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Original Article

Neutrophil to lymphocyte ratio: An indicator of recurrence in primary spontaneous pneumothorax?

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Kuwait Medical Journal 2021; 53 (4): 417 - 420

ABSTRACT

Objective(s): To address the question whether neutrophil to lymphocyte ratio may be an indicator of recurrence in primary spontaneous pneumothorax
Design: Retrospective study
Setting: Bursa Yüksek Ihtisas Hospital for Education and Research, Bursa, Turkey
Subjects: A total number of 124 primary spontaneous pneumothorax patients treated in our hospital between 5th July, 2002 and 30th April, 2015. Patients with only initial episode were enrolled in Group 1 and patients presented with recurrence were enrolled in Group 2.
Intervention(s): Age, gender, cigarette smoking history, bullae presence, pneumothorax side, length of hospital stay and presence of recurrence were noted. Initial complete blood count results were used for neutrophil to lymphocyte ratio calculation.
Main Outcome Measure(s): All data are analyzed statistically for any significant relationships between the variables and recurrence.
Result(s): Statistical analysis using chi-square test revealed a significant relationship between recurrence and neutrophil to lymphocyte ratio (X^2=62.752, *P*=.000) and cigarette smoking (X^2=8.116, *P*=.004). We did not find any significant relationship between recurrence and presence of bullae or gender.
Conclusion(s): We believe that neutrophil to lymphocyte ratio value higher than 2.48 may be an indicator of recurrence in primary spontaneous pneumothorax patients. Further multicenter studies with larger number of patients, however, are needed to verify this conclusion.

KEY WORDS: lymphocytes, neutrophils, pneumothorax, recurrence

INTRODUCTION

Pneumothorax is defined as the presence of free air between the pleural sheets[1-3]. Primary spontaneous pneumothorax (PSP) constitutes a problem for the physician because of the tendency to recur[3]. Researchers have performed studies in search for the perfect indicator of recurrence without success. Recently, a calculation depending on the physical measurements from the chest x-ray and body mass index named as the Ankara Numune Index has been reported to be of value in predicting recurrence[1,4]. Neutrophil to lymphocyte ratio (NLR) is a recent factor used in determining the severity of various disorders including seriously ill patients in the intensive care units, tuberculosis, chronic obstructive pulmonary disease (COPD), inflammatory diseases, vascular diseases and malignancies[5-16]. Its role in PSP, however, is not yet studied.

The aim of this study is to assess the relationship between NLR and PSP recurrence within a cohort of patients treated in a single institution.

SUBJECTS AND METHODS

Following the permission granted by the Bursa Clinical Study Ethics Committee (Permission date and number: June the 30th 2015, 2015-13/17) and Hospital Management following this permission (document date and number: July the 13rd, 2015/3313), the archive files of Bursa Yüksek Ihtisas Hospital for Education and Research were screened for cases of PSP hospitalized between 2nd July, 2002 and 30th April, 2015. Patients with only an initial episode were

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Table 1: Demographic properties of the two groups of patients

Variable	Group 1		Group 2	
	Average ± SD	Range	Average ± SD	Range
Age (years)	29.23±6.53	19-42	33.04±6.84	20-56
NLR	2.13±0.27	1.58-2.85	3.16±0.81	1.83-5.33
Length of hospital stay (days)	6.01±1.30	4-8	7.52±2.64	4-18
Interval until recurrence(months)	NA	NA	5.60±3.45	1-18
	n	%	n	%
Gender				
Male	51	86.4	55	84.6
Female	8	13.6	10	15.4
Affected site				
Left	23	38.9	24	36.9
Right	36	61.1	41	63.1
Tobacco				
Smoker	31	52.5	50	76.9
Non-smoker	28	47.5	15	23.1
Bullae				
Absent	27	45.7	21	33.8
Present	32	54.3	44	66.2

SD: standard deviation; NLR: neutrophil to lymphocyte ratio; NA: non-applicable.

enrolled in Group 1 and patients who presented with recurrence were enrolled in Group 2. Patients who presented with pneumothorax not leading to tube thoracostomy and due to other causes, *e.g.* trauma or COPD, were excluded. Age, gender, site of pneumothorax, cigarette smoking, presence of bullae, length of hospital stay and presence of recurrence were noted. Neutrophil, lymphocyte and platelet counts from the initial complete blood count results in the emergency room at the time of admittance were recorded as well. NLR was calculated as neutrophil count divided by lymphocyte count as defined earlier[5]. For statistical analysis, MedCalc Statistical Software version 18.6 (MedCalc Software bvba, Ostend, Belgium; http://www.medcalc.org; 2018, licensed to the author) was used. Receiver operator characteristics (ROC) curve analysis and chi-square tests were used for statistical evaluation, with a *P*-value less than 0.05 accepted as significant.

RESULTS

Within the aforementioned period, a total of 124 patients were admitted to the hospital due to either an initial or a recurrent episode of PSP. Group 1 consisted of 59 patients and there were 65 patients in Group 2. There were 51 male (86.4%) and 8 female (13.6%) patients in Group 1 with an average age of 29.23±6.53 years (range: 19-42). In Group 2, there were 55 male (84.6%) and 10 female (15.4%) patients and the average age was 33.04±6.84 years (range: 20-56). The demographic properties of the two groups are listed in Table 1 in detail.

Using the ROC curve analysis, we determined a cut-off value of 2.48 for NLR (sensitivity: 83.1%, specificity: 88.1%, area under curve (AUC): 0.916 and 95% confidence interval). Statistical analysis using chi-square test revealed significant relationship between recurrence and NLR (X^2=62.752, *P*=.000) and cigarette smoking (X^2=8.116, *P*=.004). We did not find any significant relationship between recurrence and presence of bullae or gender. Chi-square analysis results are listed in Table 2.

Table 2: Chi-square analysis of variables

Variable compared with recurrence	X^2 value	*P*-value
NLR	62.752	.000*
Smoking	8.116	.004*
Bullae	2.360	.124
Gender	0.83	.773

NLR: neutrophil to lymphocyte ratio; *statistically significant.

All patients in Group 1 were treated with tube thoracostomy with various caliber tubes changing from 14 FR to 32 FR. In Group 2, the recurrence was on the same side of the first episode in 38 patients (58%), and on the other side in 27 patients (42%). Of these patients, 18 had the second episode and the remaining patients had multiple episodes treated in other institutions. We preferred bullae resection and apical pleural abrasion in 47 (72.3%) of these patients using video assisted thoracic surgery or thoracotomy. The length of hospital stay was 6.01±1.30 days (range 4-8) in Group 1 and 7.52±2.64 days (range 4-18) in Group 2.

DISCUSSION

PSP is a benign disorder recurrent in nature[17]. Various studies suggest anatomical measurements such as Numune index and presence of bullae[1,18]. Others advocate tobacco consumption as the primary

indicator of recurrence[2]. In literature, male gender, slender body shape, cigarette smoking and presence of bullae in thorax computed tomography scan are reported as indicators[1,3,17,18]. Similar to former reports, in our groups, there was a male predominance and cigarette smoking was present in 52.5% in Group 1 and 76.9% in Group 2. In both groups, the average age was in the early 30's. We did not find any statistically significant relation between recurrence and these parameters, except for cigarette smoking (X^2=8.116, *P*=.004).

Presence of bullae at presentation is usually accepted as an indicator of recurrence, although there are some reports suggesting the opposite[4,18]. In our series, bullae were present in 54.2% in Group 1 and 66.2% in Group 2. We did not find any statistically significant relation between bullae presence and recurrence.

The time interval between the first and the second episode is reported as ranging from 2 to 18 months. In our study, the interval was 5.60±3.45 months (range: 1-18 months). This finding also is similar to former reports.

Neutrophil to lymphocyte ratio has become a popular indicator of poorer outcome in various disorders. In studies published recently, NLR is reported to be related to bad prognosis in seriously ill patients in the intensive care units, tuberculosis, COPD, inflammatory diseases, vascular diseases and malignancies[5-16]. Dilektasli *et al* revealed that an NLR greater than 8.19 and 7.92 are independent indicators of in-hospital mortality at days 2 and 5, respectively, in the critically ill trauma patients treated in intensive care units[6]. Gunay *et al* calculated a NLR value of 1.71±0.65 in control, 2.59±1.79 in stable and 4.28±4.12 in exacerbated COPD patients[8]. Iliaz *et al* reported that NLR value of 2.55 was effective in distinguishing between tuberculosis and sarcoidosis[7]. Choi *et al* studied the preoperative NLR levels in lung cancer patients as a predictor of survival in addition to non-steroid anti-inflammatory drug use postoperatively[13]. They reported that preoperative NLR ≥5 is an indicator of shorter overall survival. Takahashi *et al* studied preoperative NLR as an indicator of prognosis in a selected group of lung cancer patients[15]. Using the ROC curve analysis, they determined a cut off value for NLR as 2.498 with 66.7% sensitivity, 58.5% specificity and AUC=0.684. They used this value to discriminate the preoperative NLR as low, *i.e.* less than 2.498, and high. They concluded that low NLR values had a chance of 89.2% overall survival calculated using the Kaplan-Meier method. We calculated the NLR values of each patient from the initial complete blood count results from the emergency department. The average NLR values were 2.13±0.27 (range: 1.58-2.85) in Group 1 and 3.16±0.81 (range: 1.83-5.33) in Group 2. We used ROC analysis to determine the cut-off value in our series as 2.48 with 83.1% sensitivity, 88.1% specificity, AUC=0.916 and 95% confidence interval. The statistical analysis revealed a significant relationship between NLR value and recurrence in PSP patients (X^2=62.752, *P*=.000). This result implies that a NLR value over 2.48 calculated from the complete blood count at the initial episode indicates a recurrence.

CONCLUSION

According to these results, we suggest that NLR may be an indicator of recurrence in PSP. To our knowledge, this is the first study evaluating NLR in relation to recurrence in PSP to be published in literature. The limitations of our study include the limited number of patients in both groups, the presence of various hospitals in the area patients may seek medical assistance from and thus resulting in loss of patients under our clinical surveillance.

We conclude that further multi-center clinical studies including larger number of patients will help to assess the value of NLR as an indicator of recurrence in PSP.

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REFERENCES

1. Akkas Y, Peri NG, Kocer B, Kaplan T, Alhan A. A novel structural risk index for primary spontaneous pneumothorax: Ankara Numune Risk Index. Asian J Surg 2017; 40(4):249-253.
2. Haynes D, Baumann MH. Management of pneumothorax. Semin Respir Crit Care Med 2010; 31(6):769-780.
3. Huang YF, Chiu WC, Chou SH, Su YH, Chen YW, Chai CY, *et al*. Association of MMP-2 and MMP-9 expression with recurrences in primary spontaneous pneumothorax. Kaohsiung J Med Sci 2017; 33(1):17-23.
4. Haynes D, Baumann MH. Pleural controversy: aetiology of pneumothorax. Respirology 2011; 16(4):604-610.
5. Zahorec R. Ratio of neutrophil to lymphocyte counts rapid and simple parameter of systemic inflammation and stress in critically ill. Bratisl Lek Listy 2001; 102(1):5-14.
6. Dilektasli E, Inaba K, Haltmeier T, Wong MD, Clark D, Benjamin ER, *et al*. The prognostic value of neutrophil-to-lymphocyte ratio on mortality in critically ill trauma patients. J Trauma Acute Care Surg 2016; 81(5):882-888.

7. Iliaz S, Iliaz R, Ortakoylu G, Bahadir A, Bagci BA, Caglar E. Value of neutrophil/lymphocyte ratio in the differential diagnosis of sarcoidosis and tuberculosis. Ann Thorac Med 2014; 9(4):232-235.
8. Gunay E, Ulasli SS, Akar O, Ahsen A, Gunay S, Koyuncu T, *et al*. Neutrophil-to-lymphocyte ratio in chronic obstructive pulmonary disease: a retrospective study. Inflammation 2014; 37(2):374-380.
9. Ahsen A, Ulu MS, Yuksel S, Demir K, Uysal M, Erdogan M, *et al*. As a new inflammatory marker for familial Mediterranean fever: neutrophil-to-lymphocyte ratio. Inflammation 2013; 36(6):1357-1362.
10. Korkmaz M, Korkmaz H, Kucuker F, Ayyildiz SN, Cankaya S. Evaluation of the association of sleep apnea-related systemic inflammation with CRP, ESR, and neutrophil-to-lymphocyte ratio. Med Sci Monit 2015; 21:477-481.
11. Tamhane UU, Aneja S, Montgomery D, Rogers EK, Eagle KA, Gurm HS. Association between admission neutrophil to lymphocyte ratio and outcomes in patients with acute coronary syndrome. Am J Cardiol 2008; 102(6):653-657.
12. Yanartas M, Kalkan ME, Arslan A, Tas SG, Koksal C, Bekiroglu N, *et al*. Neutrophil/lymphocyte ratio can predict postoperative mortality in patients with chronic thromboembolic pulmonary hypertension. Ann Thorac Cardiovasc Surg 2015; 21(3):229-235.
13. Choi JE, Villarreal J, Lasala J, Gottumukkala V, Mehran RJ, Rice D, *et al*. Perioperative neutrophil: lymphocyte ratio and postoperative NSAID use as predictors of survival after lung cancer surgery: a retrospective study. Cancer Med 2015; 4(6):825-833.
14. Zhao QT, Yang Y, Xu S, Zhang XP, Wang HE, Zhang H, *et al*. Prognostic role of neutrophil to lymphocyte ratio in lung cancers: a meta-analysis including 7,054 patients. Onco Targets Ther 2015; 8:2731-2738.
15. Takahashi Y, Horio H, Hato T, Harada M, Matsutani N, Morita S, *et al*. Prognostic significance of preoperative neutrophil-lymphocyte ratios in patients with Stage I non-small cell lung cancer after complete resection. Ann Surg Oncol 2015; 22 Suppl 3:S1324-S1331.
16. Takahashi Y, Kawamura M, Hato T, Harada M, Matsutani N, Horio H. Neutrophil-lymphocyte ratio as a prognostic marker for lung adenocarcinoma after complete resection. World J Surg 2016; 40(2):365-372.
17. Kepka S, Dalphin JC, Parmentier AL, Pretalli JB, Gantelet M, Bernard N, *et al*. Primary spontaneous pneumothorax admitted in emergency unit: Does first episode differ from recurrence? A cross-sectional study. Can Respir J 2017; 2017:2729548.
18. Casali C, Stefani A, Ligabue G, Natali P, Aramini B, Torricelli P, *et al*. Role of blebs and bullae detected by high-resolution computed tomography and recurrent spontaneous pneumothorax. Ann Thorac Surg 2013; 95(1):249-255.