

Breast Cancer

This information is reviewed by a physician with expertise in the area presented and is further reviewed by committees from the American College of Radiology (ACR) and the Radiological Society of North America (RSNA), comprising physicians with expertise in several radiologic areas.

Breast cancer overview

It is estimated that more than 240,000 women in the U.S. were diagnosed with breast cancer in 2008. It is now possible to detect most breast cancers at a very early state. With early detection and improved treatments more women are surviving breast cancer. Today, women have more treatment options than ever before.

What are my treatment options?

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- How can I make a decision between mastectomy and breast conservation therapy?
- Is radiation therapy necessary if the margins of the removed tissue are negative?
- What are the cosmetic results of breast conservation therapy?
- What is the prognosis after recurrence?

Treatment options overview

Treatment options include mastectomy or breast conservation therapy (BCT). Mastectomy is an operation to remove the entire breast including the nipple.

Often an axillary dissection is also done which removes the glands under the arm called axillary nodes. Mastectomy usually requires a hospital stay. Women who undergo a mastectomy have the option of breast reconstruction.

Breast conservation surgery removes the breast tumor and a margin of surrounding normal tissues. It is also known by other names: lumpectomy, partial mastectomy, segmental mastectomy and quadrantectomy. Radiation therapy usually follows lumpectomy to eliminate any microscopic cancer cells in the remaining breast tissue.

The purpose of breast conservation therapy is to give women the same cure rate they would have if they were treated with a mastectomy but to leave the breast intact, with an appearance and texture as close as possible to what they had before treatment. The surgeon may remove the lymph nodes (axillary dissection) at the same time as the lumpectomy procedure or later. It is estimated that 75 percent to 80 percent of patients can be treated with breast conservation therapy rather than mastectomy with excellent results. Years of clinical study have proven that breast conservation therapy offers the same cure rate as mastectomy.

Your radiation therapy procedure might include:

- External Beam Therapy
- Intensity-Modulated Radiation Therapy
- Intensity
- Interstitial Therapy (or "Brachytherapy") - the temporary placement of radioactive materials within the breast, usually employed to give an extra dose of radiation to the area of the excision site (called a "boost")

Patients may also have chemotherapy or hormonal therapy if there is a risk that the cancer may have spread outside of the breast to other body organs.

How can I make a decision between mastectomy and breast conservation therapy?

Breast conservation therapy is used for patients with early-stage invasive breast cancers (called Stage I and Stage II in the classification system). It is also used for patients with ductal carcinoma in situ (DCIS, called Stage 0). Some of the reasons to not have breast conservation therapy include: personal preference; increased risk of complications from radiation therapy in individuals with certain rare medical conditions; and tumors that are more likely than average to have a relapse in the breast with breast conservation therapy.

Most patients can choose a treatment based on other factors, such as convenience (for example, how far you must travel to receive radiation therapy) or personal preference (feeling safer if you undergo a mastectomy or being very worried about the possible side effects from radiation therapy). Most women prefer to keep their breast if this is possible to do safely, but there is no right answer for everyone. However, this decision is not one the physician can make for you.

Nearly all physicians will recommend patients be treated with mastectomy instead of breast conservation therapy when the risk of recurrence in the breast is more than 20 percent. This is the case if the tumor is large or multifocal. This situation occurs for only a small number of women, however.

Is radiation therapy necessary if the margins of the removed tissue are negative?

Many studies have reviewed this approach for patients with invasive cancers. Nearly all show that the risk of relapse in the breast is much higher when radiation is not used (20 percent to 40 percent) than when it is (5 percent to 10 percent).

Having breast cancer reappear in this way is a very traumatic event psychologically. Also, patients may need to have a mastectomy to be cured in this situation, so in more cases they may lose the breast than if they had undergone radiation therapy initially. Finally, not everyone who has a recurrence in the breast can be cured. Therefore, radiation therapy after lumpectomy is the standard treatment around the world.

There are several recent studies in which older patients with small, favorable invasive cancers have had a low risk of local relapse when treated with lumpectomy and hormonal therapy without radiation therapy. There is still uncertainty about the long-term results with this approach or about which individuals will do best without radiation therapy. This issue should be discussed in detail with your doctor.

For patients with noninvasive cancer (known as "ductal carcinoma in situ") matters are more complicated. Lumpectomy without radiation works well for many patients. However, there is disagreement on who can be treated safely with just a lumpectomy. This should be discussed in detail with your doctor.

What are the cosmetic results of breast conservation therapy?

Eighty percent to 90 percent of women treated with modern surgery and radiotherapy techniques have excellent or good cosmetic results; that is, little or no change in the treated breast in size, shape, texture or appearance compared with what it was like before treatment.

Patients with large breasts seem to have greater shrinkage of the breast after radiation therapy than do smaller-breasted patients. However, this problem usually can be overcome with the use of higher x-ray energies and IMRT.

What is the prognosis after recurrence?

Many patients with a recurrence of breast cancer can be successfully treated, often with methods other than radiation if radiation was used in the initial treatment. For patients treated initially for invasive breast cancer, 5 percent to 10 percent will be found to have distant metastases at the time of discovery of the breast recurrence. The same proportion will have recurrences that are too extensive to be operated on. These patients are rarely, if ever, cured. Five-year cure rates for patients with relapse after breast conservation therapy are approximately 60 percent to 75 percent if the relapse is confined to the breast and a mastectomy is then performed.

For patients treated initially for ductal carcinoma in situ (DCIS), about one-half of recurrences are invasive and one-half noninvasive DCIS. Cure rates following recurrence after initial breast conservation therapy have been high (90 percent to 100 percent) in some studies but are not always perfect.

What happens during radiation therapy?

Radiation is a special kind of energy carried by waves or a stream of particles. When radiation is used at high doses (many times those used for x-ray imaging exams) it can destroy abnormal cells that cause cancer and other illnesses.

What are possible side effects of radiation therapy?

There are no immediate side effects from each radiation treatment given to the breast. Patients do not develop nausea or hair loss on the head.

Most patients develop mild fatigue that builds up gradually over the course of therapy. This slowly goes away one to two months following the radiation therapy. Most patients develop dull aches or sharp shooting pains in the breast that may last for a few seconds or minutes. It is rare for patients to need any medication for this. The most common side effect needing attention is skin reaction. Most patients develop reddening, dryness and itching of the skin after a few weeks. Some patients develop substantial irritation.

Skin care recommendations include:

- Keeping the skin clean and dry using warm water and gentle soap
- Avoiding extreme temperatures while bathing
- Avoiding trauma to the skin and sun exposure (use a sunscreen with at least SPF 30)
- Avoiding shaving the treatment area with a razor blade (use an electric razor if necessary)
- Avoiding use of perfumes, cosmetics, after-shave or deodorants in the treatment area (use cornstarch with or without baking soda in place of deodorants)
- Using only recommended unscented creams or lotions after daily treatment

Some patients develop a sunburn-like reaction with blistering and peeling of the skin, called "moist desquamation." This usually occurs in the fold under the breast or in the fold between the breast and the arm, or sometimes in the area given a radiation boost. Most people with a limited area of moist desquamation can continue treatment without interruption. When treatment must be interrupted, the skin usually heals enough to allow radiation to be resumed in five to seven days. Skin reactions usually heal completely within a few weeks of completing radiotherapy.

What are some of the possible risks or complications?

Minor complications include:

- Slight swelling of the breast during radiotherapy. This usually goes away within six to 12 months.
- The skin becomes darker during the course of radiotherapy, similar to tanning from the sun. In most cases, this also fades gradually over six to 12 months.
- Most women will have aches or pains from time to time in the treated breast or the muscles surrounding the breast, even years after treatment. The reason why this happens is not clear; however, these pains are harmless, although annoying. They are NOT a sign that the cancer is reappearing.
- Rarely, patients may develop a rib fracture years following treatment. This occurs in less than 1 percent of patients treated by modern approaches. These heal slowly by themselves.

More serious complications include:

- Very rarely, patients develop a breakdown of the skin, fractures of the sternum (breastbone) or such severe pain in the breast that surgery is needed for treatment.
- Radiation therapy given to the axillary lymph nodes can increase the risk of patients developing arm swelling ("lymphedema") following axillary (armpit) dissection. Radiation to this area can cause numbness, tingling or even pain and loss of strength in the hand and arm years after treatment. Fortunately, both these treatment effects are very rare.
- Some patients develop "radiation pneumonitis," a lung reaction that causes a cough, shortness of breath and fevers three to nine months after completing treatment. Fortunately, it is usually mild enough that no specific treatment is needed and it goes away within two to four weeks with no long-term complications.

- Radiotherapy may damage the heart. Fortunately, radiation techniques used now treat much less of the heart than those used in the past. Current studies have found no increased risk of serious heart disease in patients treated with modern techniques even 10 to 20 years after radiotherapy treatment was given. However, there is still some uncertainty about the risks of radiation causing heart disease for individuals who smoke or have pre-existing heart disease, or for those who receive certain chemotherapy drugs. It is likely that such risks will also be found to be very small.
- Women age 45 or younger at the time of treatment may have a slightly increased risk (by a few percent at most) of developing cancer of the other breast with time, compared with the risk they would have if they did not undergo radiation. There is a very small risk (perhaps one in 1,000 individuals) that cancers may develop five, 10, 20 or more years later in the skin, muscle, bone or lung directly in the area of treatment.

What kind of treatment follow-up should I expect?

The major goal of follow-up is, if possible, to detect and treat recurrences in the irradiated breast or lymph nodes and new cancers developing later in either breast before they can spread to other parts of the body. The routine use of bone scans, chest x-rays, blood tests and other tests to detect the possible spread to other organs in patients without symptoms does not appear to be useful. Your physician will determine a follow-up schedule for you. This may include a physical exam every few months for the first several years after treatment and then every six to 12 months or so after that. Annual follow-up mammograms are an important part of your care. If symptoms or clinical circumstances suggest a recurrence, diagnostic tests such as blood tests, ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), chest x-ray (CXR), or bone scan may be needed.

Are there any new developments in treating my disease?

Partial breast irradiation with brachytherapy or IMRT is being explored and compared to whole breast irradiation.

Clinical Trials

To learn about current clinical trials being conducted, see the Clinical Trials page of the National Cancer Institute's Web site.

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