

BREAST CANCER COMMON IN MEN AND WOMEND. K. Awasthi*¹ and Archana Dixit²¹Department of Chemistry Sri J.N.M.PG College Lucknow UP India.²Department of Chemistry Dayanand Girls PG Kanpur UP India.***Corresponding Author: Prof. D. K. Awasthi**

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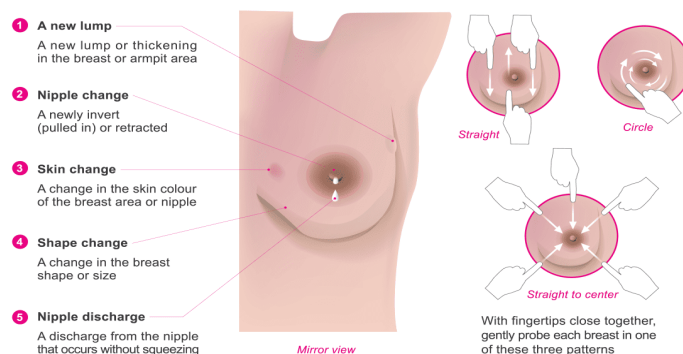
ABSTRACT

Breast cancer originates in your breast tissue. It occurs when breast cells mutate (change) and grow out of control, creating a mass of tissue (tumor). Breast cancer can invade and grow into the tissue surrounding your breast. It can also travel to other parts of your body and form new tumors. When this happens, it's called metastasis. Breast cancer is one of the most common cancers among women. It's most likely to affect women over the age of 50. Though rare, men can also develop breast cancer. Approximately 2,600 men develop male breast cancer every year in the United States, making up less than 1% of all cases. Transgender women are more likely to develop breast cancer compared to cisgender men. Additionally, transgender men are less likely to develop breast cancer compared to cisgender women. Breast cancer is most often diagnosed in adults over the age of 50, but it can occur at any age.

KEY WORDS: cells mutate, metastasis, tumors.

Description: Breast cancer is the most common cancer diagnosed in women, accounting for more than 1 in 10 new cancer diagnoses each year. It is the second most common cause of death from cancer among women in the world. Anatomically, the breast has milk-producing glands in front of the chest wall. They lie on the pectoralis major muscle, and there are ligaments support the breast and attach it to the chest wall. Fifteen to 20 lobes circularly arranged to form the breast. The fat that covers the lobes determines the breast size and shape. Each lobe is formed by lobules containing the glands responsible for milk production in response to hormone

stimulation. Breast cancer always evolves silently. Most of the patients discover their disease during their routine screening. Others may present with an accidentally discovered breast lump, change of breast shape or size, or nipple discharge. However, mastalgia is not uncommon. Physical examination, imaging, especially mammography, and tissue biopsy must be done to diagnose breast cancer. The survival rate improves with early diagnosis. The tumor tends to spread lymphatically and hematologically, leading to distant metastasis and poor prognosis. This explains and emphasizes the importance of breast cancer screening programs.

Early Signs of Breast Cancerand
Breast self-examination**Fig-1**

Identifying factors associated with an increased incidence of breast cancer development is important in general health screening for women. Risk factors for breast cancer can be divided into 7 broad categories:

1. Age: The age-adjusted incidence of breast cancer continues to increase with the advancing age of the female population.
2. Gender: Most breast cancers occur in women.
3. Personal history of breast cancer: A history of cancer in one breast increases the likelihood of a second primary cancer in the contralateral breast.
4. Histologic risk factors: Histologic abnormalities diagnosed by breast biopsy constitute an important category of breast cancer risk factors. These abnormalities include lobular carcinoma in situ (LCIS) and proliferative changes with atypia.
5. The family history of breast cancer and genetic risk factors: First-degree relatives of patients with breast cancer have a 2-fold to 3-fold excess risk for developing the disease. Five percent to 10% of all breast cancer cases are due to genetic factors, but they may account for 25% of cases in women younger than 30 years. *BRCA1* and *BRCA2* are the 2 most important genes responsible for increased breast cancer susceptibility.
6. Reproductive risk factors: Reproductive milestones that increase a woman's lifetime estrogen exposure are thought to increase her breast cancer risk. These include the onset of menarche before 12 years of age, first live childbirth after age 30 years, nulliparity, and menopause after age 55 years.
7. Exogenous hormone use: Therapeutic or supplemental estrogen and progesterone are taken for various conditions, with the two most common scenarios being contraception in premenopausal women and hormone replacement therapy in postmenopausal women.

Breast cancer rates among women from various racial and ethnic groups are as follows:

- Non-Hispanic white: 128.1 in 100,000
- African American: 124.3 in 100,000
- Hispanic/Latina: 91.0 in 100,000
- American Indian/Alaska Native: 91.9 in 100,000
- Asian American/Pacific Islander: 88.3 in 100,000

Breast cancer is the most common female cancer in the United States, the second most common cause of cancer death in women (after lung cancer), and the leading cause of death in women ages 45 to 55. When found and treated early, breast cancer is most often curable.

Abnormal lump—Breast cancer can be discovered when a lump or other change in the breast or armpit is found by a woman herself or by her health care provider. In addition to a lump, other abnormal changes may include dimpling of the skin, a change in the size or shape of one breast, retraction (pulling in) of the nipple when it previously pointed outward, bloody nipple discharge, or a discoloration of the skin of the breast not related to infection or skin conditions such as psoriasis or eczema.

To evaluate a breast lump, a mammogram and a breast ultrasound are usually recommended. If suspicious, a breast biopsy may also be recommended. **Mammogram**—A mammogram is a very low-dose X-ray of the breast. The breast tissue is compressed for the X-ray, which decreases the thickness of the tissue and holds the breast in position so the radiologist can find abnormalities more accurately. Each breast is compressed between two panels and X-rayed from two directions (top-down and side-to-side) to make sure all the tissue is examined. Mammograms are currently the best screening modality to detect breast cancer. Some mammograms capture images digitally, offering better clarity, the ability to adjust the image, and a decreased likelihood of needing to return on a different day for repeat pictures.

3D tomosynthesis is a type of improved digital mammogram that captures multiple pictures of the breast while the breast is compressed in the two directions (top-down and side-to-side) instead of just one picture. This technology allows the radiologist to examine multiple pictures of each breast. This is extremely helpful for seeing abnormalities that may be concealed by overlapping tissue. Additionally, finer detail is seen, which assists the radiologist in determining which lesions are benign (not cancer) and which lesions need further investigation with additional pictures

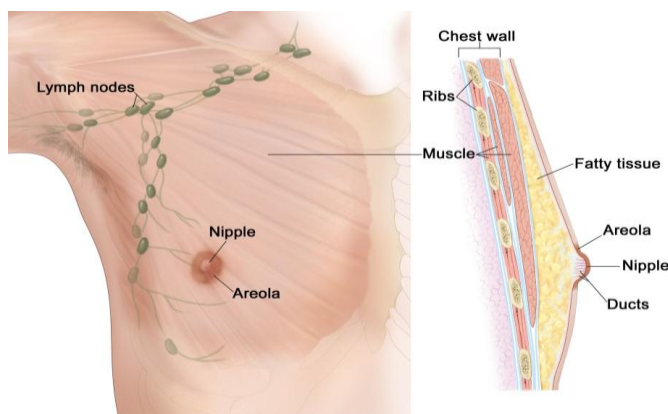


Fig-2 Anatomy of Male Breast Cancer.

Breast cancer is most often diagnosed with a routine mammogram, before a lump or other change in the breast develops. Even if the mammogram is performed because a lump was felt in one breast, both breasts need to be examined because there is a small risk of having cancer in both breasts. When we say “breast cancer,” we usually mean cancers that form in milk ducts or lobules. Cancers can also form in other parts of your breast, but these types of cancer are less common. These can include:

- **Angiosarcoma.** This rare type of cancer begins in the cells that make up the lining of blood or lymph vessels.
- **Phyllodes tumors.** Starting in the connective tissue, phyllodes tumors are rare. They’re usually benign (noncancerous), but they can be malignant (cancerous) in some cases.

SYMPTOMS AND CAUSES

Common signs of breast cancer

Breast cancer symptoms can vary for each person. Possible signs of breast cancer include:

- A change in the size, shape or contour of your breast.
- A mass or lump, which may feel as small as a pea.
- A lump or thickening in or near your breast or in your underarm that persists through your menstrual cycle.
- A change in the look or feel of your skin on your breast or nipple (dimpled, puckered, scaly or inflamed).
- Redness of your skin on your breast or nipple.
- An area that’s distinctly different from any other area on either breast.
- A marble-like hardened area under your skin.
- A blood-stained or clear fluid discharge from your nipple.

Some people don’t notice any signs of breast cancer at all. That’s why routine mammograms and are so important.

Breast cancer develops when abnormal cells in your breast divide and multiply. But experts don’t know exactly what causes this process to begin in the first place.

However, research indicates that are several risk factors that may increase your chances of developing breast cancer.

These include:

- **Age.** Being 55 or older increases your risk for breast cancer.
- **Sex.** Women are much more likely to develop breast cancer than men.
- **Family history and genetics.** If you have parents, siblings, children or other close relatives who’ve been diagnosed with breast cancer, you’re more likely to develop the disease at some point in your life. About 5% to 10% of breast cancers are due to single abnormal genes that are passed down from

parents to children, and that can be discovered by genetic testing.

- **Smoking.** Tobacco use has been linked to many different types of cancer, including breast cancer.
- **Alcohol use.** Research indicates that drinking alcohol can increase your risk for certain types of breast cancer.
- **Obesity.** Having obesity can increase your risk of breast cancer and breast cancer recurrence.
- **Radiation exposure.** If you’ve had prior radiation therapy — especially to your head, neck or chest — you’re more likely to develop breast cancer.
- **Hormone replacement therapy.** People who use hormone replacement therapy (HRT) have a higher risk of being diagnosed with breast cancer.

There are many other factors that can increase your chances of developing breast cancer. Talk to your healthcare provider to find out if you’re at risk.

Breast ultrasound — An ultrasound uses sound waves to look at breast tissue and can tell if a lump is a fluid-filled cyst or a solid lump. An ultrasound is only used to examine a limited area of the breast and is not routinely used as a screening test of the entire breast in place of a mammogram.

Breast MRI — Magnetic resonance imaging (MRI) uses a strong magnet to create a detailed image of a part of the body. It does not use X-rays or radiation but does require injection of a contrast agent (a material that shows up on imaging) into a vein. Prior to giving you the contrast, a blood test is performed to make sure you can have the contrast.

Breast biopsy — If breast cancer is suspected, the next step is to sample the abnormal area to confirm the diagnosis. Regardless of whether the lump can be felt or not, the biopsy should be obtained using a needle biopsy with the help of an imaging study (such as mammography, ultrasound, or MRI) to assure the lump has been adequately biopsied.

A fine needle aspiration may be sufficient to establish a diagnosis of breast cancer, though a core needle biopsy, which utilizes a larger-gauge needle, is often preferable as it provides a larger sample to better characterize certain features of the cancer.

Types of breast cancer — Although there are several different types of breast cancer, they are treated similarly. **In situ breast cancer** — The earliest breast cancers are called “in situ” cancers.

Ductal carcinoma in situ — If cancers arise in the ducts of the breast (the tubes that carry milk to the nipple when a woman is breastfeeding) and do not grow outside of the ducts, the tumor is called ductal carcinoma in situ (DCIS). DCIS cancers do not spread beyond the breast tissue. The best treatment for DCIS will depend on the

size of the area of disease relative to the size of the breast, the grade of the disease, hormone receptor status, and the woman's overall health. Most women are able to be treated with removal of the cancerous area (lumpectomy) followed by radiation therapy. Surgical removal of the cancerous area alone may be an option, particularly for older women with a very small area of hormone receptor positive, low-grade disease that is completely removed. Women with DCIS who are being treated with lumpectomy do not need their lymph nodes checked for spread of tumor. Additionally, genomic assays (gene tests studying the tumor cells) are being explored to determine the need for radiation following lumpectomy.

Women with extensive DCIS may need a mastectomy, which may be done with or without reconstruction. A sentinel lymph node biopsy, a special technique to identify and remove only the most important lymph nodes in the armpit, is usually performed at the time of mastectomy for DCIS. Large areas of DCIS have an increased chance of being associated with hidden invasive cancer. If the lymph nodes are involved by this hidden invasive cancer, this will affect treatment decisions. It is not possible to reliably perform sentinel node biopsy after a mastectomy.

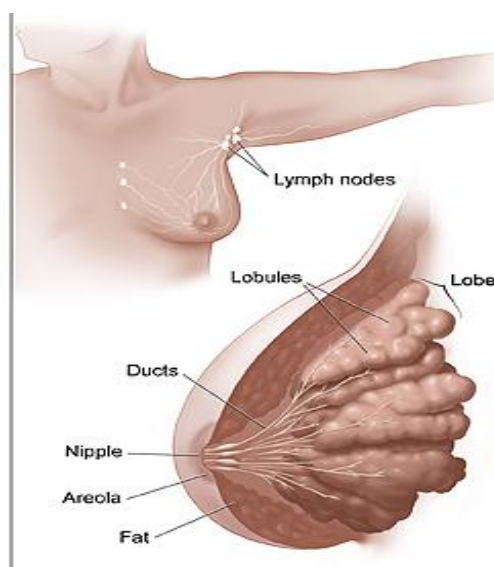


Fig-3 internal structure of Breast.

- Infiltrating (invasive) ductal carcinoma Starting in your milk ducts of your breast, this cancer breaks through the wall of your duct and spreads to surrounding breast tissue. Making up about 80% of all cases, this is the most common type of breast cancer.
- Ductal carcinoma in situ Also called Stage 0 breast cancer, ductal carcinoma in situ is considered by some to be precancerous because the cells haven't spread beyond your milk ducts. This condition is very treatable. However, prompt care is necessary to prevent the cancer from becoming invasive and spreading to other tissues.
- Infiltrating (invasive) lobular carcinoma. This cancer forms in the lobules of your breast (where breast milk production takes place) and has spread to surrounding breast tissue. It accounts for 10% to 15% of breast cancers.
- Lobular carcinoma in situ is a precancerous condition in which there are abnormal cells in the lobules of your breast. It isn't a true cancer, but this marker can indicate the potential for breast cancer later on. So, it's important for women with lobular carcinoma in situ to have regular clinical breast exams and mammograms.
- Triple negative breast cancer. Making up about 15% of all cases, triple negative breast cancer is one of the most challenging breast cancers to treat. It's called triple negative because it doesn't have three of the markers associated with other types of breast cancer. This makes prognosis and treatment difficult.
- Inflammatory breast cancer. Rare and aggressive, this type of cancer resembles an infection. People with inflammatory breast cancer usually notice redness, swelling, pitting and dimpling of their breast skin. It's caused by obstructive cancer cells in their skin's lymph vessels.
- Paget's disease of the breast. This cancer affects the skin of your nipple and areola (the skin around your nipple).

Treatment

Chemotherapy is not necessary for women with DCIS. Endocrine treatment (also called hormonal therapy) may be recommended for prevention of recurrence, particularly if the DCIS tests positive for responsiveness to estrogen (called "estrogen receptor positive" or "hormone receptor positive" cancer) and the woman did not have a mastectomy. The drug most often used for

endocrine treatment is tamoxifen. Other drugs, anastrozole or exemestane, may also be effective in postmenopausal women treated for DCIS. Endocrine treatment reduces the chances that the cancer will come back in the treated breast; it also decreases the chances of developing a new breast cancer in the other breast.

Invasive breast cancer — The majority of breast cancers are referred to as invasive breast cancers because they have grown or "invaded" beyond the ducts or lobules of the breast into the surrounding breast tissue. Several varieties of invasive breast cancers are possible. In general, they are treated similarly.

Features of a breast cancer that influence the choice of treatment — At the time breast cancer is diagnosed and/or treated, the cancer should be studied for the presence of two types of proteins: hormone receptors (estrogen and progesterone receptors) and HER2 (for invasive cancers). These proteins are important for selecting medical treatment. These tests are performed by the pathologist, the doctor responsible for examining the breast cancer tissue under the microscope and making the diagnosis. The pathologist will also grade the cancer.

Grade — A tumor's grade describes how aggressively it grows, although this cannot be translated into a timeframe such as a month, a year, etc. Tumors are graded on a scale of 1 to 3, where 1 is the slowest and 3 is the fastest growing type of tumor. Tumors with higher grades are more likely to need chemotherapy.

Hormone receptors — More than one-half of breast cancers require the female hormone estrogen to grow, while other breast cancers are able to grow without estrogen. Estrogen-dependent breast cancer cells produce proteins called hormone receptors, which can be estrogen receptors (ER), progesterone receptors (PR), or both.

If hormone receptors are present within a woman's breast cancer, she is likely to benefit from treatments that lower estrogen levels or block the actions of estrogen. These treatments are referred to as endocrine or hormone therapies, and such tumors are referred to as hormone-responsive or hormone receptor positive.

HER2 — HER2 is a protein that is present in about 15 to 20 percent of invasive breast cancers. The presence of HER2 in the breast cancer identifies women who might benefit from treatments directed against the HER2 protein. Drugs that target the HER2 protein include trastuzumab (brand name: Herceptin), pertuzumab (brand name: Perjeta), ado-trastuzumab emtansine (brand name: Kadcyla), and lapatinib (brand name: Tykerb). If the cancer is HER2 negative as well as hormone receptor negative, this is called "**triple negative**" disease.

Although by definition breast cancer starts within the breast, tiny cells or pieces of the cancer may break off

from the breast tumor at any point and travel to other places through the bloodstream or the lymph channels. This process is called metastasis.

When these stray tumor cells lodge themselves in a lymph node (gland) or an organ such as the liver or the bones, they grow, eventually producing a mass or lump that can sometimes be felt (eg, if it involves the skin or the lymph nodes in the armpit). In other cases, metastases may only be evident because they cause symptoms such as bone pain and can be seen on an imaging test such as a computed tomography (CT) scan, a bone scan, or a positron emission tomography (PET) scan. The use of these studies is discussed below. **The importance of the axillary lymph nodes** — One of the first sites of breast cancer spread is to the lymph nodes located in the armpit (axilla). These nodes (referred to as axillary lymph nodes) can become enlarged and can sometimes be felt during a breast examination. Other times, they are found on the mammogram or MRI, leading to an ultrasound of the armpit. However, even if the lymph nodes are enlarged, the only way to determine if they truly contain cancer is to examine a sample of the tissue under the microscope.

The presence or absence of lymph node involvement is one of the most important factors in determining the long-term outcome of the cancer (prognosis), and it often guides decisions about treatment.

Even if the axillary lymph nodes are negative, there is a small chance that the tumor has spread elsewhere in the body, and adjuvant therapy is recommended for some of these women.

Examination of the axillary lymph nodes — The axillary lymph nodes should be examined for tumor spread. This is done first by physical examination and sometimes with ultrasound. If a suspicious lymph node is found, then a needle biopsy to obtain a tissue sample is performed. If there is cancerous involvement of the axillary lymph nodes, a surgical procedure called axillary lymph node dissection is performed at the time of the breast surgery to remove all the nodes from the axilla.

In patients with early-stage breast cancer who do not have obvious involvement of the axillary lymph nodes, a surgical procedure called a sentinel lymph node biopsy is often performed. In this procedure, two tracers are used to mark the lymph nodes that the cancer would go to first (also called "sentinel" nodes). These lymph nodes, which are usually under the armpit, are then removed for pathological analysis. Older women with small hormone receptor positive invasive cancer may not need a sentinel lymph node biopsy. The major benefit of the sentinel lymph node procedure is that it provides important staging information while causing fewer problems such as arm swelling (also called lymphedema) than a more extensive axillary lymph node dissection. Most patients do not have cancer in their sentinel lymph nodes and will

not need additional surgery. Some studies have shown that there are select patients for whom an axillary lymph node dissection is not necessary even if one or two of the sentinel lymph node(s) are positive. Patients who have three or more positive sentinel nodes, however, will require dissection of the remaining axillary lymph nodes, in case there are additional cancer-containing nodes.

21 gene test (Oncotype DX) — A genetic test called Oncotype DX Recurrence Score (RS) can be performed on the tumor tissue to help with decision making about chemotherapy, in particular for women with ER-positive, HER2-negative, and node-negative breast cancer. The test looks at 21 different genes in order to evaluate the genetic makeup of the tumor and provides a number score to help predict the chance of recurrence. The score is called the "Recurrence Score," and the results range from 0 to 100. Cancer doctors will often use this information, in combination with other information about the patient and tumor, to guide decision making about the need for chemotherapy. In general, patients with a low recurrence score whose cancers also have other low-risk features may not need chemotherapy, whereas those with a high score benefit more from chemotherapy. Antiestrogen therapy is typically administered to patients with hormone-receptor-positive disease, regardless of the recurrence score.

Staging and the staging workup — Doctors who care for cancer patients (oncologists) use a standard set of abbreviations, called the TNM staging system, to describe the stage of individual cancers. The "T" stands for the primary tumor, the "N" stands for the status of the regional lymph nodes, and the "M" stands for the presence or absence of metastases to other organs. The T, N, and M designations are then grouped together to form the stage grouping of a breast cancer, which ranges from stage I (least advanced) to IV (most advanced). Stage 0 cancer is the categorization for patients with DCIS alone. The "stage" of the cancer is an indication of whether and how far it has spread. Stage and grade are often confused by patients, but they are not the same thing.

tumor size (T) and nodes (N) — To establish the stage of a breast cancer, the first step is to evaluate the size of the tumor (T) and establish whether the lymph nodes have cancer in them or not (N).

Metastases (M) — If any cancer is detectable outside of the breast, these deposits are called metastases (M).

Several "staging" imaging studies may be done to help determine if the cancer has spread beyond the breast and axillary lymph nodes. These may include: Bone scan, CT scan of the chest, CT scan of the abdomen and pelvis. PET scan

Stage I and II breast cancer — Women with stage I or II breast cancers are said to have early-stage localized breast cancer. In general, stage I breast cancer refers to a tumor less than 2 cm (0.8 inches) in size that is node negative. In general, stage II tumors are those with spread to the axillary lymph nodes and/or a tumor size larger than 2 cm but smaller than 5 cm (about 2 inches). **Stage III breast cancers** — Women with stage III tumors are referred to as having locally advanced breast cancer. These consist of large breast tumors (greater than 5 cm, or about 2 inches, across), those with extensive axillary nodal involvement (more than 10 lymph nodes with cancer), nodal involvement of both axillary and internal mammary nodes (behind the ribs of the breast with cancer) at diagnosis, or nodal involvement of the soft tissues above or below the collarbone (termed the supraclavicular and infraclavicular lymph nodes, respectively). A tumor is also designated as stage III if it extends to underlying muscles of the chest wall or the overlying skin. Inflammatory breast cancer, a rapidly growing form of cancer that makes the breast appear red and swollen, is at least stage III, even if it is small and does not involve lymph nodes.

Stage IV breast cancer — Stage IV breast cancer refers to tumors that have metastasized to areas outside the breast and lymph nodes to the bones, lungs, liver, or other organs. The primary tumor may be any size, and there may be any number of affected lymph nodes. This is referred to as metastatic breast cancer.

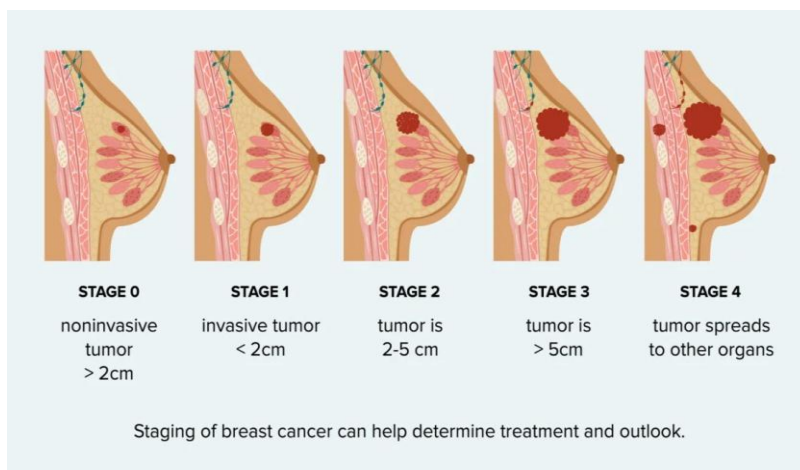


Fig4 Early-stage localized breast cancer.

Components of treatment

Local therapy — Two surgical options are available for treating localized breast cancer: mastectomy (removal of the breast) and breast-conserving surgery (BCT; removal of the cancerous tissue, called lumpectomy). BCT consists of breast-conserving surgery (lumpectomy), which may also be referred to as wide excision, quadrantectomy, or partial mastectomy. BCT also requires radiation therapy to reduce the chances of cancer coming back in the same breast. However, there are some patients for whom radiation therapy to the remaining breast may not be necessary, particularly older patients who have small, node-negative cancers that are hormone receptor positive. The combination of surgery and radiation usually results in cosmetically acceptable preservation of the breast without compromising breast cancer outcomes. In centers that specialize in breast cancer treatment, approximately 60 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. However, assuming that the patient is considered a good candidate for BCT, survival outcomes are the same whether BCT or mastectomy is performed.

Radiation therapy to the chest wall and surrounding lymph node areas may also be recommended for patients who have had a mastectomy. Factors such as positive lymph nodes, large tumors, and positive margins play into the decision.

Systemic therapy — Systemic (body-wide) anticancer treatment that is given before or after surgery is called "adjuvant systemic therapy." The term "neoadjuvant" is used when the treatment is given before surgery. Many women with early disease that is triple negative or HER2 positive will get neoadjuvant therapy; then, depending on the results of the surgery (and whether all the cancer was able to be removed), they may get additional treatment as well.

The goal of systemic therapy is to eliminate or prevent the growth of any cancer cells that may have escaped the breast and that might grow in other organs (metastases). The first place that breast cancer spreads is the lymph nodes under the armpit (axilla). When breast cancer metastasizes to lymph nodes in the axilla (the axillary lymph nodes), the chance for cure is lower than when it is only in the breast. Patients with metastases or cancer cells in other organs such as the liver, lung, or bone are rarely cured. However, systemic therapy may prevent metastases in a large fraction of patients and thus cure many women who would not be cured otherwise. Systemic therapy, therefore, has become an important component of breast cancer treatment because it significantly decreases the chance that a cancer will return, especially in situations where the cancer had already spread to the axillary lymph nodes. This, in turn, improves the chances of surviving breast cancer.

There are three types of systemic therapy. Some women may receive multiple types of these treatments depending on their tumor characteristics:

● **Endocrine therapy** (also called hormone or antiestrogen treatment) – Endocrine therapy is only recommended for women with estrogen receptor (ER)-positive breast cancer. Because it has very few life-threatening side effects and is so effective, it is recommended for almost all women with ER-positive disease, regardless of stage. Endocrine therapy reduces the odds of a breast cancer recurrence by nearly 50 percent. There are two types of endocrine therapies that are used in the adjuvant setting: selective estrogen receptor modulators (SERMs) such as tamoxifen or raloxifene and aromatase inhibitors (AIs) such as anastrozole. This is a treatment taken daily for a minimum of five years.

Women with high-risk hormone receptor-positive, HER2-negative disease may also be offered a medication called abemaciclib.

● **Anti-HER2 therapy** – Anti-HER2 therapy is usually recommended for patients whose tumors make a lot of HER2. Trastuzumab (brand name: Herceptin) and pertuzumab (brand name: Perjeta) are approved for adjuvant and neoadjuvant (before surgery) treatment. The main risk of trastuzumab is a small risk of heart damage. Doctors usually monitor patients with echocardiograms (imaging tests of the heart). Some people who received systemic treatment before surgery may get a different drug after surgery called trastuzumab emtansine (T-DM1) if there is remaining cancer at the time of surgery.

● **Chemotherapy** – There is no particular marker to determine whether or not chemotherapy should be given. Instead, treatment decisions are based on many factors, such as the stage and grade of a tumor and whether it lacks hormone receptors or makes a lot of the HER2 protein. The results of the 21 gene test (Oncotype DX) may help identify patients with ER-positive, HER2-negative, node-negative breast cancer whose prognosis is so good that chemotherapy is unlikely to provide benefit. There are many types of chemotherapies used in the adjuvant setting, and they are usually given in combination or in a sequential manner. Your oncologist will decide the regimen that is best for you. Additionally, your medical oncologist may want to give the chemotherapy before surgery, especially if the cancer is stage II with certain receptor patterns.

● **Other systemic treatments** – Some women with "triple negative" cancers will benefit from immunotherapy, which uses the body's own immune system to fight cancer. For women with *BRCA1* or *BRCA2* genetic mutations whose cancer is HER2 negative but has high-risk features, use of a medication called a poly-ADP ribose polymerase (PARP) inhibitor following adjuvant therapy can be beneficial.

Locally advanced and inflammatory breast cancer — Although not precisely defined, the term "locally

advanced" implies one or more of the following: a tumor larger than 5 cm (about 2 inches), many palpable positive surrounding lymph nodes, cancer nodules or ulceration in the skin overlying the breast, or fixation of the cancer to the chest wall behind the breast. Another form of locally advanced breast cancer is "inflammatory breast cancer," which causes swelling, redness, or thickening of the skin due to its invasion by cancer cells. The likelihood of curing locally advanced and inflammatory breast cancer is lower than for smaller cancers and cancers that do not have any of these physical findings but is still possible with appropriate treatment.

Treatment generally includes a combination of systemic therapy, surgery, and radiation therapy. Additional therapies, depending on the cancer receptors, may include endocrine therapy (if the tumor is hormone receptor positive), anti-HER2 therapy (if the tumor is HER2 positive), and immunotherapy (if the tumor is triple negative). In most cases, systemic therapy is given before surgery (neoadjuvant therapy). In fact, the treatment for locally advanced breast cancer is very similar to that for non-locally-advanced disease, except that a larger proportion of patients are treated with mastectomy rather than BCT (although BCT may be an option in some cases in which there has been a good response to neoadjuvant therapy), and almost all patients receive radiation therapy after surgery..)

Metastatic breast cancer — Few, if any, patients with metastatic breast cancer are cured (where "cure" means that the disease goes completely away and never comes back). However, substantial progress has been made in improving the length of time patients live with metastatic breast cancer and the quality of life they have during that time. To achieve these latter goals, doctors usually treat metastatic breast cancer with the approach that is most likely to reduce the symptoms related to the cancer with as few side effects as possible. This strategy is usually accomplished with a judicious use of "systemic therapy" that treats the whole body, such as chemotherapy, endocrine therapy, trastuzumab, immunotherapy, targeted therapy (which targets certain proteins that drive the growth of some cancers), or some combination of these options. Surgery and radiation therapy that are more localized are used to control disease in certain areas, such as bone metastases that are particularly symptomatic or about to cause a fracture, brain or spinal cord metastases, and skin metastases on the chest that are causing symptoms. Not all patients do well with treatment of metastatic disease, but in general for most patients, treatment can prolong life, delay the progression of the cancer, relieve cancer-related symptoms, and improve quality of life.



Fig-5 Breast cancer awerness.

CONCLUSION

Breast cancer is the most common cancer in women in Australia and the second most common cancer to cause death in women, Breast cancer is the abnormal growth of the cells lining the breast lobules or ducts. These cells grow uncontrollably and have the potential to spread to other parts of the body. Both men and women can develop breast cancer, although it is uncommon in men. Transwomen, non-binary people can also get breast cancer.

REFERENCES

1. Women carriers of BRCA1/2 gene mutations. *Climacteric*. 2018 Dec; 21(6): 529-535. [PubMed6]
2. Parada H, Sun X, Tse CK, Olshan AF, Troester MA. Lifestyle Patterns and Survival Following Breast Cancer in the Carolina Breast Cancer Study. *Epidemiology*. 2019 Jan; 30(1): 83-92. [PMC free article] [PubMed]
3. White AJ, Bradshaw PT, Hamra GB. Air pollution and Breast Cancer: A Review. *Curr Epidemiol Rep.*, 2018 Jun; 5(2): 92-100. [PMC free article] [PubMed]
4. Gucalp A, Traina TA, Eisner JR, Parker JS, Selitsky SR, Park BH, Elias AD, Baskin-Bey ES, Cardoso F. Male breast cancer: a disease distinct from female breast cancer. *Breast Cancer Res Treat.*, 2019 Jan; 173(1): 37-48. [PMC free article] [PubMed]
5. Clark BZ, Onisko A, Assylbekova B, Li X, Bhargava R, Dabbs DJ. Breast cancer global tumor biomarkers: a quality assurance study of intratumoral heterogeneity. *Mod Pathol.*, 2019 Mar; 32(3): 354-366. [PubMed]
6. Liedtke C, Kolberg HC, Kerschke L, Görlich D, Bauerfeind I, Fehm T, Fleige B, Helms G, Lebeau A, Stähler A, Schmatloch S, Hausschild M, Schwentner L, von Minckwitz G, Loibl S, Untch M, Kühn T. Systematic analysis of parameters predicting pathological axillary status (ypN0 vs. ypN+) in patients with breast cancer converting from cN+ to ycN0 through primary systemic therapy (PST). *Clin Exp Metastasis*. 2018 Dec; 35(8): 777-783. [PubMed]
7. Kitamura M, Nakayama T, Mukaisho KI, Mori T, Umeda T, Moritani S, Kushima R, Tani M, Sugihara H. Progression Potential of Ductal Carcinoma in situ Assessed by Genomic Copy Number Profiling. *Pathobiology*. 2019; 86(2-3): 92-101. [PubMed]
8. Radovic N, Ivanac G, Divjak E, Biondic I, Bulum A, Brkljacic B. Evaluation of Breast Cancer Morphology Using Diffusion-Weighted and Dynamic Contrast-Enhanced MRI: Intermethod and Interobserver Agreement. *J Magn Reson Imaging*. 2019 May; 49(5): 1381-1390. [PubMed]
9. Pediconi F, Marzocca F, Cavallo Marincola B, Napoli A. MRI-guided treatment in the breast. *J Magn Reson Imaging*. 2018 Dec; 48(6): 1479-1488. [PubMed]
10. Watanabe Y, Anan K. The decision to perform or omit sentinel lymph node biopsy during mastectomy for ductal carcinoma in situ should be tailored in accordance with preoperative findings. *Breast Cancer*. 2019 Mar; 26(2): 261-262. [PubMed]
11. Rocque GB, Williams CP, Kenzik KM, Jackson BE, Azuero A, Halilova KI, Ingram SA, Pisu M, Forero A, Bhatia S. Concordance with NCCN treatment guidelines: Relations with health care utilization, cost, and mortality in breast cancer patients with secondary metastasis. *Cancer*. 2018 Nov 01; 124(21):4231-4240. [PubMed]
12. Vande Perre P, Toledano D, Corsini C, Escriba E, Laporte M, Bertet H, Yauy K, Toledano A, Galibert V, Baudry K, Clotet L, Million E, Picot MC, Geneviève D, Pujol P. Role of the general practitioner in the care of BRCA1 and BRCA2 mutation carriers: General practitioner and patient perspectives. *Mol Genet Genomic Med.*, 2018 Nov; 6(6): 957-965. [PMC free article] [PubMed]
13. Seroussi B, Lamy JB, Muro N, Larburu N, Sekar BD, Guézennec G, Bouaud J. Implementing Guideline-Based, Experience-Based, and Case-Based Approaches to Enrich Decision Support for the Management of Breast Cancer Patients in the DESIREE Project. *Stud Health Technol Inform*. 2018; 255: 190-194. [PubMed]
14. Wang X, Xu L, Yin Z, Wang D, Wang Q, Xu K, Zhao J, Zhao L, Yuan Z, Wang P. Locoregional recurrence-associated factors and risk-adapted postmastectomy radiotherapy for breast cancer staged in cT1-2N0-1 after neoadjuvant chemotherapy. *Cancer Manag Res.*, 2018; 10: 4105-4112. [PMC free article] [PubMed]
15. Sprague BL, Arao RF, Miglioretti DL, et al. National Performance Benchmarks for Modern Diagnostic Digital Mammography: Update from the Breast Cancer Surveillance Consortium. *Radiology* 2017; 283: 59.
16. Lehman CD, Arao RF, Sprague BL, et al. National Performance Benchmarks for Modern Screening Digital Mammography: Update from the Breast Cancer Surveillance Consortium. *Radiology*, 2017; 283: 49.
17. Renart-Vicens G, Puig-Vives M, Albanell J, et al. Evaluation of the interval cancer rate and its determinants on the Girona Health Region's early breast cancer detection program. *BMC Cancer*, 2014; 14: 558.
18. Lourenco AP, Barry-Brooks M, Baird GL, et al. Changes in recall type and patient treatment following implementation of screening digital breast tomosynthesis. *Radiology*, 2015; 274: 337.
19. Gao Y, Babb JS, Toth HK, et al. Digital Breast Tomosynthesis Practice Patterns Following 2011 FDA Approval: A Survey of Breast Imaging Radiologists. *Acad Radiol.*, 2017; 24: 947.
20. Bernardi D, Macaskill P, Pellegrini M, et al. Breast cancer screening with tomosynthesis (3D mammography) with acquired or synthetic 2D

mammography compared with 2D mammography alone (STORM-2): a population-based prospective study. *Lancet Oncol.*, 2016; 17: 1105.

21. Breast Cancer HER2 Status. American Cancer Society. Available at: <https://www.cancer.org/cancer/breast-cancer/understanding-a-breast-cancer-diagnosis/breast-cancer-her2-status.html> (Accessed on November 08, 2022).