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The Role of Neutrophil-Lymphocyte Ratio and Platelet-Lymphocyte Ratios in Predicting H Pylori Positivity and Severity in Patients with Chronic Gastritis

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Research Article

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ABSTRACT

Objective: Chronic gastritis is one of the most common diseases in the World. It is estimated that more than half of the World's population will have chronic gastritis at any time in life. H pylori are the most common cause of chronic gastritis. In the previous studies, WBC, neutrophil, lymphocyte, PLT, and mean platelet volume (MPV) values and their ratios are used as inflammatory indicators. Neutrophil/lymphocyte ratio (NLR) and platelet/lymphocyte ratio (PLR) is among the most critical indicators. This study aimed to show whether there is a relationship between H pylori positivity and severity and these parameters in patients who underwent Upper Gastrointestinal system endoscopy.

Method: The files of 1689 patients who underwent upper gastrointestinal endoscopy were scanned for this study. According to laboratory results and pathology reports, the patients were divided into H pylori positivity and non-H pylori positivity. The hemogram results of the patients in both groups were examined, and neutrophil, lymphocyte, thrombocyte values were recorded. NLR and PLR were calculated.

Results: 722 (42.7%) of the patients were male, and 967 (57.3%) were female. While H pylori were positive in 838 (49.6%) patients, 851 (50.4%) patients did not have H pylori positivity. Among H pylori-positive patients, 407 patients (48%) had mild, 280 (33%) moderate H pylori positivity, and 151 patients (19%) had severe H pylori positivity. When the patients were divided into mild, moderate, and severe groups according to H pylori positivity, NLR and PLR were statistically significantly lower as H pylori severity increased. On the other hand, when both groups were compared according to H pylori positivity, no statistically significant difference was found between the two groups in terms of age, albumin, AST, ALT, WBC, Neutrophil, PLT, NLR, PLR values.

Conclusions: Our study found that NLR and PLR values were statistically significantly lower as H pylori severity increased. Therefore, when we evaluate our results in light of the literature, we assume that it is more appropriate to use PLR and NLR values together rather than separately as inflammatory markers regarding H pylori severity.

Keywords: H pylori, chronic gastritis, neutrophil, platelet parameters.

Kronik Gastriti Olan Hastalarda Nötrofil-Lenfosit Oranı ve Trombosit Lenfosit Oranlarının H Pylori Pozitifliğini ve Şiddetini Öngörmedeki Yeri

Süreç

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ÖZ

Amaç: Kronik gastrit, Dünya'da en sık görülen hastalıklardan biridir. Dünya nüfusunun yarısından fazlasının hayatının herhangi bir döneminde kronik gastrit olacağı tahmin edilmektedir. H pylori, kronik gastritin en yaygın nedenidir. Daha önceki çalışmalarda WBC, nötrofil, lenfosit, PLT ve ortalama trombosit hacmi (MPV) değerleri inflamatuar indikatör olarak kullanılmıştır. Nötrofil/lenfosit oranı (NLO), trombosit/lenfosit oranı (TLO), bu göstergelerin en önemlileri arasındadır. Biz bu çalışmamızda Üst Gastrointestinal sistem endoskopisi yapılan hastalarda H pylori pozitifliği ve şiddeti ile bu parametreler arasında bir ilişki olup olmadığını göstermeyi amaçladık.

Yöntem: Bu çalışma için üst gastrointestinal endoskopisi yapılan 1689 hastanın dosyaları tarandı. Laboratuvar sonuçları ve patoloji raporlarına göre hastalar H pilori pozitifliği olan ve olmayan olarak iki gruba ayrıldı. Her iki gruptaki hastaların hemogram sonuçları incelenerek nötrofil, lenfosit, trombosit, değerleri kaydedildi. NLO ve TLO hesaplandı.

Bulgular: Hastaların 722'si (%42,7) erkek, 967'si (%57,3) kadındı. Hastaların 838'inde (%49,6) H pylori pozitif iken, 851 (%50,4) hastada H pylori pozitifliği yoktu. H pilori pozitif hastalardan 407 hastada (%48) hafif, 280 hastada (%33) orta derecede H pilori pozitifliği ve 151 hastada (%19) şiddetli H pilori pozitifliği vardı. Hastalar H pilori pozitifliğinin ciddiyetine göre hafif, orta ve şiddetli gruplara ayrıldığında, H pilori şiddeti arttıkça NLO ve TLO istatistiksel olarak anlamlı derecede düşük bulundu. H. pylori pozitifliği açısından her iki grup karşılaştırıldığında ise yaş, albümin, AST, ALT, WBC, Nötrofil, PLT, NLR, PLR değerleri açısından iki grup arasında istatistiksel olarak anlamlı fark bulunmadı.

Sonuç: Çalışmamız, H pilori şiddeti arttıkça NLO ve TLO değerlerinin istatistiksel olarak anlamlı derecede düşük olduğunu göstermiştir. Bu nedenle sonuçlarımızı literatür ışığında değerlendirdiğimizde H pylori şiddeti açısından NLO ve TLO değerlerinin ayrı ayrı inflamatuvar belirteçler yerine birlikte kullanılmasının daha uygun olduğunu düşünmekteyiz.

Anahtar sözcükler: H pylori, kronik gastrit, nötrofil, trombosit parametreleri.

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Introduction

Chronic gastritis is one of the most common life-long severe diseases in humans. It is estimated that more than half of the World's population will have chronic gastritis at some point in their life. In other words, chronic gastritis can be seen in billions of people worldwide [1]. It is thought that millions of premature deaths may occur each year due to ulcers and cancer that develop as a complication of chronic gastritis [2].

Although chronic gastritis has been known and studied since the beginning of the 20th century, after the discovery of Helicobacter pylori (H pylori) in 1982, it was thought that a large part of chronic gastritis was due to H pylori. Among other causes, autoimmune gastritis is at the forefront. It has been shown that with the eradication of the bacteria in gastritis due to H pylori, gastritis does not progress, and the gastric mucosa returns to normal [3].

H pylori is a gram-negative, microaerophilic, spiral-shaped, and motile microorganism. It is estimated that 50-90% of the World's population is infected with this microorganism, and it is thought that it is usually encountered in childhood. In societies with a low socioeconomic level, the infection rate is high, and gastritis occurs in almost all infected people. In previous studies, many parameters such as WBC, CRP, and procalcitonin were evaluated as an indicator of inflammation in gastritis due to H pylori [4]. Blood count devices can test the complete blood cell count (CBC), the white blood cells count (WBC), neutrophil, lymphocyte (LYM), platelet counts (PLT) parameters, such as mean platelet volume (MPV), platelet distribution width (PDW), and plateletcrit (PCT). Thanks to these basic and inexpensive tests, we can distinguish the causes of hematologic diseases and predict some inflammatory events [5]. Platelets take part in normal homeostasis and play a role in abnormal conditions such as bleeding and thrombosis [6]. Neutrophils are one of the main components of the immune system [7,8]. In the previous studies, WBC, neutrophil, lymphocyte, PLT, and mean platelet volume (MPV) values and their ratios are used as inflammatory indicators. Neutrophil/lymphocyte ratio (NLR) platelet/lymphocyte ratio (PLR) is among the most important of these indicators [7,8,9].

In this study, we aimed to show whether there is a relationship between H pylori positivity and severity and these parameters or combinations of them in patients who underwent Upper Gastrointestinal system endoscopy.

Material and Methods

For this study, the files of 1689 patients who underwent upper gastrointestinal endoscopy due to dyspeptic complaints in the General Surgery and Internal Medicine Departments of Faculty of Medicine Sivas Cumhuriyet University 2019-2020 were retrospectively scanned. The study protocol was approved by the Sivas Cumhuriyet University Non-Invasive Clinical Studies Ethics Committee (Decision no. 2021-11/01). While conducting this study, the principles of the Declaration of Helsinki were taken as a guide. According to laboratory results and pathology reports, the patients were divided into H pylori positivity and non-H pylori positivity. Patients whose data could not be reached were excluded from the study. Demographic data of the patients were recorded. The hemogram results of the patients in both groups were examined, and neutrophil, lymphocyte, thrombocyte, RDW, MPV values were recorded. Neutrophil-lymphocyte ratio (NLR) and platelet-lymphocyte ratio (PLR) were calculated. The difference between the two groups was compared by looking at the degree of diagnosis, chronic inflammation, activity, atrophy, intestinal metaplasia in the pathology reports. NLR and PLR were compared according to the presence and severity of Helicobacter.

Statistical Analyses

Analyses were performed using SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA). Parameters compatible with normal distribution were described as mean±SD, and parameters that did not fit normal distribution were related to the median and distribution (lower-upper limit). Most of the variables did not satisfy the normality test assumption. However, this violation was ignored due to the high number of observations, and the analysis continued parametrically. The difference between the means of two independent groups was used with the t-test, and for the means of more than two groups, ANOVA was used. The significance level was accepted as 0.05 in all analyzes. Before the ANOVA was performed, the LEVENE test was performed to determine whether the variances were homogeneous. As a result of this test, it was seen that while the variances between the groups were homogeneously distributed for AGE, ALT, AST, Lymphocyte, PLT, WBC, NLR, and PLR, the condition of homogeneity of variances was not met for other variables. LSD significance was used for the variables in which the variances were homogeneous, while Dunnett T3 was used for the variables whose homogeneity assumption could not be provided.

Results

A total of 1689 patients who underwent upper gastrointestinal endoscopy were included in our study. 722 (42.7%) of the patients were male, and 967 (57.3%) were female. While H pylori were positive in 838 (49.6%) patients, 851 (50.4%) patients did not have H pylori positivity. Among H pylori-positive patients, 407 patients (48%) had mild, 280 (33%) moderate H pylori positivity, and 151 patients (19%) had severe H pylori positivity (Table 1). The mean age of the patients was 52.99±16.19. Laboratory values were found as albumin 42.07±6.09, AST 21.9±17.61, ALT 23.32±27.29, CRP 20.41±40.34, WBC 2.09±0.79, neutrophil 4.82±2.0, PLT 254.73±75.16, NLR 2.74±2.34, PLR 137.58±74.28 (Table 2).

In the H pylori-positive group, the mean age was 55.16±16, albumin 42±6, AST 22±20, ALT 24±28, WBC 2±1, neutrophil 5±2, PLT 257±77, NLR3±3, PLR 139±67 found. In the H pylori-negative group, the mean age was 51±16, albumin 43±6, AST 21±15, ALT 23±26, WBC 2±1, neutrophil 5±2, PLT 253±73, NLR 3±2, PLR 136±81 found. When both groups were compared according to H pylori positivity, no statistically significant difference was found between the two groups in terms of age, albumin, AST, ALT, WBC, Neutrophil, PLT, NLR, PLR values (p>0.05) (Table 3).

When the patients were divided into mild, moderate, and severe groups according to the severity of H pylori positivity, NLR and PLR were statistically significantly lower as H pylori severity increased (p=0.032, p=0.041) (Table 4).

Table 1. Demographic features of patients at presentation

	n (Sayı)
Gender (n)	
Female	967
Male	722
H pylori	
Positive	838
Negative	851
H pylori positivity degree	
Mild	407
Moderate	280
Severe	151

Table 2. Demographic and laboratory values of the patients

	mean±SD
Age (year)	52.99±16.19
Albumin (mg/dL)	42.07±6.09
AST (IU)	21.9±17.61
ALT (IU)	23.32±27.29
CRP (mg/dL)	20.41±40.34
WBC	2.09±0.79
Neutrophil	4.82±2.0
Platelet	254.73±75.16
NLR	2.74±2.34
PLR	137.58±74.28

AST: Aspartate Aminotransferaz; ALT: Alanine Aminotransferase, CRP: C Reactive Protein; WBC: White blood cells; NLR: Neutrophil Lymphosit Ratio; PLR: Platelet Lymphosit Ratio. Results were given as mean ± standard deviation

Table 3. Comparison of laboratory parameters of patients in H pylori-positive and negative groups

	H pylori Pozitive	H pylori Negative	p
Age (year)	55.16±16	51±16	p>0.05
Albumin (mg/dL)	42±6	43±6	p>0.05
AST (IU)	22±20	21±15	p>0.05
ALT (IU)	24±28	23±26	p>0.05
WBC	2±1	2±1	p>0.05
Nötrofil	5±2	5±2	p>0.05
Platelet	257±77	253±73	p>0.05
NLR	3±3	3±2	p>0.05
PLR	139±67	136±81	p>0.05

AST: Aspartate Aminotransferaz; ALT: Alanine Aminotransferase, CRP: C Reactive Protein; WBC: White blood cells; NLR: Neutrophil Lymphosit Ratio; PLR: Platelet Lymphosit Ratio. *P values indicate differences between groups. P < 0.05 was defined as statistically significant.

Table 4. Comparison of NLR and PLR by Severity of H pylori

	Mild	Moderate	Severe	p
NLR	2.78±2.10	2.67±1.93	2.63±2.57	P=0.032
PLR	136.47±69.82	132.76±62.93	128.99±59.96	P=0.041

NLR: Neutrophil Lymphosit Ratio; PLR: Platelet Lymphosit Ratio. *P values indicate differences between groups. P < 0.05 was defined as statistically significant.

Discussion

In our study, the mean age was found to be higher in the H pylori-positive patient group than in the H pylori-negative patients, but no statistically significant difference was found. Many previous studies examined whether there was a relationship between H pylori positivity and age, but no relationship was found between age and H pylori positivity [10-12]. In our study, no statistically significant difference was found in the patient group with H pylori-positive, although the mean age was high ($p>0.05$). We think that the relationship between age and H pylori positivity in previous studies is due to the difference in the sample taken, socioeconomic status, and environmental factors [13, 14].

In the study of Ferhatoğlu et al., there was no statistically significant difference in WBC, neutrophil, lymphocyte, and MPV levels in patients with positive and negative H pylori, but it was shown that NLR was higher in patients with H pylori-positive [15]. In the study of Farah et al., NLR was statistically significantly higher in patients with H pylori-positive than in patients with negative H pylori [16]. In another study conducted in our country, Nalbant et al. found that NLR was statistically significantly lower in patients with positive H pylori [17]. In our study, although NLR and PLR were found to be higher in H pylori-positive patients than in H Pylori negative patients, no statistically significant difference was found.

PLR has been shown in some studies in the literature as a new hematology marker showing the prothrombotic and inflammatory process [18,19]. Few studies show the relationship between H pylori and PLR. Şahin et al., in a study, showed that it was statistically significantly higher in H pylori-positive patients than in negative patients [20]. Although PLR was high in the H pylori-positive patient group, no statistically significant difference was found in our study. In addition to the diagnostic value of NLR and PLR, many recent studies have shown that they are prognostic markers in various diseases [21, 22]. It has been demonstrated that PLR values can also lead to diagnosing H pylori like NLR, but further studies are still needed.

When we examined the previous studies, we could not find any study that examined the relationship between H pylori severity and NLR and PLR results histopathologically. Studies in the literature have reported that NLR and PLR values are statistically high in malignant conditions such as early-stage gastric cancer, cervical cancer, head and neck cancers, renal cell cancer, and some inflammatory events [23-26]. Our study found that as the severity of H pylori in the gastric mucosa increased histopathologically, the NLR and PLR values were statistically significantly lower, contrary to the reports in the literature. To the best of our knowledge, this is the first study to investigate the usefulness of NLR and PLR in predicting the H pylori severity in chronic gastritis patients. More clinical studies are needed for more accurate inferences, as it may be early to make a definitive judgment on this issue.

Conclusion

While there was no difference in age, gender, WBC, neutrophil, lymphocyte values, NLR, and PLR in H pylori-positive patients, we found a negative correlation between H pylori severity and NLR and PLR. NLR and PLR can be used as inflammatory markers regarding H pylori severity.

Conflict of interest: The authors declare that they have no conflict of interest, and any source did not fund the study.

All authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by Suleyman KOC, and Mustafa Asim GEDIKLI. The first draft of the manuscript was written by [Suleyman KOC], and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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