

## **Radiofrequency ablation**

### **What is RFA?**

During ablation procedures, interventional radiologists directly apply extreme heat, extreme cold, or chemicals such as alcohol, to kill cancer cells. One relatively new ablation technique called radiofrequency ablation (RFA) has shown good results.

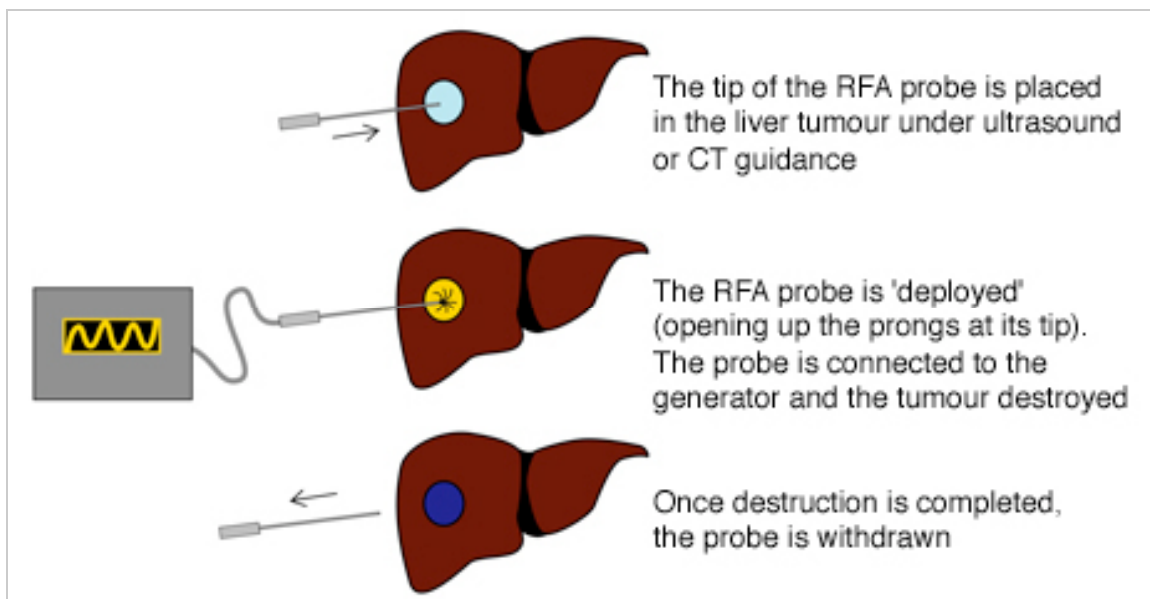
### **When and where is RFA used?**

RFA is primarily used to treat cancer in the liver, but it is also used in the kidney, adrenal glands, lung, bone and prostate. RFA is used to treat cancers that cannot be removed by surgeons because of their number (too many) or location (too scattered or dangerously close to a major blood vessel) or because the patient is not healthy enough to have open surgery. It can also be used to treat small tumours in conjunction with surgical removal of a large mass elsewhere in the liver. It may be used to treat small tumours (HCCs) as a holding measure while the patient waits for a surgical resection or a transplant. There are limitations to the technique. It can only be used to treat tumours up to 4 cm in size, and probably not more than 3 or 4 tumours can be treated in one session. Also, if a tumour lies immediately next to a big blood vessel or bile duct it may not be safe to do RFA. We now know that RFA is a reasonably safe technique, and that it can successfully burn a tumour. But whether it destroys a tumour completely (i.e. what is the chance of tumour recurring at that site) is more difficult to tell, and there are concerns that it may not match up to surgical resection in this respect.

### **What does RFA involve? How is it done?**

The procedure may be carried out in an operating room or in an x-ray department, and involves the administration of either intravenous sedation or a full general anaesthetic. During the technique, the doctor (who is usually an interventional radiologist or a surgeon) views the liver tumour through ultrasound (or CT). Once located, the doctor makes a small cut in the skin through which a needle is passed. Through the tip of the needle, the doctor extends several prongs into the tumour. When opened out, the prongs look like the frame of a miniature umbrella. The needle is then connected to the RFA generator (a machine the size of a briefcase), and radiofrequency energy is sent to the needle. It delivers a precise round ball of heat that kills the cancerous cells.

Once the tissue is “cooked” the machine senses that, the procedure is stopped, and the needle is removed. The dead tumour tissue shrinks and later forms a scar.



### **What can one expect after treatment?**

After the procedure, the patient will experience some pain and possibly nausea. Most RFA procedures can be done as a brief overnight stay. Once home, there will be pain for one or two days and there may be a low grade fever. Most patients experience few significant side effects beyond these, but depending on the size of the tumour treated and its location, some patients may feel fatigued or tired. He/she should be able to resume all normal activities within a few days. If any symptoms recur or become worse instead of improving, a doctor should be notified.

More serious complications can develop, but they are quite rare. There may be a leak of bile or blood from the point where the liver was punctured. Infection may develop at the site of the burn, leading to an abscess (a pocket of pus) within the liver. Patients with cirrhosis may rarely develop liver failure after RFA. In the longer term, damage to any bile ducts in the vicinity of the tumour may lead to jaundice.

### **Follow up tests**

The patient will get a follow-up CT or MRI scan, as well as blood tests, to determine the size of the treated tumour and how well the

RFA worked. CT and MRI scans will continue every few months thereafter to determine how much the tumour has ultimately shrunk. RFA frequently may be repeated to treat all lesions or all parts of a larger tumour.

**Are there any alternatives to RFA?**

In a similar technique, called cryoablation, probes are inserted into the tumour to freeze and kill cancer cells. Laser energy and microwave energy are also being tested for use in similar fashion. Alcohol can also be injected into tumours, particularly small HCCs, to destroy them.