Review Article

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REVIEW ON BREAST CANCER AND ITS TREATMENT

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Abstract

Breast cancer is the second leading cause of cancer death in women. In breast cancer the cells are increased abnormally. Early diagnosis of breast cancer is the best method for the cure or taking treatment to this disease. In some countries the breast cancer patient's survival rate is more than above 80% due to early prevention. Increased public awareness and improved screening thier diagnosis at stages amenable to complete surgical resection and curative therapies.This disease effects physical, mental and social aspects of women life .This article gives information about and overview of breast cancer and its treatment.

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INTRODUCTION

Cells which multiply and spread to other parts of the body are called malignant cells. Malignant cells form tumours which appears as lumps. Breast cancer is the most common malignancy in women and comprises 18% to 25% of all female cancers. When the tumours caused by cells originating in the breast tissue, the cancer is known as breast cancer [3,13]. The breast is composed of two main types of tissues i.e., glandular tissues and stromal tissues (supporting tissue). Glandular tissue is the house of lobules and ducts, stromal tissues include fatty and fibrous connective tissues in the breast and the breast tissue is also contains lymphatic tissues which is immune tissue helps in removal of cellular fluids and wastes. The main causes of breast cancer are the age, family history, intake of alcoholic liquor, menstrual periods and menopause, intake of certain anti-miscarriage drug, personal history of non-cancerous lumps, breast feeding, genetic mutations (BRCA-1 and BRCA-2), obesity, late child birth, neuroendocrine diseases, stress. Cancer develops if the immune system is not working properly and or the amount of cells produced is too great for the immune system to eliminate [6]. The rate of DNA and RNA mutations can be too high in some conditions such as unhealthy environment, poor diet, people with genetic pre-dispositions to mutations and people of advanced age [3].

A PREVIOUS HISTORY OF BREAST CANCER:

A woman who had breast cancer has an increased risk of getting breast cancer in the other breast [14].

SIGNIFICANT FAMILY HISTORY

If several members of patient families had particular types of cancer, patient may have an increased risk of developing breast cancer.

GENETIC CAUSES

Family history has long been known to be a risk factor for breast cancer both maternal and paternal relatives are important. The risk is highest if the affected relative developed breast cancer at a young age had cancer in both breasts or if she is a close relative. First degree (mother, sister, daughter) are most important in estimating risk. Several second-degree relatives (grandmother, aunt) with breast cancer may also increase risk. Breast cancer in a male increases the risk for the all his close female relatives. BRCA-1 and BRCA-2 are abnormal genes that, when inherited, markedly increase the risk of breast cancer to a life time risk estimated between 40 to 80%. Women who have BRCA-1 gene tend to develop breast cancer at an early stage.

HORMONAL CAUSES

Alteration in hormonal level may precipitate breast cancer. It could be attended by starting and stopping of periods (menstrual cycle), pregnancy in early age, hormonal replacement therapy, use of oral pills, etc.

LIFE STYLE AND DIETARY CAUSE

Sedentary life style, high dietary intake of fat obesity particularly in post-menopausal woman may cause breast cancer. The use of alcohol is also another one cause of breast cancer. The risk increases with the amount of alcohol consumed. Woman who consume 2-5 alcoholic beverages per day have a risk about one and half times that of non-drinkers for the development of breast cancer.

Environmental cause: There is known to be a slight increase of risk in ladies who work with low doses of radiation over a long period of time. E.g., X-ray technicians [9].

BREAST FEEDING

Evident suggest that breast feeding has a protective effect against the development of breast cancer. Breast feeding may delay return of regular ovulatory cycles and decrease endogenous sex hormone levels. It has been estimated that there is a 4.3% reduction for every one year of breast feeding.

Pathophysiology of breast cancer: The cells become cancerous when they loss their ability to stop dividing to attach the other cells, to stay where they belong, and to die at the proper type.

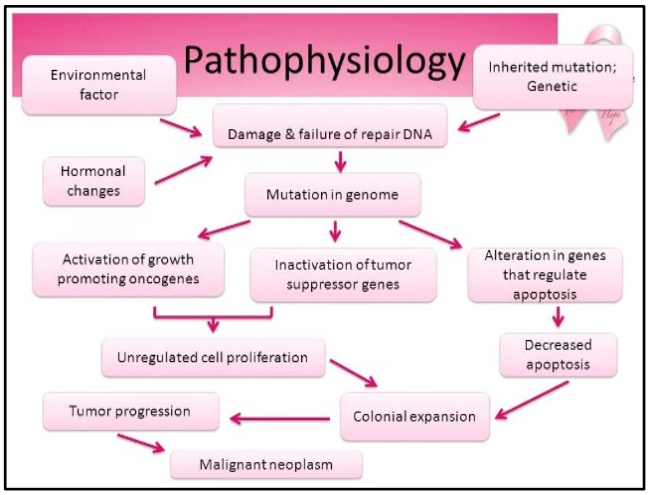

Figure 01: Pathophysiology of Cancer

Normal cells will commit cell suicide when they are no longer needed until they are protected from cell suicide by several protein clusters and pathways. One of the protective pathways is the PI3K by AKT pathway; another is the RAS by MEK by ERK pathway. Sometimes the genes along these protective pathways are mutated in a way that turns them permanently on rendering the cell incapable of committing suicide when it is no longer needed. This is one of the steps that causes cancer in combination with other mutations. Normally, the PTEN protein terms of the PI3K by AKT pathway is stuck in the "on position, and the cancer cells does not commit suicide." Mutations that lead to breast cancers have been experimentally linked to oestrogen exposure. Additionally, G-protein coupled oestrogen receptors have been associated with various cancers of the female reproductive system including breast cancer. Abnormal growth factors signalling in the interaction between stromal cells and epithelial cells can facilitate malignant cell growth in breast adipose tissue over expression of leptin leads to increased cell proliferation and cancer. In the United States, 10-20% of people with breast cancer and people with ovarian cancer have a first or second degree relative with one of these diseases.

The familial tendency to develop these cancers is called hereditary breast-ovarian cancer syndrome. The best known of these, the BRCA mutation confer a life time risk of breast cancer of between 60 and 85% and a life time risk of ovarian cancer of between 15 and 40%. Some mutations associated with cancer,

such as P50, BRCA-1, BRCA-2, occur in mechanisms to correct errors in DNA. These mutations are either inherited or acquired after birth. Presumably they allow further mutations which allow uncontrolled divisions lack of attachments and metastasis to distinct organs. However, there is strong evidence of residual risk variation that goes well beyond hereditary BRCA gene mutations between carrier families. This is caused by unobserved risk factors. This implicates environmental and other causes as triggers for breast cancers. The inherited mutation in BRCA-1 or BRCA-2 genes can interfere with repair of DNA cross links and DNA double strand breaks (known functions of the encoded protein). This carcinogens cause DNA damage such as DNA cross links and double strand breaks that often require repairs by pathways containing BRCA-1 and BRCA-2.

EARLY SIGNS AND SYMPTOMS OF BREAST CANCER

Breast cancer most commonly present as a lump that feels different from the rest of the breast tissue. More than 80% of cases are discovered when a person detects such a lump with the fingertips. Lumps found in lymph nodes located in the arm pits may also indicate breast cancer. The main indication of breast cancer other than a lump may include thickening different from the other breast tissue, one breast becoming larger or lower, a nipple changing position or shape or becoming inverted, skin puckering or, dimpling, a rash on or around a nipple, discharge from nipples, constant pain in part of the breast or armpit and swelling beneath the armpit or around the collar bone.

Malignant tumours can result in meta static tumours – secondary tumours (originating from the primary tumour) that spread beyond the site of origination. The symptoms caused by meta static breast cancer will depend on the location of meta stasis. Common signs of meta stasis include bone, liver, lung and brain. When cancer has such an invasive state, it is categorized as a stage-4 cancer. Cancers of this state are often times fatal. Common symptoms of stage-4 cancer include unexplained weight loss, bone and joint pain, jaundice and neurological symptoms. These symptoms are also called as non-specific symptoms [15].

TYPES OF BREAST CANCER

According to site: - All non-invasive breast cancer cells that are confined to the ducts and do non-invade surrounding fatty and connective tissues of the breast. Ductal carcinoma in-situ (DCIS) is the most common form of non-invasive breast cancer (90%). Lobular carcinoma in-situ (LCIS) is less common and considered a marker for increased breast cancer risk.

INVASIVE BREAST CANCER

Cells that break through the duct and lobular wall and invade the surrounding fatty and connective tissues of the breast. Cancer can be invasive without being metastatic to the lymph nodes or other organs.

FREQUENTLY OCCURRING BREAST CANCER

Lobular carcinoma in-situ: - (LCIS, lobular neoplasia): the term “in-situ”, refers to cancer that has not spread past the area where it initially developed. LCIS is a sharp increase in the number of cells within the milk glands (Lobules)of the breast.

DUCTAL CARCINOMA IN-SITU -(DCIS)

DCIS, the most common type of non-invasive breast cancer, is confined to the ducts of the breast. For e.g., ductal, comedocarcinoma

IN FILTRATING LOBULAR CARCINOMA (ILC)

ILC is also known as invasive lobular carcinoma. ILC begins in the milk gland(lobules) of the breast, but the often spreads to other regions of the body. ILC accounts for 10% to 15% of breast cancers.

IN FILTERING DUCTAL CARCINOMA (IDC)

IDC is also known as invasive ductal carcinoma. IDC begins in the milk ducts of the breast and penetrates the wall of the duct, invading the fatty tissue of the breast and possibly other regions of the body. IDC is the most common type of breast cancer, accounting for 80% of breast cancer diagnoses.

LESS COMMONLY OCCURRING BREAST CANCER MEDULLARY CARCINOMA

medullary carcinoma is an invasive breast cancer that forms a distinct boundary between tumour tissue and normal tissue. Only 5% of breast cancers are medullary carcinoma.

MUTINOUS CARCINOMA

Also called colloid carcinoma, mutinous carcinoma is a rare breast cancer formed by the mucus- producing cancer cells. Women with mutinous carcinoma

generally have a better prognosis than women with more common types of invasive carcinoma.

TUBULAR CARCINOMA

Tubular carcinoma are a special type of infiltrating (invasive) breast carcinoma. Women with tubular carcinoma generally have a better prognosis than women with more common types of invasive carcinoma. Tubular carcinoma account for around 2% of breast cancer diagnoses.

INFLAMMATORY BREAST CANCER

Inflammatory breast cancer is the appearance of inflammatory breasts (red and warm) with dimples and/or thick ridges caused by cancer cells. Blocking lymph vessels or channels in the skin over the breast. Though inflammatory breast cancer is rare, it is extremely fast growing.

PAGET'S DISEASE OF THE NIPPLE

A rare form of breast cancer that begins in the milk ducts and spreads to the skin of the nipple and areola, Paget's disease of the nipple only accounts for about 1%of breast cancers.

PHYLLODES TUMOUR

Phyllodes tumours (also spelled "phyllodes") are can be either benign (non-cancerous) or malignant (cancerous). Phyllodes tumours develop in the connective tissues of the breast and may be treated.

SCREENING/DIAGNOSIS OF BREAST CANCER

Breast cancer is usually diagnosed by biopsy of nodule detected by mammogram or by palpitation [15].

DIAGNOSIS

DIAGNOSING BREAST CANCER

Tests and procedures used to diagnose breast cancer include:

- **Breast exam**
  A doctor will check both of your breasts and lymph nodes in your armpit, feeling for any lumps or other abnormalities.
- **Mammogram**
  A mammogram is an X-ray of the breast. Mammograms are commonly used to screen for breast cancer. If an abnormality is detected on a screening mammogram, your doctor may recommend a diagnostic mammogram to further evaluate that abnormality.
- **Breast ultrasound**
  Ultrasound uses sound waves to produce images of structures deep within the body. Ultrasound may be used to determine whether a new breast lump is a solid mass or a fluid-filled cyst.
- Breast magnetic resonance imaging (MRI)
  An MRI machine uses a magnet and radio waves to create pictures of the interior of your breast. Before a breast MRI, you receive an injection of dye. Unlike other types of imaging tests, an MRI doesn't use radiation to create the image.[9,10]

BREAST CANCER SURGERY

OPERATIONS USED TO TREAT BREAST CANCER INCLUDE

- **Removing the breast cancer (lumpectomy)**
  During a lumpectomy, which may be referred to as breast-conserving surgery or wide local excision, the surgeon removes the tumor and a small margin of surrounding healthy tissue.
- **Removing the entire breast (mastectomy)**
  A mastectomy is an operation to remove all of your breast tissue. Most mastectomy procedures remove all of the breast tissue — the lobules, ducts, fatty tissue and some skin, including the nipple and areola (total or simple)
- **Removing a limited number of lymph nodes (sentinel node biopsy)**
  To determine whether cancer has spread to your lymph nodes, your surgeon will discuss with you the role of removing the lymph nodes that are the first to receive the lymph drainage from your tumour.
- **Removing several lymph nodes (axillary lymph node dissection**)
  If cancer is found in the sentinel lymph nodes, your surgeon will discuss with you the role of removing additional lymph nodes in your armpit.

- **Removing both breasts**
  Some women with cancer in one breast may choose to have their other (healthy) breast removed (contralateral prophylactic mastectomy) if they have a very increased risk of cancer in the other breast because of a genetic predisposition or strong family Complications of breast cancer surgery depend on the procedures you choose. Breast cancer surgery carries a risk of pain, bleeding, infection and arm swelling (lymphedema). [19]

RADIATION THERAPY

Radiation therapy uses high-powered beams of energy, such as X-rays and protons, to kill cancer cells. Radiation therapy is typically done using a large machine that aims the energy beams at your body (external beam radiation). But radiation can also be done by placing radioactive material inside your body (brachytherapy). Side effects of radiation therapy include fatigue and a red, sunburn-like rash where the radiation is aimed. Breast tissue may also appear swollen or more firm. Rarely, more-serious problems may occur, such as damage to the heart or lungs or, very rarely, second cancers in the treated area [24,26,30,31].

CHEMOTHERAPY

Chemotherapy uses drugs to destroy fast-growing cells, such as cancer cells. If your cancer has a high risk of returning or spreading to another part of your body, your doctor may recommend chemotherapy after surgery to decrease the chance that the cancer will recur. Chemotherapy side effects depend on the drugs you receive. Common side effects include hair loss, nausea, vomiting, fatigue and an increased risk of developing an infection. Rare side effects can include premature menopause, infertility (if premenopausal), damage to the heart and kidneys, nerve damage, and, very rarely, blood cell cancer.

HORMONE THERAPY

Hormone therapy — perhaps more properly termed hormone-blocking therapy — is used to treat breast cancers that are sensitive to hormones. Doctors refer to these cancers as oestrogen receptor positive (ER positive) and progesterone receptor positive (PR positive) cancers. Hormone therapy side effects depend on your specific treatment, but may include hot flashes, night sweats and vaginal dryness. More serious side effects include a risk of bone thinning and blood clots.[20,21,22]

TARGETED THERAPY DRUGS

Targeted drug treatments attack specific abnormalities within cancer cells. As an example, several targeted therapy drugs focus on a protein that some breast cancer cells overproduce called human epidermal growth factor receptor 2 (HER2). The protein helps breast [21,31].

IMMUNOTHERAPY

Immunotherapy uses your immune system to fight cancer. Your body's disease-fighting immune system may not attack your cancer because the cancer cells produce proteins that blind the immune system cells [29].

SUPPORTIVE (PALLIATIVE) CARE

Palliative care is specialized medical care that focuses on providing relief from pain and other symptoms of a serious illness. Palliative care specialists work with you, your family and your other doctors to provide an extra layer of support that complements your ongoing care. Palliative care can be used while undergoing other aggressive treatments, such as surgery, chemotherapy or radiation therapy [31,32].

ALTERNATIVE MEDICINE

No alternative medicine treatments have been found to cure breast cancer. But complementary and alternative medicine therapies may help you cope with side effects of treatment when combined with your doctor's care [35].

CONCLUSION

This article gives the information about etiology, sign and symptoms of breast cancer and the complete pathophysiology involved in it.This article gives us detail note on types of breast cancers, about diagnosing or screening methods of breast cancer.Early diagnosing of cancer developing tissue in breasts will helps to prevent the growth and removed by lumpectomy. It gives information about treatment methods which are involved in the breast cancer and about alternative medicine for treating the cancer.Chemotherapy and hormone therapy are highly advisable to the

people who are suffering from these types of cancers.

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