

# The Role of Hemogram Parameters in Predicting Sentinel Lymph Node Metastasis in Breast Cancer

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**Abstract: Background:** Breast cancer remains the second most common cancer in the world after lung cancer. Breast cancer rate in Turkey was 40-50 / 100.000 in the west, and was 20 / 100.000 in the east.

**Objective:** In our study, we aimed to investigate the prediction of hemogram parameters in showing sentinel lymph node metastasis.

**Materials & Methods:** Patients undergoing sentinel lymph node biopsy (SLNB) with the diagnosis of breast cancer between January 2015 and August 2019 in General Surgery Department of Abant İzzet Baysal University were retrospectively analyzed in present descriptive study. The patients were divided into two groups, SLNB positive and negative. The measured hemogram parameters were compared between these two groups. Analysis of the data was held with a statistical software (SPSS 18.0 for Windows, IBM Inc., Chicago, IL, USA).

**Results:** A total of 93 patients were included in the study. The average age of SLNB positive and negative patients were 55 (30-81) years 59 (35-88) years respectively. In detecting SLNB positivity, sensitivities and specificities of Tumor diameter > 0.9 cm were 72% sensitivity, 56% specificity, of CRP > 0.65 mg/dL were 76% sensitivity, 51% specificity, of RMR > 1.85 were 72% sensitivity, 46% specificity, of RDW > 15.45% were 75% sensitivity, 42% specificity, of PLR > 106.5 were 72% sensitivity, 56% specificity.

**Conclusion:** Since auxiliary metastasis is one of the most important points for the prognosis of breast cancer, we suggest PLR, RDW, RMR could serve as prognostic factors in determining lymph node metastasis along with CRP and tumor size in breast cancer.

**Keywords:** Breast cancer, Sentinel lymph node biopsy, Hemogram, Inflammation, Tumor, Auxiliary metastasis.

## INTRODUCTION

Breast cancer remains the second most common cancer in the world after lung cancer [1]. Breast cancer rate in Turkey was 40-50 / 100.000 in the west, and was 20 / 100.000 in the east [2]. Breast cancer can be caught at an earlier stage as a result of social awareness and screening. Cancer detection in the early stages decreases the tumor burden in the axillary pathway relatively. Since the sentinel lymph node is the first focus of the tumor on the axillary path, detection of tumor in this regions is an important step in staging and prognosis. Today, many studies show that hemogram parameters can predict prognosis, spread rate and recurrence in cancer patients [3,4].

In our study, we aimed to investigate the prediction of hemogram parameters in showing sentinel lymph node metastasis.

## MATERIALS AND METHODS

Patients undergoing sentinel lymph node biopsy (SLNB) with the diagnosis of breast cancer between January 2015 and August 2019 in General Surgery Department of Abant İzzet

Baysal University were retrospectively analyzed in present descriptive study. Institutional board was approved the study protocol (No: 33443051-929, date: 10/2019). Patients who underwent SLNB after neoadjuvant therapy, systemic inflammatory disease and male patients were excluded from the study. Age, tumor diameter and location of the patients were determined. The parameters were measured from blood samples at the time 24 hour before surgery. Parameters evaluated were included; hemoglobin (HGB), leukocyte (WBC), platelet count (PLT), red blood cell distribution width (RDW), lymphocyte (LYM), monocyte, neutrophil (NEU), mean platelet volume (MPV), NLR value (division of NEU by LYM), PLR value (division of PLT by LYM), PMR value (division of PLT by monocyte), RMR value (division of RDW by MPV) and serum C-reactive protein (CRP). Methylene blue was applied around the areola for SLNB and at least two lymph nodes, one sentinel lymph node and one non-sentinel, were excised for evaluation. The patients were divided into two groups, SLNB positive and negative. The measured hemogram parameters were compared between these two groups.

Analysis of the data was held with a statistical software (SPSS 18.0 for Windows, IBM Inc., Chicago, IL, USA). Kolmogorov-Smirnov test was conducted to determine distribution

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characteristics of the study parameters between SLNB positive and SLNB negative groups. Non-homogenously distributed variables were compared with Mann Whitney U test and homogenous variables were compared with independent samples test. Categorical parameters was assessed with X2 test. ROC analysis was used to determine area under the curve. Best cut off value was calculated with Youden index. It is considered significant when the p value was lower than 0.05.

**RESULTS**

A total of 93 patients were included in the study (50 in SLNB positive and 43 in SLNB negative groups). The average age of SLNB positive and negative patients were 55 (30-81) years 59 (35-88) years respectively. Age difference was not statistically significant (p=0.19).

Cancer was located in the left breast in 48 (51.6%) patients and in the right breast in 45 (49.4%) patients. 50 (53.8%) patients were SLNB positive while 43 (46.2%) patients were SNLB negative. The relationship of cancer localization with SLNB positivity was not statistically significant (p=0.45). Tumor diameter mean was 3.4 cm and 0.6 cm in SLNB positive and SLNB negative patients, respectively. The diameter difference was statistically significant (p = 0.004). WBC value of SLNB positive patients was not different from the WBC of SLNB negative patients (p = 0.69). HGB value was 12.7 g / dL and 13.3 g / dL in SLNB positive and negative patients, respectively. The difference was statistically significant (p = 0.03). PLT value of study groups was not statistically different (p = 0.13). RDW value of SLNB positive patients (16.2%) was significantly higher than the RDW of SLNB negative patients (15.6%), (p = 0.028).

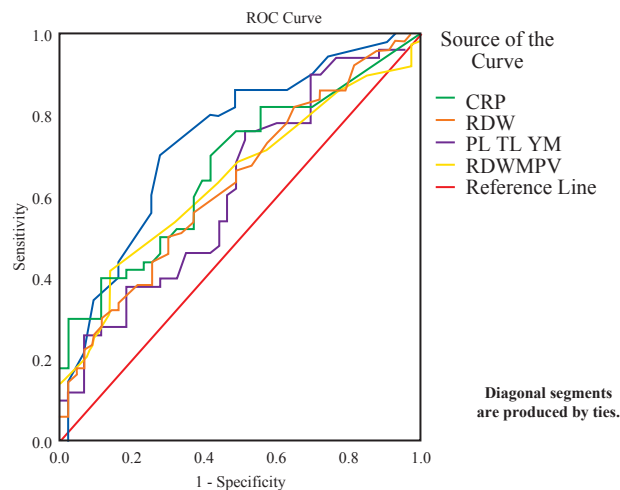
LYM (p = 0.16), monocyte (p = 0.77), NEU (p = 0.12), MPV (p = 0.10), NLR (p = 0.15), PMR (p = 0.06) values of the study groups were not statistically different.

**Table 1.** SLNB Groups Results.

Variables	SLNB Positive	SLNB Negative	p
Age(years)	55	59	0.19
Lymph node(n)	50	43	0.45
Tumor size(cm)	3.4	0.6	0.004
CRP(mg/dL)	6.5	2.4	0.004
PLR (%)	162	125	0.04
RDW (%)	16.2	15.6	0.02
RMR (%)	2.1	1.9	0.01
WBC(/mm3)	7.15	7.0	0.69
HGB (g / dl)	12.7	13.3	0.03
PLT(/mm3)	259.000	239.000	0.13
MPV (fL)	7.5	7.9	0.10
NLR (%)	2.5	2.4	0.15

The PLR value was 162 (60-596) in SLNB positive patients and 125 (61-305) in SLNB negative patients and this difference was statistically significant (p = 0.04). Similarly RMR of SLNB positive patients 2.2±0.5 was significantly higher than the RMR of SLNB negative patients 1.96±0.3, (p = 0.01). The CRP of SLNB positive and negative patients were 6.5 mg/dL (0-53) and 2.4 (0-10) mg / dL, respectively. (p = 0.004) (Table 1).

In detecting SLNB positivity, sensitivities and specificities of Tumor diameter> 0.9 cm were 72% sensitivity, 56% specificity (AUC: 0.67, p=0.005, 95% CI: 0.56-0.78), of CRP> 0.65 mg/dL were 76% sensitivity, 51% specificity (AUC: 0.67, p=0.005, 95% CI: 0.56-0.78), of RMR> 1.85 were 72% sensitivity, 46% specificity (AUC: 0.64, p=0.02, 95% CI: 0.52-0.75), of RDW> 15.45% were 75% sensitivity,% 42 specificity (AUC: 0.63, p=0.02, 95% CI: 0.52-0.74), of PLR> 106.5 were 72% sensitivity, 56% specificity (AUC: 0.61, p=0.04, 95% CI: 0.50-0.73) . Shows Roc curves of study parameters in determining SLNB positivity (Fig. 1).



**Fig. (1).** Roc Curves Of Study Parameters in Determining SLNB Positivity.

## DISCUSSION

Aggressive axillary dissection in breast cancer staging has been replaced by SLNB in recent years. The most important factor here is to detect cancer at an early stage. The accepted approach is that if SLNB was negative then the other axillary nodes are negative too. This minimally invasive approach in the axilla reduces lymphedema, arm pain, drowsiness, and other complication rates, resulting in less hospitalization time, less cost and a safer oncological treatment plan [5-8]. These developments in the axillary pathway lead the clinician to have an idea about lymph node involvement with easier methods. Hemogram parameters that are examined before the operation are the most important of these methods.

Tumor diameter is among the most important prognostic factors in breast cancer. Increasing tumor diameter increases the clinical stage, on the other hand, it positively affects the tumor spread in the axillary pathway [9,10]. In our study, it was seen that in cases where tumor diameter increases, SLNB positivity rate increases significantly.

Nowadays it is a well known fact that CRP is an important prognostic factor. Tai-Bing Deng *et al.* [11], indicate that CRP may have a prognostic value in lung cancer as we detected a significant association between elevated CRP and poorer overall survival. In our study, significant high CRP value to show SLNB positivity.

Recent works have assessed the role of PLR in cancer. Authors suggested that PRL was an independent risk factor of lymph node metastasis in valvular epidermoid cancer subjects [12]. Significantly increased PLR levels were noted in endometrial cancer subjects however, authors added that PLR was not superior than other tumor markers, such as CA-125 [13]. In addition, prognosis of colorectal cancer that undergone surgery was correlated with blood PLR levels [14]. In our study, high PLR value was found significant in showing SLNB positivity.

Various inflammatory conditions including cardiovascular diseases were reported to be associated with high RDW levels [15-17]. Certain types of malignancies, including lung, liver, esophago-gastric and breast, have been reported to be related with elevated RDW which can be a prognostic indicator in these conditions [18-23]. Increased RDW was suggested to be correlated with worse outcome in patients with colorectal carcinoma [24]. Du-Ping Huang *et al* [23], demonstrated that pretreatment RDW may be associated with disease-free survival and overall survival in young women with breast cancer. In our study, significant high RDW value to show SLNB positivity.

Yuan-yuan Qin *et al.* [25], Found the use of RDW and MPV combinations significant in the early diagnosis of malignant

and benign ovarian tumors. In our study, significant high RMR value to show SLNB positivity.

## CONCLUSION

Since axillary metastasis is one of the most important points for the prognosis of breast cancer, we suggest PLR, RDW, RMR could serve as prognostic factors in determining lymph node metastasis along with CRP and tumor size in breast cancer.

## AUTHORS' CONTRIBUTION

**Bahri Ozer, Adil Koyuncu, Songul Peltek Ozer, Oguz Catal and Mustafa Sit** have contributed equally.

## CONFLICT OF INTEREST

Declared none.

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