ISSN: 2651-4311

VOLUME CİLT: 2 ISSUE SAYI: 4 YEAR YIL: 2019

ANATOLIAN

JOURNAL OF EMERGENCY MEDICINE

ANADOLU ACİL TIP DERGİSİ

@AnatolianJEM

TATD Emergency Medicine Association of Turkey

TÜRKİYE ACİL TIP DERNEĞİ

Issued by The Emergency Medicine Association Of Turkey

anatolianjem.com

Technical Review Board

Danışma Kurulu/Advisory Board

İÇİNDEKİLER/CONTENTS

ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

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

Selma Atay İslam[1], Serkan Emre Eroğlu[2], Gökhan İşat[2], Gökhan Aksel[2], Mehmet Muzaffer İslam[2]

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

Received: July 21, 2019 Accepted: November 10, 2019

1 University of Health Sciences, Sancaktepe Training and Research Hospital, Department of Emergency Medicine, Istanbul, Turkey.

2 University of Health Sciences, Umraniye Training and Research Hospital, Department of Emergency Medicine, Istanbul, Turkey.

Corresponding Author: Selma Atay Islam, MD **Address:** University of Health Sciences, Sancaktepe Training and Research Hospital, Department of Emergency Medicine, Istanbul, Turkey. **Phone:** +90 50574646381**e-mail:** drselmaatay@hotmail.com

Atıf için/Cited as: Islam SA, Eroglu SE, Isat G, Aksel G, Islam MM. The Effect Of Neutrophil/Lymphocyte Ratio To The Prognosis And The Duration Of Hospitalization In Adult Patients Diagnosed With Ileus In The Emergency Room. Anatolian J Emerg Med 2019;2(4); 1-5.

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 .

Conflict of Interest: The authors declare no any conflict of interest regarding this study.

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

Authors' Contribution: All authors were equally involved in the preparation of this article.

References

1. Sperry J, Cohen MJ. Acute obstruction. Surg Clin North Am. 2014 Feb;94(1):77-96. doi: 10.1016/j.suc.2013.10.001. Epub 2013 Oct 30.
2. Durmus E, Kivrak T, Gerin F, Sunbul M, Sari I, Erdogan O. Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio are Predictors of Heart Failure. Arq Bras Cardiol. 2015 Dec;105(6):606-13. doi: 10.5935/abc.20150126. Epub 2015 Nov 3.
3. Aydın İ, Ağıllı M, Aydın FN, Kurt YG, Çaycı T, Taş A ve ark. Farklı yaş gruplarında nötrofil/lenfosit oranı referans aralıkları. Gülhane Tıp Derg 2015;57: 414-418.
4. Tezcaner T, Birben B, Ekici Y, Karakayalı FY, Akdur A, Tepelioğlu M ve ark. İnce barsak obstrüksiyonuna yol açan nadir nedenler ve cerrahi tedavi sonuçları. Source: Ortadogu Medical Journal . Dec2017, Vol. 9 Issue 4, p155-162. 8p.
5. Taydaş O, Ünal E, Onur MR, Akpınar E. Role of Computed Tomography in Intestinal Obstruction. İstanbul Med J 2018; 19: 105-12.
6. Çolak B, Çakır M, Tekin A, Küçükkartallar T, Bal A, Taşçı Hİ. Bride İleusda Cerrahi Tedavi Yeterli Mi? Turk J Colorectal Dis . 2013; 23(4): 192-196
7. Kwon HC, Kim SH, Oh SY, et al. Clinical significance of preoperative neutrophil-lymphocyte versus platelet-lymphocyte ratio in patients with operable colorectal cancer. Biomarkers. 2012;17(3):216–222.
8. Torreggiani WC, Harris AC, Lyburn ID, et al. Computed tomography of acute small bowel obstruction: pictorial essay. Can Assoc Radiol J 2003; 54: 93-9.
9. Düzköylü Y, Bektaş Sarı HY, Koç O, Bilsel Y, Kaygusuz A. Frequency of colorectal cancer cases that were diagnosed in emergency operations caused by ileus. Turk J Colorectal Dis . 2013; 23(3): 129-134
10. Savcı A, Narcı A, Şen TA , Uygun İ, Özkaraca E. The Impact of Traditional Methods on The Diagnosis of Abdominal Pain. The Medical Journal of Kocatepe 2008; 9:5-10.
11. Sunbul M, Gerin F, Durmus E, Kivrak T, Sari I, Tigen K, et al. Neutrophil to lymphocyte and platelet to lymphocyte ratio in patients with dipper versus non-dipper hypertension. Clin Exp Hypertens. 2014;36(4):217-21. doi: 10.3109/10641963.2013.804547. Epub 2013 Jun 20.
12. Tanrıkulu Y, Tanrıkulu CŞ, Sabuncuoğlu MZ, Temiz A, Köktürk F, Yalçın B. Diagnostic utility of the neutrophil-lymphocyte ratio in patients with acute mesenteric ischemia: A retrospective cohort study. Ulus Travma Acil Cerrahi Derg, July 2016, Vol. 22, No. 4.
13. Aral H. Sistemik Yangısal Yanıt Sendromu veya Sepsis Tanı ve İzleminde Laboratuvar. Eur J Basic Med Sci 2015;5(1): 10-20.
14. Yurtdaş M, Yaylali YT, Aladağ N, Özdemir M, Ceylan Y, Gençaslan M, et al. Heart rate recovery after exercise and its relation with neutrophil-to-lymphocyte ratio in patients with cardiac syndrome X. Coron Artery Dis. 2014 Sep;25(6):485-92.
15. Kokacya MH, Copoglu US, Kivrak Y, Ari M, Sahpolat M, Ulutas KT. Increased mean platelet volume in patients with panic disorder. Neuropsychiatr Dis Treat. 2015 Oct 13;11:2629-33. doi: 10.2147/NDT.S94147. eCollection 2015.
16. Yurtdaş M, Özdemir M, Aladağ N. Investigation of Neutrophil-to-Lymphocyte Ratio, Platelet-to-Lymphocyte Ratio and Mean Platelet Volume in Patients with Compensated Heart Failure. Journal of Academic Research in Medicine 8.2 (2018): 67-72.
17. Göğçegöz Gül I, Eryılmaz G, Ozten E, Hızlı Sayar G. Decreased mean platelet volume in panic disorder. Neuropsychiatr Dis Treat. 2014 Sep 4;10:1665-9. doi: 10.2147/NDT.S69922. eCollection 2014.

ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Evaluation of Basic and Advanced Cardiac Life Support Skills of 6th-Year Medical Students During Emergency Medicine Clerkship

Acil Servis Stajı Sırasında İntörn Doktorların Temel ve İleri Yaşam Desteği Becerilerinin Değerlendirilmesi

Enver Özçete[1], İlhan Uz[1], Funda Karbek Akarca[1]

ÖZ

Amaç

Tıp fakültesi eğitiminde öğrencilerin CPR eğitimi sırasında, kardiyak arresti etkili bir şekilde tedavi etmeye hazırlamak için CPR öğrenme deneyimini optimize etmek önemlidir. Çalışmamızın amacı intörn doktorlarda CPR eğitimimizin etkinliğini değerlendirmek ve kalitesini arttırmaktır.

Gereç ve Yöntem

Prospektif olarak 2017 - 2018 tarihleri arasında Acil Servis Stajında CPR eğitimi alan, Pre-Post testi cevaplayan intörn doktorların test skorları karşılaştırıldı. İntörn doktorlara Acil stajına başladıkları ilk gün bilgilendirme toplantısı sırasında önceden hazırlanmış sorularla pre-test ve eğitim sonrası aynı sorularla post-test yapılarak, eğitim kalitesi ve CPR bilgi düzeyleri ve değişimi değerlendirildi.

Bulgular

Çalışma süresince 185 intörn pre-test, 128 intörn post-test ile değerlendirildi. 57 intörn doktor derse katılmadıkları ya da post testi cevaplamadıkları için değerlendirilmeye alınmadı. Eğitim sonrası başarı oranı temel-ileri yaşam desteği, taşikardi-bradikardi ve toplam değerlendirmede belirgin olarak arttı. Bu bölümler içinde en fazla başarı değişimi ileri yaşam desteği sorularında en az başarı değişimi taşikardi-bradikardi sorularında idi.

Sonuç

İntörn doktorlarda temel ve ileri yaşam desteği konusunda 3 saat didaktik ve 1 saat simüle senaryo manken eşliğinde eğitimimiz etkindir.

Anahtar kelimeler: Temel yaşam desteği; ileri yaşam desteği; acil servis

ABSTRACT

Aim

It is important to optimize CPR training so that medical students become capable of treating cardiac arrest effectively. The aim of this study was to evaluate the effectiveness of our CPR training program and to improve the quality of CPR training among 6th-year medical students.

Material and Methods

In this study, the pre-and post-test scores of 6th-year medical students who received CPR training during emergency medicine clerkship between the years 2017 and 2018 were compared prospectively. The students completed the pre-test during the information meeting held on the first day of the clerkship. At the end of the training course, the students took the post-test which was identical to the pre-test. The pre-test and post-test results were compared to evaluate the improvement in the CPR skills of the students and the quality of the CPR training

Results

During the study, 185 participants took the pre-test and 128 participants took the post-test. Fifty-seven participants who failed to attend the course or the post-test were excluded. After the course, the success rates increased significantly in the Basic Life Support (BLS), Advanced Cardiac Life Support (ACLS), and arrhythmia management sections and in the overall evaluation. Among these, the most significant increase in success was in the ACLS section and the least significant increase was in the arrhythmia management section.

Conclusion

The BLS-ACLS course we provided to 6th-year medical students, which consisted of 3-hours of didactic training and 1-hour of scenario-based simulation training, was shown to be effective.

Keywords: Basic life support; advanced cardiac life support; emergency medicine department

Received: September 23, 2019 Accepted: November 10, 2019

1 Emergency Medicine Department, Ege University School of Medicine, Izmir, Turkey

Corresponding Author: Enver Ozcete MD **Address:** Emergency Medicine Department, Ege University School of Medicine, Izmir, Turkey. **Phone:** +90 5055943936 **e-mail:** eozcete@gmail.com

Atıf için/Cited as: *Ozcete E, Uz I, Akarca FK.* Evaluation of Basic and Advanced Cardiac Life Support Skills of 6th-Year Medical Students During Emergency Medicine Clerkship. Anatolian J Emerg Med 2019;2(4); 6-10.

Introduction

Sudden cardiac arrest is one of the leading causes of death (1). Cardiopulmonary resuscitation (CPR) is a life-saving procedure in cardiac arrest (2). Studies conducted have documented that the life support skills of medical students are inadequate (3-12). To date, numerous studies have shown that improved CPR quality increases survival rates in cardiac arrest patients (13-15). Although the European Resuscitation Council (ERC) and the American Heart Association (AHA) publish CPR guidelines and update these guidelines on a regular basis, even qualified hospital personnel do not fully adhere to advanced cardiovascular life support (ACLS) protocols (16). This drawback may result in a failure to achieve the return of spontaneous circulation in patients with cardiac arrest (17). It is important to optimize CPR training so that medical students become capable of treating cardiac arrest effectively (18). The findings of our study will help improve the quality of CPR training in 6th-year medical students. The aim of this study was to evaluate the effectiveness of our CPR training program and to improve the quality of CPR training among 6th-year medical students.

Material and Methods

At our faculty of medicine, medical students attend the emergency medicine clerkship only on the 6th year (undergraduate). The duration of the emergency medicine clerkship is one month. The students receive theoretical and practical training during the clerkship. Both the theoretical and practical training are provided by instructors with at least 5 years of experience. Theoretical training consists of lectures on Basic life support (BLS), defibrillator use, arrhythmia management, and Advanced Cardiac Life Support (ACLS). The lectures are prepared according to the current guidelines (AHA, ERC). Practical training consists of BLS-ACLS scenarios performed on manikins. The theoretical and practical training are given on the same day.

In this study received 6th-year medical students who CPR training during emergency medicine clerkship between the years 2017 and 2018. It is be the pre-and post-test scores were compared prospectively. The test consisted of multiple choice, true-false, and matching questions on BLS, ACLS, and arrhythmia management. For multiple-choice questions, each correct answer was scored 1 point. For true-false and matching questions, each correct answer was scored +1 point and each incorrect answer was scored -1 point. If the number of incorrect answers exceeded that of the correct answers, the total score was calculated as zero points.

Participants who did not receive CPR training during the emergency medicine clerkship, participants other than 6th-year medical students, and those who were late to the CPR training course were excluded from the study.

The students completed the pre-test during the information meeting held on the first day of the clerkship. At the end of the training course, the students took the post-test which was identical to the pre-test. The pre-test and post-test results were compared to evaluate the improvement in the CPR skills of the students and the quality of the CPR training.

The test consisted of a total of 15 questions. The first section consisted of 5 questions on BLS and was worth a total of 11 points. The second section (questions 6-13) dealt with ACLS and was worth a total of 40 points. The third section (questions 14-15) was on arrhythmia management and was worth a total of 21 points. Thus, the overall score ranged between 0-72 points. Participants who scored over 6 points in the BLS section, over 20 points in the ACLS section, and over 11 points in the arrhythmia management section were deemed successful. In total, success was defined as an overall score of 36 and above.

All statistical analyses were performed using the SPSS statistical software (SPSS for Windows, version 18.0; SPSS, Inc., Chicago, IL, USA). Descriptive statistics (mean, minimum, maximum), standard deviation, and frequency tables were used to analyze the data. Continuous variables were expressed as mean±standard deviation and percentages. Chi-square analysis was used to compare the two groups and the Student's t-test was used to determine the significance between the mean values.

Results

During the study, 185 participants took the pre-test and 128 participants took the post-test. The test results were compared in two separate groups (pretest and posttest group).

Participants who received 6 points in the BLS Section, 20 points in the ACLS section and 11 points in the Arrhythmia Management section were considered successful. In total, success was defined as an overall score of 36 and above.

The post-test group were successful 96.1% in the BLS section, 95.3% in the ACLS section, and 18% in the Arrhythmia Management section. The overall success rate in the Post test group was 83.6%. (Table 1)

After the course, the success rates increased significantly in the BLS, ACLS, and arrhythmia management sections and in the overall evaluation. Among these, the most significant increase in success was in the ACLS section and the least significant increase was in the arrhythmia management section. (Table 2)

Discussion

Health care workers are expected to follow current BLS/ACLS guidelines when resuscitating unresponsive patients or patients with cardiac arrest. The main goal of

Groups	Pre-test (N:185)	Post-test (N:128)	Odds Ratio	95% Confidence Interval	P-value
BLS (Basic Life Support)					
Successful	74 (40%)	123 (96.1%)	36.9	14.3 - 94.5	0.000
Unsuccessful	111 (60%)	5 (3.9%)			
ACLS (Advanced Cardiac Life Support)					
Successful	12 (6.5%)	122 (95.3%)	293.1	107 - 802.4	0.000
Unsuccessful	173 (93.5%)	6 (4.7%)			
Arrhythmia management					
Successful	6 (3.2%)	23 (18%)	6.5	2.5 ± 16.5	0.000
Unsuccessful	179 (96.8%)	105 (82%)			
Total					
Successful	3 (1.6%)	107(83.6%)	309.1	90 - 1060	0.000
Unsuccessful	182 (98.4%)	21 (16.4%)			

Table 1. Comparison of pre-test and post-test success

medical training in emergency medicine is to provide medical students with the necessary knowledge and skills to ensure high-quality cardiopulmonary resuscitation (CPR)(19).

In case the required skills are sustained with frequent training, CPR is simple and effective (20).

There are studies which have concluded that residents and medical students are not equipped with the necessary skills and experience to initiate and perform CPR. For instance, Lighthall et al. have found that residents often lack the necessary skills in initiating CPR and identifying arrhythmias (21). In a study by Promes et al. where residents from different specialties were evaluated, it was found that 64% of the residents had never performed BLS and that 36% of them had never performed CPR (22). Likewise, Wu et al. reported that by the end of the third year, 72% of medical students had never performed CPR and that this rate declined to 68% after the fourth year (23). Similarly, at our institution, medical students do not undergo CPR training until the sixth year. Therefore, an effective training method is of utmost importance to ensure that medical students graduate with the necessary skills to perform CPR.

In recent years, studies have aimed to discover a training method which will equip healthcare providers with the necessary knowledge and skills to perform ACLS without leading to any unfavorable clinical outcomes. Traditional (didactic) medical training (TMT) is an effective training method. On the other hand, simulation-based medical training (SBMT) is gaining popularity, as it provides a safe and supportive educational environment through advances in technology so that students can improve their performance without causing negative clinical outcomes (24-26).

Studies on ACLS training have shown that SBMT is a more effective method than TMT. In these studies, simulation-based ACLS training was provided not only to medical students, but also to residents, nurses, respiratory therapists, and dentistry students (25,26). In contrast to these studies, Kim et al. stated that TMT is a more effective method than SBMT for giving ACLS training to medical students (24). On the other hand, in a study conducted in Korea in 2012, no significant differences were found between SBMT and TMT groups after one month of ACLS training (27).

In our study, the participants received 3 hours of didactic traditional lecture (PowerPoint presentation) followed by one hour of practical training on a manikin. When the training we provided to 6th-year medical students was evaluated according to pre-test and post-test results, success rates were over 90% (96.1% and 95.3% for BLS and ACLS, respectively). We believe that our BLS-ACLS course is effective and adequate in terms of early outcomes. On the other hand, the success rate in arrhythmia management did not improve as much as expected (from 3.2% to 18%). The complicated nature of arrhythmia management may have influenced the success rates. In addition, it may be inferred that medical students should receive more effective training in arrhythmia management before their sixth year of education. We think that the arrhythmia management section of our training course should be revised in order to increase the success rate.

Limitations

The success rates of participants were evaluated according to the pre-test and post-test scores only. Due to the limited duration of training, the practical skills of participants could not be evaluated. Evaluating practical skills on a simulated model will help determine whether the increase in the success rates is related to the improvement

Groups	N	Mean	Std. Deviation	p-value
Basic Life Support				
Pre-test score	185	5.02	1.89	0.000
Post test score	128	8.99	1.62	
Advanced Cardiac Life Support				
Pre-test score	185	10.33	5.52	0.000
Post-test score	128	28.66	5.54	
Arrhythmia management				
Pre-test score	185	2.73	3.15	0.000
Post-test score	128	6.75	4.62	
Total				
Pre-test score	185	18.02	7.07	0.000
Post-test score	128	44.40	9.07	

Table 2. Comparison of mean pre-test and post-test scores

in skills. In our study, the long-term outcomes of training were not evaluated.

Conclusion

The BLS-ACLS course we provided to 6th-year medical students, which consisted of 3-hours of didactic training and 1-hour of scenario-based simulation training, was shown to be effective.

Conflict of interest

All authors have no conflict of interest to disclose.

Financial Disclosure

The authors declared that this study has received no financial support.

Authors' Contribution

All authors were equally involved in the preparation of this article.

References

1. Johnson NJ, Salhi RA, Abella BS, et al. Emergency department factors associated with survival after sudden cardiac arrest. Resuscitation 2013;84:292–7.

2. Ali B, Zafari AM. Narrative review: cardiopulmonary resuscitation and emergency cardiovascular care: review of the current guidelines. Ann Intern Med 2007;147:171–9.

3. Casey W. Cardiopulmonary resuscitation: a survey of standards among junior hospital doctors. J R Soc Med 1984;77:921–4.

4. Skinner D, Camm A, MilesW. Cardiopulmonary resuscitation skills of preregistration house officers. Br Med J (Clin Res Ed) 1985;290: 1549–50.

5. Smith GB, Hill SL. Resuscitation training for medical students in the UK—a comparison with the US. Intensive Care Med 1987;13: 260–5.

6. Morris F, Tordoff S, Wallis D, Skinner D. Cardiopulmonary resuscitation skills of preregistration house officers: five years on. BMJ 1991;302:626–7.

7. Goodwin A. Cardiopulmonary resuscitation training revisited. J R Soc Med 1992;85:452–3.

8. Gillard J, Dent T, Jolly B,Wallis D, Hicks B. CPR and the RCP (2). Training of students and doctors in UK medical schools. J R Coll Physicians Lond 1993;27:412–7.

9. Graham C, Guest K, Scollon D. Cardiopulmonary resuscitation. Paper 2: A survey of basic life support training for medical students. J Accid Emerg Med 1994;11:165–7.

10. Leah V, Whitbread M, Coats TJ. Resuscitation training for medical students. Resuscitation 1998;39:87–90.

11. Jordan T, Bradley P. A survey of basic life support training in various undergraduate healthcare professions. Resuscitation 2000;47:321–3.

12. Price C, Bell S, Janes S, Ardagh M. Cardiopulmonary resuscitation training, knowledge and attitudes of newly-qualified doctors in New Zealand in 2003. Resuscitation 2006;68:295–9.

13. Meaney PA, Bobrow BJ, Mancini ME, et al. CPR Quality Summit Investigators, the American Heart Association Emergency Cardiovascular Care Committee, and the Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation. Cardiopulmonary resuscitation quality: improving cardiac resuscitation outcomes both inside and outside the hospital: a consensus statement from the American Heart Association. Circulation 2013;128:417–35.

14. TalikowskaM, Tohira H, Finn J. Cardiopulmonary resuscitation quality and patient survival outcome in cardiac arrest: A systematic review and meta-analysis. Resuscitation 2015;96:66–77.

15. Yannopoulos D, Aufderheide TP, Abella BS, et al. Quality of CPR: an important effect modifier in cardiac arrest clinical outcomes and intervention effectiveness trials. Resuscitation 2015;94:106–13.

16. Abella BS, Alvarado JP,Myklebust H, et al. Quality of cardiopulmonary resuscitation during in-hospital cardiac arrest. JAMA 2005;293:305–10.

17. Mcevoy MD, Field LC, Moore HE, et al. The effect of adherence to ACLS protocols on survival of event in the setting of in-hospital cardiac arrest. Resuscitation 2014;85:82–7.

18. Crowe C, Bobrow BJ, Vadeboncoeur TF, et al. Measuring and improving cardiopulmonary resuscitation quality inside the emergency department. Resuscitation 2015;93:8–13.

19. Lunenfeld E, Weinreb B, Lavi Y, Amiel GE, Friedman M. Assessment of emergency medicine: a comparison of an experimental objective structured clinical examination with a practical examination. Med Educ 1991;25(1):38-44.

20. Berden HJ, Bierens JJ, Willems FF, Hendrick JM, Pijls NH, Knape JT. Resuscitation skills of lay public after recent training. Ann Emerg Med 1994; 23: 1003–1008.

21. Lighthall GK, Barr J, Howard SK, Gellar E, Sowb Y, Bertacini E, et al. Use of a fully simulated intensive care unit environment for critical event management training for internal medicine residents. *Critical Care Medicine* 2003;31:2437–43.

22. Promes SB, Chudgar SM, O'Connor Grochowski C, Shayne P, Isenhour J, Glickman SW, et al. Gaps in procedural experience and competency in medical school graduates. *AcademicEmergency Medicine* 2009;16:S58–62.

23. Wu EH, Elnicki DM, Alper EJ, Bost JE, Corbett EC Jr, Fagan MJ, et al. Procedural and interpretive skills of medical students: experiences and attitudes of fourth-year students. *Academic Medicine* 2008;83:S63–7.

24. Kim JH, Kim WO, Min KT, Yang JY, Nam YT. Learning by computer simulation does not lead to better test performance than textbook study in the diagnosis and treatment of dysrhythmias. J Clin Anesth 2002;14(5):395-400.

25. Perkins GD. Simulation in resuscitation training. Resuscitation 2007;73(2):202-11.

26. Eng AJ, Namba JM, Box KW, Lane JR, Kim DY, Davis DP, et al. High-fidelity simulation training in advanced resuscitation for pharmacy residents. Am J Pharm Educ 2014;78(3):59.

27. Yoo HB, Park JH, Ko JK. An effective method of teaching advanced cardiac life support (ACLS) skills in simulation-based training. Korean J Med Educ 2012;24(1):7-14.

ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Temperament and Character of Emergency Medicine Physicians; A Sample of Volunteers

Acil Tıp Uzmanlarında Mizaç ve Karakter; Gönüllü Örneklemi

Betül Gülalp[1]

ÖZ

Amaç

Amaç, Acil Hekimlerinin (AH) mizaç ve karakter özelliklerinin puanlarını ve demografik değişken faktörlerindeki farklılıkları tespit etmektir.

Gereç ve Yöntemler

Gönüllüler Aralık 2016-Nisan 2017 tarihleri arasında değerlendirildi. Çalışma protokolü Üniversite Araştırma Kurulu (KA16 / 352) tarafından onaylanmıştır.

Çalışma grubu Acil Tıp uzmanlık eğitimi olan ve aktif çalışan hekimlerden oluşmuştur. Yenilik arayışı, zarardan kaçınma, ödül bağımlılığı, sebat, kendini yönetme, işbirliği ve kendini aşma ölçütleri ile alt ölçütleri değerlendirildi.

Bulgular

240 soru içeren Mizaç ve Karakter Envanteri çalışmasına toplam 40 AH katıldı. Pozisyon, savurganlık (p = 0.040), çabuk yorulma ve dermansızlık (p = 0.021), zarardan kaçınma (p = 0.037) ve amaçlılık (p = 0.015) için anlamlı bir faktördü. Diğer anlamlı değişkenler şunlardı: Yaş ile keşfetmekten heyecan duyma (p = 0.010), çabuk yorulma ve dermansızlık (p = 0.012), erdemlilik-vicdanlılık (p = 0.041); cinsiyet ile yabancılardan çekinme (p = 0.004), zarardan kaçınma (p = 0.048), beceriklilik (p = 0.009), kendini kabullenme (p = 0.024), uyumlu ikinci huylar (p = 0.001), kendini yönetme (p = 0.001), sosyal onaylama (p = 0.027), acıma (p = 0.006), işbirliği yapma (p = 0.013).

Sonuç

Pozisyon derecesi, yaş ve cinsiyet, AH'lerde mizacın ve karakter özelliklerinin en etkili belirleyicileridir. Bu farklılıklara dayanarak destekleyici planlar yapılabilir.

Anahtar Kelimeler: Mizaç ve Karakter; Acil Tıp Uzmanı; Değişken Psikolojik Faktörler

ABSTRACT

Aim

The aim is to identify the temperament and character traits' scores of Emergency Medicine Physicians (EMPs) and the differences within their demographic variable factors.

Material and Methods

The volunteers were assessed from December 2016 to April 2017. The study protocol was approved by the University Institutional Review Board (no. KA16/352). The study group was patterned on EMPs, completed an Emergency Medicine residency programme and working in an Emergency Department (ED). Novelty seeking (NS), harm avoidance (HA), reward dependence (RD), persistence (P), self-directedness (SD), cooperativeness (C), and self-transcendence (ST) measures and sub-measures were evaluated.

Results

There was total number of 40 EMPs that voluntarily participated the study and completed Temperament and Character Inventory (TCI) which includes 240 questions. Position was a significant factor in extravagance (p=0.040), fatigability (p=0.021), harm avoidance (p=0.037), and purposeful (p=0.015). The other significant variable factors were: Age in exploratory excitability (p=0.010), fatigability (p=0.012), and pure-hearted conscience (p=0.041); Sex in shyness (p=0.004), harm avoidance (p=0.048), resourcefulness (p=0.009), self-acceptance (p=0.024), enlightened second nature (p=0.001), self-directedness (p=0.001), social acceptance (p=0.027), compassion (p=0.006), and cooperativeness (p=0.013).

Conclusion

Position degree, age and sex are the main effective determinants of temperament and character traits of EMPs. Supportive plans can be made based on these differences.

Keywords: Temperament and character; emergency medicine physician; variable physchological factors

Received: October 11, 2019 Accepted: December 10, 2019

1 Department of Emergency Medicine, Başkent University School of Medicine, Ankara, Adana, Turkey

Corresponding Author: Betül Gülalp Prof **Address:** Department of Emergency Medicine, Başkent University School of Medicine, Ankara, Adana, Turkey **Phone**: +90(533) 5194405 **e-mail:** docbetul@yahoo.com

Atıf için/Cited as: Gulalp B.Temperament and Character of Emergency Medicine Physicians; A Sample of Volunteers. Anatolian J Emerg Med 2019;2(4); 11-16.

Introduction

Personality is the integration of temperament and character features and manages all the components of perspective, attitude, and behaviour. Cloninger's Temperament and Character inventory (TCI) evaluates temperament and character in different dimensions (1).

Temperament and Character traits are related with genetic physiological characteristics of cerebellar white matter and cortex volumes of specific brain regions (2) and affected by environmental factors such as living and workplace conditions.

TCI includes four temperament and three-character traits. Within temperament dimensions; high scores in novelty seeking is explained as being curious and enthusiastic, while harm avoidance is being pessimistic and doubtful. Reward dependence is sentimentality and dedication. Persistence includes diligence and ambitiousness. Character traits are self-directedness, which is having maturity, responsibility and being trustworthy; cooperativeness, which provides the habits congruent with empathy and achieving long term goals; and self-transcendence, which is derived from wisdom and patience (3).

Also, TCI reveals the key points that determine how physicians manage themselves in their lives and behave towards patients. Besides, Emergency Department, being crowded, busy, stressful and requires working with frequent shifts, is a tough working environment and this affects attitude of Emergency Medicine Physicians (EMPs). Differentiation of personality traits of EMPs can provide essential suitable support and development for EMPs during their professional business process (1). While there are reports on the Temperament and Character Inventory (TCI) for physicians, only a few of them have been studied on Emergency Medicine Physicians (EMPs).

The aim is to identify the temperament and character traits' scores of Emergency Medicine Physicians (EMPs) and the differences within their demographic variable factors.

Material and Methods

The study was conducted during December 2016 - April 2017. The study protocol was approved by Baskent University Institutional Review Board (no. KA16/352). The study group included EMPs that were actively working in Emergency Department (ED). All of them had attended a residency programme on Emergency Medicine (EM). The TCI was applied via a Google Drive questionnaire. Invitation to participate in the survey was distributed via a link emailed to the group address of EMPs in Turkey: aciltipuzmanlari@yahoogroups.com. Additionally, the test included demographic questions without asking for name. Consent was required for participation.

The English version of TCI (version 9), which includes temperament and character in 7 different dimensions as in four temperaments, including novelty seeking (NS, NS1, NS2, NS3, NS4), harm avoidance (HA, HA1, HA2, HA3, HA4), reward dependence (RD, RD1, RD3, RD4) and persistence (P) and three character traits, including self-directedness (SD, SD1, SD2, SD3, SD4, SD5), cooperativeness (C, C1, C2, C3, C4, C5) and self-transcendence (ST, ST1, ST2, ST3), and also in their sub-dimensions, consisted of 240 questions, was translated into Turkish by Kose and it was translated back into its original language by Sayar; afterwards, the final version of the inventory was approved by Cloninger and published (4).

There are two types of items for each trait and sub-trait in TCI. Each question was defined as positive or negative in the scale. These were stated on scoring guide. Each trait had several questions. The TCI scale includes only two answers: true or false. For items scored as positive; if the answer is checked as true, it is 1 point, if it is false, it is zero points. For the negative scored item, the answer of false provides 1 point, true gives zero points. The total score of any trait is the sum of the points of related items(4).

There are 11, 10, 9, 10 items related with NS1, NS2, NS3, NS4, respectively. NS has a total of 40 items. There are 11, 7, 8, 9 items related with HA1, HA2, HA3, HA4, respectively. HA has a total of 35 items.

There are 10, 8, 6 items related with RD1, RD3, RD4, respectively. RD has a total of 24 items. There was not a RD2 sub-trait in our study. RD has 8 items. There are 8, 8, 5, 11, 12 items related with S1, S2, S3, S4, S5, respectively. S has a total of 44 items. There are 8, 7, 8, 10, 9 items related with C1, C2, C3, C4, C5, respectively. C has a total of 42 items.

There are 11, 9, 13 items related with ST1, ST2, ST3, ST has a total of 42 items. The remaining 14 items are not scored(4).

The SPSS 17.0 package program was used for statistical analysis of the data. Categorical measurements were summarized in terms of number and percentage and mean and standard deviation for continuous measurements. For comparing continuous measurements between groups, the distributions were checked and, when the parametric distribution assumption could be made, they were evaluated by one-way ANOVA; otherwise, Kruskal-Wallis and Mann-Whitney tests were used. The statistical significance level was <0.05.

Results

There was total number of 40 EMPs that voluntarily participated the study and completed Temperament and Character Inventory (TCI) which includes 240 questions.

Position was a significant factor in extravagance (p=0.040), fatigability (p=0.021), harm avoidance (p=0.037), and purposefulness (p=0.015). The other significant variable factors were age in exploratory excitability (p=0.010), fatigability (p=0.012), and pure-hearted conscience (p=0.041); sex in shyness (p=0.004), harm avoidance (p=0.048), resourcefulness (p=0.009), self-acceptance (p=0.024), enlightened second nature (p=0.001), self-directedness (p=0.001), social acceptance (p=0.027), compassion (p=0.006), and cooperativeness (p=0.013).

Variable			N(%)
Position		Resident (EMR)	5 (12,5%)
		Physician (EP)	15 (37,5%)
	Emergency Medicine	Attending Phy. (EMAP)	3 (7,5%)
		Ass.Prof (EMASP)	6 (15,0%)
		Asc.Prof (EMACP)	8 (20,0%)
		Prof (EMProf)	3 (7,5%)
Experience		<5 years	3 (7,5%)
		5-10 years	19(47,5%)
		> 10 years	18 (45%)
Age		25-30	2 (5%)
		31-35	13(32.5%)
		36-40	9(22.5%)
		41-45	14(35%)
		> 45	2 (5%)
Sex		Female	16 (40%)
		Male	24 (60%)
Marital status		Single	5 (12.5%)
		Married	35 (87.5%)
Number of kids		0	8 (20%)
		1	12(30%)
		2	18(45%)
		3	2(5%)
Institution		State General Hospital	3(7.5%)
		State University Hospital	19 (47.5%)
		State Training Research Hospital	8(20%)
		Private Hospital	1(2.5%)
		Foundation University Hospital	9 (22.5%)
Daily number of patients in the ED		Less than 100	4 (10%)
		100-250	12 (30%)
		251-500	13(32.5%)
		Over 500	11(27.5%)

Table 1. Demographic features of participating Emergency Medicine Physicians (EMPs).

The demographic information of participating EMPs are shown in Table 1. Table 2 describes the comparison of TCI traits of EMPs by position degree, experience, age, sex, marital status, number of kids, and institution.

The scores of TCI Traits which only have significant differences between EMPs are shared in Table 3.

Discussion

When compared with general population, healthcare professionals were found highly self-directed and cooperative in TCI(5,6). However, only a few TCI studies have been carried out specifically on Emergency Physicians (EMPs).

In one study, all physicians in residency or fellowship programme working in the hospitals of a university were asked to participate in TCI-Revised (TCI-R) by e-mail. Emergency Medicine physicians had high self-directedness, cooperativeness, novelty seeking, persistence, and self-transcendence scores and had very low harm avoidance scores (7). In a study reported by Vaidya et al, novelty seeking (22.90-7.28) was the highest, harm avoidance was the lowest (8.48-4.90) scales in medical students who preferred EM as a speciality (8).The main features of an EMP were reported as being reformer, brave, facing up to difficulties, managing life-threaten situations with stability and having communicative competence, which differentiates them from other medical specialties.

However, our study involved EMPs only, and the comparisons were made according to their demographics. Even though position has an influence on extravagance, novelty seeking, fatigability, harm avoidance, and purposefulness; in particular, scores of the first 3 decreased in higher satisfactory positions and tolerable working pressure conditions.

The confounding results were that the harm avoidance (HA) scores were the highest one both in residents, as of the frequent working shifts in overcrowded EDs, and in professors, as of their responsibilities in the clinic of EM. The purposefulness score was high in Attending Physicians and Associated Professors with an increased passion and pickiness in target-specific working. Understandably, anticipatory worry and fatigability decreases with years of experience, but attachment increases over time.

Age was found to be effective in exploratory excitability, fatigability, and pure-hearted conscience. Pure-hearted conscience was the lowest scored trait in young EMPs, feelings preceded in conscience presents with increased age. Resourcefulness, self-acceptance, enlightened second nature, self-directedness, social acceptance, compassion, and cooperativeness were higher in females and forms characteristics of them, however, unexpectedly, shyness and harm avoidance were higher in males who were clearly the first open targets for the physical violence of a patient's

TCI Traits	Mean±SD (min-max)	Position degree	Experience	Age	Sex	Marital status	Number of kids	Institution	Number of daily patients in ED
Exploratory excitability (NS1)	6,15±2,202 (1-10)	,056	,798	,010	,005	,488	,702	,682	0,783
Impulsiveness (NS2)	3,70±2,198 (0-9)	,206	,715	,807	,488	,037	,101	,010	0,014
Extravagance (NS3)	4,40±2,134 (0-8)	,040	,060	,065	,256	,042	,137	,784	0,522
Disorderliness (NS4)	3,88±1,870 (1-8)	,094	,214	,912	,395	,090	,479	,234	0,803
Novelty seeking (NS)	18,10±5,153 (5-33)	,012	,271	,295	,113	,006	,196	,067	0,097
Anticipatory worry (HA1)	5,00±2,407 (1-9)	,058	,040	,266	,355	1,000	,343	,128	0,666
Fear of uncertainty (HA2)	3,40±1,429 (0-6)	,099	,492	,660	,894	,095	,350	,537	0,861
Shyness(HA3)	3,18±2,385 (0-8)	,222	,803	,157	,004	,571	,234	,762	0,912
Fatigability (HA4)	2,68±2,223 (0-8)	,021	,002	,012	,062	,579	,037	,975	0,971
Harm avoidance (HA)	14,25±6,558 (3-27)	,037	,086	,055	,048	,707	,090	,474	0,898
Sentimentality (RD1)	6,45±2,183 (2-10)	,417	,327	,158	,908	,872	,991	,347	0,467
Attachment (RD3)	4,08±1,859 (0-7)	,935	,025	,357	,892	,875	,238	,615	0,689
Dependence (RD4)	2,63±1,148 (0-5)	,869	,550	,693	,406	,959	,757	,906	0,207
Reward dependence (RD)	13,18±4,006 (6-21)	,613	,550	,153	,740	,895	,625	,417	0,325
Persistence (P)	5,63±1,735 (0-8)	,144	,053	,166	,139	,396	,293	,493	0,856
Responsibility (SD1)	5,45±1,974 (1-8)	,084	,708	,903	,077	,208	,879	,388	0,918
Purposeful (SD2)	6,23±1,732 (1-8)	,015	,228	,373	,321	,160	,520	,145	0,395
Resourcefulness(SD3)	4,00±1,013 (2-5)	,259	,184	,172	,009	1,000	,558	,356	0,616
Self-acceptance (SD4)	6,45±2,726 (2-11)	,947	,284	,593	,024	,763	,470	,273	0,409
Enlightened second nature (SD5)	9,70±1,786 (5-12)	,702	,230	,605	,001	,693	,620	,965	0,581
Self-directedness (SD)	31,80±6,268 (16-41)	,237	,732	,783	,001	,453	,428	,383	0,866
Social acceptance (C1)	6,35±1,688 (1-8)	,355	,912	,516	,027	,364	,314	,913	0,223
Empathy (C2)	4,53±1,281 (1-6)	,248	,239	,121	,097	,382	,036	,826	0,806
Helpfulness (C3)	4,68±1,559 (0-8)	,251	,300	,276	,515	,307	,595	,935	0,423
Compassion (C4)	7,38±3,279 (0-10)	,515	,546	,246	,006	,462	,814	,574	0,480
Pure-hearted conscience (C5)	7,35±1,051 (4-9)	,606	,921	,041	,468	,433	,971	,778	0,480
Cooperativeness (C)	30,20±6,719 (8-40)	,362	,531	,120	,013	,675	,557	,937	0,589
Self-forgetful (ST1)	6,00±2,460 (2-10)	,735	,149	,100	,797	,080	,422	,625	0,695
Transpersonal identification (ST2)	5,38±2,145 (1-9)	,868	,284	,234	,373	,259	,906	,901	,452
Spiritual acceptance (ST3)	8,00±3,203 (1-12)	,212	,185	,208	,843	,770	,246	,853	,727
Self-transcendence (ST)	19,38±6,720 (8-30)	,469	,118	,117	,637	,257	,411	,975	,779

Table 2. TCI Traits of EMPs and comparison by position degree, experience, age, sex, marital status, number of kids, and institution.

relatives. Impulsiveness, extravagance and novelty seeking scores were higher in singles. Responsibilities and giving priority to their children and spouse might repress the selfishness in non-singles.

Fatigability and empathy were related with being a parent and the numbers of children, as deep, strong, unrequited feelings for a child brings an aspect of empathy to parents, however the lowest empathy scores were found in childless EMPs.

Impulsiveness is management of thoughts and presenting the behaves by personal impulses without overthinking. Scores were the highest in EMPs working in State Hospitals with increased daily numbers of patients, as it was related to being in an excessively crowded and busy ED Limitations; This research was based on only a sample of group of volunteers. Also, there was not a control group.

Exploratory excitability (NS1);
5.73±2.01, 7.90± 1.28, and 5.40 ±2.32 in <35 , 35-40, >40 years old.
Impulsiveness *(NS2)*;
5.60 ±2.40 and 3.43± 2.06 in single and married groups.
5.18 ±2, 31, 3.5±2.09, and 2.40± 1.26 in state hospitals, state university hospital, private hospitals.
2.5±1.67, 4.38±2.36, 4.64±2.01 in EDs with a daily patient admition <250, 250-500, >500.
Extravagance *(NS3);*
6.60 ± 0.89, 4.67±1.54, 6.00± 2.00, 3.33± 1.96, 3.38 ± 1.99, 2.67 ±3.78 in EMR, EP, EMAP, EMASP, EMACP, EMProf.
4.08± 2,30, 4.88± 1,82 in male and female**.**
***Novelty seeking (NS)*;**
22.40± 3,57, 19.67± 4.48, 19.00± 2.64, 14.50± 7.31, 17.25± 2.86, 11.67±3.51 in EMR, EP , EMAP , EMASP , EMACP, EMProf.
23.80±5,21, 17.29± 4.66 in single and married ones.
***Anticipatory worry (HA1)*;**
8.33±1.15, 4.74±2.53, 4.72±2.05 in participants experienced <5, 5-10, >10 years.
***Shyness (HA3)*;**
4.04±2.44, 1.88±1.62 in male, female**.**
Fatigability (HA4);
5.20± 2.16, 3.07±1.90, 1.00±1.00, 2.50±2.25, 0.88±1.35, 3.33±2.51 in EMR, EP, EMAP , EMASP , EMACP, EMProf .
6.33±2.08, 2.89±1.96, 1.83±1.88 in participants experienced <5, 5-10, >10 years.
3.80±2.39, 1.20±1.03, 2.53±2.10 in <35,35-40,>40 years old groups.
4.50±2.82, 2.08±1.92, 2.11±1.77, 4.00±1.41 in the groups with a number of 0,1,2,3 kids.
Harm avoidance (HA);
20.40± 4.27, 13.47± 5.73, 9.67±5.68, 16.50±6.97, 9.50±5.18, 20.67± 5.13 in EMR, EP, EMAP , EMASP, EMACP, EMProf .
15.92± 6.89, 11.75±5.28 in male, female**.**
***Attachment (RD3)*;**
1.33±1.52, 4.32±1.29, 4.28±2.10 in the groups of participants experienced <5, 5-10, >10 years.
***Purposeful (SD2)*;**
5.00± 2.44, 5.60± 1.88, 7.67± 0.57, 6.33±0.81, 7.63± 0.51, 6.00± 1.00 in EMR , EP , EMAP, EMASP, EMACP, EMProf .
***Resourcefulness (SD3)*;**
3.67±1.12, 4.50±0.51 in male, female.
***Self-acceptance (SD4)*;**
5.67±2.61, 7.63±2.52 in male, female.
***Enlightened second nature (SD5)*;**
8.96±1.87, 10.81±0.83 in male, female.
***Self-directedness (SD)*;**
29.80±4.43, 32.09±6.48 in male, female.
Social acceptance (C1);
7.00±1.73, 6.26±1.68 in male and female**.**
Empathy *(C2);*
3.50±1.19, 5.17±1.19, 4.56±1.19, 4.50±0.70 were in the groups with a number of 0,1,2,3 kids.
Compassion *(C4);*
6.25±3.72, 9.06±1.28 in male, female.
Pure-hearted conscience (C5);
6.93±1.16, 8.00± 0.94, 7.33± 0.81 in the groups of <35,35-40,>40 years old.
***Cooperativeness (C)*;**
28.08± 7.55, 33.38±3.46 in male, female.

Table 3. The scores of TCI Traits which only have significant differences between EMPs

Conclusion

Consequently, position degree, age and sex are the effective determinants of temperament and character features in Emergency Medicine. These could directly affect the performance, success, and sustainability of an EMP in the busy, hard, and life-threatening professional business of medicine. A new formal process could be constituted to protect and strengthen EMPs' personality features.

Conflict of Interest: The authors declare no any conflict of interest regarding this study.

Financial Disclosure: The authors declared that there is not any kind of financial support as funding, grant or sponsorship in this study.

References

1. Cloninger CR, Svrakic DM, Przybeck TR. A psychobiological model of temperament and character. Arch Gen Psychiatry 1993; 50: 975-989.
2. Laricchiuta D, Petrosini L, Piras F, Macci E, Cutuli D, Chiapponi C, et al. Linking novelty seeking and harm avoidance personality traits to cerebellar volumes. Hum Brain Mapp. 2014; 35: 285-96.
3. Kluger MT, Laidlaw TM, Kruger N, Harrison MJ. Personality traits of anaesthetists and physicians: an evaluation using the Cloninger Temperament and Character Inventory (TCI-125). Anaesthesia. 1999; 54: 926-35.
4. Kose S, Sayar K, Ak I, Aydin N, Kalelioglu U, Kirpinar I , et al. Turkish version of the TCI: Reliability, validity, and factorial structure. Bulletin of Clinical Psychopharmacology 2004;14: 107-131.
5. Eley DS, Eley RM. Personality traits of Australian nurses and doctors: challenging stereotypes? Int J Nurs Pract. 2011; 17:380-7.
6. Richter J, Aström S, Isaksson U. Personality characteristics of staff in elderly care-a cross-cultural comparison. Issues Ment Health Nurs. 2012 ; 33: 96-100.
7. Sievert M, Zwir I, Cloninger KM, Lester N, Rozsa S, Cloninger CR. The influence of temperament and character profiles on specialty choice and well-being in medical residents. PeerJ. 2016;4:e2319.
8. Vaidya NA, Sierles FS, Raida MD, Fakhoury FJ, Przybeck TR, Cloninger CR. Relationship between specialty choice and medical student temperament and character assessed with Cloninger Inventory. Teach Learn Med. 2004;16:150-6.

ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Nurses' Reasons of Transferring Between Departments

Hemşirelerin Görev Yerini Değiştirmeyi Talep Etme Nedenleri

Figen Çalışkan[1], Halil Doğan[2], Birsen Dallı[1], Rümeysa Büşra Doğan[2],Şeyhmus Işık[2]

ÖZ

Amaç

Bu çalışmanın amacı, hemşirelerin transfer taleplerinin nedenlerini araştırmaktır.

Gereç ve Yöntemler

Çalışma, tanımlayıcı nitelikte, retrospektif bir çalışmadır. Veriler, 2011 ve 2014 yıllarında doldurulan, hastanenin Hemşirelik Hizmetleri Hemşire/Ebe/Sağlık Memuru Görev Yerini Değiştirme Kartları değerlendirilerek elde edilmiştir.

Bulgular

Çalışma sonuçlarına bakıldığında; çalışmaya katılan hemşirelerin yaşlarının ortalaması 30,75±6,412 (minimum 19-maksimum 45) yıldı. Çalışmaya katılan hemşirelerin % 89,6'sı kadın, % 44,7'si lisans mezunu ve % 69,4'ü riskli birimde çalışmaktaydı. Görev yerini değiştirme talep nedenleri olarak sağlık problemi, branşlaşma isteği, mobbinge maruz kalma, nöbet ve çalışma sistemi ve ekonomik nedenlerdi. Hemşireler en sık sağlık problemi nedeniyle (%30,6) görev yerini değiştirmeyi talep etmekteydi. Çalışmaya katılan hemşireler en sık acil tıp kliniğinde (% 37,3) ve yoğun bakım ünitelerinde (% 25,4) çalışmakta idiler. Yüksek lisans/doktora mezunu hemşirelerin branşlaşma isteği nedeniyle görev yerini değişmeyi talep eden hemşireler ile diğer nedenlerle görev yerini değiştirmeyi talep eden yüksek lisans/doktora mezunu hemşireler arasında istatistiksel anlamda fark tespit edildi (p=0,032). Riskli birimde çalışan ve görev yerini değişmeyi talep eden hemşireler en fazla sağlık problemi nedeniyle riskli birimden başka bir birime geçmeyi talep ettikleri görüldü.

Sonuç

Hemşirelerin en fazla sağlık problemleri nedeniyle görev yerini değiştirmeyi talep ettikleri ve eğitim durumu yükseldikçe çalıştıkları birimden ayrılmayı istedikleri belirlenmiştir. Hemşirelerin yetkinliklerine ve çalışmayı istedikleri birimlerin göz önünde bulundurulması ve görev yerini değiştirme nedenlerinin iyi izlenmesi gerektiğini öneriyoruz.

Anahtar kelimeler: Hemşire; görev yerini değiştirme; görev yerini değiştirme nedenleri

ABSTRACT

Aim

The purpose of this study is to investigate the reasons for transfer requests of nurses.

Material and Methods

This is a descriptive and retrospective study. Our study includes all the nurses who worked at an inward patient facility of the Ministry of Health of Turkey and wished to be transferred to a new deparment between the years of 2011 and 2014.

Results

Amongst the participants; 89% were women with the mean age of 30.75±6.412, 44.7% have a college degree and 69.4% have been working at the departments with higher risks of occupational injury and work accidents. The reasons for transfer requests were health issues, wishing to major, mobbing, long working hours, irregular shifts and work schedules. The main reason for transfer requests was health issues (30.6%). Most of the participants were found to be working at the Emergency Department (37.3%) and the Intensive Care Unit (25.4%). Statistically significant difference was found between two groups of nurses; nurses with a college or a PhD degree were more likely to request a transfer in order to major in.

Conclusion

The main reason for requesting a transfer was health-related issues. In addition to this, having a higher academic degree leads the nurses to be more willing to transfer. We suggest that nurses' requests and competences should be taken into consideration and a detailed review of the reasons of transferring should be made.

Keywords: Nurse; transferring; the reason of transferring

Received: October 6, 2019 Accepted: December 12, 2019

1 University of Health Sciences, Bakırköy Dr. Sadi Konuk Training and Research Hospital, İstanbul, Turkey

2 Department of Emergency Medicine, University of Health Sciences, Bakirkoy Dr. Sadi Konuk Training and Research Hospital, Istanbul, Turkey

Corresponding Author: Halil Dogan, Ass Prof. **Address:** Department of Emergency Medicine, University of Health Sciences, Bakırköy Dr. Sadi Konuk Training and Research Hospital, Istanbul, Turkey **Phone**: +905057067282**e-mail:** drhalildogan@gmail.com

Atıf için/Cited as: *Caliskan F, Dogan H, Dalli B, Dogan RB, Isik S. Nurses' Reasons of Transferring Between Departments* Anatolian J Emerg Med 2019;2(4); 17-21.

Introduction

Nursing is one of the oldest professions. Nurses aim to improve and maintain the health of the society including the ill and the healthy while they offer solutions to public health issues. Main purpose of nursing is to protect, improve, maintain public health and restore health in case of illness (1).

Nurses are the major group of potential labor force of the health system and spend long hours taking care of patients (2). The studies show that there is a shortage of nurses in health facilities caused by two main reasons: the lack of resources and incorrect labor policy. In addition, when nurses are not assigned according to their qualifications, it decreases the quality of patient care, and the satisfaction of both the patient and the employee, while it also increases mortality rates and causes more errors (3).

When nurses are assigned in the right departments, mortality rates will decrease, the reassurance of the patients will increase and the length of the hospital stay will decrease. It will also create a less stressful work environment for the nurses.

To successfully manage the nursing administration, nurses must be employed at the departments according to their qualifications and reasons of their requests of transferring should be taken into consideration. We conducted this study in order to determine the reasons for the transferring requests of the nurses.

Materials and Methods

Subjects

Our study included the nurses who worked at inward patient facilities affiliated to the Ministry of Health of Turkey and requested a transfer to a new department between 2011 and 2014. Transfer request forms filled completely were included in the study, while others were excluded. Nurses working at the emergency services, intensive care units and dialysis units were defined as nurses working at high-risk units.

Procedure

Materials of the study were Department Change Request forms filled by nurses, midwifes and health officers between 2011 and 2014. These forms have been obtained from the Nursing Service Administration of the hospital.

Data Analyses

Data have been registered and statistically analyzed using SPSS version 23. Kolmogorov-Smirnov test has also been applied. Continuous variables are defined as mean ± standard deviation or median (minimum-maximum) according to the normal or abnormal distrubitions. Categorized variables are defined as absolute values or percentiles. The variation of the continuous variables are compared with Mann-Whitney U test and the categorized variables are compared with x^2 test. The degree of statistical meaningful is determined as $p<0.05$.

The study was approved by the Local Ethics Committee and was performed in accordance with the Principles of Declaration of Helsinki.

Our study involves the nurses who were employees of an official, inpatient facility. It cannot be implied the nurses entirely.

Results

In this study, the reasons for the transfer requests of nurses; relationships between transfer requests, years of occupation, working at high-risk units and characteristics of unit worked were evaluated. The mean age of participants was 30.75±6.412 (minimum 19, maximum 45), 89.6% were women and 44.7% were undergraduates (Table 1).

Education	**n (%)**	**Department**	**n (%)**
High School	47 (35.1)	Emergency	50 (37.3)
2-year degree	19 (14.2)	Not Emergency	84 (62.7)
Undergraduate	60 (44.7)	**Total**	**134 (100.0)**
Graduate	8 (6.0)	**Department**	**n (%)**
Total	**134 (100.0)**	Intensive Care Unit	34 (25.4)
Gender	**n (%)**	Not Intensive Care Unit	100 (74.6)
Woman	120 (89.6)	**Total**	**134 (100.0)**
Man	14 (10.4)	**High Risk Unit**	**n (%)**
Total	**134 (100.0)**	High Risk Unit	93 (69.4)
Departments	**n (%)**	Not High Risk Unit	41 (63.6)
Emergency Department	50 (37.3)	**Total**	**134 (100.0)**
Intensive Care Unit	34 (25.4)	**Reasons**	**n (%)**
Internal Medicine	15 (11.2)	Health Related	41 (30.6)
General Surgery	12 (9.0)	Schedule	36 (26.9)
Operation Room	5 (3.8)	Willing to branch out	36 (26.9)
Other (Obstetrics and Gynecology, urology-kidney transplant unit, home care services, policlinics, cardiology, orthopedic and traumatology, delivery room)	18 (13.3)	Mobbing	16 (11.9)
		Economic	5 (3.7)
Total	**134 (100.0)**	**Total**	**134 (100.0)**

Table 1: Nurses' demographics, the departments they work at and the reasons of transferring.

69.4% of the nurses work at departments with higher risks and the main reason for transfer requests was health-related issues (30.6%). 37.3% work in the Emergency Department and 25.4% work in an Intensive Care Unit (Table 1).

Health-related issues were the main reasons for all the 30 nurses who wished to switch to another unit, besides, all were working at the departments with higher risks. This finding was found to be statistically significant (p=0.030) (Table 2).

Majoring is another statistically significant reason among college graduate nurses (p=0.032) (Table 2).

There was a statistically significant difference between nurses with an associate degree and other degrees regarding mean age and working hours (p:0.001, p:0.01) (Table 3).

	Health Problems n (%)	Work Schedule n (%)	Willing to branch out n (%)	Mobbing n (%)	Economical n (%)
Emergency Department	19 (46.3)	12 (33.3)	13 (36.1)	5 (31.3)	1 (20.0)
Not Emergency Department	22 (53.7)	24 (66.7)	23 (63.9)	11 (68.7)	4 (80.0)
P	0.151	0.564	0.862	0.593	0.650
Total	41 (100.0)	36 (100.0)	36 (100.0)	16 (100.0)	5 (100.0)
Intensive Care Unit	9 (22.0)	9 (25.0)	9 (25.0)	7 (43.8)	0 (0.0)
Not Intensive Care Unit	32 (78.0)	27 (75.0)	27 (75.0)	9 (56.2)	5 (100.0)
P	0.546	0.952	0.952	0.121	0.329
Total	41 (100.0)	36 (100.0)	36 (100.0)	16 (100.0)	5 (100.0)
High Risk Units	30 (73.2)	25 (69.4)	24 (66.7)	13 (81.2)	1 (20.0)
Not High Risk Units	11 (26.8)	11 (30.6)	12 (33.3)	3 (18.8)	4 (80.0)
P	0.530	0.995	0.677	0.389	**0.030**
Total	41 (100.0)	36 (100.0)	36 (100.0)	16 (100.0)	5 (100.0)
Education					
High School	13 (31.7)	15 (41.7)	10 (27.8)	7 (43.75)	2 (40.0)
P	0.588	0.332	0.283	0.438	1.000
Associate degree	8 (19.5)	3 (8.3)	5 (13.9)	2 (12.5)	1 (20.0)
P	0.240	0.240	0.953	1.000	0.540
Undergraduate	19 (46.4)	18 (50.0)	16 (44.4)	5 (31.25)	2 (40.0)
P	0.809	0.461	0.963	0.246	1.000
College graduate	1 (2.4)	0 (0.0)	5 (13.9)	2 (12.5)	0 (0.0)
P	0.434	0.108	**0.032**	0.244	1.000
Total	41 (100.0)	36 (100.0)	36 (100.0)	16 (100.0)	5 (100.0)

Table 2: Relation between the reasons of the transferring requests and departments

There was a statistically significant difference between nurses who were undergraduate and others, regarding mean age and working hours. (p:0.000, p:0.000) (Table 3).

There was a statistically significant difference between nurses working at emergency department and other departments, regarding mean age and working hours (p:0.001, p:0.002) (Table 3).

There was a statistically significant difference between nurses working at intensive care units and other departments regarding mean age and working hours (p: 0.0028) (Table 3).

There was a statistically significant difference between nurses working at departments with higher risks and other departments regarding mean age and working hours (p: 0.025, p:0.014) (Table 3).

Discussion

In this study the reasons behind nurses' transferring requests were evaluated; and it was revealed that the nurses who made a request were mostly undergraduate with a mean age of 30.75±6.412 and had a occupation experience of 4.58 years. This finding suggests the importance of promoting the job satisfaction of the nurses that are new at the field and working night shifts at busy departments. According to our study, younger and less experienced nurses tend to resign easily when they don't feel compatible with the aim and objectives of the facility they work at. Especially when a health care facility is operated with less staff than required, nurses' motivation to work and commitment to the facility decreases. Doganlı and Demirci' s study showed that 54.7% of nurses thought that they didn't have enough motivation to work and this ended up with a negative impact on the patient care as well as the commitment they feel for their job. These findings are consistent with the findings of our study.

In our study; the emergency department (37.3%; n=50) and the intensive care unit (25.4%;n=34) were the two main departments from which requesting a transfer was most frequent and the main reasons were health-related issues (30.6%), long day and night shifts (26.9%) and the wish to major in (26.9%). Kocaman and colleagues' (5) study showed that nurses' reasons to resign were long working hours, excessive night shifts and no annual leave. Koçaşlı and colleagues' study (6) showed that reasons include problems with the family, extra shifts and excessive night shifts. Chan and colleagues' study showed that reasons included not having adequate number of nurses and not being paid reasonable wages. Mazurenko and colleagues' study showed that the main reasons were health-related issues, and extra workload; and resignments were the results of burnout syndrome, stress, managers' attitude and having no opportunity of majoring in. MacKusick and Minick's (9) study showed that nurses' resign as a result of the hostile work environment, physicological problems caused by patient care, exhaustion and fatique. Momani's study conducted in Jordan showed that the reasons include economical issues, workload, rewarding system, other career opportunities and the decision-making process of the hospital staff.

It is a known fact that the number of the nurses is less than needed in Turkey. Consequently, even a small number of

resignments may substantially effect the patient care. The remaining nurses are forced to work at even worsening conditions.

Yazıcı and Kalaycı's study (11) showed that even the shift system has a bad effect on human health, however 68% of the nurses' who participated in their study stated that working hours were acceptable. Especially, long night shifts cause physiological incompatibility, sleeping disorders and exhaustion often (12). Moreover, the long night shifts

	Age	p	t	Duration of work at the department (month)	p	t	Working Hours	p	t
The Reasons									
Mobbing	31.25±5.961	0.739	0.334	29.94±28.321	0.228	1.210	7.75±6.476	0.637	0.473
Schedule	29.89±6.131	0.350	-0.938	22.81±25.982	0.940	-0.075	7.33±6.405	0.737	0.337
Willing to major int	30.28±6.190	0.610	-0.511	19.81±21.773	0.347	-0.943	5.42±5.385	0.059	-1.919
Health related Issues	31.37±7.077	0.460	0.741	23.51±23.801	0.888	0.141	7.98±7.696	0.311	1.020
Economical	33.60±6.693	0.312	1.014	22.80±23.048	0.980	-0.025	6.00±7.314	0.728	-0.349
Education									
High School	31.79±7.226	0.168	1.386	21.98±22.090	0.704	-0.381	8.40±7.485	0.095	1.689
Associate degree	35.16±6.551	**0.001**	3.360	20.32±24.640	0.595	-0.533	11.53±7.777	**0.010**	2.806
Undergraduate	28.30±4.886	**0.000**	-4.367	22.50±24.450	0.808	-0.243	4.58±4.652	**0.000**	-4.235
College Graduate	32.50±3.381	0.189	1.402	40.25±31.527	0.038	2.093	6.38±2.134	0.491	-0.703
Department									
Emergency Department	28.42±5.814	**0.001**	-3.364	18.90±20.622	0.125	-1.543	4.86±5.551	**0.002**	-3.165
Intensive Care Unit	30.59±3.846	0.827	-0.219	32.88±31.489	**0.028**	2.279	6.15±3.702	0.233	-1.199
High Risk Department	29.78±5.348	**0.025**	-2.300	24.45±25.716	0.321	0.995	5.90±5.244	**0.014**	-2.527

Table 3: The relations between reasons of transferring requests, education, departments, age and working hours

frequently cause psychological problems, sleeping disorders and job burnout (12).

We could not find any study examining the relationship between the reasons for the transfer request of nurses and high-risk unit duty in the existing literature. There was a statistically significant difference between the nurses' who work at departments with higher risks and the others, in terms of the reasons for transfer requests. Nurses who didn't work at such departments requested transfer due to economical issues. Abaan and Duygulu's study showed that economical problems were one of the main reasons for the resign which is consistent with our study. It may be suggested that better payments would ensure the nurses to remain and increase their commitment. Findings show that better wages and extra payments prevent nurses from resigning and increase their commitment to their work.

Findings from Duygulu and Korkmaz's study (14) about nurses' commitment to their work, job satisfaction and the reasons of resignation are consistent with our study. Their study showed that the reasons were mostly economical issues, communication problems and having no opportunity of promotion at work.

Our study revealed that the college graduate nurses' main reason was the will to major in. Mazurenko and colleagues' study showed that nurses with higher education degrees leave their work more frequently than others. Hu and colleagues' (15) study showed that low chance of promotion caused nurses to be less satisfied with their jobs which eventually led them to leave their job. These findings may indicate that the nurses shall regularly be promoted and supplied with education-related opportunities. Studies showed that nurses who had better job opportunities and more job satisfaction, were more compatible, productive, trust-worthy, responsible and more dedicated to the institution. Thereby it is crucial for executive nurses to to develop strategies in order to build up a more satisfactory and peaceful working climate for nurses.

Personal and professional development includes any opportunity of promotion and majoring in (16). It is well known that nurses are target oriented and wish to enhance the quality of their service. They should be provided with regular education in means of courses, seminars etc. Thus, nurses might have the chance of improving and progressing. When their facility or institution doesn't provide the nurses with such opportunities, the nurses become less satisfied with their jobs (17). The more the nurses realize that their objects and aims don't correlate with the institution, the less they are committed to their job. If an institution plans to provide better health care service to the patients with a lesser number of staff, the executives should pay more

attention to the improvement of the nurses, because of the major impact of their job commitment and satisfaction on the quality of service. Our study suggests that this should be reviewed urgently.

Conclusion

Our study revealed that the main reason for transferring request was health related issues and the higher graduate degree a nurse has, the more she/he requests to be transfered. As a result, nurses' professional competence and the department they wish to work at should be taken into consideration, as these are the keys to successful employment policies.

Conflict of Interest: The authors declare any conflict of interest regarding this study.

Financial Disclosure: The authors declared that there is not any kind of financial support as funding, grant or sponsorship in this study.

Authors' Contribution: All authors were equally involved in the preparation of this article.

References

1. Taşocak G. Hasta eğitimi**.** Florence Nightingale Hemşirelik Yüksek Okulu Yayınları, İstanbul 2007.

2. Öztürk H, Kasım S, Kavgacı A, Kaptan D, İnce G. Bir üniversite hastanesinde çalışan hemşirelerin iş doyum düzeyleri. *Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi* 2015; 18(1): 17-25.

3. Ünal A, Seren Ş. Hastanelerde çalışan hemşirelerin hemşirelik dışı birimlerde istihdamı ve nedenlerinin incelenmesi. *Dokuz Eylül Üniversitesi Hemşirelik Yüksekokulu Elektronik Dergisi* 2010; 3(1): 23-29, http://acikerisim.deu.edu.tr/xmlui/bitstream/handle/12345/4545/23-29_pdf.pdf?sequence=1&isAllowed=y

4. Doğanlı B, Demirci Ç. Sağlık kuruluşu çalışanlarının (hemşire) motivasyonlarını belirleyici faktörler üzerine bir araştırma. *Yönetim ve Ekonomi: Celal Bayar Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi* 2014; 21(1): 47-60.

5. Kocaman G, Seren Ş, Kurt S, Danış B, Erer, T. Üç üniversite hastanesinde hemşire devir hızı. *Hemşirelikte Eğitim ve Araştırma Dergisi* 2010; 7(1): 34-38.

6. Koçaşlı S, Aktaş D, Avcı K. Bir eğitim araştırma hastanesinde hemşirelerin kurumdan ayrılmayı isteme nedenlerinin incelenmesi. *Hemşirelik Eğitim ve Araştırma Dergisi* 2017; 14(2): 127-130.

7. Chan EY, Morrison P. Factors influencing the retention and turnover intentions of registered nurses in a Singapore hospital, *Nursing & Health Sciences* 2000; 2(2): 113-121.

8. Mazurenko O, Gupte G, Shan G. Analyzing U.S. nurse turnover: are nurses leaving their jobs or the profession itself?.*Journal of Hospital Administration* 2015; 4(4): 48-56.

9. MacKusick CI, Minick P. Why are nurses leaving? Findings from an initial qualitative study on nursing attrition. *Journal of the Academy of Medical-Surgical Nurses* 2010; 19(6): 335-340.

10. Momani MA. Factors influencing public hospital nurses' intentions to leave their current employment in Jordan. *International Journal of Community Medicine and Public Health* 2017; 4(6): 1847-1853.

11.Yazıcı SÖ, Kalaycı I. Hemşirelerin çalışma ortam ve koşullarının değerlendirilmesi. *Süleyman Demirel Üniversitesi Mühendislik Bilimleri ve Tasarım Dergisi* 2015; 3(3): 379-383.

12. Yüksel İ. Çalışma yaşamı kalitesinin tipik ve atipik istihdam açısından incelenmesi. *Doğuş Üniversitesi Dergisi* 2004; 5(1): 47-58.

13. Abaan S, Duygulu S. Hemşirelerin çalıştıkları kurumdan ayrılmalarına yol açabilecek olası nedenlerin ve örgüte bağlılıklarının incelenmesi. *Hacettepe Üniversitesi Hemşirelik Yüksekokulu Dergisi* 2004; 11(2): 1-15.

14. Duygulu S, Korkmaz F. Hemşirelerin örgüte bağlılığı, işten ayrılma nedenleri. *Cumhuriyet Üniversitesi Hemşirelik Yüksekokulu Dergisi* 2008; 12(2): 1-15.

15. Hu J, Liu H, Hu J. Job satisfaction among nurses in China. *Home Health Care Management & Practice* 2004; 17(1): 9-13.

16. Chandra A. Why do nurses leave and what can health organizations do to retain them? *Hospital Topics* 2003; 81(3): 33-36.

17. Gaertner S. Structural determinants of job satisfaction and organizational commitment in turnover models. *Human Resource Management Review* 1999; 9(4): 479-493.

CASE REPORT / OLGU SUNUMU

Smoking Crushed-Boiled Hyoscine Butylbromide Tablets as Drug Abuse

Ezilmiş-Haşlanmış Hiyozin N-bütilbromid Tabletlerin İnhale Kullanımı

Hatice Şeyma Akça[1], Deniz Tengerek[1], Burcu Yılmaz[1], Serkan Emre Eroğlu[1]

ÖZ

Amaç

Hiyozin-N-bütilbromid antikolinerjik özelliklere sahip bir kuarterner amonyum bileşiğidir. Nikotinik ve muskarinik reseptörler üzerinden etki eder. Bu vakamızda, Hiyozin-N-bütilbromid tabletlerinin halusinojenik etkisinden faydalanmak amacıyla Hiyozin-N-bütilbromidi kaynatıp inhaler olarak kullanan hastayı anlatmak amaçlandı.

Olgu

47 yaşında erkek hasta ajitasyon, halüsinasyon ve bulanık görme şikayeti ile acil servise başvurdu. Oryante ve koopere değildi. GKS:13 idi ve uykuya meyilli idi. Acil servis takipleri sırasında vital bulgularda, karaciğer, böbrek fonksiyon testlerinde ve elektrolitlerinde patolojik durum saptanmadı. Kranial bilgisayarlı tomografisi'nde de kanama veya enfarkt lehine bulgu saptanmadı. Başvurudan yaklaşık 6 saat sonra hastanın genel durumu düzeldi. Yapılan fizik muayenesinde GKS:15 idi ve görme bulanıklığı şikayetinin olmadığını belirtti. Hikayesinde Hiyozin-N-bütilbromid tabletlerini toz haline getirerek metal bir kap içerisinde ısıttığını ve dumanını inhale ederek halusinojenik etkisinden faydalandığını ifade etti.

Sonuç

Hiyozin-N-bütilbromid tabletleri nikotinik, muskarinik ve halusinojenik etkileri açısından değerlendirilmelidir. İnhaler olarak hazırlanabileceği, madde bağımlıları tarafından kötüye kullanılabileceği unutulmamalıdır. Bu şekilde narkotik etkiye sahip farklı tablet formları olabileceği düşünülmelidir. Vaka sunumlarının yanı sıra kapsamlı bir araştırmalara da ihtiyaç vardır.

Anahtar kelimeler: Hiyozin-N-bütilbromid; inhalasyon; şuur bulanıklığı

ABSTRACT

Aim

Hyoscine-N-butylbromide is a quaternary amonium compound with anticholinergic properties. It acts through nicotinic and muscarinic receptors. In this case report, we aimed to describe the patient who boiled hyoscine-n butyl bromide and used it as an inhaler in order to benefit from the hallucinogenic effect of hyosine butylbromide tablets.

Case

A 47-year-old male patient was admitted to the emergency department with agitation, hallucinations and blurred vision. He was not oriental and cooperative. GCS: 13 and was prone to sleep. During the follow-up of the emergency department, vital signs, liver and kidney function tests and electrolytes were normal. There was no evidence of hemorrhage or infarct on Computer Tomography (CT). About 6 hours after admission, the patient's general condition improved. In his physical examination, GCS was 15 and he did not complain of blurred vision. In his story, he stated that hyoscine-N-butylbromide tablets were powdered and heated in a metal container and inhaled the smoke, taking advantage of the hallucinogenic effect.

Conclusion

Hyoscine-N-butylbromide tablets should be evaluated for their nicotinic, muscarinic and hallucinogenic effects. It should be remembered that it can be prepared as an inhaler and abused by drug addicts. It should be considered that there may be different forms of tablets with narcotic effect. In addition to case presentations, extensive research is needed.

Keywords: Hyoscine-N-butylbromide; smoking; consciousness

Received: September 05, 2019 Accepted: October 25, 2019

1 University of Health Sciences, Umraniye Training and Research Hospital, Department of Emergency Medicine, Istanbul, Turkey.

Corresponding Author: Hatice Seyma Akca MD **Address:** University of Health Sciences, Umraniye Training and Research Hospital, Department of Emergency Medicine, Istanbul, Turkey. **Phone:** +90 5555629831**e-mail:** drhaticeseyma_@hotmail.com

Atıf için/Cited as: Akca HS, Tengerek D, Yilmaz B, Eroglu SE. Smoking Crushed-Boiled Hyoscine Butylbromide Tablets as Drug Abuse. Anatolian J Emerg Med 2019;2(4); 22-24.

Introduction

Antispasmodic drugs are widely used in many clinics such as gastroenterology, urology, gynecology, neurology and emergency clinics (1). Hyoscine-N-butylbromide is a quaternary amonium compound with anticholinergic properties. It acts through nicotinic and muscarinic receptors (1,2). It relaxes the smooth muscles of the gastrointestinal system, bile and excretory systems, and it also causes myorelaxan on of uterus smooth muscles, so it can be used for dysmenorrhea treatment. In this case report, we aimed to describe the patient who boiled hyoscine-N-butyl bromide and used it as an inhaler in order to benefit from the hallucinogenic effect of hyoscine butylbromide tablets.

Case Report

A 47-year-old male patient was admitted to the emergency department with agitation, hallucinations and blurred vision. His general condition was moderate to poor and he could not answer questions significantly. Redness and survival were present in both eyes. The light reflex was bilateral positive, but the patient had blurred vision. He was not oriental and cooperative. GCS: 13 and was prone to sleep. Blood pressure: 140/63 mmHg, respiratory rate: 22/min, pulse rate: 85/min, sO_2: 99%. Analysis of blood gases in emergency revealed a pH of 7.44, pCO2 of 37 mmHg, arterial oxygen saturation of 94% and HCO3 of 24.7 mmol/L. During the follow-up of the emergency department, vital signs, liver and kidney function tests and electrolytes were normal. There was no evidence of hemorrhage or infarct on Computer Tomography (CT). About 6 hours after admission, the patient's general condition improved. In his physical examination, GCS was 15 and he did not complain of blurred vision. In his story, he stated that hyoscine-N-butylbromide tablets were powdered and heated in a metal container and inhaled the smoke, taking advantage of the hallucinogenic effect.

Discussion

Hyoscine-N-butylbromide, which causes muscle relaxation due to antimuscarinic effect, is also used in the treatment of cramp-like pain (3-5).

Kummer S et al retrospectively reviewed 2 different cases. One of the patients reported that he had been hospitalized with central anticholinergic symptoms while the other had more minor symptoms. Due to the Hyoscine-N-butylbromide's natural form inability to cross the blood-brain barrier, it has been thought that this is the cause of initially observed central anticholinergic symptoms. However, they learned that tablets were prepared with different methods and been transformed into central acting scopolamine (6).

Kruger et al observed that Hyoscine-N-butylbromide at high doses reduced secretion, motility and nerve activity due to nicotinic effects, while reducing muscle contractions, calcium mobilization and dependently epithelial secretion. As a result, while the antimuscarinic effect of Hyoscine-N-butylbromide is prominent, nicotinic antagonism appeared at high doses (7).

Although we could not predict the dose of nicotinic or muscarinic effect in the drinking of crushed hyoscine-N-butylbromide tablets. Our patient had marked blurred vision and loss of consciousness. The patient who had taken this medication once a week presented to our hospital with acute effects, suggesting that inhalation could be higher than the usual dose.

The use of hyoscine-N-butylbromide in patients with cardiac disease should be discussed (8). Our patient had no heart disease and no pathological data were detected during follow-up.

Hyoscine-N-butylbromide is a short-acting agent so the effects may not always show the desired effect for antimuscarinic treatment; for example in paralytic ileus, the effect is not significant (8,9).

To investigate the hallucinogenic effects, Hyoscine-N-butylbromide supplemented cigarettes were examined, scopalamin formation was observed in electrospray ionization mode by liquid chromatography-tandem mass spectrometry and in all cases scopalamin was detected. These cigarettes were obtained by crushing Hyoscine-N-butylbromide tablets (10).

Our patient complained of blurred vision and unconsciousness within 6 hours and mental status examination normalized. He reported that he used Hyoscine-N-butylbromide tablets for hallucinogenic effect once a week by heating and inhaling the smoke generated. Although cases of cigarette use have been reported, We have not reported any cases reported by boiling and inhalation of smoke to benefit from the hallucinogenic effect.

Crushed Hyoscine-N-butylbromide smoking symtoms such as amnesia, insomnia, palpitation, flushing, irritability have been reported in some case reports (10,11). The hallucinogenic effect has both increased the orientation to these investigations and has become the most obvious symptom. However it is still unknown how scopolamine acts as a hallucinogenic effect in the central nervous system.

Conclusion

Hyoscine-N-butylbromide tablets should be evaluated for their nicotinic, muscarinic and hallucinogenic effects. It should be remembered that it can be prepared as an inhaler and abused by drug addicts. It should be considered that there may be different forms of tablets with narcotic effect.

In addition to case presentations, extensive research is needed.

Conflict of Interest: The authors declare no any conflict of interest regarding this article.

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

Authors' Contribution: All authors were equally involved in the preparation of this case report.

References

1. Kara H,Göktaş MT. Acces Url: http://guncel.tgv.org.tr/journal/64/pdf/100425.pdf
2. Bourdoumis A, Stasinou T, Papadopoulos G, and Buchholz N. (2014) The evidence for using hyoscine N-butylbromide (Buscopan) in ureteric obstruction, Int J Clin Pract. 2014(68);9:1174, Doi: 10.1111/ijcp.12506.
3. Gülaçtı U, Polat H, Lök U,Aydın İ. The evaluation of patients with renal colic due to urinary tract stones in emergency department, Gaziantep Medical Journal 2016(22);1:22-6, Doi: 10.5578/GMJ.27961.
4. Sinanoğlu O, Ekici S, Uraz M, Çubuk R, Renal colic diagnosis and treatment in Emergency Services. Maltepe Medical Journal 2010(2);2:55-8.
5. Gülaçtı U, Birkan Z, Üstin C. Pelvic ectopic renal ürolitiazis, JAEMCR 2013; 4:70-2. Doi: 10.5505/jeamcr.2013.65477.
6. Kummer S, Rickert A, Daldrup T, Mayatepek E. Abuse of the over-the-counter antispasmodic butylscopolamine for the home synthesis of psychoactive scopolamine, Eur J Pediatr. 2016(175);7:1019-21. Doi: 10.1007/s00431-015-2683-5.
7. Kruger D, Michel K, Allam S, Weiser T, Demir IE, Ceyhan GO et al. Effect of hyoscine butylbromide (Buscopan®) on cholinergic pathways in the human intestine, Neurogastroenterol Motil. 2013(25);8:530-9. Doi: 10.1111/nmo.12156.
8. Dyde R, Chapman A H, Gale R, Mackintosh A, Tolan D J M. Precautions to be taken by radiologists and radiographers when prescribing hyoscine-N-butylbromide, Clinical Radiology, Clin Radiol. 2008(63);7:739-43. Doi: 10.1016/j.crad.2008.02.008.
9. Blakeborough A, Sheridan MB, Chapman AH. Complicationsof barium enema examinations: a survey of UK consultant radiologists 1992 to 1994. Clin Radiol. 1997 (52);2:142-8. Doi:10.1016/s0009-9260(97)80108-0.
10. M.Frascht, Schneider S, Schuman M, Wennig R. Formation of scopolamine from N-butyl-scopolamonium bromide in cigarettes, Journal of analytical toxicology, J Anal Toxicol. 2007(31);4:220-3. Doi:10.1093/jat/31.4.220.
11. Jalali, Afshari R, Babaei A. Smoking Crushed Hyoscine/ Scopolamine Tablets as Drug Abuse, Journal Substance Use & Misuse, 2014(49);7:793-7. https://doi.org/10.3109/10826084.2014.880178.

Anatolian Journal of Emergency Medicine 2019;2(4); 25-27

CASE REPORT / OLGU SUNUMU

Myocardial Injury Due to Inhalation of A Mixture of Sodium Hypochlorite and Hydrochloric Acid

Sodyum Hipoklorit ve Hidroklorik Asit Karışımının İnhalasyonuna Bağlı Gelişen Miyokard Hasarı

Esra Polat[1], Mehmet Cihat Demir[2]

ÖZ

Amaç

Sodyum hipoklorit (çamaşır suyu) ve hidroklorik asit (tuz ruhu) ülkemizde temizlik amacı ile sık olarak kullanılır. Bu iki sıvının karıştırılması sonucunda zehirli klor gazı ortaya çıkmaktadır. Klor gazının inhalasyonu, mukoz membranlarda irrirasyon, pulmoner gaz değişiminin engellenmesi ve pulmoner ödem nedeniyle ciddi solunum sıkıntısına neden olabilir. Nadiren kardiyovasküler sisteme de zarar verebilir.

Olgu

Bilinen kalp veya solunum hastalığı teşhisi konmamış 81 yaşında bir erkek hasta acil servise klor gazı maruziyeti nedeniyle lakrimasyon ve burun akıntısı şikayeti ile başvurdu. Aktif kardiyak şikayeti olmayan hastada troponin pozitifliği saptandı. Takibe alınan hastada takiplerinde troponin değerinde artış olması ve akut koroner sendrom dışlanamaması nedeni ile hastaya yapılan koroner anjiyografide koroner arterler plaklı olarak izlendi. Troponin yüksekliği sodyum hipoklorit ve hidroklorik asit karışımının inhalasyonuna bağlandı.

Sonuç

Klor gazına maruz kalma genellikle solunum sistemine zarar vermektedir. Bunun yanında, aritmi, akut koroner sendrom, kalp yetmezliği ve hatta ölüm gibi kardiyovasküler etkiler de görülebilir. Acil tıp doktorları klor gazıma maruz kalan hastalarda kardiyovasküler etkilere dikkat etmeli ve kalp hastalığı öyküsü olmasa bile kardiyak hasarın gelişebileceğini düşünmelidir.

Anahtar Kelimeler: Sodyum hipoklorit; hidroklorik asit; troponin; miyokard hasarı

ABSTRACT

Aim

Sodium hypochlorite (bleach) and hydrochloric acid are chemicals, commonly used in household cleaning and can be dangerous when mixed with each other. As a result of the mixture, chlorine gas is released which is poisonous. Inhalation of chlorine gas may cause severe respiratory distress due to irritation of mucous membranes, impaired pulmonary gas exchange, and pulmonary edema. Rarely, it also damages the cardiovascular system.

Case

An 81-year-old male patient, who had not been previously diagnosed with heart or respiratory disease, presented to the emergency department with a complaint of lacrimation and nasal discharge due to chlorine gas exposure. He had troponin positivity. Coronary angiography was performed due to the subsequently troponin increase. Coronary angiography revealed plaques. The cause of troponin increase was associated with the inhalation of chlorine gas.

Conclusion

Exposure to chlorine gas is commonly manifested by damage to the respiratory system. However, cardiovascular effects such as arrhythmia, acute coronary syndrome, heart failure, or even death may also occur. Emergency medicine physicians should pay attention to these cardiovascular effects and consider that patients exposed to chlorine gas may experience heart damage even if they do not have a history of heart disease.

Keywords: Sodium hypochlorite; hydrochloric acid; troponin; myocardial injury

Received: August 31, 2019 Accepted: December 18, 2019

1 Department of Cardiology, Fethiye State Hospital, Fethiye, Muğla, Turkey

2 Department of Emergency Medicine, Duzce Univercity, Duzce, Turkey

Corresponding Author: Esra Polat MD **Address:** Department of Cardiology, Fethiye State Hospital, Fethiye, Muğla, Turkey Phone: +90538 589 97 72 **e-mail:** esrapolat-1907@hotmail.com

Atıf için/Cited as: Polat E, Demir MC. Myocardial Injury Due to Inhalation of A Mixture of Sodium Hypochlorite and Hydrochloric Acid. Anatolian J Emerg Med 2019;2(4); 25-27.

Introduction

Chemicals are not only used in manufacturing or industrial fields, but they have also become a part of our daily life, particularly in household cleaning. However, chemicals may have negative consequences as a result of unconscious use. Sodium hypochlorite (bleach) and hydrochloric acid are two of these chemicals widely used household cleaning. Indeed, there is a perception that mixing sodium hypochlorite (bleach) and hydrochloric acid enables better cleaning in our region. As a result of the mixture, chlorine gas is released which is poisonous (1-2). In emergency departments, chlorine gas intoxication is the second inhaled poisoning after carbon monoxide intoxication (3).

Chlorine gas inhalation poisoning is mostly accidental. It may occur as a result of the preparation of swimming pool water, military exposures, industrial exposures, misuse of cleaning products and chemical terrorism (4-5).

Inhalation of chlorine gas mainly damages the respiratory system, while damage to other organ systems is rare (6). Since chlorine is water-solubl, it primarily damages the upper and lower respiratory tracts. In developed or developing countries, using the mixture of sodium hypochlorite with hydrochloric acid can cause mild mucosal irritation, acute lung injury, reactive airway dysfunction syndrome or even death (1).

Chlorine gas has well known cardiac effects such as sinus tachycardia, sinus bradycardia, extrasystole, myocardial infarction, and cardiac arrest (2,6,7).

Here, we presented a rare case of non-cardiac troponin elevation due to the inhalation of a mixture of sodium hypochlorite and hydrochloric acid.

Case Report

An 81-year-old male patient with no history of cardiac or respiratory disease admitted to the emergency department with complaints of lacrimation and nasal discharge after exposure to chlorine gas released by a mixture of sodium hypochlorite and hydrochloric acid for approximately 10 minutes. He had no other complaints. He had no history of medication use. His vital signs followed as; blood pressure of 108/72 mm Hg, heart rate of 98 beats/min, SPO_2 of 98%, temperature of 36,9˚C. Respiratory and cardiovascular system examinations were normal. Chest X-Ray was obtained as normal. ECG was in sinus rhythm and there was no acute ischemic change (Figure 1).

Laboratory investigations revealed; creatinine 0,92mg/dL (0,72-1,25mg/dL), white blood cell count 7,78 K/ul (4,0-10,0 K/ul), *C*-reactive protein 1,1 mg/L (0-5mg/L), creatine kinase (*CK)-MB* 3,74ng/mL (0-5 ng/mL), troponin I 0,125ng/mL(0,02-0,06 ng/mL). Results of initial arterial blood gas analyses were; pH 7,28 (7,35-7,45), PO2 98 mm Hg(80-100 mm Hg), PCO2 57,3 mm Hg(35-45 mm Hg), SO2 96,5%(95-98%) HCO3 23,6 mmol/L(22-26 mmol/L).

Figure-1: ECG

Echocardiography revealed a normal left ventricular ejection fraction with stage 1 diastolic dysfunction (without segmental or regional wall motion abnormality).

To prevent possible bronchospasm due to chlorine gas exposure, 2L/min nasal oxygen, 250 microgram inhaler ipratroprium bromide and 200 microgram inhaler budesonide were administered. Since he had no chest pain and no evidence of ischemia on ECG, cardiac enzyme and ECG were monitored.

Cardiac markers and arterial blood gas sample results at the second hour of admission were: creatine kinase (*CK)-MB* 4,15,Troponin I 0,645ng/mL, pH 7.46, PO2 99 mm Hg, PCO2 32,9 mm Hg, SO2: 98,5%, HCO3 24,6 mmol/L.

The patient was admitted to the coronary care unit because of suspicion of acute coronary syndrome. Acetylsalicylic acid (300 mg), clopidogrel (300 mg) , ramipril (2,5 mg), atorvastatin (40 mg), and enoxaparin subcutaneous (6000 IU) was initiated. Coronary angiography was performed due to increased troponin. Coronary angiography revealed plaques. The cause of troponin increase was associated with the inhalation of chlorine gas.

After the troponin level was regressed the patient was discharged from the hospital on the third day.

Discussion

By mixing chemicals such as sodium hypochlorite and hydrochloric acid or applying them to the same surface consecutively, a chemical reaction develops, and chlorine gas is released which is poisonous (1-2).

Chlorine gas dissolves in mucous membranes in the respiratory tract and forms HCL^- and O^-radicals responsible for toxicity (8). It may cause the burning of the throat, eyes, and conjunctiva. The most common symptoms are cough, dyspnea, nausea, vomiting, headache, dizziness and palpitation. Myocardial infarction, non-cardiogenic pulmonary edema, acute respiratory distress syndrome

(ARDS), pneumomediastinum and even death can be seen (2-7). Our patient's complaints were lacrimation and nasal discharge. In a study of 1566 cases of acute chlorine gas exposure, respiratory complaints and eye-burning were the most common complaints. Nine of these cases exposed to chlorine gas poisoning resulted in death (9).

Inhalation of chlorine gas may progress to hypoxia and may cause free oxygen radicals and increased sympathetic activity (3). Chlorine gas affects nitric oxide signaling pathways that are anti-inflammatory, antithrombotic, antioxidant and causes endothelial disruption and damages the cardiovascular system. (10) In addition to the effects of nitric oxide pathways, excessive $HOCL^-$ production after exposure to chlorine gas is thought to be the cause of damage to vascular tissues (11).

In the animal studies, it was determined that cardiovascular cell damage occurred due to the decrease in sarcoendoplasmic reticulum calcium ATPase (SERCA) activity after chlorine gas exposure and so cardiac damage markers were found to be high (12). Animal studies have shown that troponin I levels are high in animals with cardiovascular system involvement (13). Our patient had no chest pain but troponin levels were increased during the coronary care unit.

Inhalation of chlorine gas was considered as a stressor. So far, cardiovascular adverse effects have rarely been reported, although respiratory system damage due to chlorine gas is well documented and well known.

Conclusion

Exposure to chlorine gas is commonly manifested by damage to the respiratory system. However, cardiovascular effects such as arrhythmia, acute coronary syndrome, heart failure, or even death may also occur. Those side effects should be kept in mind, cardiac enzyme and ECG monitoring should be performed especially in elderly patients. Emergency medicine physicians should pay attention to these cardiovascular effects and consider that patients exposed to chlorine gas may experience heart damage even if they do not have a history of heart disease**.**

Conflict of Interest: The authors declare no any conflict of interest regarding this article.

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

Authors' Contribution: All authors were equally involved in the preparation of this case report.

References

1.Gorguner M, Aslan S, Inandi T, Cakir Z. Reactive airways dysfunction syndrome in housewives due to a bleach-hydrochloric acid mixture. Inhal Toxicol 2004;16(2):87-91.

2.Guloglu C, Kara IH, Erten PG. Acute accidental exposure to chlorine gas in the Southeast of Turkey: a study of 106 cases.Enviromental research. 2002; 88(2);89-93.

3. Avsarogulları L, İkizceli İ, Sozuer EM, Akdur O, Yucel M, Durukan P, et al. Akut klor gazı inhalasyonları: Olgu serisi - Turk J Emerg Med 2006;6(1):12-15.

4. Babu RV, Cardenas V, Sharma G. Acute respiratory distress syndrome from chlorine inhalation during a swimming pool accident: a case report and review of the literature. Journal of intensive care medicine. 2008; 23(4) 275-80.

5. White CW, Martin JG. Chlorine gas inhalation: human clinical evidence of toxicity and experience in animal models. Proceedings of the American Thoracic Society 2010;7(4):257-63.

6. Kose A, Kose B, Acikalin A, Gunay N, Yildirim C. Myocardial infarction, acute ischemic stroke, and hyperglycemia triggered by acute chlorine gas inhalation. Am J Emerg Med. 2009;27:e1021–e1024.

7. Zaky A, Ahmad A, Dell'Italia LJ, Jahromi L, Reisenberg LA, Matalon S, et al. Inhaled matters of the heart. Cardiovascular regenerative medicine. 2015;2

8. Al B, Bozkurt S, Yıldırım C, Zengin S, Togun İ, Eralp A, et al. Histopathological study of short and long-term pulmonary effects of nebulized sodium bicarbonate treatment in chlorine gas exposured rats. Türkiye Klinikleri J Med Sci 2010;30(2):650-8.

9. Govier P, Coulson JM. Civilian exposure to chlorine gas: A systematic review. *Toxicology letters* 2018;293:249-252.

10. Carlisle M, Lam A, Svendsen ER, Aggarwal S, Matalon S. Chlorine-induced cardiopulmonary injury. Annals of the New York Academy of Sciences. 2016;1374(1):159-67.

11. Menaouar A, Anglade D, Baussand P, Pelloux A, Corboz M, Lantuejoul S, et al. Chlorine gas induced acute lung injury in isolated rabbit lung. European Respiratory Journal. 1997;10(5):1100-7.

12. Ahmad S, Ahmad A, Hendry-Hofer TB, Loader JE, Claycomb WC, Mozziconacci O, et al. Sarcoendoplasmic reticulum Ca2+ ATPase. A critical target in chlorine inhalation–induced cardiotoxicity. American journal of respiratory cell and molecular biology. 2015;52(4):492-502.

13. Zaky A, Bradley WE, Lazrak A, Zafar I, Doran S, Ahmad A, et al. Chlorine inhalation-induced myocardial depression and failure. Physiological reports. 2015;3(6).

Anatolian Journal of Emergency Medicine 2019;2(4); 28-31

CASE REPORT / OLGU SUNUMU

Nöbet sonrası gelişen rabdomiyoliz, Serebral amiloid anjiopati olgusu

After seizures induced rhabdomyolysis, for case report with cerebral amyloid angiopathy

Mehmet Necmeddin Sutaşır[1], Derya Selçuk Demirelli[2]

ÖZ

Amaç:

Serebral amiloid anjiyopati (SAA); leptomeningeal, kortikal, subkortikal arterler, arteriyoller ve de venüllerin duvarlarında amiloid beta peptidlerin birikimi ile karakterize bir hastalıktır. İleri yaşta intraserebral hemorajinin önemli bir sebebidir. SAA hastaları geçici nörolojik bulgular, kognitif bozukluklar, epileptik nöbet ile acil servise başvurabilirler. Epileptik nöbete bağlı rabdomiyoliz akut böbrek hasarının nadir bir nedenidir.

Olgu:

Burada epileptik konvülziyon nedeniyle rabdomiyoliz gelişen ve nihayetinde akut böbrek hasarı oluşan bir SAA tanısı konulan bir olgu sunulmuştur.

Sonuç:

İleri yaş olgularda SAA; geçici nörolojik bulgular, nöbet, baş ağrısı, kognitif bozukluklar ile acil servise başvurabilirler. Epileptik nöbet ile başvuran hastalar rabdomiyoliz ve böbrek yetmezliği açısından erken dönemde değerlendirilmelidir.

Anahtar Kelimeler: Serebral amiloid anjiyopati; nöbet; rabdomiyoliz

ABSTRACT

Aim:

Cerebral amyloid angiopathy (CAA) is characterized by the accumulation of amyloid beta-peptides in the walls of leptomeningeal arteries, arterioles, and veins. This is an important cause of intracerebral hemorrhage in the elderly. These patients can come to the emergency room with transient neurological signs, cognitive disorders, epileptic seizures. Rhabdomyolysis due to epileptic seizure is a rare cause of acute kidney injury.

Case:

Herein, we report a case of CAA with rhabdomyolysis due to epileptic convulsion and ultimately, acute kidney injury.

Conclusion:

SAA may peresent with transient neurological findings, seizures, headache, cognitive disorders to the emergency department in advanced age. Patients presenting with epileptic seizures should be evaluated early for rhabdomyolysis and renal failure.

Keywords: Cerebral amyloid angiopathy, seizures; rhabdomyolysis

Gönderim: 4 Nisan 2019 Kabul:22 Ağustos 2019

1 Sağlık Bilimleri Üniversitesi, Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi, Acil Tıp Kliniği, İstanbul, Türkiye.

2 Sağlık Bilimleri Üniversitesi, Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi, Nöroloji Kliniği, İstanbul, Türkiye.

Sorumlu Yazar: Mehmet Necmeddin Sutaşır MD **Adres:** Sağlık Bilimleri Üniversitesi, Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi, Acil Tıp Kliniği, İstanbul, Türkiye. **Tel:** +90 212 373 50 00 **e-mail:** drmehmetns@gmail.com

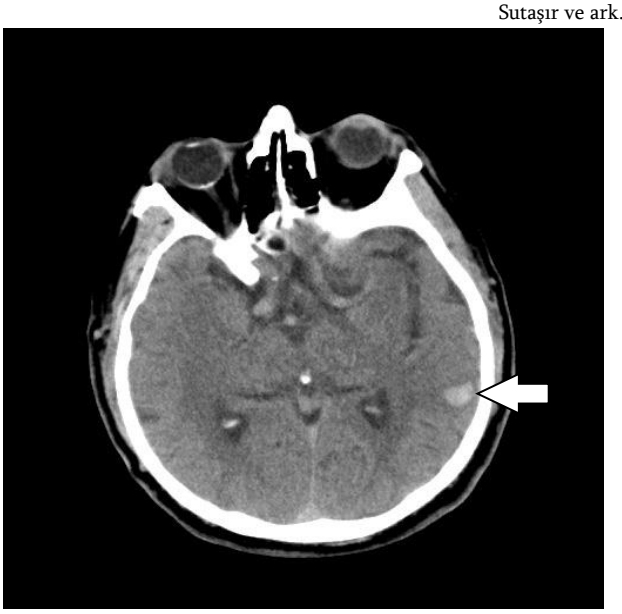
Atıf için/Cited as: Sutaşır MN, Demirelli DS. Nöbet sonrası gelişen rabdomiyoliz, Serebral amiloid anjiopati olgusu. Anatolian J Emerg Med 2019;2(4); 28-31.

Giriş

Serebral amiloid anjiyopati (SAA), intrakraniyal kanama nedenlerinden biridir. Amiloid depolanınca spontan veya travma sonucu rüptüre olabilecek şekilde damar duvarlarında zayıflama olur. SAA'nın klinik-radyolojik belirtileri, nörobiyolojisi ve doğal seyri ile ilgili bilgilerimizin çoğu son yıllarda yapılan çalışmalar sonucunda ortaya çıkarılmıştır (1). SAA büyük ölçüde asemptomatik olabilmekle birlikte, klinikte spontan lober hemoraji ile dikkati çekmekte, manyetik rezonans (MR) görüntülemede rastlantısal mikrohemorajiler ve hemosiderozis bulguları ile prezente olabilmektedir. Hastalar epileptik nöbet ile acil servislere başvurabilmektedir. Epileptik nöbete bağlı rabdomiyoliz akut böbrek hasarının nadir bir nedenidir. Rabdomiyoliz ise travmatik veya travmatik olmayan nedenlerle iskelet kas hücrelerinin hasara uğraması sonucu ortaya çıkan bir durumdur (2). Kas hücrelerinin hasarı sonucu ortaya çıkan miyoglobin ve yıkım ürünleri hem böbrek tübüllerinde direkt toksik etki ile hem de intratübüler obstrüksiyona yol açarak akut böbrek hasarına neden olabilmektedir (3). Konvülziyon geçiren hastaların olay günü böbrek fonksiyonları normal saptansa da ilerleyen günlerde böbrek fonksiyonları bozulabilir. Bu hastaların akut böbrek hasarı gelişimi açısından da yakın takip edilmesi gerekmektedir (4). Burada epileptik konvülziyon nedeniyle rabdomiyoliz gelişen ve nihayetinde akut böbrek hasarı oluşan SAA olgusu sunuyoruz.

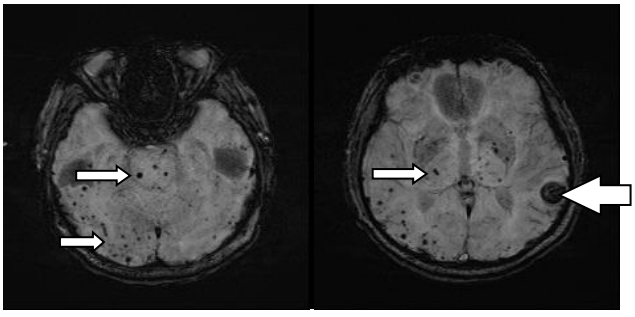
Olgu

Yetmiş altı yaşında erkek hasta yaklaşık 10 dakika süren jeneralize tonik klonik nöbet ile 112 ambulansıyla acil servise (AS) başvurdu. AS'te yapılan muayenesinde bilinç açık, koopere hastanın bir şey hatırlamadığı ancak bir mide bulantısı sonrası fenalık hissi olduğu öğrenildi. Özgeçmişinde 10 yıldır hipertansiyon ve koroner arter hastalığı olduğu verapamil 40 mg, fosinopril hidroklorotiazid 10 mg/12.5 mg, asetil salisilik asit 100 mg kullandığı bilgisine ulaşıldı. Nörolojik muayenesinde, hafif dizartri dışında muayene bulgusu olmadığı görüldü. Hastanın arteriyel kan basıncı 140/90 mmHg, nabız 92 atım/dakika, parmak ucu saturasyon değeri %96, ateşi 36,4 C^o idi. Acil serviste yapılan kraniyal bilgisayarlı tomografi görüntülemesinde; bilateral periventriküler ak madde ve sentrum semiovale düzeyinde kronik iskemik/mikroanjopatik değişikliklere sekonder dansite azalması ve sol temporal lobda yaklaşık 12 mm intraparankimal hematom lehine değerlendirilen hiperdens düzgün sınırlı alan görüldü (Figür1).



Figür 1: Sol temporal lobda intraparankimal hematom

Kraniyal MR incelemesinde ek olarak her iki serebral hemisfer subkortikal ak madde, bazal ganglionlar, pons ve her iki serebellar hemisferlerde multiple sayıda mikrohemoraji odakları izlendi (Figür 2,3). Olgunun acil başvurusundaki ilk laboratuvar tetkiklerinde; kan üre 36,9 mg/dl, kreatinin 0,90 mg/dl, kreatin fosfokinaz (CK): 36365 U/L olarak ölçüldü. Acil servis takiplerinde epileptik nöbeti tekrarlamayan olgumuzda hidrasyon ve idrar alkalizasyonu tedavisine başlandı. Lober hematom ve nöbet sonrası gelişen rabdomiyoliz ön tanıları ile nöroloji kliniğine interne edilen hastanın 4.gününde kan üre: 194 mg/dl; kreatinin: 4,55 mg/dl'e kadar yükseldi. Üriner sistem ultrasonografisi normal saptanan ve nefroloji kliniğince değerlendirilen hastada hemodiyaliz ihtiyacı olmadı. Optimum hidrasyon ve idrar alkalizasyonu ile idrar çıkışı yeterli olan hastanın üre, kreatinin ve CK değerleri geriledi. On beşinci gününde kan üre: 44.3 mg/dl, kreatinin: 1.16 mg/dl, CK: 110 U/L değerleri tespit edildi. Hastanın antiepileptik tedavisi düzenlendi ve takiplerinde tekrarlayan nöbeti olmadı.



Figür 2 **Figür 3**

Figür 2-3: Her iki serebral hemisfer kortikal ve subkortikal alanda, bazal ganglion ve pons lokalizasyonunda multiple sayıda mikrohemoraji odakları (küçük oklar) ve sol temporal lobda intraparankimal hematom görüntüsü (büyük ok)

Tartışma

Serebral amiloid anjiyopati serebrovasküler amiloid birikimini içerir. Kapiller duvarda depolanan amiloid; spontan veya travma sonucu rüptüre olabilecek şekilde damar duvarlarında zayıflamaya neden olur (5).

Yoğun olarak lober bölgelerde, manyetik rezonans gradyen eko (MRI-GRE) sekanslarında küçük noktasal siyah "susceptibility" artefaktları olarak görülüp serebral mikrokanama (SMK) olarak adlandırılan lezyonlara neden olmaktadır. Lober mikrokanamalı hastalar gelecekteki semptomatik lobar intrakraniyal kanama (İKK) açısından önemli risk altındadır. SAA ile ilgili İKK; Helsinki çalışmasında İKK vakalarının % 20'sinde ve Ulusal Tayvan Üniversitesi Hastanesi İnme Kayıt Defterinde vakalarının % 12'sinde görülmüştür. Bu çalışmalarda hipertansif anjiopatiyi takiben İKK'nın en sık ikinci nedeni SAA ile ilişkili İKK olarak raporlanmıştır (6,7). SAA ilişkili kanamalar lokalizasyon ve boyut olarak değişmektedir. En sık oksipital, temporal, pariyetal ve frontal loblarda izlenir (8). SAA'ya bağlı İKK klinik belirtileri arasında; motor parezi, bilinç bozukluğu, afazi, görme kaybı, akut aşamada baş ağrısı ile yüksek beyin fonksiyonlarındaki anormallikler ve kronik aşamalar sırasında demans ve nöbetler bulunur (9). SAA'ya bağlı nöbet sıklığı ile ilgili yeterli veri olmayıp; lober İKK bağlı epileptik nöbet sıklığı %15-32 arası bulunmuştur (10,11). Rabdomiyoliz; sıklıkla travmatik kas zedelenmesi sonrası saptanmakta iken hipertermi, hipokalemi, alkol ve kokain kullanımı, yılan sokması, infeksiyon (lejyonella, koksaki, HIV), ilaç kullanımı (statinler, nöroleptikler) ve kalıtsal miyopati gibi travmatik olmayan durumlarda da gözlenebilmektedir (12). Epileptik nöbete bağlı rabdomiyoliz sık görülmemekle birlikte literatürde %3-7 civarında olduğu gösterilmiştir. Ancak, rabdomiyoliz status epileptikusta tek bir nöbet atağı geçirenlere göre daha yaygındır (13,14,15). Olgumuzda ise tek epileptik nöbet sonrası rabdomiyoliz gelişmiştir. Ender görülüyor olsa da epileptik nöbete bağlı rabdomiyoliz sonrası böbrek fonksiyonlarının bozulduğu olgular literatürde mevcuttur (16). Literatürde tek epileptik nöbet sonucu rabdomiyoliz 3 olguda görülmüş; olguların 2'sinde akut böbrek yetmezliği gelişmiş ve hastalara hemodiyaliz uygulanmıştır (16,17). Olgumuz konvülziyon geçirdikten sonra acile başvurmuş, nöbet etiyolojik olarak araştırılmış ve başvuru anında böbrek fonksiyonları normal saptanmıştır. Ancak takiplerinde CK değerinin arttığı, böbrek fonksiyonlarının bozulduğu gözlenmiştir. Epilepsi hastalarında da şiddetli, tekrarlayıcı, jeneralize konvülziyonlar kas enerji depolarını hızla tüketerek, kas hasar eşiğini düşürerek rabdomiyolize neden olabilmektedir (18). Rabdomiyoliz sonrası miyoglobin, ürik asit, potasyum ve enzimler gibi kas hücre içeriği kana karışır. CK düzeyi hemen daima kanda yükselir. Miyoglobin glomerüllerden filtre olur ve myoglobinüri gözlenir. Miyoglobin ve yıkım ürünleri hem böbrek tübüllerinde direkt toksik etki ile hem de intratübüler obstrüksiyona yol açarak akut böbrek hasarına neden olabilmektedir (2). Rabdomiyolize bağlı akut böbrek hasarı insidansı %8-20 oranında görülmektedir (19). Rabdomiyolize bağlı akut böbrek hasarı gelişen hastaların ise %28-37'sinde diyaliz ihtiyacı gözlenebilmektedir (16). Olgumuzda izlemde hidrasyon ve idrar alkalizasyonuna rağmen üre ve kreatinin değerlerinde progresyon gözlendi. Ancak hidrasyon ve idrar alkalizasyonuna ısrarla devam edildi ve takiplerinde akut böbrek hasarında düzelme eğilimi gözlendi. Diyaliz ihtiyacı gelişmedi. Olgumuza acil serviste rabdomiyolize ve akut renal hasara yönelik tedavi başlanmıştı. Bu tür olgularda erken başlanan hidrasyon ve idrar alkalizasyonunun klinik gidişatın düzelmesinde oldukça önemli olduğu görülmüştür.

Sonuç

İleri yaş olgularda SAA; geçici nörolojik bulgular, nöbet, baş ağrısı, kognitif bozukluklar ile acil servise başvurabilirler. Lober hemorajilerde yüksek insidansından dolayı SAA düşünülmelidir. Epileptik nöbet ile başvuran hastalar rabdomiyoliz açısından değerlendirilmelidir. Erken tanı; optimum hidrasyon ve zorlu alkalin diürez yoluyla akut böbrek yetmezliği riskini önleme fırsatı sağlar.

Çıkar Çatışması: Yazarlar çıkar çatışması beyan etmemiştir.

Finansal Destek: Yazarlar herhangi bir finansal destek beyan etmemiştir.

Yazar Katkı Düzeyleri: Tüm yazarlar bu vaka sunumunun hazırlanmasında eşit düzeyde katkıda bulunmuştur.

Kaynaklar:

1. Gürol ME. Cerebral Amyloid Angiopathy, derleme, Türk Norol Derg 2009; 15: 1-9
2. Vanholder R, Sever MS, Erek E, Lameire N. Rhabdomyolysis. J Am Soc Nephrol 2000; 11:1553-1561
3. Vanholder R, Sever MS, Erek E, Lameire N. Acute renal failure related to the crush syndrome: Towards an era of seismonephrology? Nephrol Dial Transplant 2000; 15:1517-1521
4. Turan MN, Dursun H, Ağan FZ, Karacaoğlu AG ve ark., Turk Neph Dial Transpl 2016; 25 (Ek / Suppl 1): 60-61 Akut Böbrek Hasarının Nadir Bir Nedeni; Epileptik Nöbete Bağlı Rabdomiyoliz doi: 10.5262/tndt.2016.08
5. Kutlu O, Ecirli S, Aygün S, ve ark. Olgu sunumu, Haseki Tıp Bülteni 2006, 92 doi: 10.4274/haseki 2006
6. Meretoja A, Strbian D, Putaala J, Curtze S, Haapaniemi E, Mustanoja S ve ark. SMASH-U: a proposal for etiologic classification of intracerebral hemorrhage. Stroke. 2012; 43:2592–2597.
7. Yeh SJ, Tang SC, Tsai LK, Jeng JS. Pathogenetical subtypes of recurrent intracerebral hemorrhage: designations by SMASH-U classification system. Stroke. 2014; 45:2636–2642.
8. O'Donnell HC, Rosand J, Knudsen KA ve ark. Apolipoprotein E Genotype and Risk of Recurrent Lober Intraserebral Hemorrage. N engl J Med 2000; 342:240-5.
9. Hirohata M, Yoshita M, Ishida C, Ikeda SI, Tamaoka A, Kuzuhara S, et al. Clinical features of non-hypertensive lobar intracerebral hemorrhage related to cerebral amyloid angiopathy. Eur J Neurol. 2010; 17:823–829.
10. Sung CY, Chu NS. Epileptic seizures in intracerebral haemorrhage. J Neurol Neurosurg Psychiatry. 1989 Nov; 52(11): 1273–1276. doi: 10.1136/jnnp.52.11.1273
11. Sümer MM. Serebrovasküler Hastalik Sonrasi Gelten Epileptik Nöbetler. Epilepsi. 2000; 6(2): 110-115.
12. Nazliel B, Kocer B, Irkec C ve ark. AI. GUTF Nöroloji ABD da 1989-1998 Arasında İzlenen Serebral Kanama Olguları. Ege Tıp dergisi 2001; 40:105-9
13. Blanco JR, Zabalza M, Salcedo J, Echeverria L, García A, Vallejo M. Rhabdomyolysis of infectious and noninfectious causes. South Med J. 2002 May;95(5):542-4.
14. Veenstra J, Smit WM, Krediet RT, Arisz L.. Relationship between elevated creatine phosphokinase and the clinical spectrum of rhabdomyolysis. Nephrol Dial Transplant. 1994;9(6):637-41.
15. Melli G, Chaudhry V, Cornblath DR. Rhabdomyolysis An Evaluation of 475 Hospitalized Patients. Medicine (Baltimore). 2005 Nov;84(6):377-85.
16. Gupta P, Singh VP, Chatterjee S, Agarwal AK. Acute renal failure resulting from rhabdomyolysis following a seizure. Singapore Med J 2010;51:e79-80
17. Zhou J, Luo B, Peng G. A single seizure attack induced rhabdomyolysis. Neurol India 2017;65, Suppl S1:93-4
18. Khan FY. Rhabdomyolysis. A review of the literature. Neth J Med. 2009; 67:272-283
19. Splendiani G, Mazzarella V, Cipriani S, Pollicita S, Rodio F, Casciani CU. Dialytic treatment of rhabdomyolysis-induced acute renal failure: Our experience. Ren Fail 2001;23:183-191

REVİEW / DERLEME

Management of Geriatric Trauma: General Overview

Geriyatrik Travma Yönetimi: Genel Bakış

Abdullah Algın[1], Serkan Emre Eroğlu[1]

ÖZ

Türkiye İstatistik Kurumu (TÜİK) verilerine göre; 2012 yılında 5 milyon 682 bin olan yaşlı nüfus (65 yaş ve yukarı yaş) 2016 yılına kadarki süreçte %17,1 artarak 6 milyon 651 bin olmuştur. Bu bilgiler ışığında, yaşlanmakta olan ülkemizde daha fazla oranda geriatrik travma örnekleri ile karşılaşacağımızı öngörebiliriz. Bu durum ise, travmaya genel yaklaşım açısından, diğer yaş gruplarıyla aralarında belirgin fark yaratmasa da, azalmış fizyolojik rezerv, ikincil sorunlar ve olası gizli travmalar açısından dikkati gerektirir. Travma yönetiminin temellerinde yatan birincil ve ikincil bakıya ait kurallar aynen uygulanırken sergilenmesi gereken bu dikkat gereksinimini ortaya çıkaran pek çok faktör vardır.

Kullanılan ilaçlar, alerji öyküsü olup olmaması, eşlik eden bir kronik hastalıkların bilinmesi, bu hastaların yönetimi sırasında gözönüne alınan faktörlerden sadece birkaçıdır. Yine, travma öncesi son sağlık durumu travmanın etiyolojisinde rol oynayabileceğinden; eşlik eden hastalık öyküsü ve/veya eski elektrokardiyografi, kan şekeri değeri gibi kayıtlar da gözden geçirilmesi gerekenler arasındadır.

Sonuç olarak, geriyatrik travma hastalarına dikkatle genel fizik muayene yapılıp, tanı-tedavi ve süreç yönetimini etkileyebilecek faktörler değerlendirilmelidir. Özellikle yaşlı popülasyonda stabil gibi görünen hastaların, çok kısa bir sürede ve erken bir uyarıcı semptom olmadan kötüleşebileceği unutulmamalıdır.

Anahtar kelimeler: Geriyatri; travma; yönetim

ABSTRACT

According to the Turkish Statistical Institute (TSI), the Turkish geriatric population (aged 65 and above) increased from 5,682,000 in 2012 to 6,651,000 in 2016. This represents an increase of 17.1%. With respect to this information, geriatric trauma cases in Turkey are likely to increase over the coming years. Though this is unlikely to transform conventional medical approaches to trauma in geriatric patients, extra attention must be paid to this population's hidden trauma and complications secondary to reduced physiological reserves. When applying the basic principles of primary and secondary assessment in trauma management, myriad factors contribute to this need for additional caution when treating the elderly.

Medications, history of allergies, and the identification of any accompanying chronic diseases are just a few of the multiple factors that must be considered when managing elderly patients. Furthermore, patients' general health statuses prior to the trauma and accompanying medical histories should be evaluated alongside any prior tests such as ECGs or blood sugar measurements.

To summarize, geriatric patients must undergo general physical examination and factors affecting diagnosis, treatment, and process management must be analyzed and accounted for. The health of geriatric patients may deteriorate rapidly and without warning, even when it appears stable. This represents a unique challenge with this patient group and must not be overlooked.

Keywords: Geriatrics; trauma; management

Received: December 22, 2019 Accepted: December 27, 2019

1 Department of Emergency Medicine, University of Health Sciences Umraniye Training and Research Hospital, Istanbul, Turkey

Corresponding Author: Abdullah Algın, MD **Address:** Department of Emergency Medicine, University of Health Sciences Umraniye Training and Research Hospital, Istanbul, Turkey Phone: +90(554) 2763968 **e-mail:** dralgin@hotmail.com

Atıf için/Cited as: Algın A, Eroglu SE. Management of geriatric trauma: general overview. Anatolian J Emerg Med 2019;2(4); 32-36

Introduction

In the United States of America (USA), more than 1 million patients over 65 years of age present to the emergency department at least once a year due to trauma. At least 46,000 of these cases resulted in the patient's death (1).

Due to the perpetual rise in global geriatric populations, successful geriatric trauma management is of ever-increasing importance. Although geriatric patients typically experience low energy trauma incidents, they may still be seriously injured. Due to pre-existing conditions (e.g. hypertension) and/or medications (e.g. beta blockers), geriatric patients' response to injury is different than young or adult populations (2). Mental health conditions (e.g. dementia, delirium) may affect diagnosis. Chronic diseases (e.g. cirrhosis, coagulopathy, COPD, ischemic heart disease) lead to a two-fold increase in mortality rates for trauma patients (3).

As with the development of trauma, many factors are associated with changes in clinical outcomes. While assessing physiological changes, chronic diseases, and medication usage associated with advancing age, attention must also be paid to the following prominent factors;

Physiological changes and pathologies associated with advanced age

Though all bodily systems are affected by aging, three systems are typically considered to be of particular importance: the respiratory, cardiovascular, and central nervous systems.

- For the respiratory system, reduction in functional capacity and lung elasticity as well as increased rigidity of the thoracic wall leads to accompanying reduction in tidal volume (4). Additionally, stress and chronic obstructive pulmonary disease (COPD) are possible causes of decreased capacity for compensation. Clinical outcomes such as simple rib fractures and severe respiratory failure may occur as a result.
- For the cardiovascular system, a reduction in arterial elasticity, heart valve conditions, cardiac muscle loss accompanying to a reduced capacity to pump, and a reduced response to catecholamines may cause a marked reduction in ability to compensate in the case of injury or shock (5). Independently, physiological changes such as prior heart failure or coronary artery disease may contribute to decompensation.
- For the central nervous system, cerebral atrophy and the stretching or tearing of bridging veins leads to the frequent occurrence of secondary subdural haemorrhage ï(4). Furthermore, the association between advancing age and an increased risk of dementia and similar pathologies may complicate the diagnosis and treatment of patients.

Elderliness and its comorbidities' effects on trauma

Hypertension (HT), diabetes mellitus (DM), cirrhosis, ischemic heart disease, COPD, and degenerative central nervous system disorders are the primary comorbidities in the geriatric population (6).

In addition to their negative effects on trauma outcomes, physiological changes, comorbidities, and medication usage play a role in masking the severity of trauma, inhibiting effective patient management, and delaying the healing process.

Due to the effect of all these factors;

Simple traumas such as same-level falls may cause serious injury, rendering medical professionals incapable of predicting severity of injury (7).

The majority of geriatric patients are hypertensive; hypotension must therefore be evaluated relative to their normal blood pressures (8).

Geriatric patients may lose their ability to compensate in hypotensive states due to usage of medications such as beta blockers (9).

The use of warfarin and antiplatelet medications increase the risk of systemic or intracranial haemorrhage (10).

Mechanisms of Injury

Falls, motor vehicle accidents, burns, and pedestrian injuries are the most common mechanisms of injury in geriatric patients (11).

Notably, in the USA, fall-related geriatric admissions reach over 2.3 million cases and cost 30.4 billion dollars. Furthermore, simple low energy falls are associated with a serious risk of mortality (12). The most common fall-related condition in the geriatric population is traumatic brain injury. Almost half of the deaths in this population are secondary to same-level falls causing traumatic brain injury (13).

Geriatric Patient Population Trauma Examination and Management

Internationally accepted standards of trauma management must be upheld and utilized in geriatric patients. Accordingly, primary assessment of geriatric trauma patients closely resembles that of adult trauma patients. In addition to this, clinicians must take extra care to take patients' age into account during primary and secondary assessment in cases where it is of clinical importance.

The following steps in patient care must be carried out while taking both the patient's medical history and physiology into account:

Airway assessment: Patients' airways must be assessed immediately at presentation to the emergency department through evaluating their ability to talk. When assessing geriatric patients' airways, it is important to note that some patients may struggle to talk due to anatomical differences from other patient groups. For this reason, geriatric patients

must be categorized as difficult intubations, and alternative airway management methods must be prepared (14, 15).

Dentures or absent teeth may cause difficulties during airway management. Dentures may block a patient's airway. If dentures are not blocking the airway, conducting bag-valve-mask ventilation with dentures in place will increase adherence rates. In some geriatric patients, the absence of teeth may also increase difficulty of ventilation (14).

Certain arthritic conditions can also lead to difficulties. Temporomandibular arthritis may lead to an insufficient range of motion in the jaw, while cervical arthritis may prevent patients from extending their necks sufficiently (15).

In order to prevent hypotension, extra attention must be paid to medication dosage during drug-assisted orotracheal intubation. Additionally, patients must be closely monitored. Similarly, dosages of barbiturates, benzodiazepines, and similar sedative drugs must be reduced by 20 - 40% during rapid sequence intubation to decrease the risk of cardiovascular depression (16). For the same reason, etomidate should be preferred over propofol and high dose benzodiazepines for induction of anaesthesia, due to the risk of causing haemodynamic depression of the latter two (17).

Breath assessment: Geriatric patients are at particular risk of hypercapnea, hypoxia, and respiratory failure. This is due to lung/thoracic wall issues being insufficiently compensated in this patient group. Increased respiratory workload in these patients can be attributed to a decrease in thoracic wall compliance. Consequently, increased risk of complications such as lung edema, pulmonary emboli, and atelectasis is observed in geriatric patients (4).

While providing respiratory support to elderly patients, extra care should be paid to the following points:

1. Supplementary oxygen should be provided regardless of oxygen saturation (18).
2. Early intubation should be carried out in cases of serious thoracic wall injuries or increased CO2 levels (due to underlying respiratory diseases) (19).
3. If non-invasive respiratory support is utilized, tidal volumes of 7 - 8 cc/kg (500-600cc) should be preferred, and during this process gastric distention should be prevented to decrease the risk of vomiting or inhibited ventilation (20).

Assessment of circulation: When assessing circulatory function, low cardiac output secondary to reduced cardiac contractility must be considered for geriatric patients. If patients suffer from coronary failure secondary to atherosclerosis, hypertension, or structural myocardial changes, it is prudent to note that post-traumatic hypoxia and hypovolemia may cause compensatory tachycardia leading to acute myocardial infarction, acute left heart failure, and/or life-threatening defects (21).

Due to geriatric patients' increased systemic vascular resistance, or hypertension seen in the overwhelming majority of geriatric patients, seemingly normal blood pressure values may actually reflect a hypotensive state. Consequently, an adjusted hypotensive reference value for geriatric patients has been specified as 100 mmHg (22). This adjusted value should be used when treating geriatric patients.

As this patient group presents an increased risk of hypotension and ischemia, sufficient and appropriate fluid replacement is vital. Similarly, treatment should aim to normalize cardiac output and prevent tissue hypoxia while taking care not to cause volume overload. Extra care must also be paid to patients on diuretic medications during fluid replacement therapy as they may have a larger volume deficit. In order to evaluate optimal fluid levels central venous pressure, echocardiography, or ultrasonography should be utilized. In addition, parameters such as blood lactate levels and base deficit, or shock index may be used as indicators of tissue perfusion (23).

Hypotension is related to volume depletion (dehydration, sepsis, or bleeding), pump problems (heart failure or loss of left ventricular function), or heart rate (tachycardia or bradycardia). Keeping these conditions in mind, unresponsiveness to bolus fluid infusion or blood transfusion in the absence of heart failure should be treated as a likely hemorrhage (24).

Neurological assessment: The direct association of neurological deficit with mortality secondary to trauma render this assessment particularly important (25). Irrespective of etiology, the application of ABCDE and its effect on fast and effective evaluation and treatment is of critical importance. At this stage, determining chronological onset of neurological problems or trauma is of no importance in primary assessment.

Another condition that must be kept in mind while treating these patients is an increased incidence of subarachnoid or subdural hemorrhage secondary to cerebral atrophy. To reiterate, anticoagulants or antiplatelet drugs used in the treatment of comorbidities increase the risk of epidural hemorrhage (26). Conversely, atherosclerotic disease increases risk of ischemic stroke secondary to blunt cervical trauma or shock.

Another risk specific to geriatric patients is an increased rate of cervical spine injury from same-level falls due to osteoporotic and arthritic conditions. Serious cervical spine injuries may be observed even in patients falling from relatively low surfaces such as beds. For this reason, advanced imaging must be considered even in cases of low energy trauma.

Complete assessment (completely undressed): This critical step of trauma assessment must assess acute injuries and chronic skin lesions or soft tissue injuries secondary to diabetes or peripheral vascular diseases. This can prevent serious, life-threatening harm and help identify the locations of any hidden minor injuries.

Geriatric Disease and Medication

Given both the physiological and structural changes that occur with advancing age and the multitude of accompanying diseases, the importance of using medication in trauma management cannot be overstated. For example, due to thinning of the skin, microvascular circulatory changes, and subcutaneous tissue loss in geriatric patients, pre-warmed intravenous fluids and blood products (excluding thrombocytes) may be required to reduce risk of hypothermia. Non-intubated patients administered sedatives such as benzodiazepines in combination with analgesics risk respiratory depression and delirium (27). For this reason, agitated or aggressive patients should be assessed for hypoxia, hypoventilation, and shock risk prior to the administration of any sedative agents. Independently of this, elderly patients may be more susceptible to respiratory depression and hypotension, and lower starting doses should therefore be considered when administering analgesics (27).

Drugs that may influence patient management strategy should be accurately identified during medical history taking, as they are equally as important as drugs used in emergency treatment. For this purpose, warfarin, clopidogrel, salicylates, beta blockers, and ACE inhibitor usage especially should be identified prior to treatment (28). Likewise, the use of oral anticoagulants and antiplatelet agents increases risk of hemorrhage. Furthermore, beta blockers may mask tachycardia during hypovolemic shock. For these patients in particular, parameters independent of blood pressure, such as blood lactate and base deficit, must be evaluated. Accurate identification of medication usage is therefore absolutely vital.

Geriatric Patient Examination

All conventional trauma management strategies are applicable to geriatric patients. Additionally, certain specific examinations must be carried out with extra care. In this patient group, arterial or venous blood gas should be evaluated (23). Furthermore, occult shock that requires resuscitation can be predicted be evaluating lactate and base deficits; special attention should therefore be paid to these vital parameters (23). Hemorrhage and renal function tests, alcohol levels, urinary toxicological parameters, serum electrolytes, electrocardiography, elevated cardiac enzymes accompanying abnormal electrocardiographical findings or thoracic trauma, and suspicious elevations of creatine kinase suggestive of rhabdomyolysis must also be investigated thoroughly (29).

As well as laboratory tests, thoracic and pelvic imaging should be carried out in all cases of low energy trauma. Computed tomography is necessary in cases of closed head trauma. Full body computed tomography should be considered for all at-risk patients (30).

Conclusion

In geriatric patients, conventional emergency department procedures should be followed: airway, respiration, and circulation should be assessed and monitored concurrently with vital parameters such as blood pressure, pulse, respiration rate, and oxygen saturation. Though advisable for all trauma patients, cardiorespiratory monitoring should be initiated earlier in geriatric patients.

Emergency department physicians should also be especially careful to prevent late diagnosis by assessing geriatric patients for cognitive changes. Likewise, stricter thresholds should be respected when measuring physiological changes in geriatric patients as this will improve outcomes and prevent delayed diagnosis of severe injuries. Limited physiological reserves may lead to seemingly minor injuries having life-threatening consequences for geriatric patients. Clinicians may observe rapid deterioration to unstable conditions in patients, despite the absence of any precipitating symptoms.

Due to the physiological changes induced by medications used, chronic diseases must also be accounted for when examining and treating patients.

Conflict of Interest: The authors declare no any conflict of interest regarding this article.

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

Authors' Contribution: All authors were equally involved in the preparation of this article.

References:

1. Kramarow E, Chen L, Hedegaard H, Warner M. Deaths from unintentional injury among adults aged 65 and over: United States, Hyattsville, MD: National Center for Health Statistics; 2015.
2. Joyce MF, Gupta A, Azocar RJ. Acute trauma and multiple injuries in the elderly population. Curr Opin Anaesthesiol. 2015;28:145–50.
3. Min L, Burruss, S, Morley E, et al. A simple clinical risk nomogram to predict mortality-associated geriatric complications in

severely injured geriatric patients. J Trauma Acute Care Surg. 2013;74:1125–32.
4. Colwell C. Geriatric trauma: Initial evaluation and management. Web site. Available at: https://www.uptodate.com/contents/geriatric-trauma-initial-evaluation-and-management. Accessed December 22,2019.
5. Martin JT, Alkhoury F, O'Connor JA, et al. Normal vital signs belie occult hypoperfusion in geriatric trauma patients. Am Surg. 2010;76:65–9.
6. McGwin G, MacLennan PA, Fife JB, et al. Preexisting conditions and mortality in older trauma patients. J Trauma. 2004;56:1291–6.
7. Wang H, Coppola M, Robinson RD, et al. Geriatric trauma patients with cervical spine fractures due to ground level fall: five years experience in a level one trauma center. J Clin Med Res. 2013;5:75–83.
8. Keenan NL, Rosendorf KA. Prevalence of hypertension and controlled hypertension – United States, 2005–2008. Morb Mortal Wkly Rep. 2011;60:94–7.
9. Kennedy RD, Caird FI. Physiology of the aging heart. Cardiovasc Clin. 1981;12:1–8.
10. Bradburn E, Rogers FB, Krasne M, et al. High-risk geriatric protocol: improving mortality in the elderly. J Trauma Acute Care Surg. 2012;73:435–40.
11. Ferrera PC, Bartfield JM, D'Andrea CC. Outcomes of admitted geriatric trauma victims. Am J Emerg Med. 2000;18:575–80.
12. Joseph B, Pandit V, Khalil M, et al. Managing older adults with ground-level falls admitted to a trauma service: the effect of frailty. J Am Geriatr Soc. 2015;63:745–9.
13. Stevens JA. Fatalities and injuries from falls among older adults—United States 1993–2003 and 2001–2005. MMWR Morb Mortal Wkly Rep. 2006;55:1221–24.
14. Murray D, Dodds C. Perioperative care of the elderly. Contin Educ Anaesth Crit Care Pain. 2004;4:193–6.
15. Johnson KN, Botros DB, Groban L, Bryan YF. Anatomic and physiopathologic changes affecting the airway of the elderly patient: implications for geriatric-focused airway management. Clinical interventions in aging. 2015;10:1925.
16. Kanonidou Z, Karystianou G. Anesthesia for the elderly. Hippokratia. 2007;*11*:175.
17. Lewis MC, Abouelenin K, Paniagua M. Geriatric trauma: special considerations in the anesthetic management of the injured elderly patient. Anesthesiology clinics. 2007;*25*:75-90.
18. Cook DJ, Rooke GA. Priorities in perioperative geriatrics. Anesth Analg. 2003;96:1823–36.
19. Richter T, Ragaller M. Ventilation in chest trauma. Journal of Emergencies, Trauma and Shock. 2011;*4*:251.
20. Chiumello D, Coppola S, Froio S, et al. Noninvasive ventilation in chest trauma: systematic review and meta-analysis. Intensive care medicine. 2013;*39*:1171-80.
21. Strait JB, Lakatta EG. Aging-associated cardiovascular changes and their relationship to heart failure. Heart Failure Clinics. 2012;8:143-64.
22. Oyetunji TA, Chang DC, Crompton JG, et al. Redefining hypotension in the elderly: normotension is not reassuring. Arch Surg. 2011;146:865–9.
23. Calland JF, Ingraham AM, Martin N, et al. Evaluation and management of geriatric trauma: an Eastern Association for the Surgery of Trauma practice management guideline. J Traum Acute Care. 2012;73:S345–50
24. Duschessne J, De La'O C: Prehospital Care. In: Rodriguez A, et al. (eds.) Geriatric Trauma and Acute Care Surgery. 1nd ed, Baltimor, Sringer,2018, p.29-37.
25. Gardner RC, Dams-O'Connor K, Morrissey MR, Manley GT. Geriatric traumatic brain injury: epidemiology, outcomes, knowledge gaps, and future directions. Journal of neurotrauma. 2018;*35*:889-906.
26. Harris C, DiRusso S, Sullivan T, Benzil DL. Mortality risk after head injury increases at 30 years. J Am Coll Surg. 2003;197:711–6.
27. TW Cutler, TR Clark. General Principles of Geriatric Drug Therapy. Journal of Contemporary Pharmacy Practice. 2018;65:31-6.
28. C Reske-Nielsen, R Medzon. Geriatric trauma. Emerg Med Clin North Am. 2016;34:483–500.
29. Bhandarkar P, Pal R, Munivenkatappa A, et al. Distribution of laboratory parameters in trauma population. Journal of emergencies, trauma, and shock. 2018;11:10.
30. Peñasco Y, Sánchez-Arguiano MJ, González-Castro A, et al. Whole-body computed tomography as a factor associated with lower mortality in severe geriatric trauma with thoracic-abdominal-pelvic injury. Revista Española de Anestesiología y Reanimación (English Edition), 2018;65:323-28.