ENT updates
www.entupdates.org

Clinical Research

ENT Updates 2018;8(2): 110-113
DOI:10.32448/entupdates.459024

Investigation Of The Prognostic Value Of The Neutrophil/Lymphocyte Ratio In Bell Palsy

Denizhan Dizdar MD[1], Mehmet Özgür Avınçsal MD[2], Senem Kurt Dizdar MD[3]

[1]Istinye University, Faculty of Medicine, Bahçelievler MedicalPark Hospital, Otorhinolaryngology Istanbul, TR
[2]Gaziosmanpaşa Taksim Research and Education Hospital, Department of Otolaryngology, Head and Neck Surgery, Istanbul, Turkey
[3]Hamidiye Şişli Etfal Research and Education Hospital, Department of Otolaryngology, Head and Neck Surgery, Istanbul, Turkey

Abstract

Objectives: Bell palsy (BP), also known as idiopathic facial paralysis, is a unilateral, acute-onset, isolated lower motor neuron weakness. It accounts for 60% to 75% of all cases of unilateral facial paralysis. The estimated annual incidence ranges between 11 and 40 per 100.000 people, with 40.000 new cases each year in different parts of the world. The neutrophil/lymphocyte ratio (NLR), calculated as the ratio of absolute neutrophil count to absolute lymphocyte count, is an easily measurable and inexpensive systemic inflammation marker. This study investigated the association between the NLR and BP by comparing clinical characteristics and functional outcomes of patients with BP and healthy controls.

Methods: Thirty patients (24 women, 6 men) who presented to our clinic with BP between 2014 and 2016 were included in the study. The subjects underwent a general physical examination and an assessment of laboratory blood parameters. All patients were treated with prednisone, 1 mg/kg per day with a progressive dose reduction. The NLR was calculated as the simple ratio between absolute neutrophil and absolute lymphocyte counts.

Results: The mean (SD) NLR values were 2.141 (0.80) in patients with BP and 1.41 (0.46) in the control group. The difference between groups was significant (p=0.0001). There was a positive correlation between grade of facial paralysis and NLR values (r=0.663, p=0.0001). There was a positive correlation between prognosis of facial paralysis and NLR values (r=0.239, p=0.0251).

Conclusion: The NLR was a valuable marker in BP patients in this study. Moreover, this study demonstrated a linear relationship between the NLR and BP severity and prognosis.

Keywords: Bell Palsy; corticosteroids; neutrophils, lymphocytes

Introduction

Bell palsy (BP), also known as idiopathic facial paralysis, is a unilateral, acute-onset, isolated lower motor neuron weakness.[1] It accounts for 60% to 75% of all cases of unilateral facial paralysis.[2] The estimated annual incidence ranges between 11 and 40 per 100,000 people, with 40,000 new cases each year in different parts of the world.[1] There is no sex preference, and palsy can occur at any age, although more cases are seen in mid and late life with a median age of onset of 40 years. BP is still an undiscovered clinical entity, with an etiopathogenesis that has not been clearly defined. Several causes have been suggested including inflammatory, vascular, viral, and autoimmune causes.[3] Due to possible autoimmune or viral pathogenesis, combination therapy with oral corticosteroids and antivirals is

Correspondence: Denizhan Dizdar
Istinye University, Faculty of Medicine, Bahçelievler MedicalPark Hospital, Otorhinolaryngology, Istanbul, TR
Email: denizhandizdar@hotmail.com

Received: May 22, 2018; **Accepted:** July 25, 2018

Online available at:
www.entupdates.org
DOI:10.32448/entupdates.459024

commonly accepted. Surgical options can be considered when symptoms do not improve after weeks or months.[4]
The neutrophil/lymphocyte ratio (NLR), calculated as the ratio of absolute neutrophil count to absolute lymphocyte count, is an easily measurable and inexpensive systemic inflammation marker. Recently, a number of chronic inflammatory diseases and malignancies have been linked to the NLR,[5–7] with a higher NLR in patients with these conditions than in healthy subjects. It has been hypothesized that the synthesis of inflammatory cytokines triggered by the inflammatory microenvironment modifies acute phase reactants and hematological contents including serum levels of neutrophils and lymphocytes.[5]
This study investigated the association between the NLR and BP by comparing clinical characteristics and functional outcomes of patients with BP and healthy controls.

Materials And Methods

Thirty subjects (24 women, 6 men) who presented to our clinic with BP between 2014 and 2016 were included in the study. The exclusion criteria were history of otologic surgery, otitis media, cerebellopontine angle pathology or cochlear malformation, trauma or barotrauma, neurological disorders causing facial paralysis, neoplasm history, other major diseases (heart failure, hypertension, coronary artery disease, liver or renal dysfunction, diabetes mellitus, chronic obstructive pulmonary disease, connective tissue diseases, inflammatory bowel diseases), and smoking. The control group comprised 30 subjects without evidence of ear or facial nerve pathology. The subjects underwent a general physical examination and an assessment of laboratory blood parameters. All patients received the same treatment protocol, which included administration of prednisolone 1 mg/kg per day orally with a progressive dose reduction and 500 mg intravenous acyclovir three times daily. Ethics committee approval was obtained from Ethical Committee of Gaziosmanpasa Taksim Education and Research Hospital, and the study was adhered to the Declaration of Helsinki. Informed consent was obtained from all participants.

Hematological Analyses

The NLR was calculated as the simple ratio between absolute neutrophil and absolute lymphocyte counts. An automated blood cell counter was used for complete blood counts (CBCs) (Sysmex XT 2000i; Sysmex, Kobe, Japan). All of the samples were run in duplicate, and the mean values were used for statistical analyses.

Statistical Analyses

The normal distribution of continuous variables was tested using the Kolmogorov–Smirnov test. The chi-square test was used for comparisons among categorical variables, and the Mann-Whitney test was used for between-group assessments of continuous variables. Correlations among continuous variables were assessed using the Pearson correlation coefficient. Statistical significance was accepted at $p<0.05$. Descriptive statistics are represented as the mean±standard deviation (SD). Statistical analyses were performed using the Statistical Package for the Social Sciences 19.0 Evaluation for Windows.

Results

The mean (SD) ages of patients with BP and the control group were 39.6±11.2 and 38.2±8.18 years old, respectively. In total, 80% of the BP group and 60% of the control group were women. According to the House–Brackmann grading system, the subjects presented the following distribution 3 to 4 days after palsy initiation: 7 subjects were diagnosed with grade III paresis, 12 subjects had grade IV, 7 had grade V, and 5 had grade VI. After 3 months of follow-up, complete recovery was seen in 24 subjects (80%). Three subjects (10%) still presented with grade III paresis, and 2 subjects (6.6%) presented with grade II.

Laboratory Evaluation

The mean (SD) NLR values were 2.141 (0.80) in patients with BP and 1.41 (0.46) in the control group. The difference between groups was significant (p=0.0001). There was a positive correlation between grade of facial paralysis and NLR values (r=0.663, p=0.0001). The mean (SD) NLR values in grades III, IV, V, and VI BP were 1.42 (0.53), 1.74 (0.46), 3.02 (0.65), and 2.95 (0.56), respectively. The mean NLR values for grades V and VI BP were significantly higher than those in the other groups (p=0.0001). There was a positive correlation between prognosis of facial paralysis and NLR values (r=0.239, p=0.0251) (Figure 1).

Discussion

The NLR is a useful and cost-effective marker of inflammation that can be calculated simply from CBC results. Recently, the NLR has raised interest as a potential biomarker for identifying the prognosis of several malignancies and chronic inflammatory diseases, [5–7] It can be an important predictor of a poor prognosis.[8–10] In otolaryngological prac-

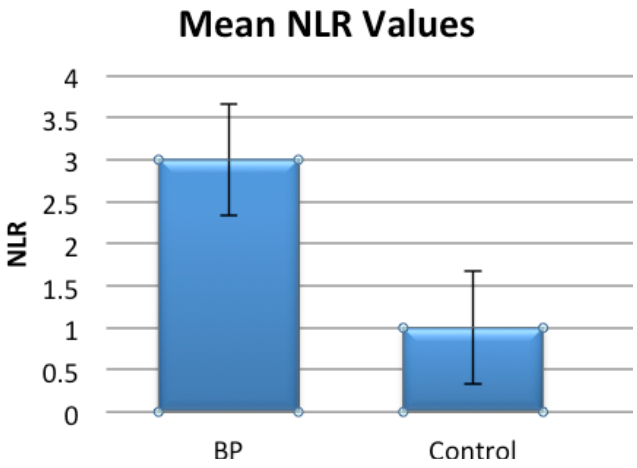

Figure 1. The mean NLR values of the BP group and the control group.

tice, the NLR is thought to be associated with numerous pathological situations including idiopathic sudden sensorineural hearing loss, [11] vestibular neuritis, [12] and BP.[13,14] To date, there have only been a few studies on the association between the NLR and BP. Bucak et al.[13] found that NLR levels were higher in BP patients compared to controls, and reported a positive correlation between the NLR and BP prognosis. Similarly, in a study of 25 patients, Ozler et al.[14] found a positive correlation between the NLR and BP severity, and stated that it should be supported by other studies. Our results are in accordance with these findings. We determined if the NLR could serve as a prognostic marker of outcome in BP and found that NLR levels were higher in patients with BP than in controls. Higher NLR levels were also significantly associated with a better prognosis. There was a positive correlation between the severity of facial paralysis and NLR values. These results are consistent with other studies that have shown a relationship between NLR levels and BP severity.

BP constitutes an important part of otorhinolaryngologists' clinical work. Clinical evaluation of the patient is of great importance to establish the appropriate therapy as soon as possible. In 71% of untreated cases, BP resolves completely without treatment, whereas up to 30% have delayed or incomplete recovery.[1] Patients may be treated at home medically with close follow-up or hospitalization on an as needed basis. The main reasons for hospitalization are comorbidities such as diabetes and hypertension. Length of hospital stay for BP varies from 20 to 30 days. Determination of prognosis in patients with BP may provide preliminary information about treatment options, duration of hospitalization, and possible interventional procedures. Although conventional tests such as predominant previous symptoms and concomitant symptoms are valuable in determining clinical outcomes, the predictive value of these markers is limited.[15] Kasse et al. reported that the absence of accompanying symptoms such as dysgeosia and hypolachrymation is associated with a favorable prognosis.[15] However, other authors have reported conflicting results, showing a favorable prognosis with the presence of dysgeusia and hypolachrimation.[2] The most predominant previous symptoms are facial paresthesia, otalgia, and headache, but these prodromic signs or symptoms have not been clearly established.[15] Electrophysiological tests can be effective for determining the severity of palsy, efficacy of the treatment regime, and length of hospital stay for patients with BP.[16] These tests consist of electromyography (EMG), electroneuronography (ENoG), stapedial muscle reflex, nerve excitability test, and blink reflex. The effectiveness of EMG and ENoG for forecasting the prognosis has been proven.[16] However, most of these tests must be done during a specific time period, and as such, are not applicable for practical use. Moreover, they are expensive. On the other hand, the NLR is a simple, inexpensive, and valuable marker that can be easily calculated from a simple hemogram analyses of a peripheral blood sample.

This study had several limitations including the small sample size and the absence of a cut-off value for the NLR. If the study had been designed with a larger study group, it might have been possible to determine a cut-off value, predicting the prognosis of BP. In addition, because 71% of the patients resolved without treatment, and considering the side effects of steroids we use for treatment, the NLR might be a good predictor for choosing patients who do not need medical treatment. Further studies including a larger patient population and other biomarkers that investigate a cut-off value are necessary.

In conclusion, the NLR was a valuable marker in BP patients in this study. Moreover, this study demonstrated a linear relationship between the NLR and BP severity and prognosis. The NLR is not expensive and is easy to obtain; therefore, it could be a useful diagnostic tool in BP patients. We conclude that while evaluating BP patients, the NLR should be taken into account as a reliable marker to predict patient prognosis.

The English in this document has been checked by at least two professional editors, both native speakers of English. For a certificate, please see:
http://www.textcheck.com/certificate/E40CLO

References

1. Somasundara D, Sullivan F. Management of Bell's palsy. Aust Prescr 2017;40:94-7.
2. Adour KK, Byl FM, Hilsinger RL Jr, Kahn ZM, Sheldon MI. The true nature of Bell's palsy: analysis of 1,000 consecutive patients. Laryngoscope 1978;88:787-801.
3. Greco A, Gallo A, Fusconi M, Marinelli C, Macri GF, de Vincentiis M. Bell's palsy and autoimmunity. Autoimmun Rev 2012;12:323-8.
4. Patel DK, Levin KH. Bell palsy: Clinical examination and management. Cleve Clin J Med 2015;82:419-26.
5. Imtiaz F, Shafique K, Mirza SS, Ayoob Z, Vart P, Rao S. Neutrophil lymphocyte ratio as a measure of systemic inflammation in prevalent chronic diseases in Asian population. Int Arch Med 2012:26;5:2.
6. Azab B, Bhatt VR, Phookan J, et al. Usefulness of the neutrophil-to-lymphocyte ratio in predicting short- and long-term mortality in breast cancer patients. Ann Surg Oncol 2012;19:217-24.
7. Jung MR, Park YK, Jeong O, et al. Elevated preoperative neutrophil to lymphocyte ratio predicts poor survival following resection in late stage gastric cancer. J Surg Oncol 2011;104:504-10.
8. Uthamalingam S, Patvardhan EA, Subramanian S, Ahmed W. Utility of the neutrophil to lymphocyte ratio in predicting long-term outcomes in acute decompensated heart failure. Am J Cardiol 2011;107:433-8.
9. Turkmen K, Guney I, Yerlikaya FH, Tonbul HZ. The relationship between neutrophil-to-lymphocyte ratio and inflammation in end-stage renal disease patients. Ren Fail 2012;34:155-9.
10. Torun S, Tunc BD, Suvak B, et al. Assessment of neutrophil-lymphocyte ratio in ulcerative colitis: a promising marker in predicting disease severity. Clin Res Hepatol Gastroenterol 2012;36:491-7.
11. Seo YJ, Jeong JH, Choi JY, Moon IS. Neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio: novel markers for diagnosis and prognosis in patients with idiopathic sudden sensorineural hearing loss. Dis Markers 2014;2014:702807.
12. Chung JH, Lim J, Jeong JH, Kim KR, Park CW, Lee SH. The significance of neutrophil to lymphocyte ratio and platelet to lymphocyte ratio in vestibular neuritis. Laryngoscope 2015;125:257-61.
13. Bucak A, Ulu S, Oruc S, Yucedag F, Tekin MS, Karakaya F. Neutrophil-to-lymphocyte ratio as a novel-potential marker for predicting prognosis of Bell palsy. Laryngoscope 2014;124: 1678–81.
14. Özler GS, Günak G. Neutrophil-lymphocyte ratio: a new predictive and prognostic factor in patients with Bell palsy. J Craniofac Surg 2014;25:944-5.
15. Kasse CA, Cruz OL, Leonhardt FD, Testa JR, Ferri RG, Viertler EY. The value of prognostic clinical data in Bell's palsy. Braz J Otorhinolaryngol 2005;71:454-8.
16. Ushio M, Kondo K, Takeuchi N, Tojima H, Yamaguchi T, Kaga K. Prediction of the prognosis of Bell's palsy using multivariate analyses. Otol Neurotol 2008;29:69-72.

Please cite this article as: Dizdar D, Avınçsal M. Ö, Dizdar S. K. Investigation of the Prognostic Value of the Neutrophil/Lymphocyte Ratio in Bell Palsy. ENT Updates 2018;8(2): 110–113.