

Histopathological Profile of Malignant Breast Tumors at Darma Usada Pathology Diagnostic Center: A Retrospective Study

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ABSTRACT

Breast cancer is a neoplasm that arises from the breast tissue, specifically from both the ductal epithelium and the lobular structures. This research aims to determine the incidence rate of malignant breast tumors by examining various parameters, including age, sex, lymph node status, and histological type of cancer, at the Darma Usada Pathology Diagnostic Center. The research design employed in this study is descriptive in nature, utilizing a cross-sectional approach. The study sample consisted of 106 breast cancer patients from the Darma Usada Pathology Diagnostic Center, collected between October 2024 and February 2025, using accidental sampling techniques. The findings indicated that the majority of breast cancer patients were female, comprising 105 individuals, while there was 1 male patient (0.9%). The age distribution of breast cancer patients revealed that 72 patients (67.9%) were over 50 years old. Additionally, 32 patients (30.2%) were aged between 31 and 50 years, and 2 patients (1.9%) were in the 20 to 30-year age group. No cases of malignant breast tumors were recorded in patients under the age of 20 (0%). Among those diagnosed with malignant breast tumors, 76 patients (71.7%) exhibited no lymph node involvement. The prevalence of malignant breast tumors, categorized by lymph node status at the Darma Usada Pathology Diagnostic Center, revealed that the highest incidence of tumor metastasis was observed in 22 patients (20.8%). Furthermore, the most significant age group was those over 50 years, comprising 72 patients (67.9%).

Keywords: breast cancer, lymph nodes, age, sex

INTRODUCTION

Breast cancer is a malignancy that arises from breast tissue, specifically from both the ductal epithelium and its lobular structures (Nurhayati, 2019). Indonesia reported approximately 348,809 cases of breast cancer in 2018, leading to 207,210 fatalities. The International Agency for Research on Cancer (IARC) subsequently estimated that, after 2020, the global incidence of breast cancer would reach 1.15 million cases, with approximately 411,000 deaths. It is anticipated that developing countries will bear the greatest burden, accounting for around 70% of new cases and 55% of all related deaths (Shintya, *et al* 2019).

The incidence of breast cancer is affected by various factors, including early menarche, late menopause, advanced age at first pregnancy, the use of exogenous hormones, fibrocystic diseases, obesity, dietary fat intake, exposure to radiation, and a family history of breast cancer (Elmika & Adi, 2020). Breast cancer can be classified based on morphological characteristics, histological grade, lymph node involvement, histopathological type, and molecular subtype (Sari, *et al* 2018).

Age is a critical factor in assessing the risk of developing malignant breast tumors. As individuals age, their likelihood of developing such tumors increases (Mirsyad *et al.*, 2022). The distribution of patients by age reveals that there were no cases in the under-20 age group, 1 patient in the 20-30 age range, 13 patients between the ages of 31 and 50, and 20 patients over the age of 50 pasien (Harbelubun & Rahmawati, 2024). Another triggering factor that has been identified is that women are much more at risk than men. Breast tumors in men account for only 1% of all breast tumors (Heuther *et al.*, 2019).

The positive-negative ratio of lymph nodes, also referred to as lymph node status, serves as a prognostic factor and may be modified in cases where discrepancies exist between the number of lymph nodes identified in surgical and pathological assessments. Positive lymph nodes indicate a more extensive spread of the disease (KEMENKES, 2018). Furthermore, the size of the tumor is directly correlated with the number of metastatic axillary lymph nodes. A reduction in tumor size from 5 cm to 2 cm is associated with a significant increase in the 5-year survival rate, rising from 45.5% to 96.3% (Rahman & Mohammed, 2015).

Malignant breast tumors, classified according to their histopathological type, are categorized into two primary groups: non-invasive carcinoma, which includes ductal carcinoma in situ (DCIS) and lobular carcinoma in situ (LCIS), and invasive carcinoma, which encompasses invasive ductal carcinoma, invasive lobular carcinoma, medullary carcinoma, colloid carcinoma, tubular carcinoma, and various other types (Alfalah, 2022). The Darma Usada Pathology Diagnostic Center is a specialized laboratory for anatomical pathology examinations, including macroscopic and microscopic examinations of body tissues, body fluids, Pap smears, and FNAB. The laboratory is located at Jalan Yosodipuro No. 89, Timuran, Banjarsari District, Surakarta City, Central Java Province. Darma Usada receives various kinds of samples so that they can be used to study and analyze this disease in more depth.

METHOD

This study employed a descriptive cross-sectional design, namely by collecting data at the Darma Usada Pathology Diagnostic Center using a *cross sectional* approach. Samples were collected using an accidental sampling technique. The sample in this study is patients with malignant breast tumors in October 2024-February 2025. This study was conducted to determine the histopathological features of malignant breast tumors at the Darma Usada Pathology Diagnostic Center with the approval of the Ethics Commission with registration number: KEPK/UMP/136/II/2025 conducted on 106 samples in October 2024-February 2025.

The tools used in this study included: a tissue processor, embedding cassette, tissue cassette, electric stove, water bath, microtome, base mold, incubator, staining rack, staining jar, tweezers, microtome blade, slide glass, deck glass, microscope, and timer. The materials used in this study included: 10% buffered formalin, 70% alcohol, 80% alcohol, 95% alcohol, absolute alcohol, xylene, paraffin, hematoxylin, eosin, bluing, tap water, mounting paper, and labels. The procedure used is the preparation of histopathological preparations with hematoxylin eosin staining.

RESULT AND DISCUSSION

Result

Figure 1. Categories of malignant tumors of the breast by sex

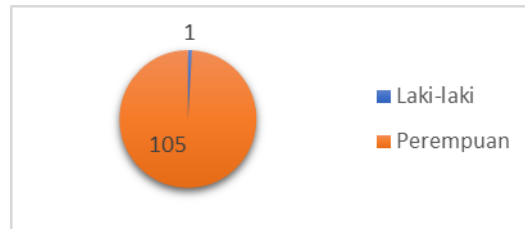


Figure 1 demonstrates that the majority of patients diagnosed with malignant breast tumors were female, accounting for 105 patients (99.1%), whereas male patients represented only 0.9% of the total cases.

Figure 2. Categories of malignant tumors of the breast by age

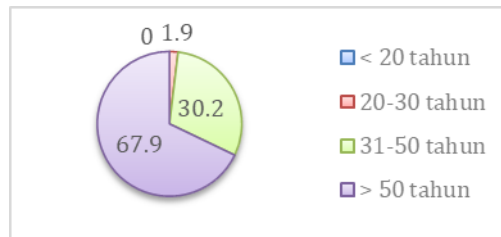


Figure 2 reveals that the highest incidence of patients with malignant breast tumors occurs in individuals over the age of 50, with a total of 72 patients (68%). Among those aged 31 to 50 years, there were 32 patients (30%), while only 2 patients (2%) were identified in the 20 to 30 age group. Notably, no patients with malignant breast tumors were observed in the under-20 age category (0%).

Figure 3. Categories of malignant tumors of the breast based on lymph node status

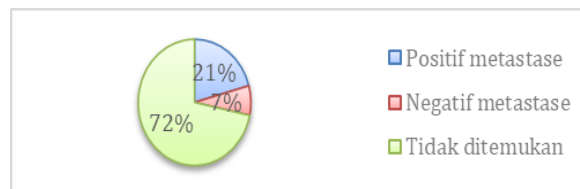
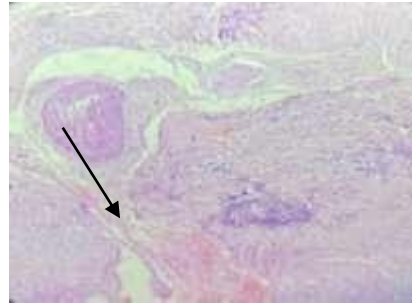


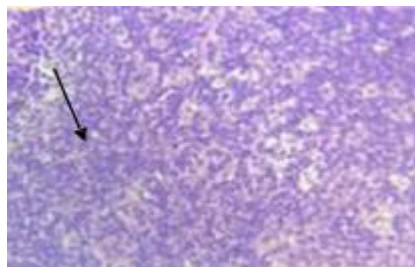
Figure 3 indicates that a total of 76 patients (72%) were identified as having malignant breast tumors without lymph node metastasis. In contrast, 22 patients (21%) presented with malignant breast tumors exhibiting positive lymph node status, while 8 patients (7%) had malignant tumors characterized by negative lymph node status.

Figure 4. Microscopic lymph nodes positively metastases tumors at 400x magnification



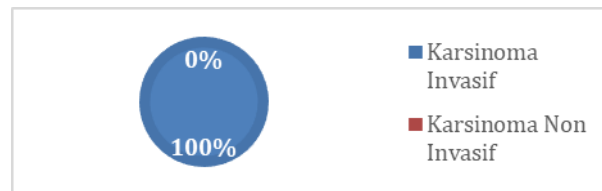
Source: Primary Data, 2024

Figure 5. Microscopic lymph nodes negative tumor metastases at 400x magnification



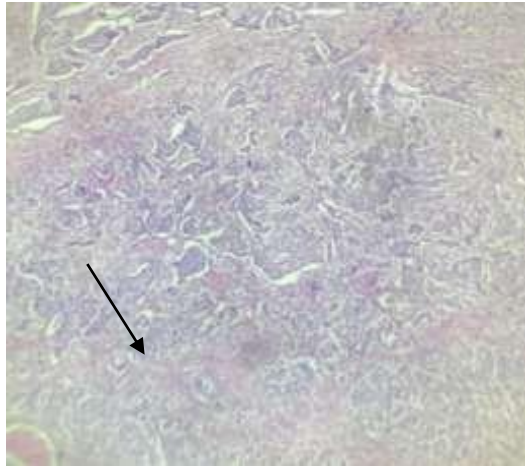
Source: Primary Data, 2024

Figure 6. Categories of Malignant Tumors of the Breast by Histological Type of Cancer



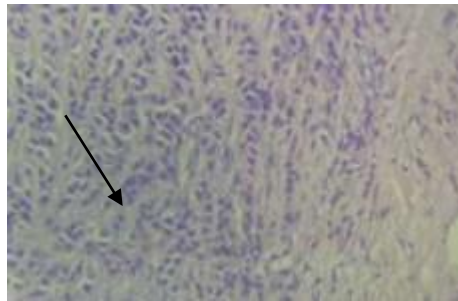
In figure 6, the results of 106 patients (100%) with invasive carcinoma breast malignant tumors were obtained. Patients with malignant tumors of the non-invasive type of breast carcinoma were not found (0%).

Figure 7. Microscopic invasive ductal carcinoma at 400X magnification



Source: Primary Data, 2024

Figure 8. Microscopic invasive lobular carcinoma at 400X magnification



Source: Primary Data, 2024

Discussion

This study found that the prevalence of malignant breast tumors is significantly higher in women than in men. Women are at an increased risk of developing these tumors due to heightened hormonal stimulation. In contrast, men have relatively low levels of estrogen, while women possess breast cells that are particularly sensitive to hormones, especially estrogen and progesterone (Lukasiewicz et al., 2021). These findings align with the research conducted by Suarfi et al (2019) at the Laboratory of Anatomical Pathology of M Jamil Padang Hospital, which reported that all 47 patients with malignant breast tumors were female (100%), with no cases identified in males. Similarly, a study by Alfalah (2022) at North Aceh Hospital in 2020 indicated that breast cancer cases were predominantly female, with 52 women (98.1%) and only 1 male patient. Furthermore, research by Zahra et al (2024) in North Maluku corroborated these findings, reporting that all 164 patients with malignant breast tumors were women. As women age, the fat cells in their breasts produce increased amounts of aromatase enzymes, leading to elevated local estrogen levels. This locally produced estrogen is implicated in the development of malignant breast tumors in postmenopausal women (Mirsyad et al., 2022).

This study revealed that malignant breast tumors were most frequently observed in patients over the age of 50. Advancing age is associated with an increased risk of breast cancer due to hormonal changes and declining immune surveillance. As women age, the fat cells in

the breast can produce more aromatase enzymes, thereby increasing local estrogen levels. Local estrogen is said to have a role in triggering breast cancer, especially postmenopausal women. Tumors that have formed will increase estrogen levels to help the tumor grow (Fairuz et al., 2024). Estrogen can contribute to breast cancer risk indirectly by induction of progesterone receptors and thus amplify progesterone signaling. Research on hormonal contraceptives shows that a slight increased risk of breast cancer from hormonal contraceptives is primarily due to progestins, rather than estrogen (Kim & Munster, 2025). Obesity and TSH use will increase estrogen levels in postmenopausal women. Estrogen produced by the adipose tissue of obese postmenopausal women will convert androgens into estrogen (Suparman & Suparman, 2014).

The findings of this study are consistent with the research conducted by Alfalah (2022) at North Aceh Hospital, which indicated that the age group over 50 years had the highest incidence of breast cancer, with 21 individuals (39.6%). Similarly, the study by Rahmawati and Harbelubun (2024) at Pandan Arang Boyolali Hospital reported the highest total of 20 patients aged over 50 years, accounting for 58.81%. Furthermore, the research by Gatsu et al (2023) at Wangaya Hospital in Denpasar City corroborated these results, noting that the highest frequency of breast cancer occurred in the age group of 46 to 55 years, with 20 patients (64.5%).

In this study, no patients with malignant breast tumors were identified in the age group under 20 years. These findings align with the research conducted by Gatsu et al (2023), which reported that no patients were diagnosed with malignant breast tumors in the 12 to 16 age range. The current study identified 2 patients (1.9%) in the under-20 category and 32 patients aged 31 to 50 years (30.2%). According to the Centers for Disease Control and Prevention (CDC), breast malignant tumors can be categorized based on the age at which cancer is diagnosed. The first category encompasses postmenopausal cancer, which is the most prevalent among breast cancer patients. The second category includes premenopausal cancer, typically affecting individuals aged 40 to 55 years. The third category pertains to reproductive age, which generally occurs in women under 40 years (Gatsu et al, 2023).

In this study, it was found that the most frequency of patients with malignant breast tumors whose lymph node status is positive for tumor metastases. Lymph nodes (lymph nodes) are a collection of peanut-shaped tissues along lymphatic vessels, such as clusters in the groin, armpits, and neck. The development of lymphatic metastases is thought to involve lymphatic vessel proliferation (lymphangiogenesis), lymphatic invasion, and gradual metastasis of lymph nodes. Lymph node status is used to identify the patient's prognosis, tumor stage and therapy modalities. Patients with positive lymph node status had a six-fold higher risk of metastasis compared to patients with negative lymph node status. Most malignant tumors of the breast first metastasize in the regional lymph nodes through the lymphatic stream (Simbolon et al, 2021). Lymph node negative is clinically defined as the absence of signs of axillary lymph node metastases, consisting of a negative axillary physical examination and preoperative axillary ultrasound (Roozendaal et al, 2017). In the study of Simbolon et al (2021) at Sanglah Bali Hospital, it was stated that most of the lymph node status was found to be positive as much as 68.4%.

The prevalence of patients with invasive carcinoma breast malignant tumors was found to be 106 patients (100%), while no cases of non-invasive carcinoma were identified (0%). Stage 0 breast cancer, commonly referred to as carcinoma in situ, represents a non-invasive form of cancer characterized by the presence of abnormal cells confined to the lining of the breast milk

ducts, without any spread to adjacent tissues. It is termed "non-invasive" because the cancer cells remain localized to their site of origin. Approximately 20% of newly diagnosed breast cancer cases are classified as stage 0, with Ductal Carcinoma In Situ (DCIS) being the most prevalent type at this stage, representing the earliest detectable form of breast cancer. Typically, breast cancer at stage 0 does not exhibit noticeable symptoms and is often identified through routine mammograms or other screening methods. However, when symptoms do manifest, they may include the presence of a breast lump or unusual nipple discharge, which can occasionally be bloody (Shockney, 2024).

The results of this study are consistent with those of Suarfi et al (2019), conducted in the anatomical pathology laboratory of M. Djamil Padang Hospital, which indicated that invasive ductal carcinoma was the most common histopathological type, affecting 30 individuals (63.8%). Similarly, the research by Putra et al (2019) at Sanglah Hospital found that invasive carcinoma of unspecified type was the predominant histological form of breast carcinoma, accounting for up to 567 cases (68.1%). These findings are corroborated by the research conducted by Wangsa et al (2018), which reported that, among 253 patients in 2015, invasive ductal carcinoma constituted the largest percentage (84.58%), with a slight decrease to 83.54% in 2016. In 2015, 9.10% of patients had aggressive lobular carcinoma, while 6.32% presented with various other forms of the disease. In 2016, among 322 patients, 11.81% exhibited invasive lobular carcinoma in their histological profiles, whereas 4.65% had other types of cancer. Invasive carcinoma is defined as a condition in which cancer cells disseminate to surrounding breast tissue or other organs in the body (Winata, 2024).

Non-invasive breast cancer is defined by the presence of abnormal cells that are restricted to the milk ducts or lobules of the breast, without infiltrating adjacent healthy tissue. This condition, commonly referred to as carcinoma in situ, is often regarded as an early or pre-cancerous stage (Breast Cancer Network Australia, 2023). Ductal Carcinoma In Situ (DCIS), also known as intraductal carcinoma, is classified as stage 0 breast cancer. It is recognized as an early and highly treatable form of breast cancer, exhibiting a very high cure rate among affected women. However, if DCIS is not detected and treated in a timely manner, it has the potential to spread into nearby breast tissue and advance to a more severe form. Once DCIS extends beyond the milk ducts and begins to invade surrounding breast tissue, it is reclassified as Invasive Ductal Carcinoma (IDC), which represents a more advanced and potentially life-threatening variant of breast cancer (Roozendaal et al, 2017).

CONCLUSION

The prevalence of malignant breast tumors at the Darma Usada Pathology Diagnostic Center indicated that the majority of cases were found in women, comprising 105 patients (99.1%). In terms of age, the highest incidence was observed in individuals over 50 years, with 72 patients (67.9%). Regarding lymph node status, the most significant number of positive tumor metastases was recorded, totaling 22 patients (20.8%). Additionally, the type of carcinoma identified. The high prevalence of positive lymph node metastasis (20.8%) suggests a need for earlier diagnostic intervention. Tumor screening data is important to carry out because the incidence of malignant breast tumors continues to increase, early symptoms are not recognized, so diagnosis and treatment are delayed.

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