

Thermal ablation works by passing energy. This energy creates heat around the electrode, which when directed into the tumour, heats and destroys the cancer cells. Because healthy liver tissue is better able to withstand heat, thermal ablation is able to destroy a tumour and only a small rim of normal tissue around the edges of the tumour. At the same time, heat from thermal energy closes small blood vessels and lessens the risk of bleeding. The dead tumour cells are gradually replaced by scar tissue that shrinks over time. Ultrasound or computed tomography imaging may be used to help the doctor guide the needle electrode into the tumour. Sometimes both are used in conjunction with one another.

### **How is the procedure performed?**

Image-guided, minimally invasive procedures such as thermal ablation are most often performed by a specially trained interventional radiologist in an interventional radiology CT suite or occasionally in the operating theatre.

You will be positioned on the CT table.

You will be connected to equipment which monitors your heart rate, blood pressure and pulse during the procedure.

A needle will be inserted into a vein in your hand or arm so that sedation medication can be given intravenously.

The area where the electrodes are to be inserted will be sterilized and covered with a surgical drape.

Your doctor will numb the area with a local anaesthetic if the procedure is to be done while you are awake. Occasionally the procedure is done under a general anaesthetic. A very small nick may be made in your skin to make it easier to pass the RFA electrode into your liver.

Thermal ablation is performed using one of three methods:-

- Surgically.
- Percutaneous, in which needle electrodes are inserted through the skin and into the site of the tumour.
- Laparoscopic, in which needle electrodes within a thin, plastic tube is threaded through a small hole in the skin in a procedure called a laparoscopy.

Using imaging-guidance, your doctor will insert the needle electrode through the skin

and advance it to the site of the tumour.

Once the needle electrode is in place, thermal energy is applied. For a large tumour, it may be necessary to do multiple ablations by repositioning the needle electrode into different parts of the tumour to ensure no tumour tissue is left behind.

At the end of the procedure, the needle electrode will be removed and pressure will be applied to stop any bleeding and the opening in the skin is covered with a dressing.  
No sutures are needed.

Each Thermal ablation takes about 10 to 30 minutes, with additional time required if multiple ablations are performed. The entire procedure is usually completed within one to three hours.

### **What will I experience during and after the procedure?**

Devices to monitor your heart rate and blood pressure will be attached to your body.

You will feel a slight pin prick when the needle is inserted into your vein for the intravenous line (IV) and when the local anaesthetic is injected.

The intravenous (IV) sedative will make you feel relaxed and sleepy. You may or may not remain awake, depending on how deeply you are sedated.

Pain immediately following Thermal ablation can be controlled by pain medication given through your IV or by injection. Afterward any mild discomfort you experience can be controlled by oral pain medications. Patients may feel nauseous, but this can also be relieved by medication.

You will remain in bed for 4-6 hours after the procedure.

Most patients are discharged home the same day.

You should be able to resume your usual activities within a few days.

Only about two percent of patients will still have pain a week following thermal ablation.

### **What are the benefits vs. risks?**

#### **Benefits**

- Thermal ablation can be an effective treatment for primary liver cancer and for cancers that have spread to the liver in select patients whose disease is unsuitable for surgical resection.
- In most studies, more than half of the liver tumours treated by thermal ablation have not recurred.
- Treatment-related serious complications are infrequent and discomfort is minimal.
- Thermal ablation may be used repeatedly to treat recurrent liver tumours.

- The percutaneous method of thermal ablation, in which electrodes are inserted through the skin, is minimally invasive, produces few complications, and does not require hospital admission.
- Thermal ablation is a relatively quick procedure and recovery is rapid so that chemotherapy may be resumed almost immediately.
- Thermal ablation is less expensive than other treatment options.
- No surgical incision is needed—only a small nick in the skin that does not have to be stitched closed.

## **Risks**

- Any procedure where the skin is penetrated carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.
- Depending on the site of treatment, thermal ablation may cause brief or, rarely, long-lasting shoulder pain; inflammation of the gallbladder that subsides after a few weeks; damage to the bile ducts resulting in biliary obstruction; or thermal damage to the bowel.
- Roughly one in four patients may develop a "post-ablation syndrome" with flu-like symptoms that appear three to five days after the procedure and usually last about five days. An occasional patient may remain ill for two to three weeks. Ibuprofen taken by mouth is commonly used to control fever and other symptoms.
- Some cases of bleeding have been reported but it usually stops on its own. If bleeding is severe, an additional procedure or surgery may be needed to control it.
- Organs and tissues near the liver, such as the gallbladder, bile ducts, diaphragm and bowel loops, are at risk of being injured. Although this occurs only 3 to 5 percent of the time, it may require surgical correction. The risk of this complication is related to the location of the liver tumour that is treated.
- Less than one percent of patients may develop a localized infection (abscess) at the site of the tumour ablation three to four weeks after the treatment. A liver abscess will require tube drainage and antibiotics to cure. Patients who have had a surgical procedure in which the liver bile duct has been connected to a loop of bowel are at much greater risk of developing a liver abscess after ablation.
- Severe pain after RFA is uncommon, but may last a few days and require a narcotic to provide relief.

## **What are the limitations of Thermal Ablation of Liver Tumours?**

There is a limit to the volume of tumour tissue that can be eliminated by thermal ablation.

This is due to limitations with current equipment.

Hopefully technical advances will permit larger tumours to be treated in the future.

Thermal ablation also cannot destroy microscopic-sized tumours and cannot prevent cancer from growing back.

**For further information contact:-**

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British Society of Interventional Radiology (BSIR) and the Clinical Radiology Patients' Liaison Group (CRPLG) of the Royal College of Radiologists.

Radiology Info.org - a link from the BSIR website.

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Mae’r ddogfen hon ar gael yn Gymraeg”.**