

FACT SHEET

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Minimally Invasive Treatments for Breast Cancer

Interventional Radiology Treatments Offer New Options and Hope to Patients Who Are Not Good Surgical Candidates

In the United States, a woman is diagnosed with breast cancer every three minutes and one woman will die from the disease every 13 minutes.¹ For these women, as well the thousands of men diagnosed each year,¹ breast cancer treatments can be highly effective, but often require invasive treatment options such as surgery and chemotherapy. Recent advancements in technology and imaging now offer patients more tools to fight breast cancer—minimally invasive treatments known as thermal ablation and laser therapy.

Thermal ablation treatment is building on the two-decade trend toward less radical approaches and utilizing local treatments for breast cancer. Due to the cosmetic result of more invasive therapies, treatments that would preserve the greatest amount of normal tissue (breast conservation) have great appeal.^{5,7} Although the devices used in radiofrequency ablation, cryoablation and laser therapy are FDA approved, more research and long-term data are needed to determine the role these procedures will have in the fight against breast cancer.

Surgery offers the best chance for a cure. Until long-term data are available, interventional treatments are reserved for women who cannot have surgery.

About Breast Cancer

When breast tissue divides and grows at an abnormal rate, a mass of extra tissue can develop into a tumor. To continue growing, a tumor generates its own blood supply to provide oxygen and nutrients. Although the cancerous cells can grow in size in the breast, they can also travel throughout a person's blood stream and become embedded in other organs, a process known as metastasis. Typically, 20 percent of breast cancer develops in the lobules where milk is produced, while 80 percent originates in the mammary ducts that carry milk from the lobules to the nipple.²

As vascular experts, interventional radiologists are uniquely skilled in using the vascular system to deliver targeted treatments via catheter throughout the body. In treating cancer patients, interventional radiologists can attack the cancer tumor from inside the body without medicating or affecting other parts of the body. For breast cancer, interventional radiologists use thermal ablation, as well as some laser therapy, to kill the cancer cells. Although the devices used are FDA approved, research to evaluate the long-term effects of these treatments is still ongoing.

Diagnosis

Interventional radiologists can also assist with the diagnosis by performing a needle-core biopsy of an abnormal lump. Using imaging for guidance, an interventional radiologist

can insert a small needle into the mass and remove a tissue sample, which is given to a pathologist to determine what the cause of the abnormal tissue—cancer, benign tissue, infection, or scar.

Needle biopsy is typically an outpatient procedure with very infrequent complications; less than 1 percent of patients develop bleeding or infection. In about 90 percent of patients, needle biopsy provides enough tissue for the pathologist to determine the cause of the abnormality.

THERMAL ABLATION TREATMENTS

Radiofrequency Ablation

For cancerous tumors, radiofrequency ablation (RFA) offers a nonsurgical, localized treatment that kills the tumor cells with heat, while sparing the healthy breast tissue. Because of the localized nature of this treatment, RFA does not have any systemic side effects. Radiofrequency ablation can be performed without affecting the patient's overall health and most people can resume their usual activities in a few days.

In this procedure, interventional radiologists use imaging to guide a small needle through the skin into the tumor. From the tip of the needle, radiofrequency energy is transmitted into the target tissue, where it produces heat and kills the tumor. Most patients experienced mild to moderate discomfort during the 15 minute RFA time.⁶ Following the RFA, the dead tumor tissue shrinks and slowly forms an internal scar. Because there is no surgical incision, RFA barely affects the appearance of the breast.⁶

Efficacy

Depending on the size of the tumor, RFA can shrink or kill the tumor, extending the patient's survival time and greatly improving their quality of life while living with cancer. RFA can extend patients' lives or in a small number of cases cure patients.

Because it is a local treatment that does not harm healthy tissue, the treatment can be repeated as often as needed to keep patients comfortable. RFA is a very safe procedure, with few complications.⁶ It is effective for small to medium-sized tumors, and emerging new technologies should allow the treatment of larger cancers in the future. One study showed 100 percent tumor cell death using RFA, with no complications after the procedure.¹⁰ RFA is often reimbursed by insurance carriers.

Currently, the protocol is to "ablate and resect," in other words, to kill the tumor with heat and then remove the dead cells to ensure all the cancer cells were destroyed. As research progresses, the treatment pattern will become "ablate and follow"—simply treat the patient with RFA and track their progress over the following years.

For some women, surgery is not an option, due to other health concerns. For these patients, RFA is an excellent treatment option. In one study of postmenopausal women 60 years of age and older, 95 percent of women would be willing to have RFA again and 95 percent would be willing to have RFA without definitive surgery if it was known that RFA could kill their entire tumor.⁶

Although the use of RFA in other organs, especially in the liver, has shown promising results for killing cancer cells, the technique is not a mainstream treatment option for breast cancer patients. Current research is underway to further explore this treatment and the long-term effects on the disease and patients.

More facts on RFA:

- Usually does not require general anesthesia⁶
- Is well tolerated. Most patients can resume their normal routine the next day and may feel tired for a few days⁶
- Has low complication rates⁶
- It can be repeated if necessary
- It may be combined with other treatment options
- Causes minimal postprocedure pain⁶

Cryoablation

Cryoablation is similar to RFA in that the energy is delivered directly into the tumor by a probe that is inserted through the skin. But rather than killing the tumor with heat, cryoablation uses an extremely cold gas to freeze it. This technique has been used for many years by surgeons in the operating room, but in the last few years, the needles have become small enough to be used by interventional radiologists through a small nick in the skin, without the need for an operation. The “ice ball” that is created around the needle grows in size and destroys the frozen tumor cells.

Laser Therapy

Laser therapy causes cell death through the delivery of laser energy by a fiberoptic probe that is inserted into the tumor using imaging for guidance. During the procedure, local anesthesia is applied around the tumor, followed by the insertion of four metal markers. Next, using imaging for guidance, an interventional radiologist inserts a laser needle into the center of the tumor through a small nick in the skin, followed by the insertion of a multisensor thermal needle through another site. The laser needle is then replaced with an optic fiber through which the energy is transmitted into the tumor. It is an outpatient procedure.

The current research is promising, with one study finding that complete tumor necrosis (death) was achieved in 66 percent of the tumors treated¹⁰ and another study showing 93 and 100 percent tumor death in two groups, with no adverse effects.⁴

Breast Cancer Prevalence

- In the United States, a woman has about a 13 percent lifetime risk of developing breast cancer.¹
- Women 50 years of age and older account for approximately 80 percent of all breast cancers.¹
- Between age 40 and 50 the incidence of breast cancer doubles and by age 70 it doubles again.^{8,9}
- In the United States, African Americans have the highest death rate from breast cancer compared to any other racial group.¹
- Breast cancer is the most common cancer among women.¹

- In American women, the breast is the leading cancer site and is second only to lung cancer in deaths.¹

Metastatic Cancer

Patients with invasive breast cancer are at risk for liver cancer. The liver serves as a way-station for cancer cells that circulate through the bloodstream. These cells may grow and form tumors in the liver. It is estimated that as many as 70 percent of all people with uncontrolled cancer will eventually develop secondary liver tumors, or metastases (tumors formed by primary cancer cells that have spread from other cancer sites). Interventional radiologists offer nonsurgical treatments for liver cancer, including embolization to cut off the blood supply to the tumor, radioembolization that delivers radiation directly inside the tumor, and chemoembolization, which delivers the cancer drug directly into the tumor and then cuts off the blood supply.

About Interventional Radiologists

Interventional radiologists are doctors who specialize in minimally invasive, targeted treatments that have less risk, less pain and less recovery time compared to open surgery. They use their expertise in interpreting X-rays, ultrasound, MRI and other diagnostic imaging studies to understand, visualize and diagnose the full scope of the disease's pathology and to map out the procedure tailored to the individual patient. Then during the procedure, they image as they go to guide tiny instruments, such as catheters, through blood vessels or skin, to treat diseases at the site of the illness nonsurgically.

Interventional radiology is a recognized medical specialty by the American Board of Medical Specialties. Interventional radiologists complete preliminary training in Diagnostic Radiology and advanced training in Vascular and Interventional Radiology. The American Board of Radiology certifies their specialized training.

For Further Information

For more information on minimally invasive cancer treatments or interventional radiology, visit the SIR Web site at www.SIRweb.org.

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