IJBCM
International Journal of Basic and Clinical Medicine
Uluslararası Temel ve Klinik Tıp Dergisi

Research Article/Araştırma Makalesi

THE IMPLICATION OF THE PREOPERATIVE PLATELET TO LYMPHOCYTE RATIO IN THE DIAGNOSIS OF LARYNGEAL CARCINOMA

Preoperatif Trombosit/Lenfosit Oranının Larengeal Kanser Tanısındaki Rolü

Tolga Ersozlu, Assist. Prof. MD[1]; Oral Burak Demirel, MD [1]

[1] Namik Kemal University, School of Medicine, Department of Otorhinolaryngology

Abstract

Objectives: To investigate the diagnostic implication of the platelet to lymphocyte ratio (PLR) as a biological marker in predicting the malignancy of space-occupying laryngeal lesions.

Methods: The medical records of the patients who underwent an operation for a laryngeal pathology between September 2010 and January 2015 in a tertiary referral center were retrospectively reviewed. For the control group, 50 age and sex matched patients were selected among the patients who underwent septoplasty. Preoperative platelet to lymphocyte ratio was calculated for each subject in the malignant, benign and control groups.

Results: Comparison of the three groups using Kruskal Wallis test showed that there was no statistical difference between the groups. (p>0.05, p=0.871) The median PLR of the patients in the malignant group was lower than the benign group and the control group.

Conclusions: In conclusion, squamous laryngeal carcinoma was not found to be associated with an increased preoperative PLR. Our findings indicated that, PLR may not be used as a biological marker for the diagnosis of laryngeal malignancy.

Keywords: laryngeal cancer; platelet; platelet to lymphocyte ratio; predictive role; differential diagnosis

Özet

Amaç: Yer kaplayan larengeal lezyonların malignite potansiyellerinin öngörülmesinde trombosit/lenfosit oranının (TLO) biyolojik marker olarak tanısal amaçlı kullanımını araştırmak.

Metod: Üçüncü basamak sağlık merkezinde Eylül 2010 ve Ocak 2015 tarihleri arasında larengeal patoloji nedeniyle opere edilen hastaların tıbbı kayıtları geriye dönük olarak incelendi. Kontrol grubu için, septoplasti operasyonu geçiren hastalar arasından yaş ve cinsiyet uyumlu 50 hasta seçildi. Preoperatif olarak trombosit/lenfosit oranı malign, benign ve kontrol grubu olmak üzere ayrı ayrı hesaplandı.

Sonuçlar: 3 grubun Kruskal Wallis testi kullanılarak karşılaştırılması sonucunda gruplar arasında istatiksel olarak anlamlı fark olmadığı gösterilmiştir (p>0.05, p=0.871). Malign gruptaki hastaların ortalama TLO değeri, benign ve kontrol grubuna göre daha düşüktü.

Kanı: Sonuç olarak, skuamöz larenks kanseri artan preoperatif TLO ile ilişkili bulunmadı. Bulgularımız göstermektedir ki, TLO larengeal maligniteyi tanıda biyolojik marker olarak kullanılamaz.

Anahtar Sözcükler: Larengeal kanser; Trombosit; Trombosit/lenfosit oranı; prediktif rolü; Ayırıcı tanı

INTRODUCTION:

In certain types of human cancers, a number of hematological parameters were reported to be reliable biological markers that predict the prognosis of the disease [1,2]. Among these parameters, the presence of elevated platelet counts were found to be associated with a shorter disease-free interval in cancer patients [3].The role of the platelets in tumor biology was

Corresponding Author / Sorumlu Yazar:

Assist. Prof. Tolga Ersozlu, M.D
Namık Kemal University, School of Medicine, Tekirdag/TURKEY
E mail: tersozlu@nku.edu.tr

Article History / Makale Geçmişi:

Date Received / Geliş Tarihi: 08.09.2016
Date Accepted / Kabul Tarihi: 04.10.2016
Int J Basic Clin Med 2016; 4(2):66-70

extensively investigated and they were found to promote aggressive cancer phenotype and induce primary tumor growth by secreting certain growth factors [4].

Recent growing evidence suggest that, the platelet to lymphocyte ratio (PLR) could be a more stable and reliable indicator for poor prognosis in human cancers compared to other hematological parameters including thrombocytosis and neutrophil to lymphocyte ratio [5,6]. The PLR was accepted to be an independent prognostic factor in various solid tumors [1,7,8], but besides its prognostic role, elevated PLR was also proposed to be useful in the diagnosis of many types of other cancers, including lung cancer [9], colorectal adenocarcinoma [10], and ovarian cancer [11].

Although the role of the PLR was investigated in other types of human cancers, literature review revealed that the prognostic or the diagnostic role of the PLR was not investigated in patients with laryngeal carcinoma. Therefore, in the present study, the authors aimed to investigate the diagnostic implication of the PLR as a biological marker in predicting the malignancy of space-occupying laryngeal lesions.

MATERIALS AND METHODS:

The medical records of the patients who underwent an operation for a laryngeal pathology between September 2010 and January 2015 in a tertiary referral center were retrospectively reviewed. Patients who had a complete blood count analysis done before the laryngeal biopsy procedure were enrolled into the study. The patients were allocated into two groups according to their definitive pathology report, either benign or malignant. Since PLR is known to increase in chronic inflammation, patients with a history of diabetes mellitus, chronic hypertension, chronic obstructive pulmonary disease and other chronic inflammatory conditions were also excluded. For the control group, 50 age and sex matched patients were selected among the patients who underwent septoplasty within the same period of time. Preoperative white blood cell, platelet and lymphocyte counts were investigated and the platelet to lymphocyte ratio was calculated for each subject.

Statistical Package for Social Sciences (SPSS) for Windows version 17 (Illinois, Chicago) was used for statistical analysis. Variables were tested for normality using Kalmogorov-Smirnov test. The descriptive data were presented as median (minimum-maximum). For the comparison of the quantitative data that did not display a normal distribution among 3 groups, Kruskal Wallis test was used. For 2 group comparisons, Mann Whitney U test was used. In all tests, $p < 0.05$ was accepted to be statistically significant.

RESULTS:

Between September 2010 and January 2015 a total of 118 patients were found to have an operation for a laryngeal pathology. 21 patients who were found to have chronic inflammatory diseases were excluded from the study. A total of 97 patients were investigated. Among these, 53 patients were found to have laryngeal squamous cell carcinoma and 44 patients were found to have a benign laryngeal lesion (e.g. laryngeal nodule or polyp). The PLRs of the patients in the control, malignant and benign groups were calculated (Figure 1). Comparison of the three groups using Kruskal

Wallis test showed that there was no statistical difference between the groups. (p>0.05, p=0.871) (Table 1).

Table 1. The median PLR values of the three groups. [a]: The difference between the groups in terms of PLR was statistically insignificant

Variable	Groups	Median (minimum-maximum)	p value
Platelet to Lymphocyte Ratio (PLR)	Malignant	110.1770 (40.69 – 380.77)	0.871[a]
	Benign	115.1945 (53.30-177.42)	
	Healthy Control	111.0420 (50.64-234.96)	

The median PLR of the patients in the malignant group was lower than the benign group and the control group. In comparison of the subgroups, no statistical difference between the groups was observed (Table 2).

Table 2. Comparison of subgroups showed that the difference between the groups were insignificant.

Comparison of subgroups	p value
Malignant/Benign	0.761 (p>0.05)
Malignant/Control	0.607 (p>0.05)
Benign/Control	0.832 (p>0.05)

DISCUSSION:

In the present study no association between the presence of laryngeal malignancy and elevated PLR could be established. The findings of this study indicated that using the PLR as a diagnostic biological marker, malignant-benign discrimination of the laryngeal space occupying lesions may not be made.

Recent investigations suggest that lymphocyte, neutrophil and platelet counts and their ratios, including the NLR and PLR, were reported to be reliable and independent predictors of decreased survival in a number of solid tumors [5,12]. As far as the platelets are concerned, their potential role in the process of tumor growth and invasion was implicated in the recent studies. The ability of the tumor cells to interact with the platelets during their hematogenous dissemination was proposed to increase their survival in the circulation and promote their chance of distant metastasis [13]. The platelets were found to promote tumor invasion by releasing angiogenic and growth factors as well as other factors that increase the vascular permeability [14]. Moreover, in an in vitro study, the invasiveness of tumor cells were found to increase when incubated with platelets. It was concluded that platelets could activate the invasiveness of tumor cells by promoting secretion of metalloproteinase-9 from the tumor cells and anti-platelet agents could inhibit their invasiveness [15]. A number of solid tumors were also found to secrete certain pro-inflammatory mediators, which in turn, promote production of the platelets [16]. Review of the literature showed that, an elevated PLR, which reflects a rise in the platelet counts and decrease in the lymphocyte counts, was suggested to be a more stable and dependable indicator of co-existing tumor induced inflammation and immunosupression [1,7,8].

In addition to its prognostic implication, PLR was also suggested to be a feasible inflammatory marker for the detection of various cancer types. The PLR was proposed to be a useful biological marker for the diagnosis of lung cancer patients, in a study by Kemal et al. [9]. The implication of PLR in early detection of colorectal adeno-carcinoma was emphasized in another study [10]. Elevated PLR was also found to be useful in discriminating

malignant ovarian masses in suspected cases [11].

To the best of our knowledge, the prognostic or diagnostic implication of PLR in laryngeal squamous cell carcinoma was not investigated before. The authors of the present study aimed to investigate the implication of the preoperative PLR in the diagnosis of laryngeal malignancy. The PLRs of the patients with benign and malignant laryngeal lesions were compared with the healthy subjects. The difference between the groups was statistically insignificant. The PLRs of the patients in the malignant group were even lower than the PLRs of the patients in the benign group. These finding were not consistent with the previously reported studies pointing out the diagnostic role of PLR in various human cancers [9,10].

CONCLUSION:

In conclusion, squamous laryngeal carcinoma was not found to be associated with an increased preoperative PLR. Our findings indicated that, PLR may not be used as a biological marker for the diagnosis of laryngeal malignancy.

Acknowledgements: None

Kaynaklar

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