ORIGINAL ARTICLE

Spectrum of Morphological Patterns in Breast Cancer - A Single Center Study

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ABSTRACT

Aim: To determine the frequency of morphological patterns of breast malignancies among female patient population of different age groups
Study design: Descriptive, Cross-sectional study
Setting: Study was conducted from January 2022 to December 2022 at Citi lab & Research Center, Lahore.
Methods: 109 diagnosed cases of female breast malignancies reported during period of one year 1st January 2022 till 31st December 2022 were included in the study.
Results: Out of 109 cases, the maximum number of patients diagnosed with malignancy were in age range of 51-60 years (33%) followed by 24.7% of cases in 41-50 years of age range while 19.2% females were between 31-40 years of age. In terms of histological type, ductal carcinoma was the predominant pattern (63.3%) %) followed by lobular carcinoma (23.8%)& mixed ductal and lobular subtype (5.5%). In terms of grade, 32 were ungraded while 33 cases were moderately differentiated, 37 as poor and 7 as well differentiated.
Practical implication: Researchers and medical experts can identify trends and risk factors associated with breast cancer in various age groups, which can help them develop prevention and treatment plans. The advancements in screening and detection as well as the establishment of tailored treatments for various age groups are some of the practical ramifications of the above information.
Conclusion: Screening programs must be carried out on regular basis at national level as earlier diagnosis of breast malignancy can lessen chances of metastatic breast disease thereby improving the life expectancy in Pakistani women.
Keywords: Breast, Cancer, Patterns, Histopathology, Diagnosis, Tumor grade, Pakistani, Females

INTRODUCTION

According to the World Health Organization, breast cancer is the most common cancer among women worldwide[1]. Its incidence has skyrocketed in the last few decades[2]. In 2020, there were approximately 2.3 million new cases of breast carcinoma and around 685,000 deaths globally[3]. In terms of mortality, breast cancer ranks fifth among all cancers[4]. It is important to note that statistics may vary across different sources, and these numbers serve as a rough estimate. In 2020, there were 2.3 million women diagnosed with breast cancer and 6,85,000 deaths globally[4]. However, compared to poor countries, the likelihood of surviving rate is greater in developed countries[2]. Factors that contribute to the global statistics of breast carcinoma include age, genetics, lifestyle choices, and environmental factors. However, these statistics may change due to various factors like awareness campaigns, early screening programs, and advances in treatment options[5].

Pakistan has the highest rate of breast cancer in Asia[6]. Approximately 1 in 9 Pakistani women develop breast cancer at some point in their life[7]. Younger age groups have been linked to greater occurrences of breast cancer, and one in four women experience breast disease after puberty[8]. Unfortunately, the incidence rate has been increasing rapidly, mainly due to lack of awareness about self-examination and preventative measures. Due to a lack of insight, 89% of women with breast cancer in Pakistan are diagnosed at a later stage of the disease, and 59% at a more severe stage[9]. Late-stage detection of breast cancer is common in Pakistan, with more than 50% of patients presenting with advanced stages of the disease[10].

Early detection rates remain low, emphasizing the need for increasing awareness programs and regular screening methods[11]. Breast cancer patients in Pakistan have a worse survival

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rate than in developed nations due to factors such as late detection, lack of knowledge, and restricted access to treatment facilities[10].

The rationale of this study is to determine the frequency of histologically diagnosed breast carcinoma cases because of the fact that local statistics and data needs to be generated from time to time to highlight the cancer burden and to prioritize early detection and mass screening programs to improve the health and life expectancy of Pakistani women. The early recognition of breast cancer is vital since reduced tumor sizes and lower risks of metastases are important determinants in longevity.

MATERIALS AND METHODS

Type of study & duration: The cross-sectional study was conducted from January 2022 to December 2022 at Citi lab & Research Center (CRC), Lahore, Pakistan after obtaining Ethical Committee permission (Letter No.CRC/MISC/959)
Sampling: Non-probability convenient sampling was employed. Sample size was calculated using the formula n= (Z2P (1-P)/e2.
Inclusion Criteria: All female breast biopsy specimens (including lumpectomy, Tru cut biopsy, and mastectomy) received from various cities in Pakistan at Citi lab & Research Center (CRC), Lahore throughout a one-year period comprising of 109 cases were included in this study. All those patients who were being diagnosed with a malignant tumor for the first time were included.
Exclusion Criteria: Patients who have already been receiving some therapy for previously diagnosed malignancies were excluded.
Procedure: Specimens for histopathological evaluation were routinely treated according to protocol, and slides were stained with standard Hematoxylin and Eosin stain (Merck). A competent Histopathologist established a diagnosis of cancer on microscopic analysis of these produced slides, which was confirmed by another expert Histopathologist. The malignancy was histologically classified according to the WHO Classification of Breast Tumors.

Data analysis: Microsoft Excel was used to evaluate the data as frequency and percentages. Stratification was used to manage effect modifiers such as age and grade.

RESULTS

Results of our study revealed that out of 109 cases received, females diagnosed with breast carcinoma were predominantly seen in age range of 51-60 years (33%) followed by 24.7% of cases in 41-50 years of age range while 19.2% females were between 31-40 years of age . In terms of histological type, ductal carcinoma was the predominant pattern (63.3%) seen in women age group of 51-60 yrs followed by lobular carcinoma (23.8%) & mixed ductal and lobular subtype (5.5%). In terms of grade, 32 cases couldn't be graded due to their distinct subtype, where grading wasn't applicable whereas 37 were poorly differentiated, 33cases as moderately differentiated and 7 were well differentiated. In terms of lymphovascular invasion (LVI) which is an important prognostic indicator of malignancy, it was identified in 68 specimen while 41 did not reveal lymphovascular invasion. Owing to the nature of biopsy specimen and lack of appropriate information related to tumor size, pathological staging wasn't performed.

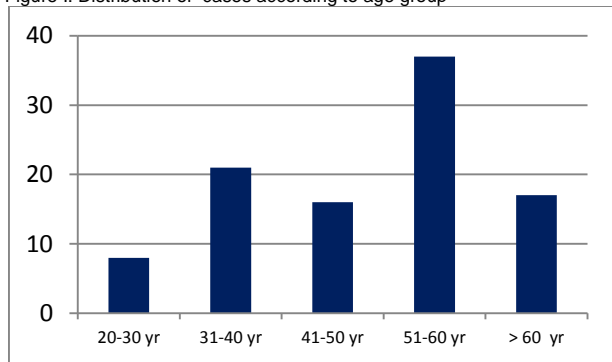Figure I: Distribution of cases according to age group

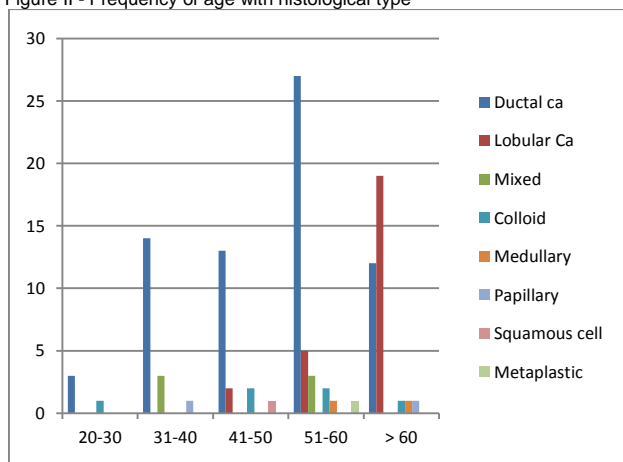Figure II - Frequency of age with histological type

Table II: Frequency of Tumor grade (n=109)

Histological subtype	n	%age
Ductal carcinoma	69	63.3%
Lobular carcinoma	26	23.8%
Mixed ductal and lobular carcinoma	6	5.5%
Colloid/Mucinous carcinoma	6	5.5%
Medullary carcinoma	2	1.8%
Papillary carcinoma	2	1.8%
Others like Squamous cell carcinoma, Metaplastic carcinoma	2	1.8%

Table I: Frequency of histological subtypes of breast carcinomas (n=109)

Grade of Tumor	n	%age
Well differentiated	7	6.4%
Moderately differentiated	33	33.27%
Poorly differentiated	37	33.94%
Ungraded	32	29.35%

Fig. III: Frequency of lympovascular invasion
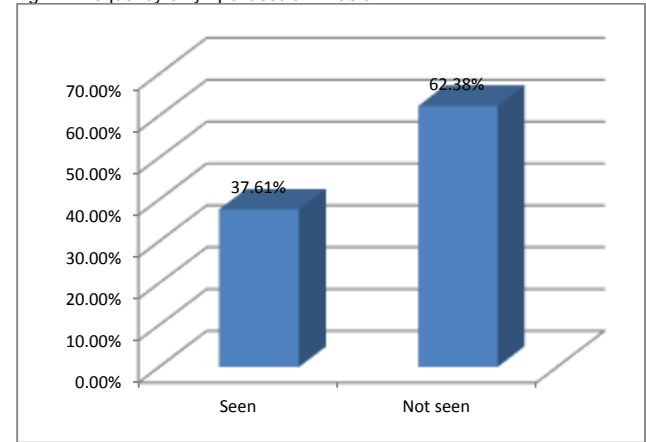
DISCUSSION

Breast cancer (BC) is the most prevalent malignancy in women globally. The need to document statistics related to breast cancer has led to the creation of breast cancer registries. Study participants ranged in age from 21 to over 70 years, with a mean age of 50.27 yrs. Female age group between 51 and 60 had the highest incidence rate. These findings were consistent with one study findings that 45% women fell within the same 51-60 year age range[10].The mean age of diagnosis in a different study carried out in Pakistan was > 50 years of age range[11].Younger age groups have been found to have a greater frequency of breast cancer, and one-fourth of women experience breast disease following adolescence[8].

Our country has a higher incidence of breast cancer than more prosperous countries because a number of factors, including poor education, low disease awareness, and religious considerations. One major risk factor is lack of awareness about the symptoms and signs of breast cancer. Women who are not familiar fail to realize the urgency of seeking medical attention when they experience symptoms such as breast lump, nipple. One major factor is a lack of awareness and knowledge about breast cancer and its symptoms. Patients who are not familiar with the signs of breast cancer may not realize the urgency of seeking medical attention when they experience symptoms such as breast lumps, nipple discharge, or skin changes.

Another risk factor is fear and anxiety about the possibility of having breast cancer. Some patients avoid seeking medical care due to social stigma, anxiety & fear of a cancer diagnosis, leading to a delay in diagnosis and treatment. Additionally, structural barriers such as limited access to healthcare or financial constraints can also contribute to delayed presentation. These barriers prevent women from receiving timely screening and accessing healthcare when they experience symptoms. Cultural beliefs and attitudes also play a significant role in delayed patient presentation. Especially in rural settings, males consider discussing such health problems with male doctors a social taboo. This also adds to further delay in their women seeking healthcare.

Breast cancer is a heterogeneous disease, and different histological subtypes display varying biological characteristics that can impact the management approach. Reporting and identification of a specific histological subtype of breast cancer is necessary as it provides critical information on the tumor's behavior, prognosis, and likely treatment response. Invasive ductal

carcinoma was the most prevalent histological subtype followed by lobular carcinoma. Invasive ductal carcinoma is an aggressive cancer that can quickly spread to surrounding tissues and lymph nodes. In contrast, invasive lobular carcinoma is a less common& less aggressive subtype that accounts for about 10-15% of all breast cancers than ductal carcinoma. Similar results were found in a different study[12], which identified invasive ductal carcinoma in 95% of cases. In another study, ductal subtype was found in 86.2% of cases[13].

Reporting and identification of a specific histological subtype of breast cancer provides valuable information to oncologist and researchers to determine the most effective treatment options while also improving patient outcomes. For instance, some subtypes of breast cancer may be hormone-receptor-positive or -negative, which affects the administration of hormone therapy. HER2-positive breast cancer, another subtype, may require more targeted therapy, such as HER2-targeted monoclonal antibodies like trastuzumab, which are not routinely used in HER2-negative breast cancers.

An essential factor in determining the prognosis of breast cancer is the evaluation of the histological grade, which should be taken into account when developing algorithms to determine treatment for breast cancer patients. The histological tumor grade is determined by how differentiated the cancer tissue is. It only necessitates that properly prepared tumor tissue sections be stained with hematoxylin and eosin and evaluated by a pathologist with the necessary training in accordance with a predetermined protocol, making it a relatively simple and affordable method for determining the morphological characteristics of breast cancer. In terms of grade, moderate differentiation was seen in 32% of cases while 49% of cases were non-graded because in these histological subtypes grading is not applicable. These findings were similar to a study which vast majority of cases in Grade 2 (Moderately differentiated)[16].

Results of a study conducted in Pakistan revealed that 57.3% of women had high grade tumor[17]. Histological grading based on the evaluation of three morphological features: (a) nuclear pleomorphism, (b) the number of mitoses, and (c) the degree of gland or tubule formation.The treatment options depend on the size and grade of the tumor. A higher grade tumor is typically more aggressive and more likely to grow and spread rapidly than a lower grade tumor.. A low-grade tumor may be treated with surgery alone, while a higher grade tumor may require chemotherapy, radiotherapy, or a combination of treatments.

Lymphovascular invasion (LVI) was seen in 62.38% of cases. This finding is consistent with another study which reported 53.6%[18]. The reporting of LVI is an important component of breast cancer staging. The American Joint Committee on Cancer (AJCC) considers LVI as part of the tumor size, nodal status, and metastasis (TNM) classification system, which determines the stage of breast cancer and helps clinicians to plan adjuvant therapies, such as chemotherapy or radiation. The detection of LVI also helps to stratify patients according to their risk of disease recurrence and overall survival.

CONCLUSION

It is crucial to discuss risk factors during awareness campaigns and screening programs must be carried out on a regular basis at the national level because early detection of breast cancer can reduce the risk of metastatic disease, thereby improving the life expectancy of Pakistani women.

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