HAYDARPAŞA NUMUNE MEDICAL JOURNAL

DOI: 10.14744/hnhj.2020.72325
Haydarpasa Numune Med J 2022;62(3):342–345

hnhtipdergisi.com

ORIGINAL ARTICLE

Investigation of Neutrophil to Lymphocyte Ratio and Platelet to Lymphocyte Ratio Parameters in Chronic Gastritis with *Helicobacter Pylori*

Emine Alev Yalın[1], Kadir Kayataş[2]

[1]Department of Internal Medicine, Başakşehir Çam & Sakura City Hospital, İstanbul, Türkiye
[2]Department of Internal Medicine, Health Sciences University Haydarpaşa Numune Health Application and Research Center, İstanbul, Türkiye

Abstract

Introduction: Easily accessible parameters are needed to predict the presence of *Helicobacter pylori* (HP) and to decide on endoscopy at the right time in chronic gastritis cases. Today, neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR) parameters have been found to be useful in demonstrating inflammation. In our study, we aimed to investigate the relationship between HP and NLR and PLR.

Methods: In patients who were found to have antral gastritis according to biopsies which were taken during the gastroscopy procedure at the Health Sciences University Haydarpaşa Numune Health Application and Research Center between on March 1, 2016 and March 1, 2019, HP presence and hemogram parameters were recorded. Patients with chronic or active inflammatory disease, taking regular medications, or antibiotics in the past 2 months were excluded from the study. IBM SPSS Statistics 22 for statistical analysis (SPSS IBM, Türkiye) programs was used. $p<0.05$ was considered as significant.

Results: In the histopathological examination of a total of 271 cases, 135 (49.8%) patients with HP positivity were evaluated as study group, and 136 (50.2%) patients with negativity were evaluated as control group. In the study group, NLR was 1.86±0.51 and PLR was 118.58±32.18 and in the control group, NLR was 1.92±0.63 and PLR was 117.21±34.82. There was no statistically significant difference between the groups in terms of NLR and PLR ($p>0.05$).

Discussion and Conclusion: In predicting the presence of HP and deciding on endoscopy at the right time, prospective studies with larger numbers of cases and different parameters can contribute to clinicians.

Keywords: Gastritis; helicobacter; neutrophil to lymphocyte ratio; platelet to lymphocyte ratio.

In chronic gastritis, lymphocytes, plasma cells, and neutrophils attack the gastric mucosa. It is characterized by loss in stomach glands, intrinsic factor, and disorder in acid and pepsin metabolism[1,2].

Systemic inflammation can be evaluated by various biochemical and hematological parameters. During the inflammatory response, changes occur between the leukocyte subtypes. Neutrophilia is associated with relative lymphopenia. Because of the responses of circulating leukocytes to physiological stress are increasing in neutrophil count and decreasing in lymphocyte count, their rate is thought to represent inflammation[3]. It is thought that the platelet to lymphocyte ratio (PLR) parameter can also be used to predict inflammation and mortality in some

Correspondence (İletişim): Emine Alev Yalın, M.D. Başakşehir Çam ve Sakura Şehir Hastanesi, İstanbul, Türkiye
Phone (Telefon): +90 535 517 55 65 **E-mail (E-posta):** alevyalin56@gmail.com
Submitted Date (Başvuru Tarihi): 25.08.2020 **Accepted Date (Kabul Tarihi):** 30.10.2020

diseases[4]. We think that the hemogram test may help in predicting the presence of *Helicobacter pylori* (HP) and making an endoscopy decision. Since HP infection is also a chronic inflammatory process, we aimed to investigate the relationship between HP infection and neutrophil to lymphocyte ratio (NLR) and PLR parameters.

Materials and Methods

Study Population, Design, and Setting

This retrospective study was performed in the archive of University of Health Sciences, Haydarpaşa Numune Health Application and Research Center. A total of 5513 patients were examined and 271 patients were included in this study.

Patients presenting to our hospital between March 2016 and March 2019 with complaints such as bloating, belching, nausea, vomiting, epigastric burning or pain, early satiety and who underwent gastroscopy, and had biopsy were examined in the study.

The patients who had complete blood count within 2 months before gastroscopy, had biopsy was taken from the antrum during the gastroscopy and had histopathologically chronic antral gastritis by examining these biopsy samples were included in the study.

Exclusion Criteria

Patients who under the age of 18, were pregnant, have had a stomach operation, have chronic or active inflammatory diseases such as active respiratory and urinary infections, coronary artery disease, cardiac arrhythmia, diabetes mellitus, hypertension, malignancy, autoimmune, hematological or rheumatological diseases, chronic kidney or liver diseases, thyroid dysfunction, crohn and ulcerative colitis, and using regular medications or used antibiotics in the past 2 months, patients with bleeding in their gastroscopy, patients with CRP, erythrocyte sedimentation rate or procalcitonin elevation in their biochemical tests were excluded from the study.

Endoscopic Examination

Gastroscopy was carried out in our hospital's Gastroenterology and General Surgery Clinics using Fujinon endoscopy sets.

Pathological Evaluation

Biopsies taken from the antrum during the gastroscopy were examined in our hospital's Pathology Clinic. Gieamsa is used for HP. According to the Sydney grading system, chronic inflammation was graded as being mild, moderate, or severe depending on the increase rate of lymphocytes and plasmocytes in lamina propria. Activity was graded as being mild, moderate, or severe depending on the presence of neutrophils on lamina propria, epithelium, or crypt lumen[5,6].

Biochemical Measurements

The hemograms studied at the Mindray BC 6800 blood count device in our hospital's Microbiology Clinic. The hemogram and biochemical values of the patients were recorded from patient files.

NLR was calculated by dividing the neutrophil count with the lymphocyte count and PLR was calculated by dividing the platelet count with the lymphocyte count.

Statistical Analysis

IBM Statistical Package for the Social Sciences Statistics 22 (SPSS, IBM Türkiye) program was used for statistical assessments. The normal distribution of the data was evaluated with Shapiro–Wilk test. In comparing qualitative data and descriptive statistical methods (mean, standard deviation, and frequency), Student's t test was used to compare parameters showing normal distribution parameters between the two groups and Mann–Whitney U test was used to compare parameters not showing normal distribution parameters between the two groups. Chi-square test, Fisher Freeman Halton test, and Continuity (Yates) correction were used to compare qualitative data. $P<0.05$ was considered as significant.

Results

Entire Population Findings

The study population included a total of 271 patients, 136 HP (–) (50.2%) and 135 HP (–) (49.8%). The mean age of the patients was 38.44±11.52 years. About 69.4% (n=188) of the population was female. Around 47.2% (n=128) of the patients had inactive chronic gastritis, 31% (n=84) had mild chronic gastritis, 21% (n=57) had moderate chronic gastritis, and 0.7% (n=2) had severe chronic gastritis.

Comparison between HP (-) and (+) groups

All the patients with severe chronic gastritis were in HP (+) group, and the ratio of patients with mild chronic gastritis was higher in HP (+) group (55.6% vs. 6.6%; $p<0.05$). No significant difference was observed between the groups in terms of other laboratory findings (Table 1).

Table 1. Distribution of demographic, clinical, and pathological findings according to HP presence

Variables	HP (+)	HP (-)	Total	p
Age (Years)	37.44±10.45	39.43±12.46	38.44±11.52	0.155
Gender, n (%)				
Male	46 (34.1%)	37 (27.2%)	83 (30.6%)	0.220
Female	89 (65.9%)	99 (72.8%)	188 (69.4%)	
Pathological diagnosis, n (%)				
Inactive chronic gastritis	1 (0.7%)	127 (93.4%)	128 (47.2%)	0.000*
Mild chronic gastritis	75 (55.6%)	9 (6.6%)	84 (31%)	
Moderate chronic gastritis	57 (42.2%)	0 (0%)	57 (21%)	
Severe chronic gastritis	2 (1.5%)	0 (0%)	2 (0.7%)	
Hematologic parameters				
NLR	1.86±0.51	1.92±0.63	1.89±0.57	0.365
PLR	118.58±32.18	117.21±34.82	117.89±33.48	0.737
Total leukocyte (µL)	7071.11±1347.63	7041.2±1325.25	7056.1±1334.05	0.854
Neutrophil (µL)	4112±922.97	4151.76±1046.68	4131.96±985.37	0.740
Lymphocyte (µL)	2295.78±571.85	2261.1±543.53	2278.38±557.05	0.609
Platelet (µL)	260688.89±54240.82	254279.41±51740.48	257472.32±52999.84	0.320
Hemoglobin (g/dL)	13.71±1.35	13.69±1.29	13.7±1.32	0.876
PDW (%)	16.08±0.35	16.08±0.36	16.08±0.35	0.888
PCT (%)	0.26±0.05	0.25±0.05	0.26±0.05	0.333
MPV (fl)	10.02±1.12	10.17±1.32	10.09±1.23	0.317

Categorical variables are shown in numbers and percentage, and numerical variables are shown as mean±standard deviation. *p<0.05 statistically significant. HP: *Helicobacter pylori*; NLR: Neutrophil-to-lymphocyte ratio; PLR: Platelet-to-lymphocyte ratio; PDW: Platelet distribution width; PCT: Plateletcrit; MPV: Mean platelet volume.

Assessment of HP (+) Group

In HP (+) group, patients with inactive and severe gastritis were excluded from the analysis because of their low numbers. No significant difference was observed between patients with mild chronic gastritis and moderate chronic gastritis in terms of age, gender, and other laboratory findings (Table 2).

Discussion

NLR and PLR, non-invasive markers, have been showed to be useful in the diagnosis of gastric cancer and in prediction of the presence of HP[5,6]. In this study, we investigated the impact of HP in a group of chronic gastritis cases with regard to NLR and PLR. There was no statistically significant difference between HP (-) and (+) groups in terms of NLR and PLR.

It is previously shown that PLR-NLR combination has been a good predictor of HP presence and gastrointestinal complications associated with HP[7]. Kaplan et al.[7] found that HP (+) patients also had higher rates of severe chronic gastritis and HP (–) patients had no severe chronic gastritis. Similar to this result, we did not record a severe chronic gastritis case in the HP (-) group in our study.

It was shown in the previous studies that platelet activation was involved in most gastrointestinal complications that occur because of altered immunity secondary to HP[7-9]. In our study, PLR value was higher in HP (+) group compared with HP (–) group, albeit not statistically significant. These results show that PLR is a good non-invasive marker that can be used to determine the presence of HP and chronic gastritis associated with it.

In study which made by Guclu et al.,[10] there were no differences in terms of NLR and platelet counts between HP (–) and (+) patients as similar to our study. They thought that the reason for absence of significantly high NLR, as expected in HP (+) patients, was the fact that absolute lymphocyte counts increased as the intensity of HP increased and that NLR value did not rise and the increase in absolute lymphoid count in peripheral blood was a very important finding.

The main limitations of our study include its retrospective design, so we did not find out whether patients have metabolic syndrome, smoke, or drink alcohol.

In conclusion, we believe that NLR and PLR will be easy-to-use, accessible, and inexpensive parameters in prediction of the presence of HP for clinicians, but prospective studies with larger numbers of cases and different parameters are needed for that.

Table 2. Distribution of demographic and clinical findings according to pathological diagnosis in HP (+) group

Variables	Pathological diagnosis		p
	Mild chronic gastritis	Moderate chronic gastritis	
Age (Years)	37.01±10.8	37.75±10.27	0.691
Gender, n (%)			
Male	27 (36%)	18 (31.6%)	0.730
Female	48 (64%)	39 (68.4%)	
Hematologic parameters			
NLR	1.92±0.57	1.8±0.42	0.152
PLR	118.69±31.32	118.73±33.27	0.994
Total leukocyte (µL)	7019.07±1458.82	7158.95±1219.3	0.560
Neutrophil (µL)	4130.13±1058.88	4107.89±740.7	0.887
Lymphocyte (µL)	2236.67±568.09	2367.02±566.3	0.193
Platelet (µL)	254333.33±52016.2	269561.4±57363.51	0.113
Hemoglobin (g/dL)	13.89±1.29	13.49±1.4	0.087
PDW (%)	16.08±0.33	16.07±0.36	0.947
PCT (%)	0.25±0.05	0.27±0.05	0.059
MPV (fl)	9.97±1.18	10.05±1.04	0.693

Categorical variables are shown in numbers and percentage, and numerical variables are shown as mean±standard deviation. HP: *Helicobacter pylori*; NLR: Neutrophil-to-lymphocyte ratio; PLR: Platelet-to-lymphocyte ratio; PDW: Platelet distribution width; PCT: Plateletcrit; MPV: Mean platelet volume.

Ethics Committee Approval: Ethics committee approval was not obtained according to retrospective nature of the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: E.A.Y., K.K.; Design: E.A.Y., K.K.; Data Collection or Processing: E.A.Y.; Analysis or Interpretation: E.A.Y., K.K.; Literature Search: E.A.Y.; Writing: E.A.Y.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Sepulveda AR, Patil M. Practical approach to the pathologic diagnosis of gastritis. Arch Pathol Lab Med 2008;132:1586–93.
2. Göral V. Akut ve kronik gastritisler. Güncel Gastroenterol 2006;10:292–304.
3. Cavuş UY, Yildirim S, Sönmez E, Ertan C, Ozeke O. Prognostic value of neutrophil/lymphocyte ratio in patients with pulmonary embolism. Türk J Med Sci 2014;44:50–5. [CrossRef]
4. Balta S, Ozturk C. The platelet-lymphocyte ratio: A simple, inexpensive and rapid prognostic marker for cardiovascular events. Platelets 2015;26:680–1. [CrossRef]
5. Pietrzyk L, Plewa Z, Denisow-Pietrzyk M, Zebrowski R, Torres K. Diagnostic power of blood parameters as screening markers in gastric cancer patients. Asian Pac J Cancer Prev 2016;17:4433–7.
6. Lian L, Xia YY, Zhou C, Shen XM, Li XL, Han SG, et al. Application of platelet/lymphocyte and neutrophil/lymphocyte ratios in early diagnosis and prognostic prediction in patients with resectable gastric cancer. Cancer Biomark 2015;15:899–907. [CrossRef]
7. Kaplan M, Ates I, Yuksel M, Arikan MF, Aydog G, Turhan N, et al. The role of the PLR-NLR combination in the prediction of the presence of Helicobacter pylori and its associated complications. Saudi J Gastroenterol 2018;24:294–300. [CrossRef]
8. Farah R, Khamisy-Farah R. Association of neutrophil to lymphocyte ratio with presence and severity of gastritis due to Helicobacter pylori infection. J Clin Lab Anal 2014;28:219–23.
9. Zeren S, Bayhan Z, Kocak FE, Duzgun SA, Kahraman C, Ekici MF, et al. Diagnostic value of platelet/lymphocyte ratio and neutrophil/lymphocyte ratio in investigations for Helicobacter pylori gastritis. Int J Clin Exp Med 2016;9:5102–6.
10. Guclu M, Faruq Agan A. Association of severity of Helicobacter Pylori infection with peripheral blood neutrophil to lymphocyte ratio and mean platelet volume. Euroasian J Hepatogastroenterol 2017;7:11–6. [CrossRef]