The Effect Of Neutrophil/Lymphocyte Ratio To The Prognosis And The Duration Of Hospitalization In Adult Patients Diagnosed With Ileus In The Emergency Room

Acil Serviste İleus Tanısı Almış Hastalarda Nötrofil/Lenfosit Oranının Prognoz ve Hastane Kalış Süreleri Üzerine Etkisi

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ÖZ

Amaç

Ileus akut karın ağrısı ile kendini gösterir ve bir hastaneye yatış ve operasyon nedeni olduğu için oldukça önemli bir hastalıktır. Bu çalışmanın amacı, ileus ile acil servise başvuran hastalarda Nötrofil / Lenfosit oranı (NLR) ile hastanede kalış süresi ve hastalığın prognozu arasındaki ilişkiyi incelemektir.

Gereç ve Yöntem

1 Ocak 2013 - 31 Aralık 2015 tarihleri arasında Sağlık Bilimleri Üniversitesi Ümraniye Eğitim ve Araştırma Hastanesi Acil servisine karın ağrısı şikayeti ile başvurup ileus tanısı alarak Genel cerrahi servisine yatırılan hastaların dosyaları retrospektif olarak taranarak, ileus tanısı alan hastalarda NLO ile hastanede kalış süresi ve mortalite arasındaki ilişkisinin varlığı araştırıldı.

Bulgular

Çalışmaya toplam 251 hasta dahil edildi. Bunların 143'ünün (%57) erkek, 108'inin (%43) kadın olduğu tespit edildi. Nötrofil lenfosit oranı ve mortalite arasındaki ilişkiye bakıldı. Ölen hastaların N/L oranı 11.65 (18.83-3.29), yaşayan hastaların N/L oranı 5.21 (8.38-3.30) olarak tespit edildi. N/L oranı ile mortalite arasında istatiksel olarak anlamlı fark bulunmakla birlikte (p=0.03, Man-Whitney U testi), N/L oranı ile yatış süresi arasında anlamlı bir fark bulunamamıştır (p=0.818, Man-Whitney U testi).

Sonuç

NLO pratikte kullanılabilcek ucuz, kolay ulaşılabilir bir yöntemdir. Çalışmamızda elde ettiğimiz verilere göre N/L oranının ileus tanılı hastaların prognozunu tahmin etmek için kullanılması anlamlı olabilir. Araştırmalarımıza göre literatürde N/L oranı ve ileus ile ilgili bu çalışma haricinde bir çalışma yoktur. Bu sebeple daha güçlü kanıtlar için farklı merkezlerde geniş hasta grupları ile yapılacak prospektif çalışmaların yapılması bu konuda yol gösterici olabilir.

Anahtar kelimeler: NLO; ileus; nötrofil lenfosit oranı

ABSTRACT

Aim

Ileus presents itself with acute abdominal pain and is important for being a reason for hospitalization and an indication of surgery. The purpose of this study is to analyze the relationship between Neutrophil/Lymphocyte ratio (NLR) and the time of hospitalization and the prognosis of the diseasein patients who admitted to emergency department with ileus.

Material and Methods

This was a retrospective study of abdominal pain patients who diagnosed with ileus and hospitalized to the General Surgery Department between January 1, 2013 and December 31, 2015 in the University of Health Sciences Ümraniye Training and Research Hospital's Emergency Service. The relationship between NLR and the duration of hospitalization and the rate of mortality was studied in the patients who are diagnosed with ileus.

Results

A total of 251 patients were included in this study. 143 (57%) of those patients were male and 108 (43%) were female. The median (min-max) NLR of the patients who died was found 11.65 (18.83-3.29), and of the patients who lived was found 5.21 (8.38-3.30). Relationship between NLR and mortality was found statistically significant (Mann-Whitney U Test, p=0.03) but no significant difference was found between NLR and hospital length of stay (p = 0.818, Man-Whitney U test).

Conclusion

NLR is a cheap and widely accessible laboratory test. Our study was shown that it can be used for predicting mortality in patients with ileus. To our knowledge, no other study have been conducted to evaluate relationship between the NLR and prognosis of ileus. In addition to this, more prospective randomised studies in larger populations are needed for getting stronger evidence.

Keywords: NLR; ileus; neutrophil-lymphocyte ratio

Introduction

Abdominal pain constitutes a rate of 4-8% of all admissions to the emergency medicine department. Is is one of the most frequent reason for emergency department admissions and is the most common symptom for ileus (1). Blood tests are frequently required for differential diagnosis of ileus. Complete blood count (CBC) among these tests is an important guide. It is cheap and fast. In addition to this, with the recent studies, it is understood that the neutrophile lymphocyte ratio (NLR) is a practical and non-invasive indicator of prognosis and hospitalization duration which can easily be tested out of the peripheral blood sample (2). And so, because of the physiological response to stress (increase in neutrophile and decrease in lymphocyte numbers), NLRis started to be used as an indicator of prognosis (3,4).

In the literature, NLR has not been examined as an indicator of prognosis and hospitalization duration in surgical operations such as ileus and that situation attracted our attention. The objective of our study was, to determine the relationship between the initial NLR values of the patients with ileus and prognosis and the hospitalization duration of these patients.

Material and Method

This study was conducted in University of Health Sciences Umraniye Training and Research Hospital's Emergency Service (ES) between the dates of January 1, 2013 and December 31, 2015. The patients who administered with abdominal pain and hospitalized with ileus diagnosis to the General Surgery Department were scanned retrospectively. The study was conducted in accordance with the principles of the Declaration of Helsinki.The patients whose files have missing information, blood tests don't include CBC and who were recieving chemotherapy were excluded. The leukocyte and neutrophil numbers, hemoglobin values, the method of diagnosis, the hospitalization duration, clinical outcome and demographics of the patients who were diagnosed with ileus was recorded via using Microsoft Excel 2010 program to study. SPSS for Windows 16.0 program was used for the analysis of these data.

The concordance of the relative variables to the normal distribution was evaluated via the Kolmogorov-Smirnov (K-S) test.The data which was suitable to normal distribution were expressed as mean and standart deviation, which was not suitable were expressed as median and minimum-maximum values. Data were analyzed by using frequencies and X2 tests to investigate the association between dichotomous and categorical variables and student's t test for continuous variables. For the statistics of non-parametrical data Chi-Square and Mann Whitney U tests are deployed.

Results

A total of 251 patients were included in our study. 143 (57%) of them, were male, 108 (43%) were female. The mean age of the patients was 58.85 ± 18.82 years (% 95 CI: 43.8-48.6) with a minimum age of 18 years and a maximum age of 95 years. When we evaluated the operation status of all patients, we determined that 83 patients (33.1%) were operated and 168 (66.9%) were not operated.

Examining the mortality rates of the patients according to their gender, 103 of 108 female patients (95%) were surviving. Of the male patients, 133 (93%) were survived while 10 (7%) were detected to be deceased. In addition to this, the relationship between the operation status and mortality was also examined in our study (Table 1).

		Deceased n(%)	Surviving n(%)	Total n(%)
Gender	Female	5 (4.6%)	103 (95.4%)	108 (100%)
	Male	10 (7.0%)	133 (93.0%)	143 (100%)
	Total patients	15 (6%)	236 (94%)	251 (100%)
Operation status	Non-operated patients	3 (1.8%)	165 (98.2%)	168 (100%)
	Operated patients	12 (14.5%)	71 (85.5%)	83 (100%)
	Total patients	15 (6%)	236 (94%)	251 (100%)

Table 1. The relationship of gender and operation status with mortality.

When the imaging method which determined the diagnosis of ileus after admission to emergency service was taken into consideration, 14 (57.8%) patients were diagnosed with erect abdominal radiograph, 14 (5.6%) patients with computed tomography and 92 (36.7%) patients with both erect abdominal radiograph andcomputed tomography.

The median age of the deceased patients was 77 (71-87) years while that of the surviving patients was 59 (44.25-74) years. Deceased patients were detected to be older in a statistically significant manner compared to the surviving patients (p = 0.002, Mann-Whitney U test)

According to our analysis, the median hemoglobin value of the deceased patients was 13 (11.06-17.70) g/dL while of the surviving patients was found to be 13.4 (11.69-14.66) g/dL. No statistically significant difference was detected between the mortality and hemoglobin value (p = 0.364, Mann-Whitney U test).

Considering the relationship between white blood cell count and mortality, the median white blood cell (WBC) count of the deceased patients was 13 (9.07-15.90) thousand / mcL while that of the surviving patients was found to be 10.90 (8.74-13.77) thousand / mcL. There was

no statistically significant difference between the value of WBC and mortality (p = 0.201, Mann-Whitney U test)

The median value of the neutrophil count was 11.3 (16.7-6.81) thousand / mcL in the deceased patients while that of the surviving patients was detected to be 8.1 (11.2-6.18) thousand / mcL. No statistically significant difference was found between the neutrophil count and mortality (p = 0.05, Mann-Whitney U test)

Examining the relationship between the length of hospital stay and mortality, the median length of hospital stay of the deceased patients was 336 (672-72) hour and that of the surviving patients was determined to be 96 (192-72) hours. There was a statistically significant difference between the length of hospital stay and mortality and the deceased group was noted to have longer length of hospital stay (p = 0.016, Mann-Whitney U test)

Considering the relationship between neutrophil lymphocyte ratio and mortality, the N/L ratio of the deceased patients was 11.65 (18.83-3.29) and N/L ratio of the surviving patients was determined to be 5.21 (8.38-3.30). A statistical significant difference was found between the N/L ratio and mortality rate (p = 0.03, Mann-Whitney U test). The N/L ratio of the deceased patient group was found to be significantly higher but no significant difference was found between NLR and hospital length of stay (p = 0.818, Man-Whitney U test).

According to the results of univariate analysis, multiregression analysis model including the parameters of age, length of hospital stay and N/L ratio, which affect the mortality of the patients, was designed. According to the Omnibus and Hosmer-Lemeshow tests, the model was found to be fit.

When the results of multiregression analysis were considered, elder age and higher rate of N/L were found to increase mortality significantly (p values; p = 0.014 and p = 0.045, respectively, Hosmer Lemeshow test) (Table 2).

	Wald	p value	OR*	95%	confidence interval for p value
Age	6.021	0.014	0.954	0.919	0.991
Length of hospital stay (hour)	0.053	0.818	1.000	1.000	1.000
Neutrophil/lymphocyte ratio	4.016	0.045	0.947	0.899	0.999
Constant	20.574	0.000	561.085		

* OR = Odds ratio

Table 2. Multivariate regression analysis of the parameters affecting mortality

The ROC curve was plotted for the N / L ratio which was determined to have significant relationship with mortality in the multiregression analysis. Accordingly, the area under the curve was determined as 0.665 and the N/L ratio was found to have a weak test reliability in predicting mortality. Despite this, considering that hemogram is studied in almost all of this kind of patient groups routinely and it has low cost, its cut-off values with low sensitivity yet high specificity can be used for predicting the mortality. (Table 3)

N/L ratio cut-off value	Sensitivity (%)	Specificity (%)
10.49	53.3	85.2
12.5	40	90.3
17.9	26.7	95

Table 3. Sensitivity and specificity ratios at different cut-off values of N / L ratio

Discussion

Abdominal pain has a significant percentage among the causes of emergency admissions (4-8%). There are numerous studies examining the demographic characteristics such as age, gender, chronic disease, mortality in patients with ileus, one of the causes of acute abdomen (5).

Although there is no significant difference among the female-male ratio of our study and those of the similar studies including the patients with ileus, the higher male ratio with the diagnosis of ileus was remarkable when compared to female ratio. This high percentage showed correlation with other studies in the literature. However, in our study, no statistically significant difference was detected between mortality and gender.

It is important to diagnose obstruction and strangulation in ileus and to make the decision of surgery. In a study examining the patients with the diagnosis of brid ileus, 244 of 322 patients received only medical therapy, 78 underwent surgery and those 224 patients who received medical treatment required no additional treatment afterwards (6). Considering the operation status of all patients in our study, a significant majority like 66.9% were non-operated and were discharged by taking medical treatment.

Although abdominal radiography is an inexpensive and easily accessible method of diagnosis, computed tomography (CT) is superior in determining the level and cause of obstruction. CT is a very useful diagnostic tool in the evaluation of patients with acute abdomen and provides valuable information especially in appendicitis, diverticulitis, intestinal ischemia, pancreatitis, intestinal obstruction and organ perforations(7). The sensitivity and specificity of CT have been reported to be 93% and 100%, respectively (8).

The median age of the patients who died was 77 (71-87) and the median age of the survivors was 59 (44.25-74). The mortality rate of elderly patients was higher than younger patients (p = 0.002). In a similar study by Düzköylü et al., The mean age of the patients was found to be 64.59 (30-93) (9). In the study performed by Savcı et al., it was emphasized that postoperative complications were more severe, hospital length of stay was longer and mortality rates were higher (10). Therefore, the results of our study are consistent with other data in the literature.

Hemogram almost always stands as an important component of the diagnosis in the patients with abdominal pain. Even though the number of leukocytes generally increases in the patients with acute abdomen, it is not a specific indicator and can be elevated in many other inflammatory situations included in the differential diagnosis (11). In our study, no significant difference was detected between white blood cell count and mortality. Similarly, no significant difference was detected between the hemoglobin value and mortality.

While other studies on increased neutrophil counts shown that the number of leukocytes and neutrophils increased in correlation with the ischemic state (12), no statistically significant difference was found between neutrophil count and mortality in our study.

The NLR is considered as a parameter showing the all negative effects both high neutrophil count showing the acute inflammatory response and low lymphocyte count reflecting the bad status of overall health and physiological stress (13,14).

In many studies conducted recently, neutrophil lymphocyte ratio was found to be useful in determining the degree of systemic inflammatory response (15). When the leukocytes are exposed to stress, a physiological response occurs as an increase in the number of neutrophils and a reduction in lymphocyte count. Again, NLR was found to correlate with the severity of attack, acidosis status and respiratory functions in chronic obstructive pulmonary disease. It was found appropriate for using as a prognostic factor in many diseases (16,17).

Considering the relationship between neutrophil lymphocyte ratio and mortality, the N/L ratio of the deceased patient group was found to be significantly higher in our study. As a result of this data, our study yielded consistent results with the literature.

Since the hemogram test which is studied in almost all diseases, is inexpensive and easily accessible and since it was understood that it had prognostic value in many diseases, this ratio has been investigated in many diseases recently and the results indicating that it did not have any prognostic value for some disease were encountered as well.

Examining the relationship between the length of hospital stay and mortality in our study, a statistically significant difference was found between the length of hospital stay and mortality and it was noteworthy that the deceased patient group had longer hospital stay.

Conclusion

The result that using NLR, which has prognostic value for many disease, could be appropriate for the patients with the diagnosis of ileus. Since hemogram is studied in almost all patients admitting to the emergency service with the complaint of abdominal pain and no additional budget is required for NLR, it is an inexpensive, easily accessible, practical method that can be used in practice.

We suggest that our study is valuable since we have not encountered any other publications investigating the relationship between NLR and ileus in the literature. However, for more powerful evidence on this topic, it would be appropriate to examine larger groups of patients in different centers.

Limitations

It is a retrospective study, all informations obtained from the patient files so we have missing informations about patients chronic diseases and chronic medications .

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