Scholars LITERATURE

Journal of Women's Health Care and Management

Review Article

DOI: https://doi.org/10.47275/2692-0948-102
Volume 1 Issue 1

Early Detection and Prevention of Breast Cancer in Women

Silvia Scaglione*

Chief Scientific Officer, React4life, Vimodrone, Italy

Abstract

Breast cancer is one of the most prevalent causes of mortality in women. Mortality from breast cancer is now at the lowest eternally in 40 years. This is mainly due to advancements in the diagnosis and practice of breast cancer. The standpoint is best in those who are diagnosed when the cancer is still diminutive and has not spread. More breast cancers are also now being diagnosed and operated at an advanced stage. In common, the more advanced cancer, the less probability that the treatment will be curative.

Correspondence to: Silvia Scaglione, Chief Scientific Officer, React4life, Vimodrone, Italy; E-mail: s.scaglione@react4life.com

Citation: Scaglione S (2020) Early Detection and Prevention of Breast Cancer in Women. J Womens Health Care Manage, Volume 1:1. 102. DOI: https://doi.org/10.47275/2692-0948-102

Received: February 04, 2020; **Accepted:** February 18, 2020; **Published:** February 24, 2020

Introduction

Breast cancer is cancer that occurs in the breast cells and it is the most common cancer in women over the age of 50 but can also occur in younger women [1,2]. Cancer typically forms in the ducts or lobules of the breast. If breast cancer is diagnosed at an early stage, there is a good chance of a cure. The more advanced cancer, the less chance that treatment will be curative.

Types of Breast Cancer

Breast cancer is categorized into two types namely: "invasive" and "non-invasive". Invasive breast cancer is a type of cancer that can spread from ducts or lobules of breasts to other parts of the body, whereas non-invasive type doesn't spread from the original tissue [3-5].

These two categories are related to representing the most prevalent types of breast cancer, which include:

Ductal carcinoma in situ: Ductal carcinoma in situ (DCIS) is a non-invasive disease. With DCIS, the cancer cells are restricted to the ducts in your breast and haven't penetrated the surrounding breast tissue [6].

Lobular carcinoma in situ: Lobular carcinoma in situ (LCIS) is cancer that originates in the milk-producing glands of your breast. Like DCIS, the cancer cells haven't penetrated the surrounding tissue [7].

Invasive ductal carcinoma: Invasive ductal carcinoma (IDC) is the usual common type of breast cancer. This type of breast cancer originates in your breast's milk ducts and then penetrates nearby tissue in the breast. Once breast cancer has developed to the tissue outside your milk ducts, it can cause to expand to different nearby organs and tissue [8].

Invasive lobular carcinoma: Invasive lobular carcinoma (ILC) first originates in your breast's lobules and has penetrated nearby tissue [9].

Molecular Subtypes of Breast Cancer

Luminal A breast cancer: It is a hormone-receptor-positive, HER2 negative, and has moderate levels of the protein Ki-67, which supports control of how quick cancer cells develop. Luminal A cancers are inferior, serve to begin gradually, and have the most favourable prognosis [10].

Luminal B breast cancer: It is a hormone-receptor-positive and either HER2 positive or HER2 negative with huge levels of Ki-67. Luminal B cancers usually become insignificantly more agile than luminal A cancers and their diagnosis is somewhat more critical.

Triple-negative/basal-like breast cancer: It is a hormone-receptor negative and HER2 negative. This kind of cancer is more prevalent in women with BRCA1 gene variations. Researchers aren't assured why, but this type of cancer is also prevalent amongst younger and African-American women.

HER2-enriched breast cancer: It is a hormone-receptor negative and HER2 positive. HER2-enriched cancers manage to develop agile than luminal cancers and can have a more inadequate diagnosis, but they are usually successfully managed with targeted treatments intended at the HER2 protein.

Normal-like breast cancer: It is related to luminal A condition hormone-receptor-positive, HER2 negative, and has moderate levels of the protein Ki-67, which maintains control of how agile cancer cells develop. However, while normal-like breast cancer has a favourable diagnosis, its prophecy is somewhat graver than luminal A cancer's prognosis.

Other, less common types of breast cancer include:

Paget disease of the nipple: This kind of breast cancer originates in the ducts of the nipple, but as it develops, it rises to attack the skin and areola of the nipple [11].

Phyllodes tumor: This very unique type of breast cancer begins in the connective tissue of the breast. Most of these tumors are benign, but some are cancerous [12].

Angiosarcoma: This cancer begins on the blood vessels or lymph vessels in the breast [13].

Breast cancer stages

Breast cancer can be classified into stages based on how deep the tumor and how much it has expanded. Large cancers are invaded to nearby tissues or organs are at a more unusual stage than cancers that are inadequate and/or furthermore carried in the breast. In order to stage breast cancer, doctors oblige to identify [14]:

- If the cancer is invasive or non-invasive
- How large the tumor mass is
- Whether the lymph nodes are involved
- If the cancer has spread to nearby tissue or organs

Breast cancer has five main stages: stages 0 to 5.

Causes

There are various causes for breast cancer including [15]:

- Increasing Age
- Family history of breast cancer
- Inherited genes that cause cancer risk
- Exposure to radiation
- Being obese or overweight
- Postmenopausal hormone therapy
- Never been pregnant

Risk Factors

There are various risk factors that potentiate the spread of breast cancer. Some of them cannot be avoided like family history, whereas other lifestyle factors can be controlled. These include [16]:

- Being obese/overweight
- Age
- Hereditary/family history of breast cancer
- Dense breasts
- Alcohol consumption
- More years of menstruation
- Never been pregnant

Symptoms

In early stages if the cancer, symptoms cannot be identified as the tumor is too small to be felt or identified. However, the abnormality can still be visible in screening tests like mammogram. The possible symptoms for breast cancer include [17]:

- Lump or thickened area of the breast
- Discharge from either of the nipples
- Swelling in all or part of the breast
- Change to the size or shape of breast or nipple
- Skin irritation or dimpling on the skin of the breast
- Nipple retraction
- Breast or nipple pain
- Breast skin appears red and scaly

It is always advised to consult the specialist if a woman observes any of these above symptoms to prevent the risk of breast cancer.

Diagnosis/Screening

The tests and procedures used in the diagnosis of breast cancer include [18,19]:

- Breast examination for any lumps or other abnormalities
- Breast ultrasound
- Biopsy (Remove a sample of breast cells for testing)
- Breast MRI

Treatment

Treatment options for breast cancer include surgery, chemotherapy, hormone therapy and radiotherapy [20]. A combination of two or more of those treatments is often used. The treatment modalities used depend on: the cancer itself-its size and stage (whether it has spread), the grade of the cancer cells and whether it is receptive to hormones or contains HER2 receptors. Alongside, causes and risk factors are also taken into consideration before suggesting the treatment option for breast cancer.

Surgeries used to treat breast cancer include:

- Removing the breast cancer (lumpectomy)
- Removing the entire breast (mastectomy)
- Removing a limited number of lymph nodes (sentinel node biopsy)
- Removing several lymph nodes (axillary lymph node dissection)
- Removing both breasts

Radiation Therapy

It uses high-powered energy beans such as X-rays and protons to kill cancer cells. The procedure is performed through external beam radiation or brachytherapy.

Chemotherapy

It is used to destroy cancer cells by using anti-cancer or cytotoxic medications. It is sometimes given before surgery in women with large breast tumors with a goal to shrink the tumor size making it easier to remove with surgery.

Hormone Therapy

Treatments that can be used in hormone therapy include:

- Medications that block the hormones from attaching to the cancer cells

- Medications that stop the body from producing estrogen after menopause
- Surgery or medications to stop hormone production in the ovaries

Targeted therapy

It is a cancer treatment that uses medications and is completely different from the traditional chemotherapy. Several targeted therapy drugs focus on a protein called human epidermal growth factor receptor 2 (HER2) that some breast cancer cells overproduce. This modality helps to stop the growth of cancer cells and prevent them from spreading to other organs.

Immunotherapy

It is a therapy for breast cancer treatment is the process of activating the immune cells to fight against cancer cells. It is a personalized treatment that aims to enhance the defence mechanism of the body to fight and destroy cancer cells. Immunotherapy uses the cells made by the patient's own body to boost or restore the function of the immune system and strengthen the immune system to fight cancer.

Prevention

- Discuss with the doctor about screening for breast cancer and benefits and risks of screening [2]
- Women can get familiarize themselves with their breasts by inspecting their breasts occasionally during a breast self-exam for breast awareness
- Limit the consumption of alcohol if a woman chooses to drink
- Be physically active. Workout at least for 30 minutes on most of the days in a week
- Use the lowest dose of hormone therapy to reduce the risk of breast cancer
- Maintain the healthy weight being on balanced diet and reduce the number of calories

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