

## About Radiofrequency Ablation (RFA)

Radio frequency ablation (RFA) is a medical procedure where part of the electrical conduction system of the heart, tumor or other dysfunctional tissue is removed using high frequency alternating current to treat a medical disorder.

High-frequency electric current is used to heat tumors from within, a process referred to as “cooking the tumor to death” (McCullough 2001). In cardiology, high frequency radio waves have been used for decades to ablate cardiac nerves in patients with dangerous heart rhythms that resisted drug therapy.

The concept merged into oncology with radiofrequency ablation (RFA) initially used to provide palliative relief to inoperable, terminal patients, particularly those with liver cancer.

Momentum is growing for the technique, and the therapeutic focus is changing as well. So strong are the prospects for RFA that this pioneering treatment appears (according to researchers) to have the potential to replace both surgery and radiation therapy. Because of its therapeutic value and cost effectiveness, along with its noninvasive, low-risk profile, RFA has the attention of both physicians and patients.

The National Institutes of Health consider RFA the most predictable, safest, and simplest method for thermal ablation in bone, liver, kidney, prostate, breast, and brain cancers.

Using open MRI, doctors gain access to the tumor through a needle puncture, a process requiring no surgery. Using specially designed titanium or stainless steel instruments, doctors are directed by the MRI image to the site of malignancy. A titanium electrode is guided to the tumor and enough heat is generated (just below the boiling point) to kill the cancerous cells. After 10-12 minutes of continuous contact with the tumor tissue, the radiofrequency energy “cooks” a sphere of 1-2 inches. By “cooking” adjacent spheres, larger tumors can be treated.

Dr. Jonathan Lewin, director of magnetic resonance imaging at University Hospitals of Cleveland, says that tumorous areas that earlier appeared white are now black, a black hole of dead tumor tissue. It is immediately possible to determine the amount of tumor destruction and to plan treatments (should additional treatment be necessary).

The dead cells are not removed, but become scar tissue and eventually shrink. The procedure is done under local anesthesia, with minimal discomfort to patients. There are no cumulative dose effects as with radiation therapy, so patients can be treated repeatedly if the cancer returns to other sites. Hospitalization is usually limited to several hours rather than days.

Dr. Patrick Sewell (University of Mississippi Medical Center) performed this procedure on nine lung cancer patients in China, ranging in age from 38-78 years. Five had primary tumors, two had primary lung tumors with metastasis, and two had metastasized cancer that had spread to the lungs from other locations. When the PET scans came back (3 days following treatment), all tumors had been killed (Sewell 2000). At the 85th Annual Meeting of the Radiological Society of North America (Chicago), Dr. Tito Livraghi of Vimercate Hospital, Italy, presented the results of a study designed to evaluate the efficacy of RFA in breast cancer-to-liver metastasis. The study consisted of 15 lesions in 10 patients (average age 51 years). Eight of the patients had progressive

metastatic disease following chemotherapy; two patients with hepatic metastasis had not undergone chemotherapy.

Following RFA, the value of the treatment was assessed by biphasic helical computed tomography (CT) performed at 4-month intervals. Complete necrosis was obtained in 14 out of 15 lesions (93%).

Follow-up imaging studies (at 4-30 months) were unable to detect a recurrence in any of the 14 lesions.

Four patients have remained disease free; five (later) have developed new hepatic and/or extra- hepatic metastasis; and one has died with diffuse metastasis. RFA resulted in no treatment-induced complications (Pullen 1999).

Early results (from an NIH Clinical Center Study) look promising for the use of RF energy in patients with certain kidney and adrenal tumors. Of 18 kidney tumors treated, 13 (72%) showed no x-ray evidence of residual tumors immediately following treatment. One patient remained cancer-free 2 years following treatment. In a related NIH study involving adrenal gland tumors, 7 of 11 tumors (64%) showed no active disease following RFA. Though the remaining 36% of patients had evidence of residual tumors on follow-up imaging, all patients treated had x-ray confirmation that most of the targeted tumor was killed by treatment (Healthlink 2000). **SOURCE: Alternative Cancer Research Institute**

#### **Further Reading & References**

- “Radiofrequency ablation of hepatocellular cancer in 110 patients with cirrhosis.” [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=10973388&dopt=Abstract](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10973388&dopt=Abstract)
- “Radiofrequency ablation of 40 lung neoplasms: preliminary results.” (18 patients with inoperable lung cancer experienced a 94.4% success rate), [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15269026](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15269026)