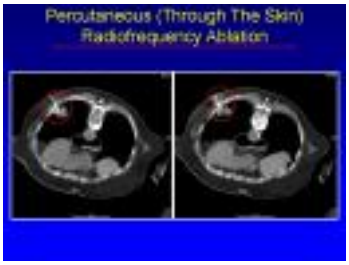
Radiofrequency Ablation (RFA) for Lung Tumors

Several people have asked about the technique of radiofrequency ablation, or RFA, for lung tumors. RFA is a pretty specialized approach in which a needle probe is inserted through the skin, under visual guidance using a CT or ultrasound, to go directly into a tumor. The tip is then pushed out and splays into a shape like the frame of an umbrella, and then an electric current is turned on to superheat the tip of the probe. In some cases, the probe is moved around to cover a broader area and destroy a larger tumor, but the procedure works particularly well for smaller tumors. It also works best for tumors that are more peripheral, along the outer edges of the lung. Here's what the CT images look like during a procedure.



(click to enlarge)

Dr. Dupuy at Brown University first described their experience of treating 3 patients with RFA for lung tumors (one dying in a nursing home 2 months later, one with a recurrence after 3 months, and another with a good result and no evidence of disease 3 months after the procedure), noting, "*RFA is a promising new minimally invasive technique for treating solid tumor malignancies*" (article here). Since 1998 there have been several hundred patients reported as having lung tumors ablated with this technique (representative recent articles from case series here and here). Some of these patients have been treated with a combination of RFA and radiation.

RFA can certainly have complications, most notably pneumothorax, or collapse of the lung, which occurs in about 30% of cases, and 1/3 of those cases require placement of a chest tube. Patients can also cough up blood, and pneumonia or abscess formation are also sometimes seen. There is also a post-ablation syndrome of fever and malaise that has been recognized in patients.

The key question is how and where this approach fits in with the array of treatment options we already have available. It is a local therapy, which means that it works for a specific tumor area, the same concept applying to surgery and most radiation techniques. But surgery and radiation have a much greater history and wide experience than RFA, which is still practiced by a few experts in a relatively small number of centers (I happen to work with a very good RFA expert, but he's only had 3 patients with lung tumors and an overall situation suitable for the technique, but he does many, many more liver tumors, in which has been much more extensively studied). While it can be done in just one treatment setting and is usually an outpatient or overnight procedure, it is invasive and can have complications. RFA doesn't have any established role or anticipated survival benefit for multifocal, advanced lung cancer, where new lesions can readily occur in short order after treating one or a few tumors with RFA.

It's generally been used for debilitated patients who are not candidates for surgery but have early stage lung cancer. The problem is that this is the setting in which most people would recommend and pursue radiation therapy, and there are not many situations in which radiation is not possible but RFA is an appropriate option.

About the only scenario in which I would consider RFA to be a strong consideration is when a rather frail patient who has a localized lung cancer is not a surgical cancer, undergoes radiation to that lesion, and then has viable residual cancer in the radiation field, and it is not felt to be safe or feasible to deliver more radiation. Right now, many centers, including my own, have a rapidly growing array of radiation techniques, including sterotactic radiosurgery approaches like cyberknife and "image-gated radiation therapy" (IGRT), and intensity-modulated radiation therapy (IMRT), while other centers have proton beam radiation, etc. All of these approaches are designed to deliver very focal radiation to a narrow target while minimizing collateral damage to surrounding tissues, and in most cases I would consider radiation and even re-irradiation with such techniques to be a strong consideration. RFA may occasionally be an option, but it is very specialized and not widely available, and my interpretation is that there are many other techniques that offer similar advantages. I don't foresee RFA emerging as a standard tool for lung tumors in the foreseeable future, but for the occasional patient with access to a specialist, it may be a good option.