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Review Article on Breast Cancer

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Abstract: However being rare in women, breast cancer can have a substantial morbidity and fatality rate. The goal of the current review is to ascertain whether breast cancer treatment and evaluation methods used on female patients are suitable for this type of cancer. In comparison to male breast cancer, female breast cancer differs biologically in that it is more common in some regions of Africa, has a higher frequency of oestrogen receptor positive, and has more aggressive clinical behavior. It reacts to chemotherapy and hormonal therapy, yet it is unknown what the best treatment plans are for female patients. Breast cancer in women is still a rare condition. The majority of what we currently know about its biology, natural history, and methods of therapy has been derived from research on its female counterpart.
Keywords: Breast cancer, appropriatein breast cancer.

I. INTRODUCTION

Carcinogenesis, which has six main characteristics, can happen in any type of cell, tissue, or organ and cause the degenerative changes that give rise to a large variety of cancers. Evading apoptosis, having an infinite proliferative potential, increased angiogenesis, resistance to anti-growth signals and activation of own growth signals, and the ability to metastasis are the main processes that allow it to proceed[1]. Cancer has become a major issue of the century due to its increased frequency in recent years and its effects on various physical, mental, and social aspects of human life [2]. When comparing transitioning countries (Melanesia, Western Africa, Micronesia/Polynesia, and the Caribbean) to transitioned countries (Australia/New Zealand, Western Europe, Northern America, and Northern Europe), the incidence rate of breast cancer deaths is approximately 88% higher in the former. A number of measures, including screening programs and general preventative practices, are essential for reducing the incidence rate of breast cancer and enabling the commencement of early treatment [3]. A woman's lifetime risk of invasive breast cancer is 12.6%. In the United States, one in every eight women will have breast cancer at some point in their lives [4]. Over the past ten years, the death rate from breast cancer has been gradually declining, and the incidence has been stable since 1988 after rising significantly for about fifty years [5]. The second greatest cause of death worldwide and the most prevalent type of cancer is breast cancer. This illness is the main reason why women between the ages of 45 and 55 die [6]. The extremely old may not receive aggressive treatment or may have concomitant conditions that enhance the mortality rate from breast cancer. It seems that the very young have more aggressive disease [7]. It ranks as the second most common cause of mortality from cancer. Almost one in eight women will get breast cancer, which usually requires total tissue excision, chemotherapy, radiation therapy, and hormone therapy [8].

A. Breast Cancer Epidemiology

The World Health Organization (WHO) estimates that malignant neoplasms cause 107.8 million Disability-Adjusted Life Years (DALYs) annually for women globally, with breast cancer accounting for 19.6 million of these DALYs [9]. Breast cancer is the most common disease in women diagnosed globally; 2.26 million [95% UI, 2.24–2.79 million] new cases were reported in 2020 [10]. Throughout their lives, one in nine women will develop breast cancer. Although precise data on the disease's prevalence is lacking in Iran, research indicates that breast cancer is the second most common type of cancer [11]. One of the most serious psychological effects of breast cancer is that the patient experiences fear and anxiety while thinking about dying and having a mastectomy. A patient with cancer experiences different psychological phases as they deal with and identify their illness. A woman with cancer has a sudden and spectacular collapse of her world. The patient loses her sense of direction and her meager expectations turn into enormous disappointments. No one can truly comprehend her emotions [12].

B. Risk Factor

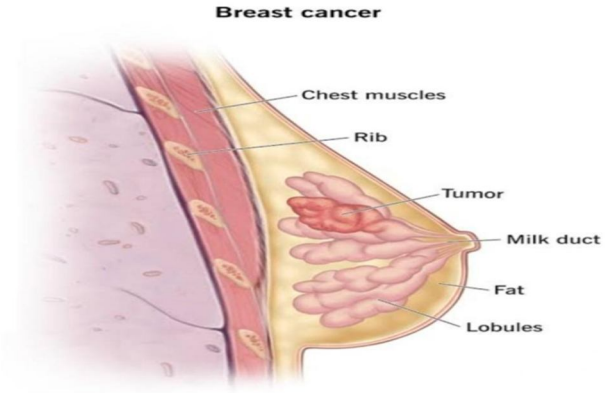
1) *Sex:* Ninety-nine percent of cases of breast cancer are found in women. Men are affected by this malignant tumor in only 1% of instances; in Poland, the standardized incidence rate is 0.4/105. Annually, no more than 100 instances are documented .Nonetheless, there is a consistent rising trend in the incidence of breast cancer in males as well as women, which is most likely related to obesity and longer survival times [13].

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2) *Age:* Despite being uncommon in this age group, this malignant tumor still poses a serious clinical and social issue because of its worse prognosis. Several studies have shown that breast cancer in young women is characterized by a higher histological malignancy, marginal steroid receptor expression, frequent overexpression of the HER-2 receptor, or it manifests as a molecular biological subtype known as "basal-like" or "triple negative".. Moreover, premenopausal women are becoming more likely to develop breast cancer; in just 30 years, this risk has nearly doubled [14].
3) *Hormonal Status:* The likelihood that a woman may get breast cancer appears to be significantly influenced by factors related to her hormonal condition. Numerous research' findings show that the length of time spent exposed to estrogen prolongs early menarche, late menopause, the age at which a child is born, and the number of children born. These factors all raise the chance of getting breast cancer[15,16].
4) *Degree Of Economic Development:* This phenomena is a byproduct of the previously discussed "Western lifestyle." Simultaneously, there appears to be a likelihood that developing nations may soon experience the same high morbidity trend. Along with increased economic growth, these nations see reductions in maternal, newborn, and child mortality, greater access to public health care, and the introduction of prevention and screening programs that boost detection [17].
5) *Alcohol Consumption:* Alcohol increases the amount of estrogens in the blood by both accelerating the conversion of androgens to estrogens and decreasing their metabolism in the liver. These two mechanisms together account for the dependence. Furthermore, it may enhance cellular migration and proliferation and hinder DNA repair mechanisms or the immune system. Ultimately, alcohol itself contains carcinogenic byproducts [18].
6) *Diet:* However, there is some inconsistency in the studies evaluating the connection between breast cancer risk and diet. Systematic investigations published between 2013 and 2017 were examined by Dandamudi et al. Out of the seventeen publications, ten are available. An analysis examined the relationship between breast cancer risk and a diet deemed to be "unhealthy." The staples of the diet under consideration were processed fruit juices, sweetened soft drinks, red and processed meats, hardened fats, saturated fats, salted goods (peanuts, chips, and chips), refined grains, and sweetened goods [19].

II. LIFETIME PROBABIY OF DEVELOPING BREAST CANCER by AGE (%) [20]

Age	30	40	50	60	70	80
Female	0.3	1.3	2.2	2.8	3.2	2.4



III. DETECTION OF BREAST CANCER

Since breast cancer rarely hurts, a lump that doesn't hurt is far more concerning for malignancy than one that does. For women without any risk factors, the current recommended is a yearly mammogram starting at age 40 [21]. The main goal of a mammography in a patient with a solid, dominant mass (suspicious mass) is to check for nonpalpable malignancies in the opposite breast and the normal surrounding breast tissue, not to diagnose the palpable lump. Consequently, a negative mammography does not always indicate the absence of malignancy; rather, a mass that does not go away or collapse upon aspiration needs to be considered malignant and biopsied [22].

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IV. DIAGNOSING BREAST CANCER: THE BIOPSY

Three techniques exist for extracting material from a breast mass that seems worrisome. Because fine-needle aspiration cannot differentiate between ductal carcinoma in situ and invasive malignancy, it is not a reliable method of diagnosis and may produce a false-negative result [23]. Fine needle aspiration (FNA) is often saved for lumps that feel like cysts and are apparent on an ultrasound or mammography. While false-negative results are rare, false-positive results happen 15–20% of the time. As a result, further biopsy is required if the cyst or lump doesn't go away after FNA [22]. About 50% of patients with atypical ductal hyperplasia in a core needle biopsy also have coexisting cancer.

Thus, an excisional biopsy is required in light of this diagnosis [24]. It is anticipated that 75–80% of excisional biopsies will be benign. For the remaining 20% to 25% of cases that show cancer, a second procedure is frequently required to guarantee the removal of all malignant tissue.

Participation of axillary lymph nodes is the most significant regularly known indicator of survival and recurrence [25]. Accordingly, a study showing that patients with stage I breast cancer who have complete axillary dissection have an 85% 10-year survival rate drops to 66% when axillary dissection is not done reflects the expense of performing sentinel node biopsy alone [26]. A recent edition of this publication has a more thorough explanation of sentinel lymph node biopsy [27]. Compared to receptor-negative cancers, estrogen and/or progesterone receptor-positive tumors have a better prognosis and respond better to hormone therapy. DNA Index, also known as DNA content, is measured by flow cytometry. Normal DNA content, or a DNA index of 1, indicates that cancer cells are diploid, while those with aneuploidy have a poorer prognosis [28].

V. INTRADUCTAL (DUCTAL) CARCINOMA IN SITU (DCIS)

The proliferation of malignant epithelial cells restricted to ducts without any indication of penetration through the basement membrane is known as intraductal (or ductal) carcinoma in situ, or DCIS. Before the invention of mammography, DCIS was a rare diagnosis. The age-adjusted incidence of DCIS increased by 587% from 2.3 to 15.8 per 100,000 females with the introduction of regular mammography.During the same year, there was a 34% increase in new instances of invasive breast cancer [29]. The primary determinant distinguishing benign from malignant calcification is the morphology of the microcalcifications. Heterogeneous clustered calcifications, tiny linear branching calcifications, or calcifications in a segmental distribution are among the findings that may indicate malignancy. When benign findings are viewed in magnification, they frequently exhibit several clusters of finely granular microcalcification, but DCIS-related findings typically show coarser microcalcifications [30].

VI. TREATMENT OF BREAST CANCER:

Together, you and your doctor will create a customized treatment plan for your breast cancer that will lower your risk of the disease spreading to other parts of your body and coming back in the breast. After a diagnosis, treatment usually begins within a few weeks. The size and location of the tumor in the breast, the findings of laboratory tests performed on the cancer cells, and the stage or severity of the disease will all influence the suggested course of treatment. Your doctor will often take into account your age, overall health, and preferences for therapy.

1) *Surgery:* Epirubicin, cyclophosphamide, and docetaxel (Taxotere) or paclitaxel (Taxol) come next. The majority of breast cancer patients have some kind of surgery. A breast tumor is frequently removed surgically. Mastectomy and breast-conserving surgery are the options available for this. The reconstruction of the breast can take place either during or after the procedure. Checks for cancer spread in the lymph nodes under the arm are also performed during surgery. A sentinel lymph node biopsy and an axillary (underarm) lymph node dissection are two possible treatments for this.
2) *Radiation Therapy:* High-energy radiation therapy or particles are used to treat cancer by killing cancer cells. Breast conservation surgery is frequently followed by radiation therapy to the breast to lessen the likelihood that the cancer may return in the lymph nodes that are close to the breast cancer. If a patient's cancer is detected in their lymph nodes or if their malignancy is greater than 5 cm, radiation therapy may also be advised following a mastectomy.
3) *Chemotherapy:* The most often prescribed chemotherapy medications for early-stage breast cancer are taxanes (paclitaxel/Taxol and docetaxel/taxotere) and anthracyclines (doxorubicin/Adriamycin and epirubicin/Ellence). These could be taken with several other medications, such as fluorouracil. Several of the most often prescribed medication combos for early breast cancer.
4) *Hormone Therapy:* Tamoxifen: Tamoxifen prevents breast cancer cells from expressing estrogen receptors. As a result, estrogen is prevented from attaching to them and stimulating cell division and growth. In breast cells, tamoxifen functions as an anti-estrogen; however, in other tissues, such as the uterus and bones, it functions as an estrogen. It is known as a selective estrogen receptor modulator, or SERM, since it functions as an antiestrogen in some tissues and as an estrogen in others.

Tamoxifen and toremifene (Fareston) are comparable medications. Its negative effects are comparable to those of another SERM. Only the treatment of metastatic breast cancer is authorized. If tamoxifen has been taken and stopped working, this medication is unlikely to be effective.

VII. TREATMENT OPTION

There are many readily available, efficient treatments for breast cancer that can be used singly or in combination, depending on the patient's needs. The most popular course of treatment for localized breast cancer is surgery. The two surgical techniques most frequently employed are modified radical mastectomy and lumpectomy with axillary node dissection. Excision of the tumor mass, together with lymph nodes under the arm and a clear margin of normal breast surrounding the tumor, is required for a lumpectomy with axillary node dissection.

Complete removal of the breast, the underlying pectoral fascia, and some of the axillary nodes are required for a modified radical mastectomy . If the specific location of the cancer is known, and if the surrounding healthy organs and tissues can be preserved without suffering harm, then surgery and radiation therapy are particularly effective in removing or eliminating malignant tissue. Chemotherapy, on the other hand, works throughout the body to eradicate cancer cells no matter where they are found. When a secondary tumor is known to exist but the main tumor has been managed by radiation or surgery, chemotherapy is frequently employed as an adjuvant treatment. In certain cases, when the cancer is limited to a single location, it is also utilized [31]. The annual rate of breast cancer relapse was shown to rise gradually over the first four years of the trial, which included 416 patients. In the first year, the yearly hazard rate for relapse for patients with positive nodes was 5%; in the third and fourth years, this climbed to 10% and 14%, respectively. On the other hand, the risk of recurrence was 1% in year one and 5% in years three and four for patients who were node negative at diagnosis (n = 302; 73 percent) [32].

VIII. EFFECT FOR WAITING FOR TREATMENT

1) Practice Guideline: In terms of treating patients with breast cancer, at least eleven clinical practice guidelines have been created. The majority of these guidelines covered patient care; however, they did not address the timing of therapy initiation or the consequences of postponement. The Guidelines for the Treatment of Breast Cancer (revised 1997) published by the National Comprehensive Cancer Network (NCCN) did not specify the timing of treatment in relation to diagnosis [33]. If only in passing, the topic of when to have surgery was covered in two guidelines. The Scottish Intercollegiate Guidelines Network's 1998 publication Breast Cancer in Women: A National Clinical Guideline made no mention of when surgery should be scheduled, other than to state that treatment delays shorter than three months were not expected to result in a discernible improvement in survival [34].
2) Defination and cause of dalay:- It is widely acknowledged that early cancer detection is optimal. Nonetheless, there are several reasons why a diagnosis or course of treatment may be delayed. Delays may be connected to each of the following: patients may find the early indicators of breast cancer on their own, through a screening program, or by chance. Similar to this, there could be a wait between the initial primary care appointment and a hospital referral, or between the initial hospital visit and the commencement of conclusive treatment. The legal community is interested in hospital delays, and there is a growing number and cost of claims for delays in breast cancer diagnosis [35].
3) Influence of dalay surviver:- Richards and colleagues conducted a thorough analysis of observational studies conducted globally in 1999 to investigate the impact of delay on survival in breast cancer patients. We identified and examined eighty-seven studies (101,954 patients) that included direct data relating delay (including patient delay) and survival that were published between 1907 and 1996. For analytical purposes, each study was categorized into one of three groups: category I, where groups with delays of less than three months, less than six months, or both had actual survival rates available five years after diagnosis; category II, where the investigators reported additional analyses but did not report actual survival rates at five years [36].
4) *Other Factors Related to Dalay:* Aside from survival, a number of other variables, such as disease stage, tumor size, and lymph node involvement upon diagnosis, have also been linked to treatment delays. Patients with a delay of more than six months showed an approximately twofold increased chance of nodal involvement (as compared to patients with a delay of less than three months; adjusted for age), and they also had a three to fourfold increased risk of receiving an advanced illness diagnosis [37].

IX. CONCLUSION

Our goal in conducting this study was to provide an overview and an update of the current understanding of breast cancer, with a focus on the disease's epidemiology, risk factors, categorization, prognostic biomarkers, and accessible treatment options. Considering that the morbidity and since breast cancer death rates have risen dramatically in recent years, it is imperative to give the best preventative measures possible while keeping in mind that changing some risk factors may be essential to lowering the incidence of breast cancer. Currently, the most widely used screening tests that allow for the early diagnosis of breast cancer are mammography and sonography. The management and clinical results of patients with breast cancer have greatly improved as a result of the ongoing quest for prognostic biomarkers and targets for prospective biological therapies.

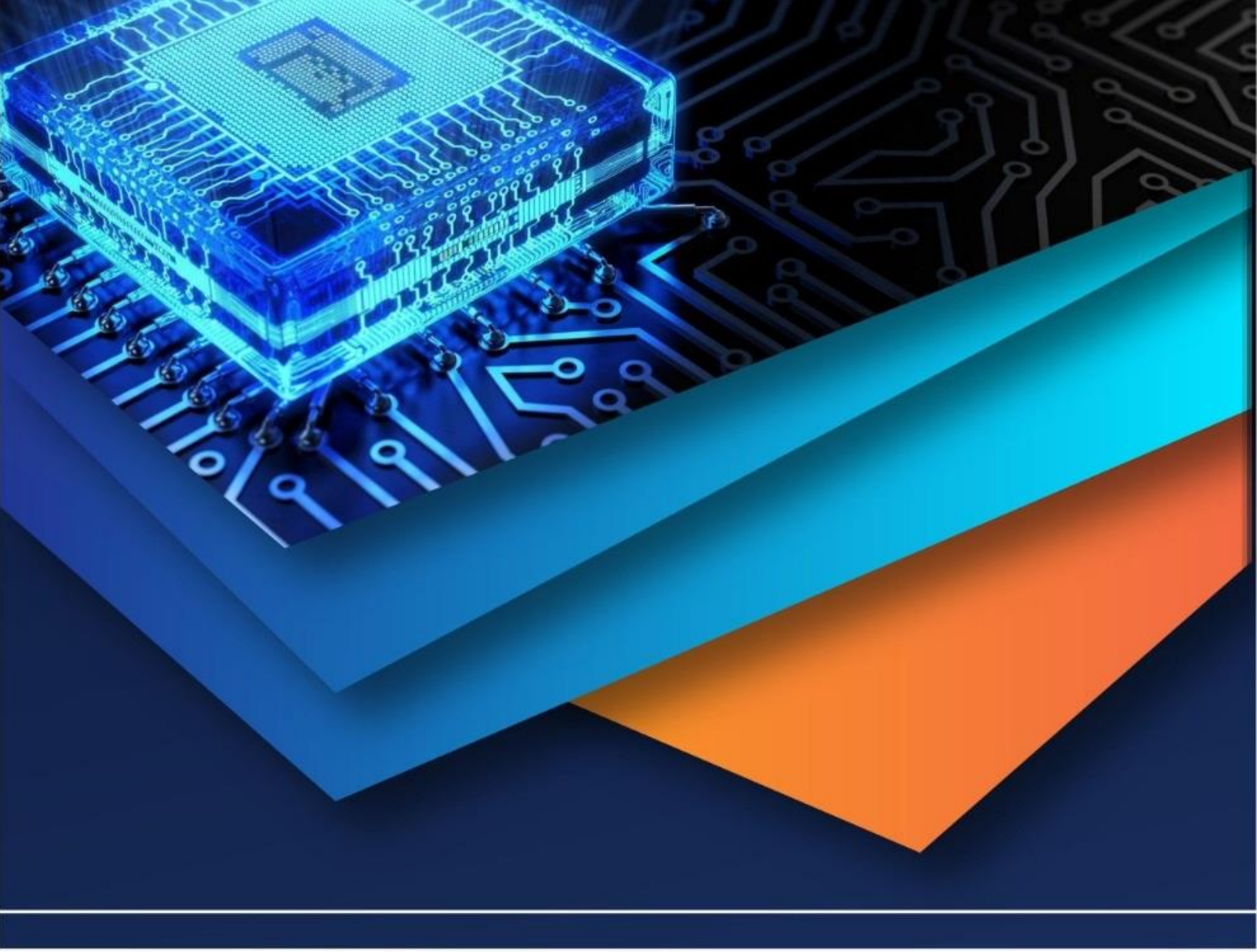
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