

THE STUDY OF BREAST CANCER: MINI REVIEW

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ABSTRACT

One of the most common cancers in women is breast cancer, and oestrogen receptor overexpression is responsible for 70% of breast cancer cases (ER). According to research, breast cancer (BC) survivorship is rising quickly. In keeping with earlier research on the symptoms experienced by breast cancer survivors, exhaustion, sleep disturbance, mental agony, and functional impairment were the most common and severe symptoms. As for challenges, In low-income countries, where breast cancer is less common, the population is younger, and access to high-quality care is less common, the mammography's value has not been studied. Breast cancer is treated with lumpectomies, interstitial implants, and axillary node dissection. With response rates of 60%, cytotoxic therapy has reached a plateau in effectiveness, and multiple trials have demonstrated that tamoxifen therapy used after progression is similarly beneficial. In Malaysia, one in 19 women are at danger, compared to one in 8 in Europe and the US. Breast cancer is the second biggest cause of cancer-related deaths among women globally, affecting an estimated one million people annually. As with most cancers, breast cancer treatment outcomes are improved the sooner it is found and identified.

Keywords: Breast cancer, immunohistochemistry, lumpectomy, Axillary Node Dissection.

INTRODUCTION

Incidence and mortality of breast cancer (BC) have increased globally in 2018 (Montagnese,2020). The most frequent non-cutaneous malignancy in women worldwide is breast cancer (Evron E,2019). In the majority of the world's areas, breast cancer (BC) is the most frequently diagnosed cancer in women and the main reason for cancer-related death. Global BC survival rates are rising, reaching 86 percent in Italy in 5 years. The prevalence of BC is on the rise, and BC patients have decent survival

rates, which emphasises the need of focusing on HRQoL and understanding how it is influenced by lifestyle like food and exercise. Greater quality of life has been linked to healthy lifestyles, and improved quality of life has been linked to better prognoses and lower mortality

(Montagnese,2020). Cancer-related muscular weakness is a significant clinical problem that affects a wide range of patients and is not just a problem for palliative or advanced-stage patients because it has been seen in freshly diagnosed patients with small tumour loads as well. A few of the many factors that could affect skeletal muscle performance include age, comorbidities, malnutrition, physical inactivity, tumour-derived factors, systemic and local cancer treatments, and supportive care medications. Observational studies show that physical activity can lower overall mortality and mortality due to breast cancer (BC), however the importance of muscular strength during cancer therapy has not been thoroughly studied (Klassen O, 2017).

For women with early breast cancer, the advantages of exercise have been increasingly shown during the last ten years (Ligibel JA,2016). Patients with cancer describe deteriorating physical function, increased pain, and a general loss in quality of life. Oncologic therapy compliance may decrease as a result, which could have a negative impact on mortality and cancer prognosis. The Mediterranean diet has been linked to higher levels of physical functioning and health status in women who have just been diagnosed with BC, and it has been demonstrated that diet can improve quality of life in BC survivors. Through direct physiologic effects or indirectly by lowering the side effects of oncologic treatment, physical activity has also been demonstrated to be useful in enhancing overall quality of life in BC survivors (Montagnese,2020). Better muscle performance and exercise-induced adaptations may lessen cancer toxicities, which in turn may enhance the quality of life for cancer survivors and possibly even boost long-term survival (Klassen O,2017). Despite similar findings in women with early-stage breast cancer, to our knowledge, there is no evidence supporting the viability or benefits of exercise in women with advanced breast cancer. Women who are diagnosed with metastatic breast cancer frequently live for several years because of improved treatments. However, many women go through this period while still suffering from symptoms of their illness and serious side effects from breast cancer treatment. In the years following a metastatic breast cancer diagnosis, fatigue, poor physical performance, ache, and other signs can make it difficult for a woman to carry out everyday tasks, which in turn severely lowers quality of life (QOL) and mood. Interventions are required to help women who have advanced breast cancer manage their symptoms and carry on with their daily lives (Ligibel JA,2016).

MECHANISMS OF BREAST CANCER

In early-stage breast cancer, tumour cells move through lymphatic vessels, however in advanced stages of the disease, they spread through the blood. Breast tumours' inherent ability to spread is a characteristic of the clinically diverse disease known as breast cancer. (Rosa Mendoza, E. S., 2013) There is significant genetic heterogeneity, both within and among patients with primary breast cancer. Despite this intratumor variability, RNA can predict future sites of recurrence, sensitivity to therapy, and overall survival based on the intrinsic gene expression features of the initial tumour. There aren't many studies that have looked at the RNA and DNA sequencing of numerous distant metastases within a patient or across numerous subtypes of breast cancer from bigger cohorts of patients. (Siegel, M. B., 2018) On a molecular level, breast cancer is a varied illness; numerous molecular subtypes have been identified based on gene expression profiles and immunohistochemistry, which may be accounted for by the cell of origin. The luminal A subtype makes up to 50–60% of all instances of breast cancer, making it the most prevalent subtype. These tumors can be identified by their prominent oestrogen receptor alpha (ER) expression due to their low rate of proliferation and generally good prognosis. The ERa, PR, and/or ERBB2 are mixedly expressed in luminal B subtype breast cancers, which make up 10–20 percent of all breast tumours. It frequently manifests as a more aggressive breast cancer phenotype with a higher tumour

grade. Immunohistochemistry is typically used to determine whether a breast tumour expresses the oestrogen receptor (ER), and the presence of 1 percent or more ER-positive tumour cells is used to define the status as "positive." Expression of ER frequently affects how responsive these cancers are to hormonal therapy, whether it be with selective oestrogen receptor modulators like tamoxifen or aromatase inhibitors. Circulating tumour cells may serve as the progenitors of distant metastases (CTCs). These cells have separated from the main tumour, are circulating in the blood, and may eventually extravasate to metastasis. If 1 percent of the cells in a breast tumour exhibit nuclear reactivity of any degree, the tumour is deemed to be ERa positive. It is therefore unnecessary to assume that CTCs produced from primary ERa-positive breast tumors will also be ERa-positive. ER-negative CTCs may arise from early tumor cells that were also ER-negative, or they may be chosen due to anti-ER therapy and show superior development. If there are chromosomal or epigenomic aberrations, ER-negative CTCs might become detectable. (Babayan, A. , 2013)

SIGNS AND SYMPTOMS

The most prevalent and serious symptom, in line with previous study on breast cancer survivors' symptoms, was fatigue. (Lengacher, C. A.,2012) Figure 1 illustrates persistent fatigue as one of the most prevalent and taxing long-term consequences of breast cancer treatment. Even ten years after ending their treatment, up to one-third of breast

cancer survivors still report having moderate to severe persistent fatigue. According to research, persistent fatigue frequently co-occurs with depression, insufficient sleep, and a lower quality of life. It is also independently linked to shorter times to breast cancer recurrence and shorter overall survival. (Zick, S. M., 2017) In spite of this, women with metastatic breast cancer continue to experience low quality of life, high levels of pain, and additional disease-related symptoms such as exhaustion, based on figure 2, sleep disturbance, psychological anguish, and functional impairment. It can be quite difficult to deal with these symptoms when you have a life-limiting illness (Carson, J. W., 2017). After treatment is over, patients still experience physical symptoms like pain, exhaustion, and sleep problems as well as psychological symptoms including stress, worry, depression, fear of recurrence, and reduced cognitive functioning, which has a detrimental influence on their quality of life (QOL) (Lengacher, C. A.,2012) In the years following a metastatic breast cancer diagnosis, a woman's capacity to carry out everyday tasks may be hampered by fatigue, poor physical performance, pain, and other symptoms. This has a substantial negative impact on a woman's quality of life (QOL) and mood. (Ligibel, J. A.,2016) Breast cancer survivors continue to have a variety of symptoms even after treatment is over, but they may not be as severe as they were; (Lengacher, C. A.,2012)



Figure 1: Fatigue

(<https://stock.adobe.com/images>)



Figure 2: Exhaustion

(<https://www.shutterstock.com>)

COMPLICATIONS OF BREAST CANCER

Cancer affects every population, but the effects should be examined in light of the significant discrepancies in healthcare that we see globally. In low- and middle-income countries (LMIC), the population is even more vulnerable, diagnoses are made late phase of the disease, and where access to care remains a significant challenge, disparities in resource allocation, established infrastructure, organization, and access to

healthcare will undoubtedly result in a higher cancer death rate.(Barrios, 2022). In poverty-stricken nations, where people diagnosed with cancer frequently enter with advanced-stage disease and outcomes are dismal, the incidence and death of breast cancer are rising. Mammography's usefulness has not been researched in low-income nations, where the prevalence of breast cancer is lower, the population is of younger age, and high-quality care is less frequently accessible. (Lydia E. Pace & Jean Marie Vianney Dusengimana, 2019).

TREATMENT AND THERAPY ADMINISTRATIONS

Patients with locally advanced breast cancer have a worse prognosis due to clinical and biological factors like age at diagnosis, tumour size, nodal status, tumour histological grading, expression of estrogen/progesterone receptors, and Her2 recognition.(Swaminathan & nisha, 2019). The effectiveness of the conservative surgery and RT approach to treating early breast cancer depends on it providing patients with an identical chance of survival to radical surgery while also improving their appearance and quality of life. (Seymour H. Levitt, 1985). Based on figure 3, one of the treatments is Lumpectomy and Interstitial implant. During lumpectomy, the gross mass is removed. The margins at the location of the resection are marked with ink and checked using the frozen section method for disease. Further normal-appearing tissue at that location is extracted if any margin tests positive for the presence of remaining tumor cells until the absence of any residual tumor at the margin is established. Based on figure 4, Axillary Node Dissection can also be done as a treatment. At the time of the lumpectomy, the entire axillary node is dissected, including levels I, II, and III. If the axillary nodes are positive, one of the various SouthWest Oncology Group regimens is used to administer systemic therapy to the patient. Cytosan, methotrexate, 5-fluorouracil, vincristine, and prednisone are used to treat most individuals. (Leela Krishnan, 1989).

In advanced breast cancer, the effectiveness of cytotoxic therapy has reached a plateau with response rates of 60% and median durations to progression of 8–12 months. Tamoxifen therapy after progression was shown in several trials to be equally beneficial in terms of response rate and survival. (C Rose, 1989). External beam radiation is begun three weeks after the implant has been removed. This window of time is intended to allow the axillary wound to heal and some arm mobility to return. Following careful planning, the breast is administered a dose of 40–50 Gy over a period of 551 weeks applying tangential fields. (Leela Krishnan, 1989).

Physical exercise has also been reported to be correlated to survival both before and after breast cancer diagnosis, with physical activity following breast cancer diagnosis being linked to the biggest gain in survival. The greatest risk of mortality was shown to be reduced in women with breast cancer in stages I to III who walked the equivalent of 3 to 5 hours per week following their diagnosis. (Oxana Palesh, 2017). The secondary prevention strategy includes pre-cancerous lesion screenings and treatments. Additionally, aggressive therapeutic chemotherapy and radiation therapy are being used as tertiary treatments for cancer that has already been identified as being invasive. (Swaminathan, 2020)

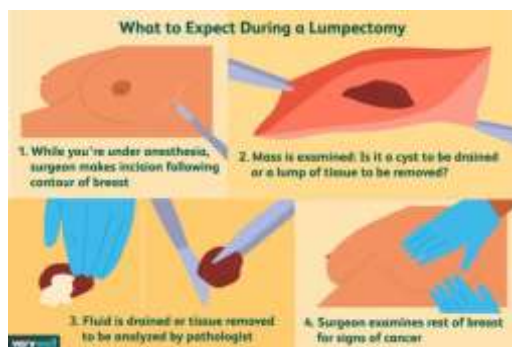


Figure 3 :Lumpectomy

(<https://www.verywellhealth>)

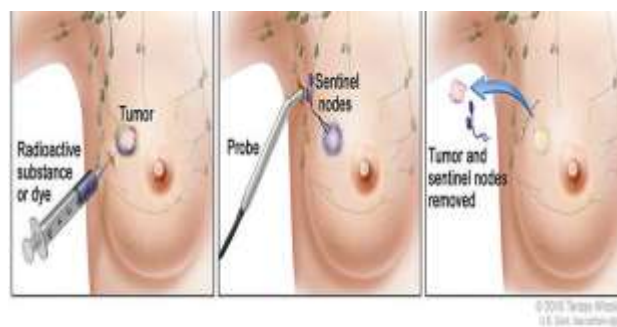


Figure 4: Axillary Node dissection

(<https://www.cancer.gov/news-events>)

CONCLUSION

In conclusion, breast cancer (BC) is the most common non-cutaneous tumors in women, and its prevalence has increased globally. When breast cancer is in its early stages, tumor cells travel through lymphatic vessels; but, when the disease is more advanced, they spread through the blood. Constant fatigue is among the most prevalent and taxing long-term side effects of breast cancer treatment. Due to clinical and biological factors, patients with locally advanced breast cancer have a worse prognosis.

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