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Patient education: Surgical procedures for breast cancer — Mastectomy and breast-conserving therapy (Beyond the Basics)

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BREAST CANCER OVERVIEW

Breast cancer is the most common female cancer in the United States. Finding and treating breast cancer in the early stages allows many women to be cured.

This article will focus on the surgical treatment of breast cancer. An introduction to breast cancer and an overview of treatment for breast cancer are also available. (See "[Patient education: Breast cancer guide to diagnosis and treatment \(Beyond the Basics\)](#)".)

BREAST CANCER STAGING

In addition to removing the cancer from the breast and lymph nodes, surgery also provides important information about the "stage" of the cancer. The anatomic stage of breast cancer is based upon the size of the tumor in the breast (T), presence of cancer in the lymph nodes (N), and metastatic spread to distant sites (M). The prognostic stage also depends upon additional information, such as tumor grade and the expression of biomarkers, including estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2).

Staging of breast cancer is discussed in detail in a separate article. (See ["Patient education: Breast cancer guide to diagnosis and treatment \(Beyond the Basics\)"](#).)

FACTORS AFFECTING SURGICAL TREATMENT

Several factors must be considered when choosing the best surgical treatment for your breast cancer. You should discuss these factors with your health care provider as you decide which treatment is best for you.

Microscopic findings — The surgeon must determine if a breast cancer is invasive or noninvasive (in situ). (See ["Patient education: Breast cancer guide to diagnosis and treatment \(Beyond the Basics\)"](#), section on 'Types of breast cancer'.)

Invasive breast cancer — Invasive breast cancers usually require surgical treatment (mastectomy or breast-conserving therapy) as well as treatment after surgery (called adjuvant treatment). Adjuvant treatment can include radiation as well as systemic treatment such as chemotherapy or endocrine therapy.

Noninvasive (in situ) breast cancer — Noninvasive or in situ breast cancer is divided into two types: lobular carcinoma in situ (LCIS) and ductal carcinoma in situ (DCIS).

- **LCIS** – Although LCIS is often described as noninvasive breast cancer, it is **not** a cancerous or even precancerous lesion and does **not** require treatment. However, the presence of LCIS on a breast biopsy is associated with an increased risk of developing breast cancer over a lifetime, and patients are often counseled on risk reduction. This is discussed separately. (See ["Atypia and lobular carcinoma in situ: High-risk lesions of the breast"](#).)
- **DCIS** – Women with DCIS require surgical treatment (mastectomy or breast-conserving therapy) and may require treatment after surgery (called adjuvant treatment). Adjuvant treatment can include radiation as well as systemic treatment such as endocrine therapy. Chemotherapy is usually not necessary. (See ["Ductal carcinoma in situ: Treatment and prognosis"](#) and ["Microinvasive breast carcinoma"](#).)

Size of the breast tumor — Mastectomy may be needed for larger tumors, as lumpectomy may not be possible or produce the desired cosmetic outcome. However, sometimes patients with larger tumors can undergo chemotherapy prior to surgery, which is called neoadjuvant chemotherapy, and undergo breast-conserving surgery if the tumor shrinks. (See ["General principles of neoadjuvant management of breast cancer"](#).)

Tumors that invade the skin or muscle and inflammatory breast cancers also require chemotherapy, and mastectomy is usually recommended for these more advanced cancers. This is discussed in a separate article. (See ["Patient education: Locally advanced and inflammatory breast cancer \(Beyond the Basics\)"](#).)

Spread to the lymph nodes — Lymph nodes are usually the first place for breast cancer to spread. If a breast cancer has spread to lymph nodes, it is called **node positive**; a cancer that has not spread to the lymph nodes is called **node negative**. If a breast cancer has spread to the lymph nodes, it is more likely to recur. (See ["Management of axillary lymph nodes"](#) below.)

SURGICAL TREATMENT

Surgical removal of the tumor is often the first step in treating early-stage breast cancer. However, systemic treatment (eg, chemotherapy, targeted therapy, or endocrine therapy) may be recommended before surgery for some type of breast cancer, or for larger or more advanced tumors. (See ["Patient education: Locally advanced and inflammatory breast cancer \(Beyond the Basics\)"](#), section on ["Treatment of locally advanced breast cancer"](#).)

There are two options for breast surgery:

- Mastectomy involves removing the entire breast. (See ["Mastectomy"](#) below.)
- Breast-conserving surgery removes just the cancerous area and a small amount of surrounding normal tissue (also called lumpectomy). Breast-conserving surgery plus radiation therapy is referred to as breast-conserving therapy or BCT. (See ["Breast-conserving therapy \(BCT\)"](#) below.)

In centers that specialize in breast cancer treatment, approximately 75 percent of women with early-stage breast cancer are candidates for BCT. In 25 to 50 percent of women, there are medical, cosmetic, and/or social and emotional reasons for having a mastectomy rather than BCT. Survival outcomes are the same whether BCT or mastectomy is performed.

MASTECTOMY

Mastectomy may be recommended because of the location of your tumor, the size or shape of your breast, findings on your imaging examinations (mammogram or magnetic resonance imaging [MRI]), or whether radiation may be used. Mastectomy may also be your preference. (See ["Mastectomy"](#).)

Simple mastectomy — A total or simple mastectomy involves removing the entire breast without removing the axillary lymph nodes. A technique called sentinel lymph node biopsy is performed to be sure that the cancer has not spread to the lymph nodes.

Skin-sparing mastectomy — In a skin-sparing mastectomy, the nipple and areola are usually removed, but the rest of the skin over the breast is preserved. This is done in conjunction with immediate reconstruction with a plastic surgeon.

Nipple-sparing mastectomy and areola-sparing mastectomy — Because there is breast tissue extending to the nipple-areolar complex (NAC), standard mastectomies (both simple and skin-sparing) usually involve removing the NAC. However, for certain subsets of patients, it may be safe to preserve either the entire NAC (the nipple-sparing mastectomy, NSM) or remove the nipple with the breast tissue but preserve the areola (areola-sparing mastectomy, ASM). As with the skin-sparing mastectomy, these are done in conjunction with immediate reconstruction with a plastic surgeon.

Modified radical mastectomy — During a modified radical mastectomy (MRM), the breast tissue and the lymph nodes in the armpit (the axillary lymph nodes) are removed. An axillary node dissection is necessary only if the cancer has spread to the lymph nodes. (See ['Management of axillary lymph nodes'](#) below.)

Contralateral prophylactic mastectomy — Some women undergoing mastectomy may opt to have the opposite (uninvolved) breast removed as well. This is done to reduce the risk of a subsequent new breast cancer, particularly in women at a high risk of second breast cancers (such as those with a strong family history or a known genetic mutation).

Breast reconstruction — Reconstruction of the breast is an important option for women who undergo mastectomy. You may choose to have breast reconstruction immediately after the mastectomy or at a later time. The nipples may also be reconstructed to allow the breast to appear more natural. There are several options for reconstruction, and all women planning to undergo mastectomy should see a plastic or reconstructive surgeon to discuss these options before having breast surgery. (See ["Overview of breast reconstruction"](#).)

Complications of mastectomy — Mastectomy is generally a safe surgery, although complications can occur, including bleeding, pain, infection, or a persistent collection of fluid beneath the skin. (See ["Patient education: Lymphedema after cancer surgery \(Beyond the Basics\)"](#).)

Radiation therapy after mastectomy — Radiation therapy is sometimes recommended after a mastectomy to decrease the chance of a recurrence, especially in women who have locally

advanced cancer, who have close or positive margins after mastectomy, or who have positive lymph nodes.

More information about radiation therapy is available below. (See '[Radiation therapy](#)' below.)

BREAST-CONSERVING THERAPY (BCT)

Breast-conserving therapy refers to surgical removal of the tumor and a small portion of normal surrounding breast tissue. BCT is often followed by radiation therapy to the remaining breast tissue. Breast-conserving surgery is also called a partial mastectomy or lumpectomy. (See "[Breast-conserving therapy](#)".)

Radiation therapy

Invasive breast cancer — Radiation therapy (RT) refers to the exposure of a tumor to high-energy X-rays in order to slow or stop its growth. Exposure to X-rays damages cells. Unlike normal cells, cancer cells cannot repair the damage caused by exposure to X-rays over several days. This prevents the cancer cells from growing further and causes them to eventually die.

RT for breast cancer is mostly given as external beam RT, meaning that the radiation beam is generated by a machine that is outside the patient. Exposure to the beam typically takes only a few seconds (similar to having an X-ray). In some patients, RT is given daily, five days per week, for approximately five to six weeks; in others, RT is given over three weeks. Some patients may be candidates for an accelerated course of RT, which is only given to the part of the breast where the cancer was removed. This is called "accelerated partial breast irradiation" and can be performed with either external beam RT or by placing a catheter within the space where the tumor was and delivering the radiation from the inside ("brachytherapy").

Radiation is generally recommended for most women who have had breast-conserving surgery for invasive breast cancer, even if the tumor is very small. The goal of this treatment is to kill any remaining cancer cells. Some women, such as those who are over 65 and have hormone-receptor positive cancer, may be safely treated without radiation.

In situ breast cancer — Some women with ductal carcinoma in situ (DCIS) will be advised to have radiation therapy after breast-conserving surgery. This will depend on the size and grade of the DCIS, your age, the margins, and whether the DCIS is hormone receptor positive. (See "[Breast ductal carcinoma in situ: Epidemiology, clinical manifestations, and diagnosis](#)" and "[Ductal carcinoma in situ: Treatment and prognosis](#)" and "[Microinvasive breast carcinoma](#)".)

Cosmetic outcomes — With modern surgical techniques, cosmetic results are good to excellent in most women after breast-conserving therapy (ie, the treated and untreated breast are almost identical or there are only slight differences). The effects of BCT on the appearance of the breast take about three years to stabilize. Factors such as weight gain and the normal age-related sagging of breast tissue also affect the shape and size of the breasts.

Complications following BCT — Following breast-conserving surgery or radiation, complications can sometimes occur, including bleeding, pain, infection, or collection of fluid.

MASTECTOMY VERSUS BREAST-CONSERVING THERAPY

Studies show that women with localized breast cancer are **equally likely** to survive their cancer whether they are treated with BCT or a mastectomy [1,2].

Factors to consider — Although cancer outcomes are similar, there are several factors that you should consider when trying to decide between BCT and mastectomy.

- **Tumor size** – Some women who have a large tumor and small breasts are advised to undergo mastectomy rather than BCT. However, chemotherapy may be given before surgery to shrink the tumor; this may allow the woman to have breast-conserving surgery, if she desires it.
- **Extensive DCIS** – Extensive ductal carcinoma in situ (DCIS), a very early cancer, does not respond well to chemotherapy and therefore may necessitate a mastectomy in order to make sure that all the disease is removed.
- **Tumor margins** – After lumpectomy, it is important to have a margin of normal breast tissue around the tumor. If cancer cells are found at or near the edges of the tissue removed, additional surgery may be necessary. If a large amount of tissue has been removed and the margins are still involved, mastectomy may be recommended.
- **Need for radiation** – For most women, BCT involves both lumpectomy and radiation. While radiation does allow for preservation of the breast, there are both immediate and long-term side effects. Mastectomy is often recommended in women who prefer to avoid radiation. (See "[Radiation therapy techniques for newly diagnosed, non-metastatic breast cancer](#)".)
- **Individual needs and preferences** – You should discuss your preferences and concerns about preserving your breast with your doctor.

- **Risk of a second breast cancer** – Some women may be candidates for BCT but may be at a high risk of developing another breast cancer. These include very young women, women with a strong family history of breast cancer (such as several family members with cancers at young ages or in multiple generations), or women with a known breast cancer gene mutation. These women are still candidates for BCT but may wish to undergo bilateral mastectomy to not only treat the known cancer but prevent a second cancer in the future. (See '[Contralateral prophylactic mastectomy](#)' above.)

Reasons to avoid BCT — Certain factors **clearly** favor mastectomy over BCT. These include:

- **Multiple tumors** – Having two or more separate tumors in different areas (quadrants) of the breast. Unless two tumors are close enough that they can be removed with one excision, mastectomy is recommended for women with more than one cancer in the breast.
- **Extensive tumor** – If tumor is spread throughout the breast tissue, it will not be possible to remove the entire tumor without a mastectomy.
- **Contraindications to radiation** – Some women are not candidates for radiation, such as women who are pregnant, who have already had radiation to the area, or with conditions that make radiation dangerous, such as scleroderma.

Factors that do not affect your decision — Several factors **do not** play a role in the choice between BCT and mastectomy:

- Age
- The spread of cancer cells to lymph nodes in the axilla
- The chance that breast cancer cells will metastasize or spread to other locations in your body

MANAGEMENT OF AXILLARY LYMPH NODES

Most women with invasive cancer will have an operation to check for cancer cells in the axillary lymph nodes. Women with ductal carcinoma in situ (DCIS) have a very small chance of having cancer cells spreading to the axillary lymph nodes. In general, sentinel lymph node biopsy (SLNB) is not recommended for women with DCIS unless a mastectomy is being performed. In that case, SLNB is done since, if invasive cancer is found in the mastectomy specimen, the surgeon cannot go back and do an SLNB procedure after a mastectomy.

Axillary lymph node dissection — This procedure involves removing most of the lymph nodes in the axilla (armpit). In the past, this was performed for all women with invasive breast cancer, but it can be associated with complications such as pain and lymphedema (arm swelling). An axillary lymph node dissection is now usually performed only for patients when cancerous lymph nodes can be felt in the axilla or when the sentinel lymph node excision reveals multiple nodes containing cancer or a large burden of cancer cells. An axillary lymph node dissection may also be recommended for women who still have cancer in the lymph nodes following neoadjuvant chemotherapy. (See '[Sentinel lymph node definition](#)' below and '[Sentinel lymph node excision](#)' below.)

Sentinel lymph node definition — The sentinel lymph node is the first lymph node that receives lymphatic drainage from the breast. The sentinel node for patients with breast cancer is usually located in the axilla but in some patients may be near the sternum (breast bone) between the ribs (internal mammary lymph nodes). In addition, there may be more than one sentinel lymph node. Most patients do not have cancer in their sentinel lymph nodes.

Sentinel lymph node excision — A sentinel lymph node excision is performed to spare patients an axillary lymph node dissection when possible. It is based upon the finding that if the sentinel node does not contain cancer cells, the likelihood that other lymph nodes in the axilla contain cancer cells is very small [1].

To identify the sentinel lymph node, the surgeon injects blue dye or a radioactive material, or a combination of both, into the breast. The dye or radioactive material enters the lymphatic channels and flows to the sentinel lymph node, which helps the surgeon identify and remove the appropriate lymph nodes. The sentinel nodes are examined under the microscope by a pathologist.

If no cancer cells are identified in the sentinel node(s), then no further axillary surgery is needed. Today, most women with cancer in the sentinel node(s) also do not require any additional axillary surgery. However, some patients with positive sentinel lymph node(s) may be recommended to have an axillary dissection, depending on the number of involved nodes, the burden within the node, or whether they are planning on having radiation therapy. (See "[Overview of sentinel lymph node biopsy in breast cancer](#)".)

TREATMENT AFTER SURGERY

Treatment after surgery, called adjuvant treatment, is often recommended for women with invasive breast cancer. Adjuvant treatment is discussed in a separate article. (See "[Patient](#)

education: Treatment of early-stage, hormone-responsive breast cancer in postmenopausal women (Beyond the Basics)" and "Patient education: Treatment of early-stage, hormone-responsive breast cancer in premenopausal women (Beyond the Basics)".)

SURVEILLANCE AFTER INITIAL TREATMENT

After being treated for breast cancer, there is a risk that breast cancer may recur or a new breast cancer may develop. Breast cancer survivors are advised to see their surgeon and/or medical oncologist every six months for an examination. Some patients may require examinations every three months, especially within the first three years. Your doctor will advise you on the appropriate follow-up schedule for you.

All patients treated for breast cancer are advised to perform a self-breast and chest wall examination monthly. Patients who have undergone a mastectomy with reconstruction should perform an examination of the reconstructed breast. Patients treated with a mastectomy without reconstruction should examine the chest wall. The self-examination for all patients should also include checking the lymph node areas. You should promptly call your doctor or nurse if you feel a new mass, see any redness of the skin not related to radiation treatments, or if you have any questions about your self-examination.

A yearly mammogram should be performed for all women who have undergone breast-conserving therapy or a unilateral mastectomy. In most instances, mammography after mastectomy and breast reconstruction is usually not recommended. (See "[Approach to the patient following treatment for breast cancer](#)".)

A summary of the American Society of Clinical Oncology's recommendations for surveillance after breast cancer treatment is provided in the table ([table 1](#)).

WHERE TO GET MORE INFORMATION

Your health care provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our website (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for health care professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Breast cancer \(The Basics\)](#)

[Patient education: Breast reconstruction after mastectomy \(The Basics\)](#)

[Patient education: Choosing surgical treatment for early-stage breast cancer \(The Basics\)](#)

[Patient education: Ductal carcinoma in situ \(DCIS\) \(The Basics\)](#)

[Patient education: Seroma \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient education: Breast cancer guide to diagnosis and treatment \(Beyond the Basics\)](#)

[Patient education: Lymphedema after cancer surgery \(Beyond the Basics\)](#)

[Patient education: Locally advanced and inflammatory breast cancer \(Beyond the Basics\)](#)

[Patient education: Treatment of early-stage, hormone-responsive breast cancer in postmenopausal women \(Beyond the Basics\)](#)

[Patient education: Treatment of early-stage, hormone-responsive breast cancer in premenopausal women \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Overview of the treatment of newly diagnosed, invasive, non-metastatic breast cancer](#)

[Atypia and lobular carcinoma in situ: High-risk lesions of the breast](#)

[Breast-conserving therapy](#)

[Breast ductal carcinoma in situ: Epidemiology, clinical manifestations, and diagnosis](#)

[Ductal carcinoma in situ: Treatment and prognosis](#)

[Overview of breast reconstruction](#)

[Hormone receptors in breast cancer: Clinical utility and guideline recommendations to improve test accuracy](#)

[Mastectomy](#)

[Microinvasive breast carcinoma](#)

[Overview of sentinel lymph node biopsy in breast cancer](#)

Radiation therapy techniques for newly diagnosed, non-metastatic breast cancer

Approach to the patient following treatment for breast cancer

The following organizations also provide reliable health information.

- National Cancer Institute

1-800-4-CANCER

(www.nci.nih.gov)

- American Society of Clinical Oncology

(www.cancer.net)

- American Cancer Society

1-800-ACS-2345

(www.cancer.org)

- National Library of Medicine

(www.nlm.nih.gov/medlineplus/healthtopics.html)

- Susan G. Komen Breast Cancer Foundation

(www.komen.org)

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REFERENCES

1. Clarke M, Collins R, Darby S, et al. Effects of radiotherapy and of differences in the extent of surgery for early breast cancer on local recurrence and 15-year survival: an overview of the randomised trials. *Lancet* 2005; 366:2087.
2. Early Breast Cancer Trialists' Collaborative Group. Effects of radiotherapy and surgery in early breast cancer. An overview of the randomized trials. *N Engl J Med* 1995; 333:1444.

This generalized information is a limited summary of diagnosis, treatment, and/or medication information. It is not meant to be comprehensive and should be used as a tool to help the user understand and/or assess potential diagnostic and treatment options. It does NOT include all information about conditions, treatments, medications, side effects, or risks that

may apply to a specific patient. It is not intended to be medical advice or a substitute for the medical advice, diagnosis, or treatment of a health care provider based on the health care provider's examination and assessment of a patient's specific and unique circumstances. Patients must speak with a health care provider for complete information about their health, medical questions, and treatment options, including any risks or benefits regarding use of medications. This information does not endorse any treatments or medications as safe, effective, or approved for treating a specific patient. UpToDate, Inc. and its affiliates disclaim any warranty or liability relating to this information or the use thereof. The use of this information is governed by the Terms of Use, available at <https://www.wolterskluwer.com/en/know/clinical-effectiveness-terms> ©2023 UpToDate, Inc. and its affiliates and/or licensors. All rights reserved.

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GRAPHICS

Watching for cancer return after breast cancer treatment

Type of monitoring	What experts recommend
Regular doctor visits	For the first three years after being treated for breast cancer, see your doctor or nurse every 3 to 6 months. During the 4th and 5th year after treatment, see your doctor or nurse every 6 to 12 months. After that, see your doctor or nurse once a year. Having these regular check-ups will give your doctor or nurse a chance to check for any signs of returning cancer. After treatment, it's good to have a doctor who is familiar with monitoring patients for cancer recurrence. If your primary care physician takes over monitoring, make sure he or she is in touch with your cancer specialists.
Symptom checks	If you notice any symptoms that might signal the return of cancer, tell your doctor or nurse. Symptoms to look for include new lumps in the breast, bone pain, chest pain, belly pain, trouble breathing, or persistent headaches.
Genetic counseling or testing	If you are at higher-than-average risk for a second breast cancer, consider genetic counseling or testing. High-risk groups include women with: ▪ Ashkenazi Jewish heritage ▪ A personal or family history of ovarian cancer ▪ A daughter, sister, or mother who was diagnosed with breast cancer before the age of 50 ▪ Two or more relatives diagnosed with breast cancer at any age ▪ Breast cancer in both breasts or a relative who had breast cancer in both breasts ▪ A male relative with breast cancer
Mammograms	After you have been treated, have a mammogram 1 year after the mammogram that led to the diagnosis but no earlier than 6 months after radiation therapy. You may also need other subsequent mammograms, depending on your individual situation. (Note that experts do not recommend breast MRI as a routine part of post-treatment monitoring.)

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