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RESEARCH ARTICLE

THE ROLE OF NEUTROPHYL-TO-LYMPHOCYTE RATIO (NLR) AS A PREDICTOR FACTOR OF DISTANT METASTASES IN BREAST CANCER PATIENTS AT RSUP H. ADAM MALIK MEDAN

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ABSTRACT

Background: Breast cancer is the fifth leading cause of death in Indonesia. The prevalence of breast cancer in Indonesia is quite high, with 6% or 13.2 million people suffering from breast cancer. This study aims to determine the relationship between the neutrophyl-to- lymphocyte ratio (NLR) and distant metastases in breast cancer patients. Methods: This cross-sectional study was conducted on 124 breast cancer patients at the H. Adam Malik General Hospital Medan from February to April 2019. Results: Chi-square test showed a relationship between the NLR value and the incidence of metastasis ($p < 0.001$), with odds ratio (OR) = 5.9 which states that in breast cancer patients with high NLR (> 3) there is an increased risk of distant metastases by ± 5.9 times. Conclusion: There is a significant relationship between the neutrophyl-to-lymphocyte ratio (NLR) and distant metastases in breast cancer patients treated at H. Adam Malik General Hospital Medan.

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INTRODUCTION

Cancer is the second leading cause of death with an estimated death rate of 9.6 million people in the world in 2018 and 627,000 cases (6.6%) are caused by breast cancer (WHO, 2018). Breast cancer is the fifth leading cause of death in Indonesia. The prevalence of breast cancer in Indonesia is high, with a figure of 6% or 13.2 million people suffering from breast cancer. The latest data reported by the Globocan International Agency for Research on Cancer in 2018, new cases of breast cancer in women in Indonesia reached 30.9% (58,256) with a death rate of 22,692 cases (WHO, 2018). According to 2013 Basic Health Research Data, breast cancer sufferers in North Sumatra Province were 2,682 cases. Based on the Hospital Information System in 2014, the number of outpatients or inpatients with breast cancer reached 12,014 people (28.7%). Data from the Department of Surgical Oncology at the H. Adam Malik General Hospital Medan, recorded 1027 breast cancer profiles from 2009-2011. With the distribution of cases in 2009 with the highest number, namely 90 cases of stage III (71.4%) and 34 cases of stage IV (26.9%). The same condition happened in 2010 and 2011 where the highest were patients with stage III (68.1% and 71.06%) followed by patients with stage IV (29.5% and 22.78%).

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The identification of prognostic indicators, which allowing appropriate risk stratification of cancer patients and the selection of appropriate treatment, remains the subject of intense investigation of breast cancer (Drukker, 2013). Neutrophyl-to- lymphocyte ratio (NLR), which reflects a comprehensive evaluation of the balance between systemic inflammation and immunity, plays a necessary role in the prognostic prediction of various malignancies. Accumulation studies have shown that a high neutrophyl-to-lymphocyte ratio (NLR) is associated with high breast cancer mortality.[3] There is a need for the identification of metastases in breast cancer, especially for centers that have limited investigations. This study aims to determine the relationship between the neutrophyl- to-lymphocyte ratio (NLR) and distant metastases in breast cancer patients treated at H. Adam Malik General Hospital Medan in 2019.

METHODS

This cross-sectional study was conducted at the H. Adam Malik General Hospital Medan from February to April 2019. The study population was all breast cancer patients at the H. Adam Malik General Hospital from February to April 2019 who met the inclusion and exclusion criteria. Sampling was done by consecutive sampling technique and obtained a total sample of 124 people.

RESULT AND DISCUSSION

From all samples, the number of samples with metastases was 48 samples (38.7%) and without metastases were 76 samples (61.3%). Based on the results of the examination of the neutrophyl value, the mean score was 67.83 ± 16.05 for the metastatic group, and 60.58 ± 10.90 for the non-metastatic group.

Characteristic	Metastases		P-value*
	Yes (n=48)	No (n=76)	
Neutrophyl	67,83 ± 16,05	60,58 ± 10,90	0,003
Lymphocyte NLR	21,84 ± 13,26	26,85 ± 8,75	0,013
	9,42 ± 17,92	2,64 ± 1,40	0,001

Table 2. Analysis of the relationship between the NLR value and the incidence of metastases

NLR	Metastases				P-value*	Odds Ratio
	Yes	%	No	%		
High (≥ 3)	34	70,8	22	28,9	<0,001	5,9
Low (< 3)	14	29,2	54	71,1		
Total	48	100,0	76	100,0		

Table 3. Distribution of metastatic breast cancer patients

Metastases	Total	Percentage
	N =48	N = 100%
Bone	29	60%
Lung	11	22,5%
Liver	7	15%
Brain	1	2,5%
Total	48	100%

Based on the results of examination of lymphocyte values, the mean number was 21.84 ±13.26 for the metastatic group, and 26.85 ± 8.75 for the non-metastatic group. Based on the results of the examination of the NLR value, the mean score was 9.42 ± 17.92 for the metastatic group, and 2.64 ± 1.40 for the non-metastatic group. In the unpaired T test there was a significant difference between groups in the neutrophyl, lymphocyte and NLR parameters. Based on Table 2, high NLR values were found in metastases in 34 samples (27.4%) and high NLRs in non-metastases in 22 samples (17.7%). The highest low NLR was found in the non-metastatic group as many as 54 samples (43.5%), while in the metastatic group there were 14 samples (11.3%).

Chi-square test showed a significant relationship between the NLR value and the incidence of metastasis (p <0.001), with an odds ratio (OR) = 5.9, which states that breast cancer patients with high NLR (≥ 3) have an increased risk of experiencing distant metastases were ± 5.9 times as much as those with low NLR (<3). Based on table 3, it was found that the highest number of metastases was bone as many as 29 cases (60%), while lung metastases were found in 11 cases (22.5%), liver metastases in 9 cases (15%) and 1 case with brain metastases (2.5%). NLR is a convenient, inexpensive and reproducible method that can demonstrate an association with inflammation and tumors. Previous studies clearly suggested the diagnostic and prognostic importance of NLR in a wide variety of cancer patients.[4]

Conclusion

Chi-square test showed a significant relationship between the NLR value and the incidence of metastases (p <0.001), with an odds ratio (OR) = 5.9 which stated that in breast cancer patients with high NLR (≥3) there was an increased risk of distant metastases. as much as ± 5.9 times compared to the odds ratio (OR) low NLR (<3).

Conflict of Interest statement: None.

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