

Patient Profile and Survival Rate of Breast Cancer Patients with FEC Chemotherapy Regimen at H. Adam Malik Hospital

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Abstract

Breast cancer is a prevalent disease that impacts public health worldwide, including Indonesia. There are various chemotherapy regimens that are currently available. One widely utilized chemotherapy regimen for breast cancer is the FEC regimen, which combines 5-fluorouracil, epirubicin, and cyclophosphamide. This study provides a study of patient profiles and survival rates among breast cancer patients undergoing FEC chemotherapy at H. Adam Malik Hospital. The study utilized a descriptive-retrospective approach with data collected from the medical records of patients who underwent FEC therapy at RSUP H. Adam Malik during January-December 2019. A total of 157 patients were administered anthracycline-based treatment, with 54 patients receiving FEC (34.39%). The majority of individuals under the FEC regimen were primarily luminal B (51.75%) and IBC (33.33%). The survival rate for individuals using the FEC chemotherapy regimen was found to be 37.98 months. Additionally, patients with risk factors associated with invasive breast cancer (IBC) exhibited a 1.20-fold increased risk of mortality compared to individuals with other forms of breast cancer. The first-line FEC chemotherapy regimen continues to be a feasible therapeutic option for subtypes of breast cancer, and there is no discernible variation in survival rate observed across these characteristics.

Keywords: Breast cancer, Chemotherapy, Survival rate

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1 Introduction

Breast cancer is considered one of the most widespread types of cancer worldwide, especially within the specific geographical context of Indonesia. Breast cancer is a malignant neoplasm that exhibits the highest prevalence rate (11.7%) and fatality rate (6.9%) on a global scale [1]. Based on the statistics available in Indonesia, breast cancer emerges as a prominent health concern within the nation, occupying the third position regarding participant numbers and total health claim costs. This ranking places breast cancer below heart disease and stroke regarding its impact on the population. Further data indicates that in 2019, there were a total of 28,910 confirmed occurrences of breast cancer, along with an additional 2,910 cases that were suspected, among women aged 30-50 in Indonesia [2], [3].

The chemotherapy regimens commonly employed in the treatment of breast cancer entail the administration of anthracycline-based drugs. The treatment protocol outlined above is often preferred due to its capacity to reduce mortality rates by approximately 20% compared to the initial chemotherapy regimen [4]. The FEC chemotherapy regimen is a frequently used therapeutic approach for breast cancer, renowned for its notable effectiveness in facilitating patient recuperation. This treatment protocol involves the concurrent administration of three chemotherapeutic agents, specifically 5-fluorouracil (5-FU), epirubicin (an anthracycline), and cyclophosphamide. Upon analyzing these treatment protocols, it is evident that the recorded rates of overall survival and disease-free survival stand at 90.6% throughout a span of 70 months [4]. FEC chemotherapy regimens are commonly administered in different medical institutions offering chemotherapeutic interventions, specifically treating breast cancer. Central General Hospital (RSUP) H. Adam Malik is a government-run hospital in North Sumatra. The

FEC chemotherapy regimen is one of the chemotherapeutic regimens commonly utilized at RSUP H. Adam Malik so it is necessary to evaluate its effectiveness, whether it has efficacy on certain factors or can be used for various types of breast cancer. The study intends to assess the chemotherapy services provided at RSUP H. Adam Malik as a means towards improving the sustainability and quality of healthcare services, particularly pharmaceutical care in the field of breast cancer chemotherapy.

2 Methods

This study is based on a retrospective analysis of descriptive findings regarding breast cancer patients treated at H. Adam Malik Hospital. The study utilized research data from the medical records of patients who underwent FEC chemotherapy regimens between January 2019 and December 2019. The research methodology utilized in this study is purposive sampling, which involves the deliberate selection of data relevant to the study period based on predetermined inclusion criteria.

The inclusion criteria for this study are adult females 18 years or older who have undergone FEC-based chemotherapy for breast cancer. Furthermore, participants must have histopathology reports confirming breast cancer diagnosis. Additionally, their data must be accessible and full, adhering to the research requirements. The research's exclusion criteria comprise individuals who are not of the female gender, individuals under 18, individuals with insufficient data, and those who are not getting FEC treatment throughout the allocated study time. The data was subjected to further analysis using the Kaplan-Meier and Cox regression methods to evaluate the outcome of overall survival and the likelihood of mortality.

3 Results and Discussions

The histopathological observations of cancer cases at RSUP H. Adam Malik during the period of January 2019 to December 2019 reveal a cumulative count of 3,987 individuals diagnosed with cancer. Among this cohort, a subset of 448 patients received a diagnosis of breast cancer. Based on the available data on medication use, it was seen that among the total cases of breast cancer recorded during the specified time frame, a subset of 157 patients (35.04%) possessed complete information and were subjected to treatment regimens involving anthracycline-based chemotherapy. Out of the total sample size of 157 patients, 54 individuals (34.39%) were administered FEC treatment and met the specified inclusion criteria.

Other chemotherapy regimens that have been utilized include AC-T (17.19%), AT (40.76%), and TC (7.64%), in that order. No statistically significant distinction was observed between the two age cohorts. Participants aged 50 and above constituted 44% of the overall population, while participants under the age of 50 accounted for 55% of the total population. Table 1 provides a comprehensive summary of the research subjects and their characteristics.

Table 1. Characteristics of Breast Cancer Chemotherapy subject

Characteristic	N (%)
Age	
<50 years	30 (55,5)
>50 years	24 (44,4)
Chemotherapy	
AT	64 (40,76)
AC-T	27 (17,19)
FEC	54 (34,39)
TC	12 (7,64)

The findings from the immunohistochemical analysis, as displayed in Table 2, demonstrate that the Luminal B subtype had a higher prevalence (55.17%) than the Luminal A subtype (42.59%). Moreover, it was shown that among the Luminal B subtype, the percentage of cases exhibiting HER2 positive accounted for 55.17% of the entire population. The histological analysis of breast cancer demonstrated that the most prevalent subtype was invasive breast cancer (IBC), accounting for 33.3% of cases. This type was

followed by the non-specific type (NST) at 25.9% and invasive ductal carcinoma (IDC) at 3.7%. The results presented are consistent with previous studies investigating the histological subtype of invasive breast cancer (IBC), namely the non-specific type (NST), which is the most prevalent [5]. Other investigations conducted at RSUP Hospital by Adam Malik have also revealed similar findings, revealing a significant prevalence of non-specific tumor (NST) breast cancer [6].

Table 2. Profile Histopathology and Immunohistochemistry Chemotherapy (FEC)

Profile	N (%)
Luminal A	23 (42,59)
Luminal B	29 (51,75)
HER2 +	16 (55,17)
HER2-	12 (41,37)
TNBC	1 (1,85)
Invasive breast cancer	18 (33,3)
Grade I	3 (16,66)
Grade II	11 (61,11)
Grade III	4 (22,2)
Invasive ductal carcinoma	
Grade II	2 (3,7)
Nonspecific type	14 (28,92)
Grade I	1 (7,14)
Grade II	6 (42,85)
Grade III	7 (50)
Phylloides tumor	1 (1,85)
Primary osteosarcoma	1 (1,85)
Not defined	18 (33,33)

Approximately one-third (33.33%) of malignancies with an unspecified histological subtype are believed to be a result of the difficulties encountered by pathologists in accurately identifying tissue biopsy samples. The aforementioned issues mostly arise due to constraints in the sampling methodology and unaccounted factors that influence the samples. Within the scope of this specific research era, two unique and uncommon types of breast cancer were identified, specifically primary osteosarcoma breast cancer and phylloides breast cancer, in accordance with the findings of a researcher [7].

The age distribution of the participants in this study does not exhibit a statistically significant disparity between individuals aged 50 years and over (44.4%) and those under 50 years (55.5%). The results indicate that individuals who are younger than 50 years old demonstrate a noteworthy level of public

awareness concerning the early detection of breast cancer. The outcomes of this study are consistent with previous research findings [10]. This observation aligns with the recurring observations made by histopathologists in cases of invasive breast cancer (IBC) and big non-specific type tumors (NST) of about grade 2. Nonetheless, it is clear that there is still a need to improve educational initiatives that focus on raising awareness about early identification of breast cancer, specifically in instances where there is a lower prevalence of grade 1 histopathological characteristics compared to grade 2 or 3 across different subtypes. The subtype of breast cancer known as IBC demonstrated the highest prevalence, comprising 33.3% of the overall population. It was closely followed by the NST subtype, which had a prevalence of 28.92%. Breast cancer cases characterized by not-defined histology represent a substantial fraction of the overall breast cancer population, although they do not fall into any precise subtype classification. The challenge in precisely discerning a specific variant of breast cancer originate from constraints inherent in the acquisition and analysis of diagnostic examinations, with neoplastic cells manifesting a composite of multiple cancer subtypes. The complicated biology of breast cancer poses challenges in establishing a definitive categorization [11].

The findings of this study necessitate a comprehensive evaluation of a number of other studies, as they have not yet demonstrated consistent outcomes across various breast cancer subtypes. The present study is constrained by limitations related to data availability for analysis within the groups of triple-negative breast cancer, invasive ductal carcinoma, and invasive lobular carcinoma. Investigating the collective and diverse factors that could impact the patient's survival rate is advisable. This study is expected to function as a forward-thinking initiative aimed at improving research and services at RSUP H. Adam Malik, a healthcare institution renowned for providing breast cancer chemotherapy services to the community. The immunohistochemistry study demonstrated the existence of breast cancer, wherein the luminal B subtype displayed the most significant incidence at 51.75%, followed by the luminal A subtype at 42.59%. Furthermore, there was no

statistically significant differentiation seen across the aforementioned subgroups. Comparable results have been documented in other areas of Indonesia, suggesting a dearth of significant discrepancies in the number of tests conducted amongst the groups, as mentioned earlier [12]. The population size of patients with triple-negative breast cancer who get the FEC regimen is small due to their advanced-stage breast cancer condition. Individuals with advanced-stage breast cancer are often not administered the FEC regimen as their initial chemotherapy treatment due to the severity of the disease. Alternatively, Patients who are presented with that condition are recommended to undergo treatment regimens that incorporate platinum-based agents.

The survival analysis of the FEC chemotherapy regimen is presented in Table 3. The mean patient lifespan is 37.98 months, with a 95% confidence interval ranging from 34.02 to 41.93 months. In cases not defined histopathological type, the average duration of survival is slightly longer (38.35 months, 95% CI 31.50-45.19) when compared to breast cancer cases characterized by invasive breast carcinoma (37.88 months, 95% CI 31.63-44.14) and breast cancer cases with non-specific tumors (37.57 months, 95% CI 30.15-44.99). Nevertheless, the observed disparity does not exhibit statistical significance ($p = 0.758$). The utilization of FEC in research, with a similar average life expectancy, where the differences in histopathological characteristics of breast cancer do not significantly influence, is consistent with the recommendations that support using the FEC regimen as the first-line chemotherapy for breast cancer [8].

Table 3. Breast cancer life expectancy

Histopathology	Estimate	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Not Defined	38,350	3,492	31,506	45,194
IBC	37,889	3,191	31,634	44,144
NST	37,571	3,786	30,151	44,992
Overall	37,980	2,016	34,029	41,932

According to previous studies, utilizing the FEC regimen is renowned for its favorable cost-utility. Consequently, the FEC regimen is frequently employed as a foundational

chemotherapy regimen in conjunction with other chemotherapeutic drugs [9]. The risk assessment of breast cancer with the FEC regimen (figure 1.) revealed that individuals diagnosed with invasive breast cancer (IBC) exhibit a 1.20-fold increased mortality risk compared to those with other histopathological breast cancer subtypes. However, it is important to note that these findings do not reach statistical significance ($p=0.757$).

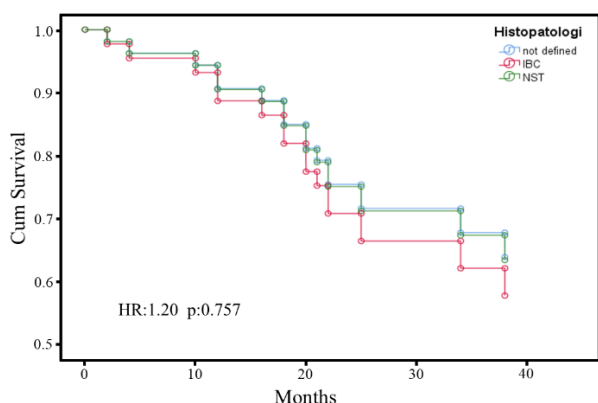


Figure 1. Kaplan-Meier curve on immunohistochemical characteristics

The survival rate analysis of FEC treatment regimens was 37.98 months, with a 95% confidence interval ranging from 34.02 to 41.93. Several research investigations have been conducted to assess the survival analysis of FEC regimes, yielding diverse outcomes. Two studies have provided data on a particular survival rate. It was observed in the research that a median longevity of 70 months and a survival rate of 90.6% [13], but in contrast another research reported a median lifespan of 108 months and a survival rate of 73.9% [14]. The results demonstrate a range of outcomes due to multiple factors, such as the unique characteristics of the subjects in the local area, differences in chemotherapy treatment plans, and the concurrent utilization of alternative therapeutic approaches in conjunction with chemotherapy.

The risk analysis findings indicated that individuals with breast cancer characteristics displaying the invasive breast cancer (IBC) subtype had a relative risk of 1.20 ($p = 0.757$) compared to individuals with distinct characteristics. Research published in a recent

study that reveals consistent results, suggesting an increased mortality risk concerning invasive breast cancer starting from ductal carcinoma in situ [15]. While the findings of this study did not yield statistically significant results, it is crucial to assess further and anticipate these concerns regarding the utilization of FEC regimens for IBC breast cancer. The potential increase in mortality risk could potentially undermine the effectiveness of related chemotherapy regimens. The heightened vulnerability linked to these characteristics of breast cancer has been postulated to arise from enhanced progression of cancer cells, thereby requiring additional strategies to impede the growth of cancer cells and contemplating the adoption of alternative treatment protocols, such as chemotherapy regimens based on anthracyclines and taxanes, to mitigate the aggressiveness of cancer cells [16], [17].

4 Conclusions

The utilization of FEC regimens in breast cancer chemotherapy at RSUP H. Adam Malik from January to December 2019 amounted to 34.39%. It was observed that a significant proportion of patients receiving this treatment were within the age range of under 50 years old. The most prevalent immunohistochemistry subtype is Luminal B, which comprises 51.75% of the entire population. Similarly, it is noteworthy that invasive breast cancer (IBC) stands out as the histological category with the highest prevalence, accounting for 33.33% of the overall population. The survival analysis conducted inside the FEC regime yielded results indicating that the mean survival rate for patients is predicted to be 37.98 months, with a 95% confidence interval ranging from 34.02 to 41.93 months. Moreover, no statistically significant differences were identified in the characteristics of various forms of breast cancer. Therefore, the findings of this study indicate that the FEC regimen continues to be a feasible choice for the initial chemotherapy treatment of breast cancer.

Continuous assessment is crucial for investigating efficacious strategies in delivering enhanced therapeutic options to individuals diagnosed with breast cancer while also evaluating the progression of the disease and the accessibility of diverse chemotherapy

protocols. This review should specifically emphasize local populations.

5 Declarations

5.1 Acknowledgment

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5.3 Author contribution

Alfi Syahri G., as author, contributed to the design and performed research, drafting the initial manuscript. Retno Murwanti, as a co-author and correspondence author, contributes to the design research, interpretation result, and revised manuscript. Agung Endro Nugroho, as a co-author, contributed to the study design, interpretation of results, and manuscript revisions.

5.4 Ethic

The research and acquisition data were conducted in accordance with ethical guidelines and received clearance approval from the ethical committee of FK-KMK UGM under the reference number KE/FK/1197/EC/2023.

5.5 Conflict of interest

The researcher declares that no conflicts of interest occurred throughout the research process or concerning the composition of this paper.

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