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The journal aims to publish scientifically high quality articles which can contribute to the literature and written in the emergency medicine field and other related fields. Review articles, case reports, editorial comments, letters to the editor, scientific letters, education articles, original images and articles on history and publication ethics which can contribute to readers and medical education are also published.

The journal's target audience includes Emergency Medicine experts, School members who conduct scientific studies and work in the Emergency Medicine field, researchers, experts, assistants, practicing physicians and other health sector professionals.

Editorial and publication processes of the journal are shaped in accordance with the guidelines of the international organizations such as the International Council of Medical Journal Editors (ICMJE), the World Association of Medical Editors (WAME), the Council of Science Editors (CSE), the Committee on Publication Ethics (COPE), the European Association of Science Editors (EASE). The journal is in conformity with Principles of Transparency and Best Practice in Scholarly Publishing (doaj.org/bestpractice).

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Manuscript Types

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Case Report	1500	200	10	No tables	10 or total of 20 images
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Book Section: Sherry S. Detection of thrombi. In: Strauss HE, Pitt B, James AE, editors. Cardiovascular Medicine. St Louis: Mosby; 1974.p.273-85.

Books with Single Author: Cohn PF. Silent myocardial ischemia and infarction. 3rd ed. New York: Marcel Dekker; 1993.

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EURASIAN JOURNAL OF EMERGENCY MEDICINE

The Relationship Between Blood Alcohol Concentration and Injury Severity in Patients Admitted to The Hospital Emergency Department After a Motor Vehicle Accident

Serkan Doğan[1], Nurdan Acar[2], Arif Alper Çevik[2], Engin Özakın[2], Filiz Baloğlu Kaya[2], Didem Arslantaş[3]

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Abstract

Aim: The aim of our study is to establish the point at which a high blood alcohol concentration (BAC) in patients admitted to a hospital's emergency department (ED) after an automobile accident can increase the severity of the injury and influence the survival and death rates.

Materials and Methods: Our study is a prospective performed on patients ≥18 years of age admitted to the ED for in-car road accidents (ICRA) between September 15, 2011 and September 14, 201214-09-2012. Information such as demographic features, trauma score systems, BACs, hospital charges, discharge, hospitalization, and death of the patients was recorded.

Results: The BACs of 52 out of a total of 324 patients were determined to be above normal limits (50 mg/dL). The clinical condition of patients with a BAC above normal limits was relatively worse (42.9%) than those with a BAC within normal limits ($p<0.05$). The BAC was above normal limits for 30.0% of the hospitalized patients, for 50% of surgical patients, and for 45.5% of deceased patients.

Conclusion: This study determined that there is a relationship between a high BAC and injury severity for patients admitted to the ED for ICRA and that a high BAC negatively affects the survival rate and increases the death rate in emergency medicine.

Keywords: Blood alcohol concentration, in-car road accident, injury severity, emergency unit

Introduction

Trauma, especially during automobile accidents, is the primary cause of death among young people aged 1-44 years in developed countries (1). According to estimates by the World Health Organization (WHO), while road accidents were placed ninth for the cause of death in 2004, they will become the fifth in 2030: 2.4 million people are expected to die in automobile-related accidents (2). A significant increase has been observed in trauma associated with the consumption of alcohol, with road accidents at the top of the list. These represent 23% of admissions to a hospital's emergency department (ED) (3, 4). In many countries, the consumption of alcohol by drivers is limited by law. In Turkey, the legal limit is defined as 0.50 promille (50 mg/dL) (5).

Easy access to alcohol creates individual, social, economic, and health problems. Alcoholic people can be the source of problems not only for their family and friends but also for society at large. In the management of patients admitted for automobile accidents, alcohol, injury severity, and the resultant damage it may cause (including handicap and death) are an important part of social health policies because of high economic costs.

Physiological, anatomical, and combined trauma scoring systems (TSSs) are used to determine injury severity and to estimate death and handicap rates (6).

In our study, our primary objective is to determine whether the blood alcohol concentration (BAC) in patients admitted to the hospital for in-car road accidents (ICRA) can alert emergency physicians about potential injury severity and survival and death outcomes in order to direct appropriate patient management and undertake carefully planned action in the diagnosis and treatment of these patients. Our secondary objective is to observe whether hospital charges increase for patients with BACs above normal limits.

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Materials and Methods

Study design

This prospective study is an observational and descriptive research performed in the Emergency Medicine Department of the Faculty of Medicine of Eskişehir Osmangazi University (ESOGÜ) between September 2011 and September 2012. Approval was obtained for this study from the Ethics Committee of this university on October 31, 2011 under Reference 266. We informed our patients regarding this study. Patients ≥18 years of age who were admitted to the ED of this university between September 15, 2011 and September 14, 2012 (over 1 year) for ICRA were included in the study.

Results, measurements, and data collection

Trauma management of all ICRA patients was performed according to the actual advanced trauma life-support guidelines. The vital statistics of the patients who were evaluated by the trauma team were recorded, and primary care and necessary medical interventions were applied simultaneously. Data collection forms were used to collect the following: demographic data of the patients; details of each accident and patient; results of the TSSs, which included the Glasgow coma scale (GCS), abbreviated injury scale (AIS), revised trauma score (RTS), injury severity score (ISS), trauma and injury severity score (TRISS), as well as BACs; interventions made and analyses requested; all consultations; and data on discharge, hospitalization, and death. Hospital charges were also recorded as part of the data.

Laboratory alcohol analysis

An additional tube of blood from the first blood samples was sent to the laboratory for the determination of BAC, which was analyzed using an Olympus AU400 autoanalyzer, Indigo desktop device, and Thermo Fisher Scientific Ethyl Alcohol Assay A-E kit. When considering BAC and its effects on the organism, the blood alcohol levels were separated into four groups: legal limit (0-50 mg/dL), slightly inebriated (51-150 mg/dL), moderately inebriated (151-200 mg/dL), and severely inebriated (≥201 mg/dL) (7).

Criteria for study inclusion and exclusion

Patients aged ≥18 years involved in an ICRA were included in this study. Patients <18 years, accidents other than ICRA, patients transferred from any other center where the first intervention was already made, patients with an AIS score of 6 (patients who are not treated and patients dead on arrival (DOA) to the ED), and patients who did not give their approval were not included in this study.

Statistical analysis

After calculations, the trauma scores were recorded. GCS was scored by evaluating three main functions, namely, eye opening, oral, and motor responses. The best prognosis obtained was 15 points, while the worst was 3 points. RTS, GCS, respiratory rates, and systolic blood pressure values were calculated by scoring. The scores defined were multiplied by the coefficients and then summed (RTS = 0.9368 × GCS + 0.7326 × SKB score + 0.2908 × SS score). In our study, this calculation was made using the RTS calculator provided on the www.trauma.org Web site. The injuries were scored from 0 to 5, using AIS 90-94 scales according to the anatomical regions. The squares of the scores obtained for the three anatomical regions with the highest scores were summed. The scores of the other regions were not included in the calculation. A score of 75 was considered to be the highest score. Our study used the ISS calculator on the www.trauma.org Web site for the ISS score calculation. TRISS was calculated by adding the age index to RTS and ISS. The upper limit for the age index was 55 years. Due to calculation difficulties, we used the TRISS calculator provided on the www.trauma.org Web site (8). Data analyses were performed using the Statistical Package of Social Sciences 20 (IBM SPSS Statistics; Armonk, NY, USA) software. The chi-square, Student's T-test, Mann-Whitney U test, Kruskal-Wallis H test, and Pearson and Spearman correlation tests were used. The value of $p<0.05$ was considered statistically significant, with a 95% confidence interval.

Results

The total number of admissions in 1 year was 324: 210 (64.8%) patients were men and 114 (35.2%) were women; the BAC was above normal limits for 52 (16%) patients. Alcohol consumption was the highest in the 35- to 44-year-old age group, i.e., 26% ($p<0.05$). The alcohol consumption rate in men (21.9%) was higher than that in women (5.3%) ($p<0.05$). It was observed that 169 (52.2%) patients admitted after an ICRA were drivers. For 34 (20.1%) patients, the BAC was above normal limits ($p<0.05$). We detected that 240 (74.1%) patients admitted after an ICRA had an unfastened seatbelt and the BAC for 41 (17.1%) patients was above normal limits. We observed that 41 (78.8%) of 52 patients for whom BAC was above normal limits had an unfastened seatbelt. It was established that 243 (75%) and 81 (25%) of the accidents occurred in normal and abnormal (rainy, snowy, foggy, and icy) weather/road conditions, respectively. In 18 (22.2%) of the accidents occurring in abnormal weather/road conditions, the BAC was above normal limits. For patients with a BAC above normal limits, the general clinical condition was 42.9% worse ($p<0.05$) than that for those within normal BAC limits. The most frequent cases of ICRA with a BAC above normal limits occurred during spring (21.7%); in March, it was 31.2%.

The most frequent arrival times of ICRA patients with a BAC above normal limits to the ED were between 00:00 and 07:59 AM (32.2%). The distribution of the arrivals over 24 hours is shown in Figure 1 ($p<0.05$).

When considering the medical interventions provided to patients with a BAC within normal limits, the intubation rate was 8% and the reanimation rate was 4%, whereas these were 38.5% and 46.2%, respectively, for patients with a BAC above normal limits ($p<0.05$). A statistically positive relationship was established between a BAC above normal limits and injury severity. The relationship between a BAC above normal limits and TSS is enumerated in Table 1 ($p<0.05$).

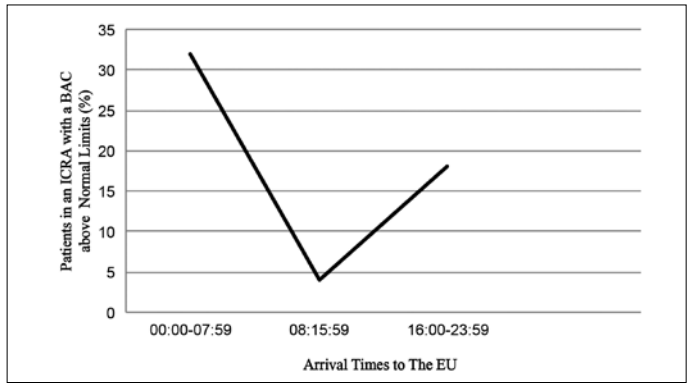

Figure 1. Relationship between ICRA patients with a BAC above normal limits and their arrival times to the ED

In addition to the statistically positive relationship between a BAC above normal limits and the injury severity in patients, this study determined that there is a statistically significant increase in injury severity associated with the increase of BAC. Table 2 shows the relationship between BAC, divided into four groups, and TSS (p<0.05).

While the median value of the number of consultations requested in the ED management process for patients with a BAC above normal limits is 1 (0-5), this value was 0 (0-7) for patients with a normal or subnormal BAC (p<0.05). When considering the time spent by patients in ED (in hours), it was determined that patients with a BAC above normal limits spent, at the most, 12 hours, whereas patients with a normal or subnormal BAC spent at the most 24 hours (p<0.05).

When considering the clinical output of patients, this study established that 30% of the patients hospitalized in services, 45.5% of the patients who died, and 50% of the patients who required surgery had a BAC above normal limits (p<0.05). The hospital charges calculated for the time spent at the hospital was higher for patients with a BAC above normal limits than for those within normal limits. The median value of hospital charges for patients with a BAC above normal limits was $178.44 ($14.94-14143), while it was $84.69 ($12.34-28642) for patients with a normal or subnormal BAC. The relationship between a BAC above normal limits and the hospital charges is given in Figure 2 (p<0.05).

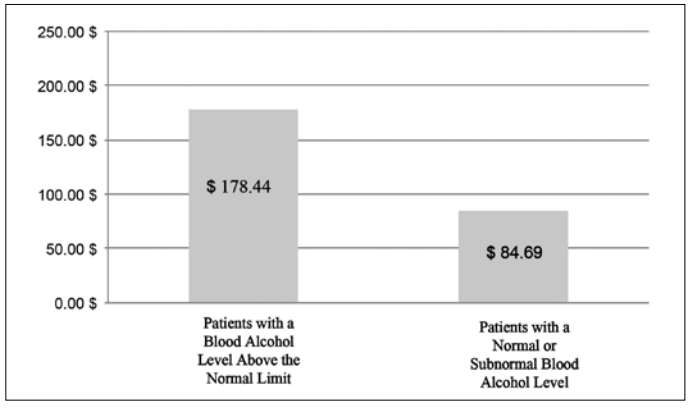

Figure 2. Relationship between a BAC above normal limits and the hospital charges

Table 1. Relationship between a BAC above normal limits and TSS

Trauma scoring system	Alcohol detected X±SE	No alcohol X±SE	Statistical value
GCS	12.84±0.61	14.50±0.12	t=2.63 p<0.05
RTS	6.97±0.29	7.67±0.50	t=2.36 p<0.05
TRISS	87.37±3.85	96.38±0.84	t=2.28 p<0.05
	Alcohol detected Median (min-max)	No Alcohol Median (min-max)	
ISS*	6 (0-66)	3 (0-57)	z=9.53 p<0.05

*The ISS parameter was analyzed using the Mann–Whitney U test.

Discussion

The patients admitted to the ED for ICRA were evaluated for death and handicap by the admissions department at the multidisciplinary trauma center and finalized as soon as possible. In our study, increases were observed in the injury severity, death, handicap, and hospital charges for patients with a BAC above normal limits. The risks increase with the increase in the BAC. Thus, in our study, the aim was to determine how to perform medical diagnosis and treatment in a more careful and planned manner by taking into consideration the increased risks in the ED.

Most road accidents involving patients with a BAC above normal limits were observed in the 35-44-year-old age group, which is considered to be the most frequent age group for ICRA patients. In literature, Mason et al. (9) reported that the most frequent ICRA patients with a BAC above normal limits fall within the 21-24-year-old age group, while Kesen et al. (10) cited the same to be the 35-44-year-old age group. Evidently, people involved in road accidents with a BAC above normal limits constitute the young and productive population. Alcohol is considered to be one of the most significant factors contributing to the loss of life and property, loss of labor force, and lifelong disability of people all over the world.

We determined that the most frequent arrival times to the ED for ICRA patients with a BAC above normal limits occurred between 00:00 and 07:59 AM (32.2%). In the study by Kesen et al. (10), the patients were mostly taken to the hospital between 00.00 and 05:59 AM (60.5%). This can be explained by the consumption of alcohol during the evening and driving under the influence of alcohol, which leads to road accidents and the transfer of patients to the hospital after midnight.

The utilization of a seatbelt is one of the most efficient ways to reduce deaths in road accidents (11). In Turkey, the rate for utilization of seatbelt is between 4.7% and 37.5% (12). In literature, according to the study by Hitosugi et al. (13), studies about injury severity in the case of ICRAs revealed that the seatbelt utilization rate was 20%. The study by Newman et al. (14) revealed that 71% of the patients did

Table 2. Relationship between the BAC groups and TSS

Trauma scoring systems	Legal (0-50 mg/dL) X±SE	Slight (51-150 mg/dL) X±SE	Medium (151-200 mg/dL) X±SE	Severe (201 mg/dL and over) X±SE	Statistical value
GCS[1]	14.51±0.12	13.30±1.10	12.50±1.18	11.66±1.40	F=8.98 p<0.05
RTS[1]	7.67±0.49	7.69±0.14	6.90±0.50	6.04±0.81	F=12.21 p<0.05
TRISS[1]	96.42±0.82	94.01±5.38	86.41±7.01	77.08±9.75	F=7.85 p<0.05
	Median (min-max)	**Median (min-max)**	**Median (min-max)**	**Median (min-max)**	
ISS[2]	3 (0-57)	5 (0-42)	7.5 (1-48)	14 (2-66)	H=15.8 p<0.05

[1]The GCS, RTS, and TRISS parameters were analyzed using the Pearson and Spearman correlation test
[2]The ISS parameter was analyzed using the Kruskal–Wallis test

not have their seatbelts fastened; in our study, this value is 74.1%, which is in agreement with earlier literature. The BAC was above normal limits for 17.1% of the patients who did not fasten their seatbelt. In addition, we also observed that 41 (78.8%) out of 52 patients, for whom the BAC was above normal limits, had an unfastened seatbelt. We suggest that the increased self-confidence of drivers under the influence of alcohol and the reduction of reality testing by relevant authorities leads to the situation of unfastened seatbelts. Therefore, both public education and legal sanctions for the generalized use of seatbelts will engender positive results.

TSSs are very important for the efficient evaluation of trauma patients and determination of treatment protocols, prognosis of death and disability, and creation of national health policies for associated trauma (15). In our study of patients with a BAC above normal limits, while the GCS, RTS, and TRISS decreased, the ISS increased. The study by Kesen et al. (10) reported that the GCS was under 10 for 22.7% of ICRA drivers with a BAC above normal limits. For drivers with a normal or subnormal BAC, the GCS score did not reduce below 10. In our study, while the GCS was 14.50±0.12 for patients with a normal or subnormal BAC, the GCS decreased to 12.84±0.61 for patients with a BAC above normal limits. According to these data, it is possible to say that a BAC above normal limits increases injury severity.

When considering the medical interventions provided to patients admitted to the ED after an ICRA and after physical examination and taking the patient's history, it was observed that death and injury were proportional. As per the literature, the study by Bilgin et al. (16) revealed that intubation resulted in the reanimation of 4.7% patients involved in an automobile accident. In our study, the intubation and reanimation rates were 8% and 4%, respectively, for patients with a normal or subnormal BAC: this result conforms to the literature. In contrast, these rates were 38.5% and 46.2%, respectively, for patients with a BAC above normal limits. The differences in these rates indicate that the increase of injury severity for ICRA patients with a BAC above normal limits is significant.

In our study, when considering the consultation request rates of patients after their evaluation in ED, the median value for patients' consultation with a normal or subnormal BAC was found to be 0 (0-7). In literature, the study by Kocak et al. (17) determined that between 1 and 5 consultations were requested for 50 out of 57 patients and that this consultation number increased further in patients who had multiple traumas (43.8%). Our study determined that the median value for consultation requested for patients with a BAC above normal limits increased by 1 (0-5). For patients with a BAC above normal limits, the increase of consultation requests is another indicator of the severity of injuries and more regions affected by trauma. Of the patients who died, 45.5% had a BAC above normal limits, and 50% of the surgery patients had a BAC above normal. The study by Fabbri et al. (18) reported that in 33-69% of the dead and 8-29% of outcomes other than death, the BAC was above normal limits. The study by Akay et al. (19) found that all the patients who died had a BAC above normal limits. This situation is a clear indicator of the increase in injury severity in road accidents involving a BAC above normal limits. Furthermore, only 14.9% of the patients with a BAC above normal limits were discharged, whereas 85.1% of the patients with a normal or subnormal BAC were discharged. This shows that injury severity is higher in ICRA with a BAC above normal limits, and the hospitalization rate and hospital charges are significantly higher. Moreover, when considering the hospitalization time of the patients admitted to the ED after an ICRA, it was determined that patients with a BAC above normal limits spent at the most 12 hours, while patients with normal or subnormal BAC spent at the most 24 hours. As the injury severity of the patients having an ICRA with a BAC above normal limits is high, they are immediately operated and/or hospitalized and leave the ED rapidly. For the patients with a normal or subnormal BAC, as the injury severity is low, the requirement of operation and/or hospitalization is reduced and they are under trauma monitoring in the ED. A shorter time spent in the ED is an indicator that the injury severity of patients with a BAC above normal limits is higher than in patients with normal or subnormal BAC.

When considering the hospital charges incurred, the average charge for patients with a BAC above normal limits was $178.44, as opposed to $84.68 for patients with a normal or subnormal BAC. In the study by Akay et al. (19), the average hospital charge for patients with a BAC above normal limits was $175.49, while it was $67.63 for patients with a normal or subnormal BAC. In another study by Akgul et al. (20), an average hospital charge of $343.65 per patient was reported. The reason this hospital charge exceeded to double that of other patients with a BAC above normal limits is that as the injury severity increases, there is a corresponding increase in charges incurred due to intervention, imaging, procedures, requested consultations, and hospitalization time. The financial losses that occur as a result of a road accident are higher even more for patients with a BAC above normal limits. We predict that the costs will increase further when the loss of labor force, loss of function, and lifelong treatment costs are factored.

There are many factors that increase the severity of injury in all trauma patients, particularly in the case of traffic accidents. Other important factors that increase the severity of injury and chance of death include the following: older age (21); injured at site (head trauma); multiple trauma (22); presence of additional diseases (23); additional time required to arrive at the ED and time spent in the ED; and failure to comply with traffic rules such as seatbelt use, wearing helmets, using vehicles at excessive speeds, and driving under the influence of alcohols or drugs. On the basis of the fact that all of these factors increase the severity of injury in traffic accidents, we emphasized that increased BAC could negatively affect the severity of injury and death rates in our study.

Study limitations

The AIS 6 patients, i.e., those who are included in the fatal group and who were not actually treated, were not admitted to the ED of the university, but were directly transferred to the morgue; they are, therefore, not included in this study. As these patients were not treated in the ED and as their BACs were not analyzed, the lack of their statistics can be considered as a limitation of this study.

As the study was performed at the 3rd ED level, the non-inclusion of patients admitted to the 1st and 2nd ED levels of the hospitals in the city and/or the country; the absence of detailed information about the demographic features, general situation, trauma scoring, BACs, clinical outcomes, and hospital charges of these patients; and the possibility of these differences influencing the results can be considered as a limitation of this study.

Conclusion

Because the trauma scores are higher for injury severity and survival and death rates are significantly affected for patients with

a high BAC, we consider-as emergency physicians-the BAC to be a useful tool for patient management in emergency medicine, which can help in the preparation of a more careful plan of action in treatment directed toward more successful clinical outcomes. Moreover, we believe that the knowledge of high BACs in ICRAs will be beneficial toward understanding the increases in hospital charges in order to make plans to prevent such increases in the future.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Eskişehir Osmangazi University School of Medicine.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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Urinary Tract Infections in the Emergency Department: Which Antibiotics are Most Appropriate?

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Abstract

Aim: Urinary tract infections (UTIs) are frequently seen and also empirically treated in the emergency department (ED). It is known that the antimicrobial resistance of uropathogens is increasing worldwide. Because geographical location plays an important role in antimicrobial resistance and can be used as a guide for treatment, regional studies are particularly important. The aim of this study is to analyze the urine cultures performed at our ED.

Materials and Methods: We investigated the medical records of 4,493 patients who were requested to give urine samples for culture at the ED of the Tepecik Training and Research Hospital between 2010 and 2014.

Results: In our study, 47.3% cultures were positive, and the most frequent microorganism was found to be *Escherichia coli (E. coli)* (66.7%). Trimethoprim/sulfamethoxazole (TMP-SMX) and ciprofloxacin resistance rates were detected as 44.8% and 36.8%, respectively; further, nitrofurantoin and fosfomycin resistance rates were detected as 13.3% and 7.6%, respectively. The relationship of nitrite positivity with the reproduction of pathogens was found to be stronger than that of leukocyte esterase (LE).

Conclusion: For our region, for the empirical treatment of uncomplicated UTIs, fosfomycin and nitrofurantoin must be considered as the first-line agents. Because of the increasing ratio of antibiotic resistance, urinary culture samples must be arranged for in the ED itself where administering first-line treatment has mostly been initiated.

Keywords: Urinary tract infection, emergency medicine, antibiotic resistance

Introduction

The types of urinary tract infections (UTIs) presented to the emergency department (ED) in a clinic vary from simple cystitis to urosepsis (1).

The diagnosis of a UTI is done via urinary culture analysis, which can reveal a significant reproduction of bacteria (2). UTIs are classified by localization (upper/lower), clinical properties (complicated/uncomplicated), or source (community acquired/nosocomial) (3). The foremost pathogen in community-acquired UTIs is *E. coli*, followed by *Klebsiella spp.*, *Proteus mirabilis*, *Enterococcus spp.*, and *Pseudomonas aeruginosa*; however, for nosocomial infections, the expected pathogen is generally related to the urinary catheter, and the patient's own flora is the culprit (4, 5). These classifications are used in order to choose the treatment method and duration (6).

In the guidelines of Infectious Diseases Society of America (IDSA) published in 2011, because of increasing antibiotic resistance, greater emphasis has been put on choosing the proper antibiotic; therefore, it becomes more important to understand changes in regional antibiotic resistances (3, 7).

The aim of this study is to analyze the urine cultures performed at our ED and define the antimicrobial resistance rates for our region.

Materials and Methods

Study design and setting

This study was a retrospective review of adult patients with a positive urine culture between January 1, 2010 and December 31, 2014, in the ED of the Tepecik Training and Research Hospital-a tertiary hospital. Local ethics committee approval was obtained.

Selection of participants

By tracing the electronic health record, the urinary cultures received from predetermined patients above 18 years old were careful-

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ly studied. Among these patients, the ones whose culture and antibiogram results could not be obtained were excluded.

Methods and measurements

The demographic data of patients, their urinalysis, microorganisms which reproduced in their urine cultures, antibiogram results, accompanying diseases, history of urinary catheterization, method how the sample was obtained (catheter or mid-flow urine), and the outcomes were recorded.

Complete urine analysis was semi-quantitatively obtained using the H800 analyzer (Dirui Industrial Co. Ltd., China) and H10–800 strips (Dirui Industrial Co. Ltd., China). Test results that were negative (-) and trace (+/-) for leukocyte esterase (LE) were accepted as negative.

When bacteria $>10^5$ cfu/mL were reproduced in the urine culture, the result was considered positive. Isolated bacteria forms were conventionally defined. Isolates that were not conventionally identified were then defined by using a fully automated identification and antibiogram device (VİTEK 2 compact, bioMérieux, France). The presence of more than two isolates at a concentration $\geq 10^4$ cfu/mL was considered as contamination.

Statistical analysis

For data analysis, Statistical Package for the Social Sciences (IBM SPSS Statistics Armonk, NY, USA) version 22 was used. Qualitative data were defined as the number of observations and percentage, while quantitative ones were represented as interquartile range (IQR) and minimum–maximum values. To compare the qualitative data, the chi-square test was used. For understanding the effect of LE and nitrite positivity on reproduction, the odds ratio (multinominal logistic regression) was considered for analyzing the mean modality. Values of $p<0.05$ were accepted to be statistically significant for a confidence interval of 95%.

Results

During the 5-year period under consideration, 882,997 adult patients were admitted to the ED, and 4,493 patients were asked to provide a urine sample for culture. Because of getting no results, 80 samples were excluded; therefore, the research was carried out with 4,413 urine cultures.

Among the group who was asked to give a urine culture, 51.9% were female. The general median age was 66 years (IQR=32; min: 18; max: 114): the median age of men was 68 years (IQR: 26; min: 18; max: 97), whereas women had a median age of 63 years (IQR: 40; min: 18; max: 114). For all the cases, concomitant diseases were listed (Table 1).

In 2,585 urinary culture samples, bacteria reproduction was observed, but 11.3% (n=497) samples were considered as contamination. This contamination was more frequent in women (n=301, 13.1%) than men (n=196, 9.2%). As a result, 2,088 (47.3%) cases were accepted as culture-positive UTIs.

In our study, 91% microorganisms that reproduced in the culture were gram-negative bacilli; 7.5%, gram-positive cocci; and 0.7%, yeasts. Microorganism identities and their antimicrobial resistance frequencies are listed in Table 2 and 3.

Four of the top frequently prescribed antibiotics and their resistance rates are shown in Figure 1.

Here, 1,311 (29.7%) urine samples were obtained by employing urinary catheterization in the ED, and 1.8% samples were obtained from urine catheters, which were already present. The frequency of contamination was almost the same with the patients who did not have a urinary catheter.

Further, 23.7% patients who had been asked to give a urine culture were hospitalized, and 19.8% were ICU admissions.

Table 1. Concomitant diseases

Concomittant diseases	**n (%)**
Malignancy	765 (17.3)
Diabetes	572 (13)
Acute Renal Failure	380 (8.6)
Chronic renal failure	356 (8.1)
Cerebrovascular Diseases	245 (5.6)
Alzheimer's Disease	223 (5.1)
Urolithiasis, nephrolithiasis	191 (4.3)
Benign Prostate Hypertrophy	162 (3.7)
Epilepsy	111 (2.5)
Kidney Transplantation	57 (1.3)
Parkinson's disease	41 (0.9)
Immobile patients	15 (0.3)
Hypertension	649 (14.7)
Chronic obstructive pulmonary disease	132 (3)
Heart failure	184 (4.2)
Liver Cirrhosis	40 (0.9)
AIDS	3 (0.1)

Table 2. Uropathogen microorganisms reproduced in urine cultures

Uropathogen microorganism	**n (%)**
Escherichia coli	1392 (66.7)
Klebsiella pneumoniae	150 (7.2)
Coagulase-negative staphylococcus	138 (6.6)
Pseudomonas aeruginosa	84 (4)
Proteus mirabilis	70 (3.4)
Enterococcus faecalis	66 (3.2)
Staphylococcus aureus	43 (2.1)
Klebsiella oxytoca	26 (1.2)
Candida spp.	17 (0.8)
Acinetobacter baumannii	8 (0.4)
Enterobacter aerogenes	7 (0.3)
Others*	87 (4.2)
Total	2088 (100)

**Citrobacter freundii, Enterobacter cloacae, Stenotrophomonas maltophilia, Proteus vulgaris, Morganella morganiii Streptococus pyogenes, Enterecoccus faecium, Providencia rettgeri, Serratia marcescens, Citrobacter koseri, Salmonella spp., Streptococus viridans, Streptococcus spp., Providencia stuartii, Enterobacter spp., Enterococcus gallinarum, Corynebacterium spp., Streptococcus mitis*

Table 3. Resistance ratios of uropathogen microorganisms to antimicrobial agents

Antimicrobial Agents	Total % (n)	Female %	Male %
Levofloxacin	45.7 (127)	32.3	58.5
Trimethoprim-sulfamethoxazole	44.8 (1743)	40.6	50.5
Cefuroxime	37.9 (596)	33	44.7
Ciprofloxacin	36.8 (1694)	30.7	44.9
Amoxicillin-clavulanate	36.2 (1207)	29.2	46.1
Cefixime	35.6 (402)	28.5	45.5
Ceftriaxone	32.6 (1397)	26.3	41.6
Extended-spectrum beta-lactamases	14.3 (1916)	12.2	17.1
Nitrofurantoin	13.3 (1135)	11.0	16.6
Piperacillin-tazobactam	11.8 (1684)	10.7	13.3
Fosfomycin	7.6 (1344)	5.8	10.1
Imipenem	3.4 (1160)	2.1	5.0
Vancomycin	1.9 (52)	5.3	0
Ertapenem	1.6 (980)	1.4	1.9

Table 4. Antimicrobial agents' resistance ratios among gender

		Gender		
		Female, n (%)	Male, n (%)	p*
Nitrofurantoin (n=1135)	Susceptible	591 (89%)	393 (83.4%)	0.007
	Resistant	73 (11%)	78 (16.6)	
TMP-SMX (n=1743)	Susceptible	597 (59.4%)	365 (49.5%)	<0.001
	Resistant	408 (40.6%)	373 (50.5%)	
Ciprofloxacin (n=1694)	Susceptible	669 (69.3%)	401 (55.1%)	<0.001
	Resistant	297 (30.7%)	327 (44.9%)	
Fosfomycin (n=1344)	Susceptible	742 (94.2%)	500 (89.9%)	0.004
	Resistant	46 (5.8%)	56 (10.1%)	
	Resistant	214 (26.3%)	242 (41.6%)	

*Chi-square

The resistance ratio of the antibiotics, which are mostly empirically chosen, are listed in Table 4.

The relationship between urinary LE levels, nitrite positivity levels, and their relationship with respect to reproduction in urine cultures are listed in Table 5.

The resistance rates of *E. coli* strains against antimicrobial agents are listed in Table 6.

Discussion

In this research that is based on investigating the urinary cultures that were requested from the ED, we found that 47.3% samples were positive for microorganism reproduction, and the most frequent species was *E. coli*. Nitrite positivity in urine has a more powerful effect on the positivity of LE.

Table 5. Relationship of leukocyte esterase and nitrite positivity with reproduction in urine culture

		Reproduction in urine culture		OR
		Negative (n)	Positive (n)	(95% CI)
Leukocyte esterase	Negative	1370	1090	
	1+	215	175	1.0 (0.8-1.3)
	2+	229	265	1.5 (1.2-1.8)
	3+	258	397	1.9 (1.6-2.3)
Nitrite positivity	Negative	1574	906	
	Positive	496	1021	3.6 (3.1-4.1)
Infection sign*	Negative	1117	529	
	Positive	954	1398	3.1 (2.7-3.5)

*Leukocyte esterase is least +1 or nitrite positivity, OR: odds ratio; CI: confidence interval

Table 6. Resistance rates of *E. coli* strains against antimicrobial agents

Antimicrobial agents	Resistance ratio % (n)
Levofloxacin	52.7 (55)
Trimethoprim-sulfamethoxazole	44.6 (1277)
Cefuroxime	35.3 (431)
Ciprofloxacin	38.6 (1231)
Amoxicillin-clavulanate	33.6 (923)
Cefixime	34.4 (314)
Ceftriaxone	30.5 (1032)
Extended-spectrum beta-lactamases	11.3 (1916)
Nitrofurantoin	6.7 (913)
Piperacillin-tazobactam	8.7 (1224)
Fosfomycin	4.8 (1061)
Imipenem	0.25 (804)
Vancomycin	0 (0)
Ertapenem	0.82 (732)

Urinalysis is one of the most popularly used tests in the ED. Dipstick tests have taken the place of urinary microscopy because the use of the former is very easy and is cheaply available (8, 9). LE and nitrite positivity are stated to be good predictors in UTI diagnosis (10–12). In our study, the relationship between nitrite positivity and reproduction in cultures was found to be stronger than that with LE positivity. The +2/+3 LE positivity in the odds ratios of urinalysis were 1.5 and 1.9 by the order of value, while nitrite positivity was noted as 3.6. However, urinary culture is still the primary standard for proving the existence of UTIs (2).

In the study by Arman al. (13), it was determined that the average age was 39.4±16.26 years (16–82 years) among 400 patients who applied to first-grade health farms. In this research, the most frequent uropathogens were gram-negative microorganisms [*E. coli* (62.8%), *Enterococcus spp.* (3.2%), *Klebsiella pneumoniae* (3.4%), *Pseudomonas aeruginosa* (4%), *Proteus mirabilis* (1.1%), and *Enetero-bacter cloacae* (0.5%)], followed by *coagulase-negative staphylococcus*

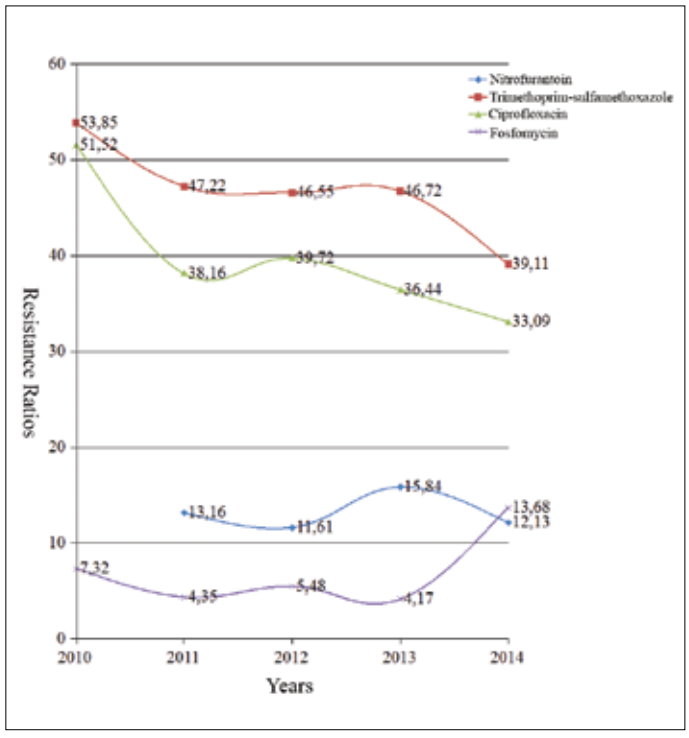

Figure 1. Resistance ratios for nitrofurantoin, trimethoprim-sulfamethoxazole, ciprofloxacin, and fosfomycin over several years

(24.5%) (13). In our study, the majority of the isolated uropathogens were gram-negative bacilli (91.8%). In agreement with the literature, the most frequent species was *E. coli* (66.7%), followed by *Klebsiella pneumoniae* (7.2%), *coagulase-negative staphylococcus* (6.4%), *Pseudomonas aeruginosa* (4%), *Proteus mirabilis* (3.4%), and *Enterococcus faecalis* (3.2%) in the order of frequency (4, 6).

The study by Bekeris et al. (14) was performed in 127 laboratories located in USA and Canada in which 14,739 urinary culture samples were collected, and the average contamination rate was noted as 15%. In our study, the contamination rate was 11.3%, which was notably excessive among women. Even though no disclosure form was present in our ED, the reason for the reduced contamination rate might be because the microbiology laboratory is located very close to the ED, so the samples reach the laboratory quickly, thereby reducing the risk of contamination.

In our study, it has been reported that even though having a downward trend from 2010 to 2014 (from 53.8% to 39.1% and from 51.5% to 33.1%, respectively), TMP-SMX and ciprofloxacin resistance levels are still found to be high. Nitrofurantoin and fosfomycin are noted to have lower resistance levels, namely, 13.3% and 7.6%, respectively.

In a retrospective research done by Guneysel et al. (15), among 274 patients who were diagnosed as having complicated UTI, the resistance rate of TMP-SMX was 34.4%. In 2013, a meta-analysis was carried out by detecting the resistance of TMP-SMX for *E. coli* variables; the resistance percentage was determined as 47.8% between 2008 and 2012 (16). In our study, the TMP-SMX resistance was found to be 44.8%, with a slight reduction during the intervening period. There are other studies that have revealed a similar resistance ratio (7, 17–19).

Karlowsky et al. (20) showed the resistance ratio for ciprofloxacin as 2.5% in 1999. Sanchez et al. (21) used the data from 2000 to 2010 and showed that the resistance ratio of ciprofloxacin increased from 3% to 17%. In the research by Arslan et al. (22), which was made throughout Turkey, ciprofloxacin resistance ratio with respect to *E. coli* isolates was found to be 17% in uncomplicated UTI patients, whilst it was 38% in complicated ones. In our study, we found that ciprofloxacin resistance reduced from 51% to 35%, implying that ciprofloxacin resistance is still too high for our region.

Because of having a very low resistance ratio, fosfomycin is one of the most appropriate agents for treating uncomplicated cystitis (23). In our study, we determined that fosfomycin resistance among women was 5.8%.

Nitrofurantoin resistance has been found to range between 2% and 28% in different studies. In our research, we found the resistance of nitrofurantoin to be 13.3%. Because of this low resistance ratio, the use of nitrofurantoin seems to effectively fit for our region (7, 17–20, 24).

Study limitations

Our study was limited due to its retrospective nature. Even though the presentations to the ED were mostly outpatients, the discrimination of infections (community-acquired or nosocomial) was not done. Because this study consisted of ED patients, it did not involve all the UTI cases. Also, some patients may have been discharged without being asked for a urine culture. In our study, the urine samples obtained from urinary catheters comprised 29.7% of the total; therefore, our research shows that the old with general debility may have been considered in a larger number as compared to other studies. For this reason, resistance ratios may be higher than expected.

Conclusion

In our study, we found that even though there is a slight reduction over the years, TMP-SMX and ciprofloxacin resistance ratios are still high. Because of lower resistance, fosfomycin and nitrofurantoin must be considered as the first choice for the treatment of lower UTIs.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Tepecik Training and Research Hospital (25.06.2014).

Informed Consent: In this retrospective study, informed consent form was not obtained, due to data abstracted from medical records.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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The Bibliometric Qualities of Original Research Published in the Eurasian Journal of Emergency Medicine between the Years 2010-2014

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Abstract

Aim: Bibliographic work in the Turkish emergency medicine community is very scarce. We aim to improve upon the shortcomings in this area.

Materials and Methods: Original research published in the Eurasian Journal of Emergency Medicine (EAJEM) (formerly known as the Academic Journal of Emergency Medicine) within the 5-year period between 2010 and 2014 was retrospectively reviewed.

Results: While retrospective publications stood out the most (n=81, 54.7%), they were followed by prospective (n=38, 25.7%) and sectional (n=29, 93.9%) works. A vast majority of the work was concentric (n=139, 93.9%). Here 6.1% publications were sourced overseas. The most commonly studied subjects in the articles published in the EAJEM were medical emergencies (26.35%), trauma (20.27%), and emergency service (19.59%). Further, 52.7% (n=78) texts were written in English and 47.3% (n=70) were written in Turkish. In 15.5% (n=23) articles, an emergency medicine resident and/or emergency medicine specialist was not among the authors. The original research most commonly had 3 keywords (n=73, 49.3%). There were 12 (8.1%) articles in which no tables were used and 70 (47.3%) articles in which there were no figures. According to our findings, a total of 2981 references were used in the 148 articles that were reviewed, and the median reference value per article was 17 (min: 6; max: 50). In our study, 38 references were self-references (12.85) and 727 (24.4%) references were references to texts published in journals in the Turkish index. Within all the references, there were 43 (14.4%) references to the Turkish Journal of Emergency Medicine (TJEM), 41 (13.8%) references to the EAJEM, and only 3 (1.1%) references to Journal of Emergency Medicine Case Reports (JEMCR). The median value of references made to texts in the journals in the Turkish index per article was 2 (min: 0; max: 32). The number of references to the TJEM per article was 43/148 (29.1%), that to the EAJEM was 41/148 (27.7%), and that to JEMCR was 3/148 (2%). While the acceptance period ranged between 1 and 350 days, the average period was 49 days.

Conclusion: We believe that preference should be given to the printing of prospective and multi-centric publications and those with more keywords.
Keywords: Bibliometrics, Eurasian Journal of Emergency Medicine, original research, article

Introduction

The Academic Journal of Emergency Medicine is the international, scientific, and official publication of the Emergency Medicine Physicians Association of Turkey, based on the principles of independent and unprejudiced peer review. The journal underwent restructuring in the year 2015 and continued on its publications in the scientific arena as the Eurasian Journal of Emergency Medicine (EAJEM). The first issue of the journal was published in 2003 (1). Since 2007, it has been being published quarterly, in the months of March, June, September, and December. Information regarding the process of the uploading of scientific papers and the evaluation and acceptance of papers can be found at the Web address www.eajem.com (2).

Bibliometrics is the statistical investigation of scientific publications in a certain subject and within a certain time period with respect to the subject, author, referenced author, and referenced sources, and it reveals the general structure of a particular discipline based on the obtained statistical results (3). Bibliometrics can simply be called the statistical analysis of publications. Bibliometric analyses can be of a definitive quality, such as determining the number of articles published in a particular year, or they can be evaluative, such

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as doing a reference analysis in order to reveal in what way an article has influenced articles succeeding it (4).

Unfortunately, studies based on the analytical evaluation of scientific articles published in periodicals in our country are extremely rare. Such research is of paramount importance in terms of determining the tendencies, content, and effects of scientific journals in a country (5).

In this bibliometric study, our aim is to map out the publication of original articles in the Academic Journal of Emergency Medicine (now, EAJEM) within the 5-year period between 2010 and 2014.

Materials and Methods

All the published issues of EAJEM within the 5-year period between 2010 and 2014 are available online at the Web address http://www.eajem.com/eng/arsiv/archive. All printed publications were examined. For articles opened in the PDF format, if the text "original article" was present in the upper left corner in the information regarding the type of article, it was included in this study. For each examined article, the following parameters were recorded and calculated: the year; issue; language; number of authors; how many of the authors worked at the emergency service; rank of the responsible author; which region of Turkey the corresponding author is from; number of keywords in the abstract; study design; number of centers where the study was done; whether it is an experimental study or not; the topic of the article; number of tables, figures, and references in the article; the acceptance period of the articles; whether any of the authors made a reference to his/her own texts in the article; number of references to journals in the Turkish index; and number of references to the Journal of Emergency Medicine Case Reports (JEMCR), Turkish Journal of Emergency Medicine (TJEM), and EAJEM.

The topics of the texts were grouped under 7 main headings: trauma, intoxication, medical emergencies, surgical emergencies, pharmaceutical studies, disaster medicine, and emergency service. Articles included under the heading of emergency services were related to training, management, security, cost, patient satisfaction, demographics of the admitted patients, hospital organization, and emergency medical system.

The study design data were accepted as stated in the materials and methods section of the article being investigated.

The journals listed on the Web page http://www.atifdizini.com/journals/tr-index.html of the Turkish Citation Index were accepted as the Turkish index, and the journal citations in this list were grouped as the Turkish index citations.

Exclusion criteria for the articles: Articles written before 2010; articles written during 2015; and work that is not in the original research category, such as case reports, letters to the editor, letters, reviews, meeting reports, questions, and images, were excluded from the analyses.

Statistical analysis

Data were entered into the Statistical Package for the Social Sciences (IBM SPSS Statistics, Armonk, NY, USA) version 20.0. Data were represented as percentage, mean±SD (for normally distributed data), and median (for data that did not conform to the normal distribution). The chi-square test was used in the comparison of percentages, and the Student's t-test or Mann–Whitney U test were used in the comparison of mean values. Here, $p<0.05$ was considered significant.

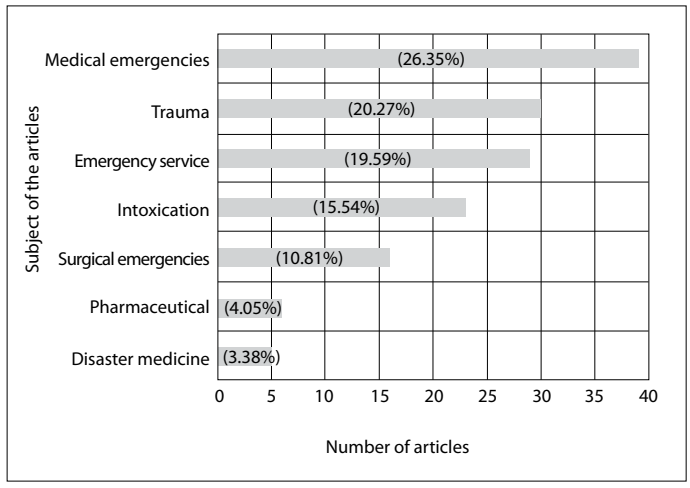

Figure 1. Distribution by subject of articles published between 2010 and 2014 in the EAJEM

Results

A total of 148 original studies carried out in the 5-year period between 2010 and 2014 were included in this study: out of these, 23 (15.5%) were from 2010; 27 (18.2%), 2011; 34 (23%), 2012; 32 (21.6%), 2013; and 32 (21.6%), 2014. The issues were printed quarterly. A total of 20 journals were examined in this study. The median number of articles per journal was 7 (min: 5; max: 9).

A total of 9 articles were from abroad (6.1%). The ratio of the citation of articles published in journals in the Turkish index by articles from abroad was significantly lower than that for domestic citations (0.2±0.7 vs. 5.2±6.3, $p<0.001$). There was no significant difference (64±56 vs. 66.6±53.9, $p=0.893$) in terms of the period of acceptance between domestic articles and those sent from abroad.

When the research types were examined, retrospective publications (n=81, 54.7%) stood out the most, while prospective (n=38, 25.7%) and sectional (n=29, 19.6%) publications were fewer. A vast majority of the research was concentric (n=139, 93.9%), while the number of studies with two or more centers was 9 (6.1%). Only 4 (2.7%) studies were experimental. The ratio of journal citations recorded in the Turkish index in the prospective studies was significantly lower as compared to those in retrospective articles (1.7±2.8 vs. 6.5±7.1, $p<0.001$). The distribution of articles by subjects is shown in Figure 1.

The distribution of articles by region is as follows. Marmara: 14.2% (n=21); Aegean: 7.4% (n=11); Central Anatolia: 25% (n=37); Mediterranean: 15.5% (n=23); the Black Sea: 9.5% (n=14); Eastern Anatolia: 6.1% (n=9); Southeast: 16.2% (n=24); and overseas: 6.1% (n=9) (Figure 2). Articles sent from Northern Cyprus were categorized as overseas.

In this study, 52.7% (n=78) articles were written in English and 47.3% (n=70) were written in Turkish. No Turkish publications have been published after 2014. About a third of the articles published each year between 2010 and 2013 were written in English. In 2013, the Turkish–English ratio was 1:1. The ratio of references to scientific articles published in journals in the Turkish index in the Turkish articles was significantly higher when compared to articles written in English (6.9±6.9 vs. 3.2±4.9, $p<0.001$).

The distribution of the number of authors is shown in Figure 3; at 26.4%, articles written by a total of 6 authors were the most com-

Figure 2. Distribution by region of original articles printed between 2010 and 2014 in the EAJEM. Region % (n)

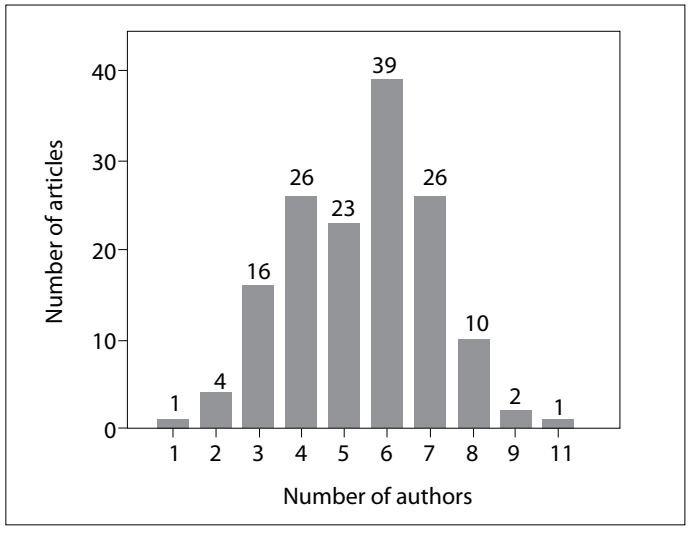

Figure 3. Distribution by number of authors of articles published between 2010 and 2014 in the EAJEM

mon. This was followed by articles with 4 and 7 authors (17.6 %). The percentage of articles with 5 authors was 15.5%.

In 15.5% (n=23) articles, there were no emergency medicine residents and/or emergency medicine specialists among the authors. The design of these studies was mostly retrospective (73.9%, n=17). The ratio of references to the Turkish index per article in these papers (8.9±1.87) was higher (p=0.028) as compared to studies in which there was at least one emergency doctor. However, the total number of references to the Turkish emergency medicine journals per article (JEMCR references + TJEM references + EAJEM references) was lower (p=0.045) in articles with no emergency doctors among its authors (0.21±0.59) as compared to studies with at least one emergency doctor among its editorial staff (0.65±1).

In 72.3% (n=107) articles, the first name was also the corresponding author. In 17.6% (n=26) studies, the corresponding author was the second name and in 6.8% (n=10), the corresponding author was the third name.

Table 1. The total number of references given to the AJEM, AJEMCR, and TJEM in the articles published between 2010 and 2014 in the EAJEM and their distribution per article

	EAJEM	JEMCR	TJEM	Total
Distribution within total references per thousand (n)	13.8‰ (41)	1.1‰ (3)	14.4‰ (43)	29.3‰ (87)
References per article, % (n)	27.7% (41)	2% (3)	29.1% (43)	58.8% (87)

EAJEM: Eurasian Journal of Emergency Medicine (formerly known as the Academic Journal of Emergency Medicine); JEMCR: Journal of Emergency Medicine Case Reports; TJEM: Turkish Journal of Emergency Medicine

Original research most commonly had 3 keywords (n=73, 49.3%). This was followed by articles with 4 keywords (n=42, 28.4%), 5 keywords (n=16, 10.8%), 2 keywords (n=13, 8.8%), and 6 keywords (n=4, 2.7%).

According to our findings, a total of 2981 references were used in the 148 articles that were examined: the median reference value per article was 17 (min: 6; max: 50). Here, 38 references were self-references (12.8%) and 727 (24.4%) references were citations of articles published in the journals in the Turkish index. Within all the references, the number of references to the TJEM was 43 (14.4%); EAJEM, 41 (13.8%); and AJEMCR, 3 (1.1%). References per article to the TJEM were 43/148 (29.1%); EAJEM, 41/148 (27.7%); and AJEMCR, 3/148 (2%) (Table 1).

The median value of the acceptance period of the articles was 49 days (mean: 64.1±55.3; min: 1; max: 350). The language, either Turkish or English, did not affect the acceptance period (the mean acceptance periods for Turkish and English were 62.8±61.1 and 65.4±49.8, respectively; p=0.782). Whether an article was prospective (65.7±53.8) or retrospective (58.3±57.2), it had no effect on the acceptance period (p=0.498).

Discussion

Our study is one of the leading bibliographic studies in the Turkey emergency medicine community. Using bibliometric methods, the topics studied, authors studying these topics, collaboration among authors, and topics with little or numerous studies within a particular discipline and particular country can be determined (3).

Bibliometric analyses provide the following benefits to the researcher:

- Providing information about the content of the journal,
- Selection of objectives relating to the planned publications,
- Revealing the academic effect.

In addition, it is effective for determining the research power of institutions and for developing research strategies (6).

Bibliometric methods and journal impact factors are also being used for purposes such as research evaluation, recruitment, academic promotion, research fund distribution, and publication support (7). At the same time, such a study can help in analyzing authors' trends and accumulation of academic publications, thereby providing guidance for the future. Research related to international publications by emergency medicine departments in Turkey is also available (8, 9).

The printed version of the EAJEM is being produced in limited numbers and is distributed free of charge to emergency medicine specialists and academics. In addition, the abstract and full texts of all articles can be obtained for free from the Web address www.eajem.com. The journal is indexed by the CINAHL, Gale/Cengage Learning, EBSCO, DOAJ, ProQuest, Index Copernicus, and TUBITAK ULAKBIM Turkish medical index (1). Also, as of 2016, it will start to be indexed in the Emerging Sources Citation Index (ESCI) database of Thomson Reuters and the printed publications will be viewable in the Web of Science (WoS) system (10). According to the data from TUBITAK, the number of Turkish journals indexed in the Thomson Reuters WoS scientific database is 70; here, 30 of these are journals have medical content (11).

The target audience of the magazine consists of emergency medicine specialists and faculty, researchers, specialists, assistants, general practitioners, and other healthcare personnel who conduct scientific studies and serve in the field of emergency medicine. The journal accepts research articles; reviews; case reports; editorial commentaries; letters to the editor; scientific letters; and articles related to training, original images, history, and publication ethics (1). The publication language, which was English and Turkish until 2014, was changed to English only thereafter in order to increase the journal's global recognition (12).

It is stated in the journal that within the context of editorial policies, articles on the most current topical headlines worldwide on the subject of emergency medicine are given priority. In addition, it is stated that papers on local and regional diseases, particularly those presenting different data than the information contained in the literature, are published (2). According to our study, the topics that found the least place in the EAJEM were disaster medicine (n=5, 3.4%) and pharmaceutical research (n=6, 4.1%). Therefore, due to the limited number of publications in these subjects, we assume that articles sent on these subjects will reach a higher level of acceptance.

Co-authoring is valuable in terms of enriching the article that is written by reflecting the different perspectives of individuals, as well as minimizing individual mistakes that can be overlooked by one person. At the same time, by bringing together experienced researchers and those who do not have much experience in the field of research, it contributes toward new names being introduced into the world of science and toward the quality of future research. The most important point to consider with respect to multi-authoring is to ensure that the list of authors does not include individuals whose contribution to the article is questionable (13, 14). The number of authors of original research articles published within the last 5 years in the EAJEM varied between 1 and 11, while articles with 6 authors were the most common. In our study, the total percentage of articles with 4, 5, 6, and 7 authors was 77%.

While the number of references given to journals belonging to the Turkish medical index in articles with no emergency medicine resident and/or specialist among its authors was higher as compared to studies with at least one emergency physician among its authors, it was determined that the number of references given to Turkish emergency medicine journals (AJEMCR references + TEJM references + EAJEM references) was lower. The reason for this is that the publication history of emergency medicine journals is not as long as other Turkish medical index journals or that the article contents are not adequate for branches other than emergency medicine or that the authors chose their sources from their own fields.

One of the most important factors in ensuring that researchers are able to reach a published article is the keywords. Keywords appropriate to the article subject, in sufficient numbers, and provided with a standardized terminology carry great importance in making sure the article gets cited and contributes toward science (15). In our study, articles with 3 keywords were the most common; articles with 3 and 4 keywords comprise a majority (75%) of all articles. Within the framework of article writing rules of the EAJEM, at least 3 and up to 6 keywords are required (16). It can be seen that authors have used the minimum required number of keywords. The use of more keywords by authors will facilitate access to their articles and increase recognition.

According to the writing guidelines of the EAJEM, the maximum number of references that can be used for research articles is 50 (16). There is no limitation on the number of references in two high-impact-factor international publications on emergency medicine, namely, the European Journal of Emergency Medicine (17) and the American Journal of Emergency Medicine (18). The journal Emergencias limits this number to 30 (19), while the Emergency Medicine Journal limits it to 25 (20). With 17 citations per article, the studies published in our journal maintained the number of keywords accepted by international journals.

Another association in Turkey related to emergency medicine is the Turkish Association of Emergency Medicine Specialists. The scientific publication organ of this association is the TJEM (21). In our study, the number of references given to the TJEM was 43, while the number of references given to the EAJEM (self-reference) was 41. These numbers are very close to each other, revealing that these two competitor associations support each other on the scientific platform.

One of the most critical decisions in the process of publication of a scientific study is determining the proposed publication journal. Since articles that are not evaluated and published on time lose their significance, authors who are going to send a publication pay attention to the acceptance period in their choice of journals (14, 22). In medical journals, the period of evaluation and acceptance can extend up to 1 year. Publications that are not accepted within this period will, no doubt, have a negative impact on their authors. It is stated that in several medical journals, this period can extend up to 4–6 months (22). In a study done in our country, it was determined that

the period of acceptance varied between 0 and 12 months, but the most common period of acceptance was between 2 and 4 months (14). In our journal, the period of acceptance varied between 1 and 350 days, with an average of 49 days. Following this data, the editorial staff of the journal convened and limited the first evaluation period to 15 days.

Conclusion

Mainly retrospective articles are published in the EAJEM. We believe that in order for the journal to be scanned in higher-quality databases, the printing of prospective and multi-centric publications should be given preference. The number of keywords, which is an important parameter in reaching and referencing an article, being at the lower limit is an important problem. Only 29.3% references belong to Turkish emergency medicine journals. The number of original articles accepted from overseas is low.

Peer-review: Externally peer-reviewed.

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CT Hypoperfusion Complex: Emergency CT Results During One Year

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Abstract

Aim: Computed tomography (CT) hypoperfusion complex is observed in the imaging findings of intra-abdominal organs and vascular structures during shock and hypoperfusion. The aim is to examine the frequency of CT hypoperfusion complex and etiologic factors by retrospectively analyzing the CT performed on patients admitted to emergency departments.

Materials and Methods: In our study, 930 abdomen and thorax tomographies were obtained from the patients admitted to our emergency department during a 1-year period. All CT scans were performed by using a 640-slice tomography device. The CT criteria for hypoperfusion complex included the small-caliber aorta and inferior vena cava (IVC), hyperdense bowel wall, surrenal enhancement, hypoperfused liver, spleen, and hyperdense kidney.

Results: Our study revealed the presence of CT hypoperfusion complex in at least 1 of 15 patients (0.16%). We detected low-calibrated abdominal aorta together with hyperdense adrenal glands in all the CT hypoperfusion complex cases (15 cases, 0.16%). We found the presence of intra-abdominal free fluid in 13 cases (0.13%), halo sign in IVC in 8 cases (0.08%), hypoperfusion view of the spleen and liver in 5 cases (0.05%), pericholecystic fluid in 3 cases (0.03%), and sign of renal hyperperfusion (white kidney sign) in 3 cases (0.03%).

Conclusion: Our study showed that low-calibrated abdominal aorta and hyperdense adrenal glands were present in each patient showing CT hypoperfusion complex, and the assessment of these two structures is very important before the setting-in of irreversible shock.

Keywords: Computed tomography, hypoperfusion, shock

Introduction

Computed tomography (CT) hypoperfusion complex is seen particularly in intra-abdominal organs and vascular structures as a result of shock and hypoperfusion (1–10). It was first defined in pediatric patients with multiple traumas by Taylor et al. (1). Besides trauma, it can also be observed during sepsis, diabetic ketoacidosis, and myocardial infarction (MI) (2). Since cardiac output and arterial pressure can be sustained in the compensatory phase of shock, blood pressure and pulse parameters alone may be insufficient to explain the patient's state. The evaluation of imaging findings is of great importance in such circumstances. In this article, we aimed to examine the frequency of CT hypoperfusion complex and etiologic factors by retrospectively analyzing the abdomen and thorax tomographies performed on patients admitted to emergency departments for various reasons between 2014 and 2015.

Materials and Methods

Patients' population

In our study, we retrospectively evaluated 930 abdomen and thorax tomographies obtained from patients admitted to our emergency department for various reasons between October 2014 and October 2015.

CT imaging

All these patients underwent abdomen and/or thorax tomography by means of 640-slice CT (Aquilion ONE ViSION, Toshiba, Japan). Approximately 100 cc of iodinated contrast media (3.5 cc/s) was injected into the patients from the left antecubital region by means of auto-injectors. Portal-phase scan was performed for patients undergoing abdominal tomography, and arterial-phase scan was performed for patients undergoing abdominal thorax tomography.

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Figure 1. Hyperdense adrenal glands are seen in axial CT image (arrows)

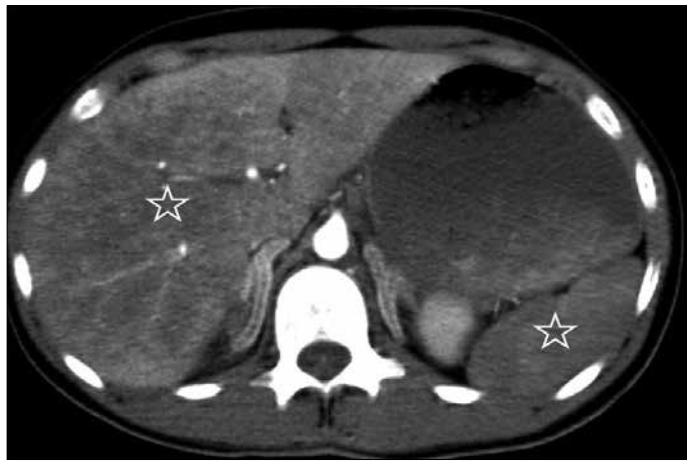

Figure 3. Perfusion defects in the liver and spleen are seen in axial CT image (stars)

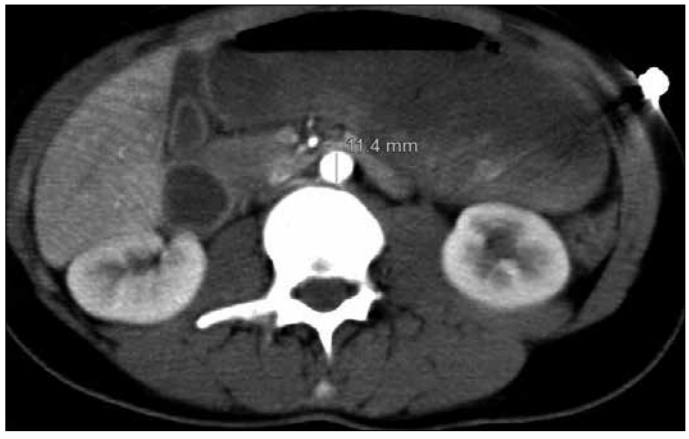

Figure 2. Low-calibrated abdominal aorta is seen in axial CT image. It must be less than 13 mm in measurements performed 2 cm below and above the renal arteries (3)

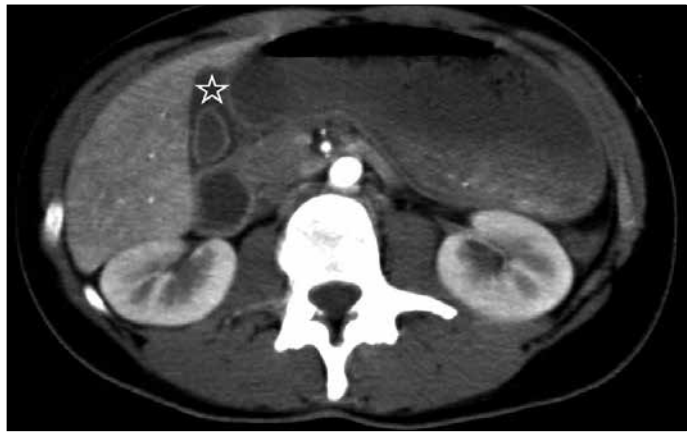

Figure 4. Pericholecystic fluid is seen in axial CT image (star)

CT evaluation

For the diagnosis of low-calibrated abdominal aorta, the diameter measurements of the abdominal aorta of the renal arteries 2 cm below and above were considered to be the diagnostic criteria (3). For low-calibrated IVC, the average was calculated by measuring 3 different regions of the intrahepatic vena cava: measurements less than 9 mm were considered to be the diagnostic criteria (3). For hyperdense adrenal glands, the state of being equal or hyperdense when compared to peripheral vascular structures (e.g., IVC) and holding more contrast than the spleen and liver were considered to be the diagnostic criteria (3). For the diagnosis of shock kidney, extended and contrast kidneys were considered to be the diagnostic criteria. For hypoperfused spleen and liver, an increase in the heterogeneous area (perfusion defects) when compared to normal parenchyma was considered to be the diagnostic criterion. All CT images were evaluated by a radiologist with 8 years of experience in emergency radiology (IY).

Results

In our study, 930 abdominal and thorax tomographies of pediatric and adult patients were evaluated. In these, 544 patients were male (58%) and 386 patients were female (41%). The mean age of the patients was 32±5.3 years. We found the presence of CT hypoperfusion complex in at least 1 of 15 patients (0.16%). All of these patients' vital signs were stable (they might have been in the compensatory phase of shock). Further, out of the 15 patients, 12 patients suffered from multiple traumas (0.12%), 2 patients were in the post-operative stage (0.02%), and 1 patient (0.01%) suffered from sepsis. We observed low-calibrated abdominal aorta together with hyperdense adrenal glands (15 cases, 0.16%) (Figure 1, 2) in all the patients with CT hypoperfusion complex. We detected intra-abdominal free fluid in 13 cases (0.13%), halo sign in the IVC in 8 cases (0.08%), hypoperfused spleen and liver in 5 cases (0.05%) (Figure 3), pericholecystic fluid in 3 cases (0.03%) (Figure 4), and sign of renal hyperperfusion (white kidney sign) in 3 cases (0.03%) (Figure 5). Apart from this, low-calibrated thoracic aorta and collapsed heart appearance observed in thorax-related results were present in 5 cases (0.05%). On the other hand, 1 patient died because of septic shock. Other patients recovered fully after a 3-month follow up.

Discussion

Computed tomography hypoperfusion complex is a set of tomographic results that was defined by Taylor et al. (1) for the first time in 1987. Basically, it is the definition of hypoperfusion results seen in abdominal and, sometimes, thoracic structures as a result of circulation

Figure 5. White kidney sign is seen in axial CT image (stars)

guidance from splanchnic circulation to vital organs due to the activation of the sympathetic system post-shock (hypovolemia). At the same time, CT hypoperfusion complex was found to be associated with poor prognosis (3). However, it is known that emergency physicians and even radiologists have difficulties in defining these findings.

There are three basic stages of shock: compensatory, decompensatory, and irreversible. Arterial pressure, in particular, can be maintained in the compensatory phase, and monitoring of only the vital signs is not enough to explain the patient's state. In abdominal tomography performed at this stage, the presence of CT hypoperfusion complex in the patient indicates that the patient is in shock and there must be an appropriate treatment for this exigency. At the same time, understanding the signs of CT hypoperfusion prevents confusion with pathologies that can enter the differential diagnosis, including ileus, gallbladder perforation, mesenteric ischemia, portal venous thrombosis, and DIC.

The signs of CT hypoperfusion complex can be divided into two: vascular and non-vascular. Low-calibrated abdominal aorta, IVC, and mesenteric arteries can be categorized as vascular signs. Dilated and edematous bowel loops, hyperdense adrenal glands, shock kidney, shock pancreas, free fluids in the abdomen, splenic and hepatic perfusion deficits, and pericholecystic fluid can be categorized as non-vascular signs. Apart from these findings about the abdomen, low-calibrated thoracic aorta and loss of volume in cardiac chambers (in extreme cases) can also be considered.

Certainly, some measurements are also needed to be made for the evaluation of these signs. For instance, the following can be considered to be diagnostic criteria: (A) in the diagnosis of low-calibrated abdominal aorta, the abdominal aorta diameter of the renal arteries 2 cm below and above is less than 13 mm; (B) with regard to low-calibrated IVC, the IVC diameter is less than 9 mm in the measurements made from 3 different regions of the intrahepatic vena cava; (C) in the case of hyperdense adrenal glands, the state of being equal or hyperdense when compared to peripheral vascular structures (e.g., IVC) and holding more contrast than the spleen and liver; (D) in the case of shock kidney diagnosis, extended and significantly more hyperdense kidneys; and (E) in the case of hypoperfused spleen and liver, increase in the heterogeneous area (perfusion defects) when compared to normal parenchyma (3).

In our study, we emphasize the observation of hyperdense adrenal glands and low-calibrated abdominal aorta signs in all patients whose imaging reveals CT hypoperfusion complex (sensitivity: 100%; specificity: 100%). Therefore, the observation of hyperdense adrenal glands together with low-calibrated abdominal aorta in portal-phase abdominal tomography (early portal phase is used to observe the arteries) obtained from patients suspected to be in the compensatory phase of shock can confirm that the patient is in shock. Emergency physicians should be alert during this phase of shock. It has been assumed that the above is caused by hypovolemia, and the appropriate treatment is supportive therapy rather than surgical intervention.

The incidence of complex CT hypoperfusion has been reported differently in several studies. However, CT hypoperfusion complex occurs at a higher rate in post-traumatic patients. In our study, 12 out of the 15 cases with CT findings consisted of post-traumatic cases. In a study conducted on post-traumatic cases by Ryan et al. (3), CT hypoperfusion complex was seen in 27 out of 498 patients (5.5%). Again, CT findings in a pediatric group with blunt abdominal trauma were evaluated by Taylor et al. (1), and they reported the incidence as 0.01%. In our study, this incidence is 0.16%.

Conclusion

Computed tomography hypoperfusion complex is a set of imaging signs that is even difficult for radiologists to identify. However, if identified, it can lead to appropriate treatment along with diagnosis even in patients in the compensatory phase of shock. In addition, the observation of hyperdense adrenal glands together with low-calibrated abdominal aorta in abdominal CT scans can confirm that the patient is in shock, and we should check at least these two structures in patients suspected to be in shock.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Informed constent was not obtained because our study was a retrospective study.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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

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Investigation of Electrocardiography Changes and, Specifically, Changes in the TpTe Interval and TpTe/QT Ratio in Patients Presenting with Electrical Injuries

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Abstract

Aim: The purpose of this study was to examine changes in cardiac monitoring, electrocardiography (ECG), or cardiac enzymes and, specifically, changes in the TpTe interval and TpTe/QT ratio in patients who presented with electrical injuries.

Materials and Methods: All patients aged over 18 years who had visited the Emergency Medicine Clinic between January 2011 and January 2014 because of electrical injuries and who were monitored for more than 24 h were included.

Results: Seventy patients were included in the trial. ECG changes were present in 19 patients (27.1%) at various time points (0th, 6th, 12th, and 24th hour). The TpTe intervals of the patients at the time points were 64.5 (IQR: 21.25), 65 (IQR: 21.5), 64 (IQR: 20), and 64 (IQR: 20) ms, respectively, which were within the normal range. Although a statistical difference was present (p=0.033), superior analyses showed no significant difference among the groups. The TpTe/QT ratios of the patients were 0.18 (0.07), 0.18 (0.05), 0.18 (0.06), 0.18 (0.05), respectively, which were within the normal range (p=0.105). We compared the TpTe intervals and TpTe/QT ratios of patients with and without ECG changes and found that no statistically significant difference was present at all time points. Besides this, no difference in the TpTe intervals and TpTe/QT ratios was identified between the groups with elevated and non-elevated troponin levels.

Conclusion: The use of TpTe intervals and TpTe/QT ratios may not be the correct approach for predicting potential rhythm disorders in electrical injuries. In addition, there is no association of the TpTe interval or the TpTe/QT ratio with ECG changes or troponin elevation caused by electrical injuries.
Keywords: Electrical injuries, electrocardiography, TpTe interval

Introduction

Electrical injuries (EIs) are associated with high morbidity and mortality and are a type of trauma that puts all age groups at risk (1). In the USA, more than 500 deaths are attributed to EIs annually (2). EIs can cause cardiac arrest, myocardial and valvular ruptures, structural changes in the coronary arteries, pericardial effusion, and various electrocardiography (ECG) changes. In most patients, at the very least, temporary ECG changes can be observed (3, 4). The purpose of our study was to investigate the epidemiologic characteristics of EIs, cardiac monitoring, ECG reports, and cardiac enzyme changes and, specifically, the TpTe and QT intervals and TpTe/QT ratio that develop in patients presenting with EIs.

Materials and Methods

Study population and study protocol

All patients who had visited the Emergency Medicine Clinic of Konya Training and Research Hospital between January 2011 and January 2014 because of EIs, who were monitored for more than 24 h, and who were over 18 years of age were included. This retrospective study was conducted by reviewing patient files. The cases were reviewed with regard to gender, age, location of EI, course of EI, and cause (low voltage or high voltage). Further, changes in ECG and cardiac enzymes, specifically, TpTe and QT intervals and the TpTe/QT ratio, and their association with rhythm disorders were investigated".

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The study protocol was approved by the Necmettin Erbakan University Faculty of the Medicine Ethics Committee and was conducted in accordance with the Declaration of Helsinki and Good Clinical Practice.

Electrocardiography measurement

The ECG records of the patients at baseline (0 h) and at 6, 12, and 24 h were evaluated. The Nihon Kohden ECG 1250 Cardiofax S (2009, Tokyo, Japan) device was used for recording ECGs. Records were obtained at a speed of 25 mm/s and with an amplitude of 10 mm/mV. The ECG records were at 800-dpi resolution and were measured by two specialists uninformed about the patient's conditions and with the help of a computer. The PR interval was measured as the distance from the start of the P wave to the start of the QRS complex (normal range of PR interval: 120–200 ms). A prolonged QRS duration was defined as ≥120 ms.

The TpTe interval was measured in precordial derivations by the "tail method." According to this, the distance between the projection of the T-wave's peak point on the isoelectric line and the end of the T wave was measured (normal range of TpTe: ≤85 ms) (5-7). The QT interval was measured as the distance between the start of the QRS complex and the end of the T wave (normal QT: 360–440 ms). In addition, in situations when the heart rate was not in a normal range, the corrected QT interval was calculated using Bazett's formula (7-10). This prevented abnormalities in the heart rate from affecting the TpTe/QT ratio (10). The TpTe/QT ratio was calculated after the TpTe interval was measured (11).

Statistical analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS Inc.; Chicago, IL, USA) version 15.0 for Windows. Both visual (histogram and probability graphs) and analytical (Kolmogorov–Smirnov and Shapiro–Wilk tests) methods were used to determine if the data were normally distributed. Descriptive variables are expressed as the mean±SD for data normally distributed and as the median and interquartile range (IQR) for variables not normally distributed. Clinical and laboratory characteristics were evaluated via the Mann–Whitney U test for variables without normal distribution. For comparison of the differences among the groups, the Mann–Whitney U test was used for quantitative variables and the chi-square test was used for categorical variables. Hourly differences in the ECG parameters were evaluated via repeated measures analysis of variance for normally distributed variables, whereas variables without normal distribution were evaluated via the Friedman test. When necessary, the Wilcoxon test with the Bonferroni correction was used to compare variables. A p value of <0.05 was accepted as statistically significant with a 95% confidence interval.

Results

During the study period, 187 patients with EIs visited our clinic. Out of these patients, 45 were excluded because they were under the age of 18 years. In addition, 72 patients were excluded because they were monitored for less than 24 h. This left 70 patients who were included in the trial. The median age of the patients was 24 years (IQR: 22). The number of male patients was 55 (78.6%). Twenty-three patients (32.9%) were exposed to a high-voltage electrical current. When the Glasgow Coma Scores (GCSs) of the patients were reviewed on admission, 66 (94.3%) had a GCS of 15, while the remaining 4 (5.7%) had GCSs of 3, 6, 8, and 9. Eleven (15.7%) patients had elevated cardiac injury marker levels (troponin>0.2 ng/mL), while four (5.7%) had respiratory failure (need for endotracheal intubation and mechanic ventilation).

Table 1. 24-h ECG analysis of patients

ECG	At the 0th hour Number (n) (%)	At the 6th hour Number (n) (%)	At the 12th hour Number (n) (%)	At the 24th hour Number (n) (%)
NSR	55 (78.6)	63(90)	65 (92.9)	65 (92.9)
Sinus bradycardia	2 (2.9)	3 (4.3)	1 (1.4)	2 (2.9)
Sinus tachycardia	7 (10)	3 (4.3)	2 (2.9)	1 (1.4)
T-wave inversion	1 (1.4)	-	-	1 (1.4)
ST segment elevation	1 (1.4)	-	-	-
ST segment depression	1 (1.4)	-	1 (1.4)	-
Sinus arrhythmia	1 (1.4)	-	-	-
1st degree AV block	1 (1.4)	-	-	-
Ventricular fibrillation	1 (1.4)	-	-	-
Ventricular tachycardia	-	1(1.4)	-	-
Cardiac arrest	-	-	1 (1.4)	1 (1.4)
Total	70 (100)	70 (100)	70 (100)	70 (100)

ECG: electrocardiogram; NSR: normal sinus rhythm

Electrocardiography changes were present in 19 (27.1%) patients at various time points of the 24-hour ECG monitoring. The most common ECG change was identified as sinus tachycardia. Ventricular tachycardia (VT) and ventricular fibrillation (VF) occurred in one patient each. These patients were administered amiodarone and underwent electrical cardioversion, defibrillation, and cardiopulmonary resuscitation. Two (2.9%) of our patients died, and 68 (97.1%) were discharged from the hospital. The PR, QRS, QT, and TpTe intervals and the TpTe/QT ratio were evaluated at baseline and at 6, 12, and 24 h. The QT intervals of the 70 patients were 370 (IQR: 40), 380 (IQR: 35), 380 (IQR: 43.5), and 382 (IQR: 36) ms at baseline and at 6, 12, and 24 h, respectively, which were within normal ranges. No statistically significant difference was present (p=0.059). The TpTe intervals of the 70 patients were 64.5 (IQR: 21.25), 65 (IQR: 21.5), 64 (IQR: 20), and 64 (IQR: 20) ms at baseline and at 6, 12, and 24 h, respectively, which were within normal ranges. Although a statistically significant difference was apparent (p=0.033), the superior analysis showed no significant difference. The TpTe/QT ratio of the 70 patients were 0.18 (0.07), 0.18 (0.05), 0.18 (0.06), and 0.18 (0.05) at baseline and at 6, 12, and 24 h, respectively, which were within normal ranges. No statistically significant difference was shown (p=0.105). The details of these differences are shown in Tables 1 and 2. In addition, we compared the TpTe, QT intervals, and the TpTe/QT ratios in patients with and without ECG changes. The ECG records at baseline and at 6, 12, and 24 h were evaluated individually. There was no statistically significant difference among the groups at all time points (Table 3).

We compared the ECG changes and troponin elevation in patients with high- and low- voltage EIs. The median age of patients with high-voltage injuries was 28 years (IQR: 16), whereas that of

Table 2. Analysis of the ECG findings of the patients

ECG	Median value (IQR)				p
	At 0th hour	At 6th hour	At 12th hour	At 24th hour	
PR interval (ms*)	140 (23)	150 (23)	140 (28)	150 (20)	0.042
QRS distance (ms)	85 (20)	92 (20)	90 (19)	90 (20)	0.019[a]
QT interval (ms)	370 (40)	380 (35)	380 (43.5)	382 (36)	0.059
TpTe interval (ms)	64.5 (21.25)	65 (21.5)	64 (20)	64 (20)	0.033
TpTe/QT	0.18 (0.07)	0.18 (0.05)	0.18 (0.06)	0.18 (0.05)	0.105

Friedman Test; Wilcoxon signed-rank Test; [a]: The difference at 6 h from the first application of QRS distance. *ms: millisecond

Table 3. Comparing the TpTe intervals and TpTe/QT ratios of patients with and without ECG changes

	Patients with ECG changes (n: 19)	Patients with no ECG changes (n: 51)	p
First TpTe interval	71 (IQR: 27.5)	64.5 (IQR: 20)	0.622
TpTe interval at the 6th hour	65 (IQR: 21.5)	67 (IQR: 22)	0.973
TpTe interval at the 12th hour	63.5 (IQR: 20)	64 (IQR: 21)	0.591
TpTe interval at the 24th hour	63.5 (IQR: 20)	64 (IQR: 21)	0.591
First QT interval	386 (IQR: 46.3)	367 (IQR: 36)	0.400
QT interval at the 6th hour	377 (IQR: 54.5)	380 (IQR: 34)	0.753
QT interval at the 12th hour	380 (IQR: 50)	380 (IQR: 42)	0.612
QT interval at the 24th hour	388 (IQR: 46.3)	380 (IQR: 34)	0.676
First TpTe/QT	0.18 (IQR: 0.08)	0.18 (IQR: 0.06)	0.843
TpTe/QT at the 6th hour	0.19 (IQR: 0.07)	0.18 (IQR: 0.05)	0.946
TpTe/QT at the 12th hour	0.18 (IQR: 0.06)	0.18 (IQR: 0.06)	0.738
TpTe/QT at the 24th hour	0.17 (IQR: 0.05)	0.18 (IQR: 0.05)	0.618

Mann–Whitney U test, Interval: milliseconds.

patients with low-voltage injuries was 24 years (IQR: 22). No statistically significant difference in the ages of the patients in these two groups was shown (p=0.05). When genders of the patients in these two groups were compared, 23 males and no females were present in the high-voltage group, while 32 males and 15 females were present in the low-voltage group. A statistically significant difference in gender was present between the groups (p=0.001). High-voltage EIs were more common in males. ECG changes were identified in 10% of high-voltage EIs and 17.1% of low-voltage EIs. In addition, troponin levels were elevated in 8.6% of high-voltage EIs and in 7.1% of low-voltage EIs. No statistically significant difference in ECG changes and troponin level elevation was shown between the two groups (p=0.665 and p=0.095, respectively) (Table 4).

The median age of patients with elevated troponin levels was 26.5 years (IQR: 23.25) and 26 years (IQR: 21) in patients without elevated troponin levels. In the group with elevated troponin levels, there were 11 males and no females, while in the group without elevated troponin levels, there were 44 males and 15 females. The age and gender was compared in patients with elevated troponin levels caused by EIs and without elevated troponin levels, but no difference was seen (p=0.471 and p=0.105, respectively). However,

Table 4. Comparison of the ECG changes and troponin elevations in patients with high- and low-voltage EIs

	High-voltage EI (n: 23)	Lo- voltage EI (n: 47)	p
Age	28 (IQR: 16)	24 (IQR: 22)	0.05
Gender	M: 23; F: 0	M: 32; F: 15	0.001
ECG Changes	7 (10%)	12 (17.1%)	0.665
Troponin Elevation	6 (8.6%)	5 (7.1%)	0.095
	Patients with elevated troponin levels (n: 11)	Patients without elevated troponin levels (n: 59)	
Age	26.5 (IQR: 23.25)	26 (IQR: 21)	0.471
Gender	M: 11; F: 0	M: 44; F: 15	0.105
ECG Changes	7 (10%)	12 (17.1%)	0.007
First TpTe interval	75.5 (IQR: 22.1)	64 (IQR: 22)	0.339
TpTe interval at the 6th hour	80.5 (IQR: 20.5)	65 (IQR: 22)	0.325
TpTe interval at the 12th hour	71 (IQR: 25)	64 (IQR: 20)	0.870
TpTe interval at the 24th hour	71 (IQR: 25)	64 (IQR: 20)	0.870
First QT interval	389 (41)	370 (42)	0.428
QT interval at the 6th hour	382 (28)	380 (37)	0.701
QT interval at the 12th hour	380 (31.8)	380 (42)	0.561
QT interval at the 24th hour	386 (10.5)	380 (40)	0.884
First TpTe/QT	0.185 (0.05)	0.170 (0.07)	0.501
TpTe/QT at the 6th hour	0.206 (0.04)	0.175 (0.05)	0.091
TpTe/QT at the 12th hour	0.191 (0.06)	0.180 (0.06)	0.980
TpTe/QT at the 24th hour	0.182 (0.07)	0.172 (0.05)	0.905

Mann–Whitney U test and chi-square test, Interval: milliseconds

when the ECG changes in the two groups were compared, it was seen that ECG changes were identified in 10% of the patients with elevated troponin levels and in 17.1% of the patients without elevated troponin levels. The difference was statistically significant (p=0.007). In addition, no differences in TpTe, QT intervals, and TpTe/QT ratios were identified among patients in the group with elevated troponin levels and those in the group without elevated troponin levels (Table 4).

Discussion

It is expressed that the degree of myocardial injury increases as the voltage gets higher (12). Asystole and VF are fatal cardiac problems caused by EI, and besides these, ECG changes, such as sinus tachycardia, non-specific ST-T changes, heart blocks, QT elongation, supraventricular-ventricular arrhythmias, and atrial fibrillation, may also develop (13). Akkaş et al. (14) identified normal sinus rhythm in 76%, sinus tachycardia in 9%, sinus bradycardia in 3%, ST-T changes in 4%, and premature ventricular beats in 1% of the 120 patients with EIs in their study, while cardiac enzymes were elevated in only 4% of the patients and acute coronary syndrome did not develop in any of the patients. In addition, eight patients in their study died due to cardiac problems that started at the time of EI and one died of sepsis. In the patients that survived, no ECG changes that required medical or electrical treatment were observed. Arrowsmith et al. (15) stated that ECG changes were present in 3% of the patients in their study. In the study conducted by Karadaş et al. (16), ECG abnormalities were identified in 29.3% of the patients. In our study, similar to medical literature, the results of the evaluations of the 24-hour ECG monitoring showed that ECG changes were present in 19 (27.1%) of the patients at various time points. The most common ECG change was identified as sinus tachycardia. One of our patients died due to VF and one died due to VT within 6 hours. In addition, cardiac enzymes were high in 11 (15.7%) of our patients.

Some authors recommend ECG monitoring after every EI (3, 12) because ECG changes have been identified in past studies, whereas others state that this is necessary only in selected cases (17). Teodoreanu et al. (18) stated that cardiac monitoring is indicated if cardiac arrest or loss of consciousness occurs, if the ECG is abnormal or if a dysrhythmia is present, if the patient has a history of cardiac disease or important cardiac risk factors before hospital admittance, and if the patient has severe injuries, chest pain, or hypoxia. In the present study, we also investigated the need for 24-hour cardiac monitoring. Normal sinus rhythms were observed in 78.6% of patients at baseline, 90% at the 6th hour, and 92% at the 12th and 24th hours. We observed that only two patients died in the first 6 hours because of cardiac arrest caused by VT or VF and that no other patient experienced serious rhythm disorders after 6 hours. We proposed that, when no ECG changes are present at baseline or in the first 6 hours, prolonged cardiac monitoring is unnecessary for these patients.

We aimed to report, for the first time, the measured TpTe interval and TpTe/QT ratio values as a new method for predicting rhythm disorders in EIs. In past studies on the TpTe interval, it has been identified that the prolongation of the TpTe interval is a potential risk factor for the development of re-entry ventricular arrhythmias (19, 20). In addition, it has been observed that prolonged QT intervals increase the mortality risk in congenital or acquired long QT syndromes and in hypertrophic cardiomyopathy patients with troponin I mutations (11, 21). It has also been shown that they are associated with malignant arrhythmias in prolonged TpTe interval long QT syndrome, hypertrophic cardiomyopathy, Brugada syndrome, and AMI (11). Besides these, another important new parameter is the TpTe/QT ratio. In a study on animals such as cows and pigs, the ratio was measured to be between 0.17 and 0.23 (on average, 0.21 in healthy adults), and it has been reported to play an important role in the electrical stability of the myocardium. It is also very useful in counteracting the individual differences in the heart rate and QT interval (22). It has been stated that the TpTe interval and the new transmyocardial repolarization marker the TpTe/QT ratio are superior to the QT interval in predicting arrhythmias (23). In their study including 353 cardiac arrest cases, Panikkath et al. (7) reported that prolonged TpTe (≥85 ms) and high TpTe/QT ratios are strongly associated with cardiac arrest. Lubinski et al. (24) reported that prolonged TpTe intervals and high TpTe/QT ratios are associated with VT in coronary artery disease patients. Because the TpTe interval and TpTe/QT ratio are important in cardiac rhythm disorders, we investigated if EIs cause prolonged TpTe intervals and high TpTe/QT ratios in our study. However, we were unable to identify any prolongation in the TpTe interval or increase in the TpTe/QT ratio in EIs. In addition, we were unable to identify an association of the TpTe interval or the TpTe/QT ratio with ECG changes in patients with EIs.

It is known from the medical literature that ECG changes occur with both high-and low-voltage currents (25). In their study, Karadaş et al. (16) identified ECG changes in only 8.9% of low-voltage EIs. Rai et al. (26) identified ECG changes secondary to shock or arrhythmia in seven of 58 patients with high-voltage EIs. They also reported that fatal arrest developed in two patients exposed to a high-voltage current in the same study. In our study, there was no difference in ECG changes and there were no troponin level increases between high- and low-voltage EIs.

Akkaş et al. (14) reported that troponin levels were elevated in only 4% of their patients. Jensen (3) was also unable to detect a significant elevation in troponin levels.

In our study, troponin levels were elevated in 15.7% of the patients. However, in our patient group with elevated troponin levels, the number of patients with ECG changes identified was fewer than expected. Thus, we must be careful in using elevation in troponin levels for predicting ECG changes in patients with EIs.

Study limitations

The major limitation of this study is the low number of patients, particularly of patients with ECG changes. Conducting this study in a larger patient group that includes patients with more severe arrhythmias might provide an opportunity to gather more definite results.

Conclusion

Using the TpTe interval and TpTe/QT ratio in predicting potential rhythm disorders that develop in EIs may not be an appropriate approach. In addition, there is no association of the TpTe interval or the TpTe/QT ratio with ECG changes or troponin level increase because of EIs. It is unnecessary to continue cardiac monitoring for longer periods of time if no ECG changes are present at baseline or have not developed in the first 6 hours.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Necmettin Erbakan University Faculty of Medicine.

Informed Consent: Written informed consent wasn't obtained from patients who participated in this study because our study is a retrospective study and the data obtained by screening of the patient files.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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Systematic Review of the Personality Profile of Paramedics: Bringing Evidence into Emergency Medical Personnel Recruitment Policy

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Abstract

Aim: Because emergency medicine is extremely demanding and challenging for emergency medical personnel (EMP), it is important that the personality traits of EMP be understood. Few studies have addressed the personality traits that EMP should possess. The aim of this study was to systematically review the personality traits of EMP to establish a profile that can help identify individuals whose personalities are suited to prehospital emergency occupations.

Materials and Methods: Electronic databases, including MEDLINE, SCOPUS, CINAHL, and PsychINFO, with information accumulated from their conception to March 2015, were searched using the terms "personality," "trait," "rescue," "emergency," "medical," "services," "personnel," "paramedic," and "technician." The Preferred Reporting Items for Systematic Reviews and Meta-Analyses Statement was followed in this review. Data extraction was performed by two authors who independently reviewed each article.

Results: Of 398 articles found, 27 were eligible for review. A total of 9,721 paramedics had participated in the selected studies. Nearly half of the studies were performed in the USA and Australia. The paramedics scored high in conscientiousness, sensation seeking, resiliency, and empathy but low in extroversion, neuroticism, and agreeableness.

Conclusion: While high conscientiousness and low neuroticism could be assumed to be protective factors against post-traumatic stress disorder among EMP, certain personality traits, such as conscientiousness, put them at risk of burnout. The personality traits of paramedics need to be further investigated in terms of role model traits and performance indicators related to personality traits.

Keywords: Personality, emergency, medical, services, paramedics

Introduction

Emergency medical services (EMSs) provide medical care for patients in life-threatening conditions in highly demanding, challenging, and interactive environments (1). In this context, emergency medical personnel (EMP) must have the ability to cope with emotionally challenging and stressful situations. Despite the many contextual variables that exist in emergency clinical practice (2), EMP have unique roles and responsibilities in dealing with stressful situations. Therefore, the personality traits of EMP have been the focus of a number of studies (3).

It would be advantageous to recognize personality traits that are congruent with emergency working conditions. Mitchell and Bray (4) indicated that a rescue person may score low in neuroticism and openness to experience but high in extraversion, low openness to experience, high conscientiousness, high agreeableness, and sensation seeking. Although a typical "rescue personality" has been reported in several studies (3), few studies have concentrated on the personality traits of EMP (5, 6). These traits are associated with job performance criteria, particularly conscientiousness (7). Individuals with high conscientiousness may show higher competency or more extrovert ones may have higher social interaction than others, but both traits are necessary for EMSs. On the contrary, neuroticism would play an unconstructive role in chaotic emergency circumstances. In addition, a debate has arisen from studies addressing the issue of whether personality traits are homogenous among EMP (8). Wagner et al. (3) concluded that there is little evidence for a distinct personality type that is reflective of emergency service workers as a whole. Therefore,

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this disparity must be addressed so that the personality traits of EMP can be fully identified.

Emergency medical personnel are typically involved in disasters and traumatic events that could contribute to the development of post-traumatic stress disorder (PTSD) (9). As PTSD and burnout are recognized as serious issues among EMP (10, 11), it is vital to identify the personality traits of EMP that would help them cope effectively with stress so that psychological health could be maintained. To this end, Chng and Eaddy (11) investigated the relationship between sensation seeking and burnout, while Sheikhbardsiri (10) evaluated the relationship between personality traits and PTSD among EMP. Thus, there is a strong rationale for obtaining comprehensive insight into personality traits that cause an individual to be susceptible to psychological disorders, particularly PTSD.

To summarize, the significant role of EMP in EMSs, their multidimensional role in a decidedly interactive context, and the considerable occurrence of psychological disorders among EMP make it necessary to systematically review the personality traits of this group of workers to identify a personality profile that makes an individual suitable for prehospital emergency practice.

Materials and Methods

A literature review was performed to identify the personality traits of EMP. A search retrieved potentially relevant articles in electronic databases, such as MEDLINE, SCOPUS, CINAHL, and PsychINFO. The databases were searched from their conception to March 1, 2015, without any additional filters. The search terms used were "personality," "trait," "rescue," "emergency," "medical," "services," "personnel," "paramedic," and "technician." The procedures used in this review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Statement (12). Articles about the personality traits of EMP were included if they evaluated the personality of paramedics or emergency medical technicians or if they identified a "rescue personality." Studies that represented gray literature, congress abstracts, reviews, case studies, and duplicate publications were excluded. Two researchers independently reviewed the titles and abstracts of all papers identified in the primary search results. Disagreements were discussed by the researchers to reach a consensus. Relevant articles found in the reference lists of the retrieved papers were also searched for (Figure 1). If necessary, the authors of the research articles were contacted to retrieve supplementary information. The final articles were reviewed by the authors. Data extraction involved the two authors' independent reviews of each article and was based on country, instrument type, participants, sample size, and the results. The methodological rigor of the studies was also assessed. The authors reviewed the extracted data together and agreed on the results of the extraction of data and quality of each article (Table 1).

Results

Of 398 articles that were found, 27 were included in the final sample; a total of 9,721 paramedics had participated in the selected studies. Seven studies had been conducted in the US, six in Australia, two in Germany, two in Slovakia, and one each in South Africa, Austria, Canada, Sweden, Hungary, Iran, Norway, Romania, China, and England. Nine studies used researcher-constructed questionnaires, and the remaining studies used standardized instruments (Table 1).

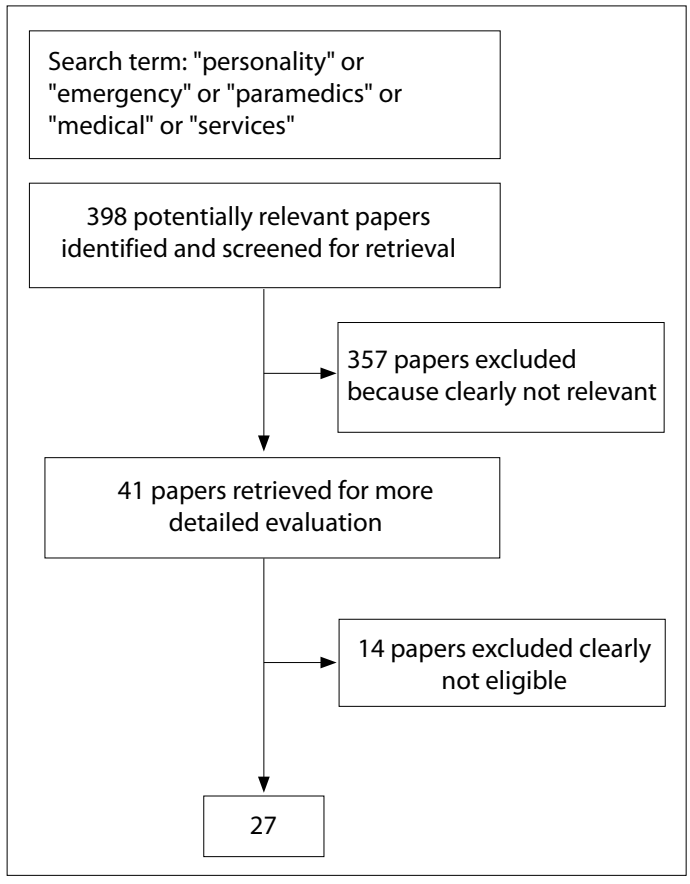

Figure 1. Results of the literature search and selection process

Big five personality and associated traits

Neuroticism: Traits related with neuroticism are being anxious, angry, emotional, worried, and insecure (7). EMP scored lower on neuroticism than the norm sample (5). Paramedics also scored significantly lower for neuroticism than other healthcare professionals (8). Among EMP, dispatchers had significantly higher scores than other groups for neuroticism, while ambulance drivers scored the lowest in this category (13). Furthermore, neuroticism was strongly related to the severity of stressors and to organizational conditions (14).

Extraversion: Traits related with extraversion are sociable, assertive, talkative, and active (7). EMP showed no differences in extraversion scores compared to the norm sample (5). Paramedics also scored significantly lower for extroversion than other healthcare professionals (8). Among paramedics, males were significantly less introverted than females (8), and it was possible to predict decision-making based on extraversion among male paramedics (6). The choice to join EMS was solely related to extraversion in comparison with firefighter jobs (15). Paramedic students scored lower for extraversion than other students in the university (16); high levels of anxiety and extraversion were negatively related to academic performance (17). Extraversion was also significantly related to the perceptions of post-traumatic growth (PTG) (18).

The sensation-seeking trait may also be associated with extraversion. EMP scored higher on risk and competition seeking than the norm sample (5, 12). Paramedics scored insignificantly lower on risk taking than other healthcare professionals (8). Paramedics who scored high on burnout also scored high on sensation seeking (19).

Table 1. Summary of findings extracted from the review literature on the personality profiles of paramedics

Study	Participants	Instrument	Results
Backus et al. (32)	125	Questionnaire about their beliefs and behaviors regarding their spirituality	EMP are interested to talk about their spiritual lives. Those EMTs with more active spiritual lives perceive themselves as happier.
Grevin (26)	225	MMPI-2 PK Scale	Both paramedics and paramedic students had significantly low scores on empathy.
Palmer and Spaid (19)	91	Standardized instruments	Burnout did not correlate with the overall sensation-seeking scale.
Chng and Eaddy (11)	425	Arnett's Inventory of Sensation Seeking and Revicki's Work-Related Strain Inventory	EMP had significantly higher sensation-seeking scores than the general public, but this dimension alone does not protect them from the effects of burnout.
Reich (38)	31	Adjective checklist and 23-item social identities questionnaire	EMT now/real me was significantly correlated with activity. EMT future/real me and EMT future/ought me were both significantly correlated with commitment.
Brown et al. (39)	361	46-item core survey and a 16-item survey	Being able to help others was the most important and satisfying aspect of work life of EMP.
Regehr et al. (34)	86	The Bell Object Relations and Reality Testing Inventory (BORRTI)	EMP with personality patterns characterized by suspiciousness, hostility, and isolation and who had a tendency toward demanding, controlling, and manipulative behavior in relationships were more likely to have taken a mental health stress leave.
Fannin & Dabbs (2003) (15)	195	Questionnaires	EMS performance was predicted by extraversion. EMS performance was related to an interaction of testosterone with conscientiousness.
Jonsson and Segesten (23)	362	Professional Self-Description Form (PSDF)	Stress tolerance, consideration, and flexibility had the highest rank among the 21 self-description items named by ambulance personnel.
Kilner (31)	34	Questionnaire	Honesty, patient-centered approach and having caring, empathic and values life from technician's viewpoint.
Louria (17)	53	16 Personality Factor Questionnaire (the 16 PF)	Five factors were found to be significant in relation to academic achievement on this course. These included abstract, verbal reasoning, levels of anxiety, levels of extraversion, work methods, and year level of study.
Shakespeare-Finch et al. (18)	526	Questionnaire	Correlations revealed that extraversion, openness, agreeableness, conscientiousness, and coping levels significantly relate to perceptions of PTG.
Mitmansgruber et al. (20)	239	Meta-emotion scale, Mindful attention and awareness scale, positive affectivity and negative affectivity scale	Meta-emotions would allow for a meaningful differentiation of processes in emotion regulation. Experiential avoidance is consistently negatively correlated with well-being.
Sterud et al. (14)	1180	Basic Character Inventory	Neuroticism was related to higher severity scores in all stressor dimensions except for time pressure. Neuroticism was related to both severity and frequency of lack of sup port from co-workers and leaders.
Pajonk et al. (8)	245	Hamburg Personality Inventory (HPA)	Results revealed differences for nervousness, extraversion, control, and altruism but not for openness and risk taking.
Pilarik and Sarmany-Schuller (6)	92	The Iowa Gambling Task, EQTM map, Stroop test, Rational-Experiential Inventory, NEO-FFI questionnaire	In men, it was possible to predict appropriate decision-making based on emotional stability, extraversion, and quick reactions. Appropriate decision-making of female paramedics could be predicted based on two zones of emotional intelligence (low emotional awareness and positive current conditions) and on quick reactions in the Stroop test.
Abedi et al. (16)	492	The NEO–Five-Factor Inventory (NEO-FFI)	Paramedical students were more introverted than others.

Table 1. Summary of findings extracted from the review literature on the personality profiles of paramedics (continued)

Gayton and Lovell (24)	219	The 10-item Connor–Davidson Resilience Scale	These results showed that higher resiliency was significantly associated with better general health and well-being.
Williams et al. (27)	783	Medical Condition Regard Scale (MCRS)	Females had higher mean scores than males on each medical condition, supporting the multitude of empathy studies in healthcare students, where females were identified as being more empathetic than their male counterparts.
Williams et al. (28)	783	Jefferson Scale of Physician Empathy-Health Profession Students	Females had greater mean empathy scores than males: 108.69 vs 103.58 (p=0.042).
Jurišová and Sarmány-Schuller (22)	134	Melbourne Decision-Making Questionnaire, MDMQ, Questionnaire SPARO	Significant relationships between components and factors of mental integration (emotional and regulatory invariability, lower mental arousal) were found. Their integration forms a "calm, mentally stable and resilient personality type."
Klee and Renner (5)	173	Critical Incident Stress Debriefing, Hamburg Personality Inventory	EMS personnel scored lower on neuroticism and openness but higher on conscientiousness and risk and competition seeking than a norm sample. EMS personnel showed lower scores for agreeableness and no differences for extraversion. EMS volunteers did not differ from EMS professionals regarding personality, except for the degree of extraversion.
Niculita (13)	458	The Big Five©plus Personality Inventory, Sensation Seeking Scale	The results revealed a series of significant personality differences among professional groups of ambulance workers. The high-level performance dispatchers group showed significant differences from the low-level performance group of the same category regarding their scores to the following personality scales and subscales: conscientiousness, self-efficacy, and achievement striving.
Fjeldheim et al. (25)	131	Connor–Davidson Resilience Scale (CD-RISC)	Participants meeting PTSD criteria also had significantly lower levels of resiliency and social support. Participants meeting criteria for PTSD had significantly higher rates of depression, perceived stress, and physical health symptoms and significantly lower rates of resiliency and social support.
Sheikhbardsiri (10)	180	The NEO Five-Factor Inventory and the Mississippi combat-related PTSD scale	PTSD of EMP was significantly correlated with personality traits of conscientiousness and neuroticism.
Williams et al. (29)	1719	Jefferson Scale of Physician Empathy – Health Profession Students' version (JSPE-HPS)	Empathy did not decline during course progression with third-year students recording the highest mean empathy score across all 3 years.
Williams et al. (30)	554	Jefferson Scale of Physician Empathy – Health Profession Students' version (JSPE-HPS)	Overall, self-reported empathetic regard for each medical condition included intellectual disability, substance abuse, attempted suicide, and acute mental illness. For students as a whole, mean scores generally improved over their course as they progressed through their degree. This study found that compared to males, females generally have a higher regard for patients presenting with intellectual disability, substance abuse, and attempted suicide.

Among firefighters, the preference for firefighting over EMS work was predicted by the characteristic of fearlessness (15).

Openness to experience: Traits related with openness to experience are being imaginative, cultured, curious, broad-minded, and artistically sensitive (7). EMP scored lower on openness than the norm sample (5). The review also indicated that there was no difference between paramedics and other healthcare professionals in terms of openness to experience (8). Ambulance worker professional groups scored lower on openness to experience than doctors (13). Among firefighters, individuals who preferred firefighting over EMS work were predicted by low scores for openness to experience (15). Perceptions of PTG were significantly related to openness to experience (18). Experiential avoidance related to lower scores for openness to experience was consistently negatively correlated with well-being among EMP (20).

Conscientiousness: Traits related with conscientiousness are being careful, thorough, responsible, and organized (7). EMP scored higher on conscientiousness than the norm sample (5, 21). Conscientiousness was significantly related to perceptions of PTG (18). Resilien-

cy related positively to conscientiousness and negatively to neuroticism. Consequently, 50–70% of EMP could be characterized as resilient (8). Conscientiousness was due to the integration of emotional and regulatory invariability and lower mental arousal (22). Stress tolerance ranked highest among the 21 items in ambulance personnel's self-description measuring ambulance attendants' perceptions of personality (23). Higher resiliency scores were significantly associated with better general health and well-being (24). Participants meeting PTSD criteria also had significantly lower scores for resiliency (25).

Agreeableness: Traits related with agreeableness are being flexible, trusting, cooperative, forgiving, and tolerant (7). EMP had lower scores for agreeableness than the norm sample (5). Among firefighters, the preference for firefighting over EMS work was predicted by a low score for the characteristic of agreeableness (15). Agreeableness significantly related to perceptions of PTG (18). Altruism scores were also high among paramedics, the difference being significant only in comparison with doctors (8). Both paramedics and paramedic students had significantly low scores for empathy (26). However, female paramedic students were identified as being more empathetic than their male counterparts (27-29). In general, empathy levels either declined (27) or improved (28, 29, 30) as students progressed through their coursework programs. Paramedic students (in response to empathy for medical conditions) scored the lowest for substance abuse and the highest for intellectual disability (27). Honesty is one of the dimensions of the HEXACO (honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience) personality model, and some of the characteristics categorized under honesty-humility are incorporated into the big five's agreeableness factor. Honesty was the most important characteristic reported by EMP (31). EMP are spiritual but not more so than the average civilian, and EMP with more active spiritual lives perceive themselves as happier (32). Although help is not a personality trait, helping behavior or prosocial behavior is also related to the big five traits, particularly to agreeableness. EMP reported that being able to help others was the most important and satisfying aspect of their work.

Discussion

Paramedics have been shown to score high for conscientiousness (5, 22). This means that they make every effort to be extremely thorough when administering EMSs (4). Life-threatening conditions require the attention of organized and responsible personnel, indicating that conscientiousness is a vital trait for paramedics. In addition, there is a significant difference in the key trait of conscientiousness between high- and low-level performance groups of dispatchers (13). Therefore, conscientiousness is recognized as an essential trait for EMP. However, the trait of conscientiousness may occasionally put paramedics at a disadvantage. Penterman et al. concluded that workers who score high on conscientiousness are sometimes inflexible in their responses during patient interactions, so the patient might quickly become irritated (21). It has also been reported that PTSD is significantly correlated with the personality trait of conscientiousness; however, this result requires further investigation (11).

It has also been shown that paramedics score high on sensation seeking (5, 12, 19). Due to the varied, new, complex, and intense situations that exist in the clinical practices of EMP, it would appear that the trait of sensation seeking is fitting in individuals who assume paramedic roles. Sensation seeking has been recognized as a common trait in rescue workers (4). Chng and Eaddy (11) showed a weak correlation between sensation seeking and burnout; however, Palmer and Spaid showed that, overall, burnout is not correlated with sensation seeking (19).

Paramedics had low scores for neuroticism (5, 8). As Mitchell and Bray (4) indicated, people involved in rescue work may benefit from a calm and measured attitude (low neuroticism). Emotional stability is vital for paramedics who are involved in life-threatening medical situations in daily clinical practice (5), where they are required to remain controlled in many emergency situations and feel secure. Low neuroticism may indicate that paramedics are using effective coping mechanisms in response to stressful situations (19). In addition, neuroticism is significantly correlated with PTSD in EMP (11). It should be noted that these traits are not homogenous for all EMP. In contrast, dispatchers scored higher in neuroticism. Niculita mentioned that this might be related to their inability to stabilize a caller's situation or to provide the necessary assistance (13). Therefore, it is vital to implement effective interventions to lessen the effects of PTSD, particularly among dispatchers (33). As PTSD is significantly associated with lower levels of resiliency (34) and as resiliency relates positively to conscientiousness and negatively to neuroticism (8), resiliency should be considered as a protective trait for EMP.

Paramedics scored lower in extraversion (8). Although being introverted may seem to prevent the engagement of paramedics in intense personal interactions, being sociable, talkative, and active have been reported as appropriate traits for paramedics and for all individuals involved in rescue operations and engaged in daily interaction and communication with people (4). Several studies have confirmed that extraversion is one of the personality traits negatively associated with burnout (35). In addition, a tendency to be more optimistic may result in extroverted paramedics experiencing more feelings of satisfaction with their work (36).

Paramedics have also shown lower scores in openness to experience and agreeableness (5, 8). Mitchell and Bray (4) indicated that high agreeableness and low openness are optimal personality traits for rescue workers. Empathetic, highly dedicated, and a strong need to rescue others are key traits of the role models of paramedics (8, 36). Klee and Renner (5) discussed the discrepancy between low agreeableness and empathetic attitude, which may be related to the construct validity of the personality scales. Paramedics did not show imaginative and independent personalities (5, 8). This trait may be instrumental in their ability to precisely follow routines and procedures. Thus, it may be assumed that paramedics are resistant to new experiences.

Personality traits are related to burnout (37). Chng and Eaddy (11) reported that there may be no relationship between sensation seeking and burnout among EMP in spite of the weak positive correlation, so sensation-seeking or extroversion traits may not protect EMP from burnout. However, Sheikhbardsiri (10) showed that conscientiousness and neuroticism were significantly correlated with the Mississippi combat-related PTSD scores, suggesting that these personality traits accelerate burnout. These findings have been confirmed by Alarcon et al. (37), who meta-analytically indicated that neuroticism, extraversion, and conscientiousness are related to burnout.

Emergency medical personnel personality traits are congruent with professional practice in accordance with contemporary factor models for personality. The personality traits of EMP suffer from limited evidence and require further investigation, particularly to elucidate the association of the identified traits with certain critical disorders, such as PTSD and burnout (38, 39). Our review is limited due to the absence of randomized clinical trials in the field of personality traits of EMP and their association with work performance and professional proficiency, so a more rigorous design method is recommended.

Conclusion

Paramedics score high in conscientiousness, sensation seeking, resiliency, and empathy, but low in extroversion, neuroticism, and agreeableness. While high conscientiousness and low neuroticism could be assumed to be protective traits against PTSD in EMP, certain personality traits, such as conscientiousness, that help paramedics provide patients with secure medical service, also put them at risk of burnout. Further investigations into the personality traits of paramedics' role models and performance indicators related to personality traits is required.

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Comparison of ESC and ACCF/AHA Guidelines for Oral Antiplatelet Treatment in the Management of Patients with Acute Coronary Syndrome

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Abstract

Basically, acute coronary syndrome (ACS) is caused by the partial or total occlusion of coronary arteries because of platelet activation and aggregation. Hence, one of the major components of ACS treatment is the inhibition of platelet activation and aggregation. New studies performed in recent years have led to the update of guidelines for the usage of antiplatelet agents (APA) in the treatment of ACSs. This paper aims to compare the European Society of Cardiology (ESC) and American Heart Association (ACCF/AHA) guidelines, by summarizing the key points, regarding the usage of oral APA in patients admitted to emergency departments due to ACS.

Keywords: Acute coronary syndrome, recommendations, aspirin, prasugrel, ticagrelor, clopidogrel

Introduction

Basically, acute coronary syndrome (ACS) is caused by the partial or total occlusion of coronary arteries because of platelet activation and aggregation. Hence, one of the major components of ACS treatment is the inhibition of platelet activation and aggregation. Antiplatelet agents (APA) act by inhibiting the cyclooxygenase enzyme (aspirin) and $P2Y_{12}$ receptor. The main features of $P2Y_{12}$ receptor inhibitors are listed in Table 1. New studies performed in recent years have led to the update of guidelines for the usage of APA in the treatment of ACSs. This paper aims to compare the European Society of Cardiology (ESC) (1, 2) and American Heart Association (ACCF/AHA) guidelines (3, 4), by summarizing the key points, regarding the usage of oral APA in patients admitted to emergency departments due to ACS. APA strategies that should be chosen in ST-segment elevation myocardial infarction (STEMI) and non–ST-segment elevation myocardial infarction (NSTEMI)/unstable angina (UA) pectoris cases were discussed under separate headings.

APA Treatment in STEMI

European Society of Cardiology (2) and AHA (4) guidelines on this subject were updated in 2012 and 2013, respectively. Both guidelines recommend the administration of aspirin as the first step (Class I), regardless of the treatment strategy chosen (i.e., fibrinolytic or percutaneous coronary intervention). Both guidelines also agree on the immediate initiation of dual antiplatelet therapy (a $P2Y_{12}$ inhibitor in addition to aspirin) (Class I). Drugs and dosages vary according to the chosen treatment strategy. Thus, the recommendations have been described separately with regard to treatment strategy. An initial aspirin dose of 150–500 mg and clopidogrel dose of 75 mg/day are recommended in patients for whom no reperfusion therapy is planned (2).

If fibrinolytic therapy is planned

Aspirin

ESC (Class IB)

- 150–500 mg oral loading dose (250 mg IV loading dose if oral ingestion is not possible)
- 75–100 mg/day maintenance dose

ACCF/AHA (Class IA)

- 162–325 mg oral loading dose
- 81–325 mg/day maintenance dose

$P2Y_{12}$ Receptor Inhibitors

Both guidelines recommend the use of clopidogrel in patients with STEMI for whom fibrinolytic therapy is planned. However, prasugrel and ticagrelor should not be used in such patients because the use of these agents has not been studied yet as an adjunctive treatment in fibrinolysis (2, 4).

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Table 1. Main features of P2Y12 receptor inhibitors (1)

	Clopidogrel	Prasugrel	Ticagrelor	Cangrelor
Chemical class	Thienopyridine	Thienopyridine	Cyclopentyl-triazolo-pyrimidine	Stabilized ATP analogue
Administration	Oral	Oral	Oral	Intravenous
Dose	300–600 mg bolus, 75 mg/day	60 mg bolus, 10 mg/day	180 mg bolus, 90 mg × 2 /day	30 mcg/kg bolus, 4 mcg/kg/min inf.
Receptor inhibition	Irreversible	Irreversible	Reversible	Reversible
Activation	Prodrug	Prodrug	Direct-acting	Direct-acting
Onset of action	2–6 h	30 min	30 min	2 min
Duration of effect	3–10 days	7–10 days	3–5 days	1–2 h
Withdrawal before surgery	5 days	7 days	5 days	1 h

ESC and ACCF/AHA

Clopidogrel (Class IA)

- 300 mg bolus (if age ≤75 years), 75 mg/day maintenance dose
- If the patient's age is >75 years: 75 mg bolus, 75 mg/day maintenance dose

If percutaneous coronary intervention is planned

Aspirin

ESC (Class IB)

- 150–300 mg oral loading dose (80–150 mg IV loading dose if oral ingestion is not possible)
- 75–100 mg/day maintenance dose

ACCF/AHA

- 162–325 mg bolus (Class IB)
- 81–325 mg/day maintenance (Class IA)

$P2Y_{12}$ Receptor Inhibitors

ESC

- Prasugrel (if there is no history of stroke/transient ischemic attack; age <75 years) (Class IB)
- Ticagrelor (Class IB)
- Clopidogrel: 600 mg bolus, 75 mg/day maintenance (if prasugrel and ticagrelor are contraindicated or not available) (Class IC)

ACCF/AHA

All the three APAs are recommended as Class IB, contrary to European guidelines.

- Clopidogrel: 600 mg bolus, 75 mg/day maintenance (Class IB)
- Prasugrel (Class IB)
- Ticagrelor (Class IB)

If percutaneous coronary intervention is planned in patients who have been given fibrinolytic therapy previously

ESC

Recommends the same $P2Y_{12}$ receptor inhibitor dose as it is used in patients undergoing percutaneous coronary intervention

ACCF/AHA

In patients who have not taken clopidogrel loading dose previously

- Clopidogrel: 300 mg bolus if the patient is admitted within 24 h following fibrinolytic therapy (Class IC)
- Clopidogrel: 600 mg bolus if more than 24 h have passed following fibrinolytic therapy (Class IC)

It is not necessary to repeat the loading dose in patients who have been given a loading dose previously.

APA Treatment in UA/NSTEMI

Aspirin therapy significantly decreases the rates of mortality and reinfarction. Aspirin is recommended in the ESC and ACCF/AHA guidelines as it has been used for patients with STEMI (Class I). Aspirin should be administered as soon as possible following patient admission, if it is not contraindicated. A clopidogrel loading dose followed by maintenance doses should be administered to patients who cannot take aspirin due to hypersensitivity or gastrointestinal intolerance (Class IB). The usage of $P2Y_{12}$ receptor inhibitors together with aspirin provides an additive effect. Dual APA therapy is a Class IA recommendation in the ESC and ACCF/AHA guidelines.

Aspirin

ESC (Class IA)

- 150–300 mg oral loading dose
- 75–100 mg/day maintenance dose

ACCF/AHA (Class IA)

- 162–325 mg oral loading dose (75–162 mg if there is a high risk of hemorrhage)
- 81–162 mg/day maintenance dose

$P2Y_{12}$ Receptor Inhibitors

ESC

- Ticagrelor (Class IA)
- Prasugrel (recommended in patients proceeding to percutaneous coronary intervention) (Class IB)
- Clopidogrel (recommended in patients who cannot receive prasugrel or ticagrelor) (Class IB)

ACCF/AHA

- Ticagrelor (Class IB)
- Clopidogrel (Class IB)
- Ticagrelor in preference to clopidogrel in patients treated with an early invasive or an ischemia-guided strategy (Class IIaB)

- Prasugrel is recommended after the patient is taken to the laboratory, and the coronary anatomy is seen if the patient was not given a $P2Y_{12}$ receptor inhibitor until he is taken to the laboratory (Class IB)

Prasugrel is contraindicated in patients ≥75 years of age or <60 kg of weight or have a history of stroke/transient ischemic attack. Besides, prasugrel should not be used in patients with an unknown coronary anatomy (Class IIIB).

Cangrelor, another $P2Y_{12}$ receptor inhibitor, may be considered in patients who need to undergo percutaneous coronary intervention (Class IIbA). However, cangrelor is not approved by the European Medical Agency or the Federal Drug Administration. Thus, there is no specific recommendation for its usage.

Conclusion

The administration of aspirin as the first step is recommended for all patients with ACS. Since the usage of $P2Y_{12}$ receptor inhibitors together with aspirin provides an additive effect, immediate initiation of dual antiplatelet therapy is recommended, too. A combination of an initial aspirin dose of 150–500 mg and clopidogrel dose of 75 mg/day is recommended in STEMI patients for whom no reperfusion therapy is planned. Clopidogrel is recommended in patients with STEMI for whom fibrinolytic therapy is planned. If percutaneous coronary intervention is planned in a STEMI patient, prasugrel, and ticagrelor are preferred over clopidogrel. A clopidogrel loading dose followed by maintenance doses should be given to patients with UA/NSTEMI who cannot take aspirin due to hypersensitivity or gastrointestinal intolerance. While choosing a $P2Y_{12}$ receptor inhibitor for a patient with UA/NSTEMI, clopidogrel should be used only if the patient cannot take prasugrel or ticagrelor. Prasugrel should not be used in patients with a history of stroke/transient ischemic attacks or ≥75 years of age or <60 kg of weight. It should also be emphasized that prasugrel can only be used after the coronary anatomy is seen.

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Thromboembolism in a Patient with a Left Ventricular Aneurysm

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Abstract

Idiopathic aneurysms involving the left ventricle are considered very rare, and in a majority of instances, they are asymptomatic. In a minority of patients, they may present with cardiac rupture, cardiac tamponade, ventricular arrhythmias, and sudden death. We describe the case of a 21-year-old male patient who was hospitalized for altered mentation and critical left lower limb ischemia because of acute embolic events. Transthoracic echocardiography demonstrated a left ventricular aneurysm and a reduced ejection fraction. Similarly, cardiac computed tomography showed a large left ventricular aneurysm with mobile vegetations representing thrombi. He was managed with therapeutic anticoagulation and recovered uneventfully.
Keywords: Thromboembolism, aneurysm, left ventricle, transthoracic echocardiography

Introduction

A left ventricular aneurysm (LVA) refers to a dyskinetic area of the ventricular wall with a broad neck; this distinguishes it from a pseudoaneurysm (1). Pathologically, the wall of a true LVA is thinned out in comparison to the rest of the wall of the left ventricle and is usually composed of fibrous tissue, necrotic muscle, and sometimes, viable myocardium. LVAs can be congenital or acquired. The congenital variety is potentially lethal and develops as a result of a defective ventricular wall (2). The acquired types can be differentiated into cardiac and non-cardiac types where they are most commonly attributed as a result of coronary artery disease. Other various causes include cardiomyopathy, myocarditis, trauma, cardiac sarcoidosis, or Chagas disease (3). LVAs without an established cause are referred to as idiopathic (4). Favored sites of involvement include the anterior or anterolateral wall territory. Well-documented complications include thrombus formation, cardiac output impairment, aneurysmal rupture, and ventricular arrhythmias (5). Mortality in patients with LVA is up to six-times higher than that in patients without aneurysms (6). Death is often sudden and is most commonly related to the high incidence of ventricular tachyarrhythmias as a result of LVAs (7).

Case Presentation

A 21-years-old male presented to a hospital with a 1-day history of left lower extremity pain, which was followed by an altered mental status occurring in the last 4 h associated with a single episode of non-bilious, non-projectile vomiting. The prior medical, surgical, and family history was unremarkable. Upon presentation, he had a Glasgow Coma Scale (GCS) of 12/15 (E3V3M6), and a physical examination revealed a pale, pulseless, and poikilothermic left lower extremity. His baseline 12-lead electrocardiogram (ECG) demonstrated left ventricular hypertrophy with inverted T waves in leads II, III, aVF, and V5-6 (Figure 1). Laboratory investigations of blood samples were sent, which included a complete blood count; blood glucose, BUN, creatinine, and serum Electrolytes levels; and coagulation profile, and the results were within normal ranges. The chest X-ray was unremarkable. He underwent CT angiography of lower extremities (Figure 2), which revealed occlusion of the left common femoral artery. Immediate anti-coagulation with IV heparin and activated partial thromboplastin time monitoring were started. Because of his altered mentation, MRI of the brain was performed, which demonstrated multiple bilateral infarcts involving the frontal and parietal regions and thalami, suggesting an embolic phenomenon. A transthoracic

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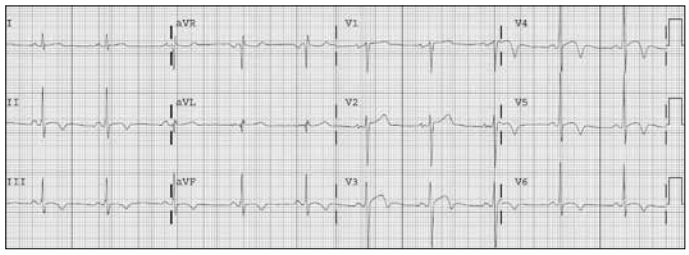

Figure 1. Twelve-lead electrocardiogram demonstrating left ventricular hypertrophy with inverted T waves in leads II, III, aVF, and V5-6

Figure 2. Abrupt cutoff/complete occlusion of the left common femoral artery noted. The left internal iliac artery also appears occluded just distal to its origin

Figure 3. a, b. CT coronary angiogram demonstrating a large left ventricular aneurysm involving the mid-to-distal inferolateral segments and large mobile filamentous structures arising from the junction of normal and aneurysmal wall representing thrombi

echocardiogram was performed, which showed severe global hypokinesia with an ejection fraction of 20% and a mid-to-distal posterolateral wall aneurysm, with suggestion of further advance imaging. Cardiac CT showed a large LVA involving the mid-to-distal inferolateral segments and large mobile filamentous structures arising from the junction of normal and aneurysmal wall, representing thrombi. The coronaries were normal (Figure 3). During the hospital stay, the patient underwent above-knee amputation of the left side. His anti-coagulant was progressively modified to enoxaparin and he was started on beta blockers. He recovered uneventfully and was discharged in a stable condition; he was advised to visit the hospital for regular follow-ups.

Discussion

Left ventricular aneurysms are rare lesions that most commonly occur in the African population (8). They seem to occur as a result of a junctional defect between the cardiac muscle and the fibrous structure of the heart. The anatomy of the lesion can be complicated and has varying sizes, ranging from a few millimeters to several centimeters (9). Generally, a routine physical examination can fail to diagnose LVAs, unless there is calcification involving the aneurysmal wall (10). Progressive aneurysmal growth can cause eventual loss of support to the mitral apparatus, resulting in mitral regurgitation and cardiac failure. Currently, echocardiography serves as the most accurate tool for identification (11). The typical location of the aneurysm and the absence of coronary artery disease on angiography confirm a diagnosis of LVA.

Patients with LVAs can present with a variety of symptoms such as recurrent arterial emboli (12, 13), angina (14), congestive heart failure (15), ventricular tachyarrhythmias, and sudden cardiac death. The treatment and prognosis of LVAs are largely dependent on their size and location and on the degree of valvular involvement, functional class of congestive heart failure, and presence of ventricular tachyarrhythmias. Therefore, treatment can range from antiarrhythmic drugs (16) to VT ablation (17), implantation of an ICD (18), or aneurysmectomy (19). However, there are no long-term follow-up studies comparing the different management strategies.

Conclusion

Left ventricular aneurysms are rare lesions that should be suspected in patients presenting with a clinical history of embolism, ventricular arrhythmias, and no cardiovascular disease. For emergency physicians, this should be considered in the differential diagnosis in patients presenting with multiple thromboembolisms involving different sides. Such patients should undergo echocardiography early in the ED to identify the condition.

Informed Consent: Informed consent was taken from the patient prior to writing the case report.

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A Woman with Mild Pain in the Right Upper Quadrant

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A 69-year-old woman presented to the emergency department (ED) with mild pain in the right upper quadrant. She had a history of similar pain intermittently, but she did not visit the doctor regarding this, until she presented to the ED. Laboratory tests showed that her transaminase and total bilurubin levels were within normal limits. A physical examination revealed an absence of Murphy's sign. Transabdominal sonography revealed the following: multiple septa with a honeycomb appearance at the fundus of the gallbladder, the presence of gallstones in the body, and sludge in multiple septa (Figure 1).

Biliary tract anomalies can be seen in approximately 10% of humans; in such anomalies, the most common variation related to the gallbladder is locational differences (1, 2). Gallbladder agenesis and duplication are rare. A multiseptate gallbladder is a rare congenital malformation of the gallbladder, which is characterised by the bridging of multiple septa in a honeycomb pattern within the gallbladder lumen (2). Multiple septa can lead to bile stasis, thereby influencing bile motility (2, 3). Due to stasis and ineffective motility, cholecystitis and cholelithiasis may occur. On the one hand, asymptomatic patients can get incidentally diagnosed when getting imaged for other reasons; on the other hand, chronic or intermittent gallbladder colic pain may clinically occur because of stasis or cholelithiasis. A multiseptate gallbladder can be associated with hepatobiliary and pancreatic ductal anomalies and can also increase the risk of cancer (4). Ultrasound is an important diagnostic workup tool for detecting a multiseptate gallbladder at the initial stage; magnetic resonance cholangiopancreatography and other imaging modalities can be selectively used for diagnoses (5). Symptomatic patients can be treated by cholecystectomy. At first glance, patients who are independent of biliary symptoms may not need surgical treatment; however, they should be closely followed up.

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Figure 1. Transabdominal sonography showed multiple septa with a honeycomb appearance (black arrows), gallstones (wide arrow), and sludge (star shape) within the honeycomb appearance

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